305 Lecture 1.3 - Validity

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Plan for This Lecture

We're discussing the nature of validity.

Associated Reading

forall x, chapter 2, "The Scope of Logic".

Virtues of Arguments

What are some virtues of arguments that you can think of? What makes for a good argument?

Virtues of Arguments

- Premises are true.

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- Premises are true.
- Premises are known.
- Premises are accepted in debate.
- Premises are evidence for the conclusion.
- Premises guarantee the truth of the conclusion.

Logic

To a first approximation, logic is about the last of these virtues.

- Does the truth of a set of premises **guarantee** the truth of the conclusion?

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To a first approximation, logic is about the last of these virtues.

- Does the truth of a set of premises **guarantee** the truth of the conclusion?
- If so, we'll say the argument is **valid**.

Guarantee

What is it for the premises to guarantee truth?

- It's for every **case** where the premises are true to also be a case where the conclusion is true.

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What is it for the premises to guarantee truth?

- It's for every **case** where the premises are true to also be a case where the conclusion is true.
- That's nice, you might say, but what's a case?

Cases

- This, I'm afraid, we're going to leave a little abstract.
- As the book in effect notes, it's probably best to leave this as a placeholder.
- Different notions of what a case are get you different notions of what arguments are valid.
- But you get into deep metaphysical waters here pretty fast; let's retreat to some defintions.

Terminology

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- The conclusion **follows from** the premises.

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When an argument, with premises $P_1, P_2, \ldots, P_n$ and conclusion C is valid, we'll say all the following things are true.

- The premises **entail** the conclusion.
- The conclusion **follows from** the premises.
- The conclusion is a **consequence** of the premises.

Invalid

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- An argument is **invalid** just in case it is not valid.
- That is, it is **invalid** if there is a case where the premises are true and the conclusion false.

Structure

- Logic is largely about validity, about which premises guarantee the truth of which conclusions.
- It's about a special kind of guarantee, one that holds in virtue of the **structure** or **form** of the premises and conclusion.

A Valid Argument

All kangaroos are wise.

Skippy is a kangaroo.

$\therefore$ Skippy is wise.

Non-Structural Guarantee

Compare the Skippy argument with this one.

Today is Wednesday.
∴ Tomorrow is Thursday.

The premise guarantees the truth of the conclusion, but it does so in virtue of meanings of ‘Wednesday’ and ‘Thursday’, not structural features.

Form and Structure

- In the book they talk about the **form** of arguments.
- This is just the same thing as I'm meaning by **structure**.
- There is something about the Skippy example that's special; just the form of the argument shows that it is valid.

Structure and Substitution

When the structure of the argument does the guaranteeing, the guarantee would persist through some substitutions.

All kangaroos are wise.
Skippy is a kangaroo.
∴ Skippy is wise.

Structure and Substitution

When the structure of the argument does the guaranteeing, the guarantee would persist through some substitutions.

All kangaroos are wise.
Lucky is a kangaroo.
∴ Lucky is wise.

Structure and Substitution

When the structure of the argument does the guaranteeing, the guarantee would persist through some substitutions.

All koalas are wise.
Lucky is a koala.
∴ Lucky is wise.

Structure and Substitution

When the structure of the argument does the guaranteeing, the guarantee would persist through some substitutions.

All koalas are dishonest.
Lucky is a koala.
∴ Lucky is dishonest.

Terminology

- We'll say an argument is **valid** just in case the truth of the premises guarantees the truth of the conclusion.
- We'll say an argument is **formally valid**, or occasionally **logically valid**, if it is valid, and any argument with the same form/structure is valid.
- We'll say an argument is **sound** just in case it is valid and has true premises.
- We won't have much interest here in soundness; just in validity.

Structure

- You might have noticed that I never actually defined what it is for two arguments to share a structure.
- I just said that changing a name (consistently throughout the argument), or changing a noun/adjective (consistently) preserves structure.
- But I didn't say more than that.
- Hold that thought! We'll have quite a lot to say as the course goes on about this notion of structure.

Validity

Here are some equivalent ways to define validity.

- An argument is valid if necessarily, when the premises are true, the conclusion is too.
- An argument is valid if it is impossible for the premises to be true and the conclusion to not be true.

We'll use that last formulation a lot.

For Next Time

We'll start our look at the most fundamental kind of logic: propositional logic.