

Philosophy 324A
Philosophy of Logic
2016

Note Four

Formal Representability

1. *Formal languages FL are aurf.*

- artificial
- unmeaningful
- representative
- formal

These are four *separate* properties.

2. *Changing the subject*

- It is a *good* thing or *not*, depending on the nature and properties of the *formal representation relation FR* between an *aurf FL* and a *NL* such as English, and the good that's *intended* to come from it.

3. Representations are *intrinsically distortive*; at least the *various* ones we'll be considering here. Consider now *two kinds* of distortion:

(i) *deliberate and well-intended*

- *abstraction, idealization, simplification and reconceptualization*

ABSTRACTION: e.g. how we get the *number 2* from all those pairs of things

IDEALIZATION: e.g. taking rationality to be *omniference*.

SIMPLIFICATION: making *approximations* to reality – e.g. *DSGE models*.

RECONCEPTUALIZATION: thinking of things as they are in ways that they *aren't* – e.g. thinking of belief-intensities as *real numbers*.

(ii) *careless and/or sneaky*

- calling things by their *wrong names* without notice – e.g. *Tarski's tort*, giving rise to *unnecessary confusion*.

4. *Tarski's tort* – John P. Burgess, "Tarski's tort", in his *Mathematics, Models, and Modality*, chapter 8, CUP 2008.

- IMAGINARY DIALOGUE:

Smart student: Professor, can you please tell me what *semantics* is?

Professor: Yes of course. Semantics is a theory of *meaning* for a language.

SS: Would that be what the semantics of a *formal* language is?

P: Well, of course. That's what semantics is.

SS: But, Professor, aren't formal languages entirely without meaning? Aren't they completely *meaningless*?

5. Functions

A *function* is a *many-one relation* mapping one or more relata to some unique relation.

- *addition* is a function that maps numbers to their *sums* – e.g. $2 + 3 = 5$.
- *negation* is a function which maps a sentence to a sentence just when the truth value of the mapped sentence is *false* when the truth value of the mapping sentence is *true*, or *vice versa*.
- *equivalence* is also a truth-preserving sentential function mapping single sentences to single sentences of the same truth value, as they too map them back in this same way to the originals.
- a *one-to-one* correspondence is a function mapping sets or systems of objects in ways that assign each element of a system to a unique counterpart in the other, as it does in turn. When the elements of each system are *truth-valued*, they stand to their unique counterparts in the other system in a relation of *truth-preserving equivalence*. But it is *not* a condition on one-to-one correspondences that its elements be truth-valued.
- it is possible for a given system to bear a one-to-one correspondence to a *proper subset* of *another* system.
- it is possible for certain proper subsets of a *given* system to stand in a one-to-one correspondence with the proper subsets of *another* system.

6. Fruitful formal representations

- A formal representation relation FR is *fruitful* to the extent that it *preserves* the *properties of interest* attaching to the things *represented*.

