

# Logic

## 2. Validity

### Argument

- The course will begin with analysis of the third act of the intellect—inference.
  - Inferences are stated in “arguments” or “syllogisms.”
- An argument is defined as “a discourse in which, certain things being asserted [the premises], something else [the conclusion] follows from their being so.”
  - Arguments differ from other kinds of discourse, e.g., descriptions & narratives.
- What makes an argument a good one?
  - A good argument is an argument which gets from truths we know us to other truths.
    - This does not mean merely an argument which is, as a matter of psychological fact, persuasive, but an argument which is, as a matter of logical fact, compelling.
  - Such an argument does what an argument is supposed to do.
  - Three things are needed:
    - True premises
    - A proper form
    - Premises that are in some sense prior to the conclusion

### True Premises

- True premises are those in which there is a correspondence between thought & thing.
- This evaluates the second act of the intellect—judgment.
  - But this is not properly the task of logic.
  - The task of logic is rather the relation between premises & conclusion.

### Proper Form

- Proper form means the proper relation between premises and conclusion
  - Example of an improper relation  
All the students in the German class know what *die Friedhofwärters-witwenundwaisenrentenempfangsbescheinigung* means.  
Mary knows what the word means.  
So, she is in the German class.
  - Example of the proper relation  
All the students in the German class know what the word means.  
John does not know.  
So, he’s not in the class.
  - What *kinds* of proposition are being used as evidence for what?
- This evaluates the third act of the intellect—inference—*formally*.

### Priority

- Premises can be prior to a conclusion in either of two ways
  - by being better known than the conclusion
    1. Mars & other planets which we have observed move in elliptical orbits.
    2. So, all planets do.
  - by stating the cause of the conclusion
    1. All planets move in elliptical orbits.
    2. Mars is a planet.
    3. So, Mars moves in an elliptical orbit.
- If the premises are not prior to the conclusion, the argument is bad:
  1. Dogs have four legs.
  2. So, Dogs have four legs.
- This evaluates the third act of the intellect—inference—*materially*.

### Possible Relations between Premises & Conclusion

- An argument (again) is “a discourse in which, certain things being asserted [the premises], something else [the conclusion] follows from their being so.”
- A valid argument is an argument in which the conclusion follows with necessity from the premises
  - or (equivalently), ... in which the truth of the premises guarantees the truth of the conclusion
  - or ... for which the assertion of the premises and the denial of the conclusion would be a contradiction.
- In other good arguments,
  - the premises give good reasons for believing the conclusion to be true
  - but the conclusion does *not* follow from the premises *as a matter of necessity*.

### The Definition of Validity

- A valid argument form is an argument form in which the truth of the premises guarantees the truth of the conclusion.
- This definition, which is in too general use to be ignored, even for good reason, limits validity to apodictic arguments.
  - Probable reasoning is never, in this technical sense, “valid,” no matter how unreasonable it might be to reject that reasoning.
  - Nevertheless, “invalidity” has such a pejorative sense, that it would be unreasonable to apply it to good probable reasoning.
  - So, probably reasoning will just be evaluated as “good” or “bad.”

### Examples of Validity

- Valid argument
  1. All mammals are vertebrates.
  2. Dogs are mammals.
  3. So, Dogs are vertebrates.
- Here
  - the conclusion follows with necessity from the premises
  - the truth of the premises guarantees the truth of the conclusion
  - the assertion of the premises and the denial of the conclusion would be a contradiction.
- Another good argument
  1. This dog has always been friendly in the past.
  2. So, it will be friendly today.
- Here
  - the conclusion does not follow with necessity from the premises
  - the truth of the premises does not guarantee the truth of the conclusion
  - the assertion of the premises and the denial of the conclusion would not be a contradiction.

### Truth & Validity

- Values & the Acts of the Intellect
  - Concepts [first act of the intellect] may be accurate or not.
  - Judgments [second act of the intellect] are True or False.
  - Inferences [third act of the intellect] are (ideally) Valid or Invalid.

### Logic & Validity: A Modern View

- “Logic is only about validity.”
  - Cf. Pascal Engel, *The Norm of Truth* (p. 1): “By ‘logic’ I shall mean, in the usual sense, the theory of inferences that are valid in virtue of their form.”
  - Real logic is therefore “formal” logic.
- Problems with this view:
  - Whether an argument is a good one is not merely a matter of validity.
    - There are other kinds of good arguments.
    - Validity is not a sufficient criterion of goodness.
      - Soundness requires true premises as well.
      - But there are discourses that are sound, but still not good arguments:
        - » Dogs have four legs. So, Dogs have four legs.
      - A third criterion is needed. Cf. Aristotle’s account of demonstration in the *Posterior Analytics*.  
“A demonstration is a syllogism [valid by Aristotle’s definition of them] whose premises are true, first, immediate, prior to, better known than, and cause of the conclusion.”

### Logic & Validity: The Classical View

- Logic includes more than validity.
  - Logic gives an account of all three acts of the intellect, not only inference.
  - Logic is concerned with definition and proof.

### What is Validity?

- Validity is a property which arguments have in virtue of their *form*.
- Preliminary Distinction—Two aspects of arguments
  - The Content: what the argument is about
  - The Form of an argument

## The Form of an Argument

- The concept of form
  - Examples from elsewhere
    - In mathematics
      - Quadratic equation ( $ax^2+bx+c=0$ )
      - & Its solution  $x_{1,2} = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$
    - In literature
      - Limerick—five lines, *aabba* rhyme scheme, &c.  
A tutor who taught on the flute  
Tried teaching two tooters to toot.  
Said the two to the tutor  
Is it harder to toot or  
To tutor two tooters to toot?
  - Application in logic
    - What *kinds* of proposition are being used as evidence for what?

## The Relevance of Form

Contrast:

- |                       |                       |
|-----------------------|-----------------------|
| 1. All mogs are glip. | 1. All mogs are glip. |
| 2. This is a mog.     | 2. This is glip.      |
| 3. So this is glip.   | 3. So this is a mog.  |

•Which is valid? Why?

## Examples of Form & Content

- Arguments of the same form, but with different content:

1. All cows are mammals.	1. All sharks are boneless.
2. All Holsteins are cows.	2. All grayfish are sharks.
3. So, All Holsteins are mammals.	3. So, All grayfish are boneless.
- Arguments of the same content, but with different form:

1. Some fish in that tank are sharks.	1. All fish in that tank are dogfish.
2. All fish in that tank are dogfish.	2. Some sharks are [fish] in that tank.
3. So, Some dogfish are sharks.	3. So, Some sharks are dogfish.

These arguments make the same point on the basis of the same evidence,  
so it is reasonable to say that they have the same content.  
Their forms, however, are different.