Lecture 5

Part One
Functionalism

Preview

- Functionalism, Functions, Functional Roles
- Machine Tables as Functional Role Characterizations
- Semantics, Syntax, Reducing Semantics to Syntax
- Kinds of Functionalism
- A concern for Machine Functionalism

- Pendulum between dualism and materialism through history
  - Functionalism is an attempt to avoid the pendulum
- Wouldn’t it be nice if there were a theory to capture what is plausible in what went before and avoided some of the problems?
  - Functionalism is an attempt to do so

Functionalism

Mental states are functional role states

What are Functions?

- Think of mathematical functions…
  - +, =, x (mathematical operators)
- Or logical functions…
  - ., v, -> (boolean connectives)
  - Transformations (e.g., modus ponens or disjunction introduction)
- Or syntactic functions
  - Rules of combining words into sentences
  - Transformations (e.g., present -> past tense)

What is a ‘Functional Role’

- In order for x to count as a state of belief x must play the functional role of belief

- Functional roles are abstract, structural, formal, or syntactical properties.

Machine Table

Takes $1 and 50c, coke costs $1.50, gives change

- State 0
  - If $1 is input then goto state 1
  - If 50c is input then goto state 2
- State 1
  - If 50c is input then output coke and goto state 0
  - If $1 is input then output coke and output 50c and goto state 0
- State 2
  - If $1 is input then output coke and goto state 0
  - If 50c is input then goto state 3
- State 3
  - If $1 is input then output coke and output 50c and goto state 0
  - If 50c is input then output coke and goto state 0

Functionalism and Machine Tables

- The machine table specifies different (internal) states of the coke machine (0, 1, 2, and 3)
- Each state is defined by its abstract structural, formal, or syntactic relation to :
  - 1) INPUTS ($1 and 50c)
  - 2) INTERNAL STATES (goto)
  - 3) OUTPUTS (coke, change)
- Functionalism is thus a tripartite (three part) theory

Semantics vs Syntax

- A semantics for a language is the meaning or informational content that the syntax provides rules for manipulating
- A semantics for logic would replace content-less variables (p, q etc) with semantic constants (e.g., Socrates is a man)
- Thus we have a distinction between content / meaning and rules that govern content / meaning transitions

Semantics and Syntax

- One (controversial) thought is that ‘if you take care of the syntax then the semantics will take care of itself’
- The thought here is that semantic content (e.g., ‘dog’) can be characterized syntactically with respect to
  - typical inputs (dogs)
  - inferences it licenses (it is not a cat), the relations it bears to other states (e.g., desires),
  - the output that is produced (e.g., petting)
- We will return when we look at machine intelligence
  - Can programming an appropriate syntax give machines content to think about (genuine understanding)?

Kinds of Functionalism

- How do we specify the functional role of the different kinds of mental states?

- MACHINE FUNCTIONALISM
  - Look to logic / syntactic transformation rules

- ANALYTIC FUNCTIONALISM
  - Common-sense folk psychology

- EMPIRICAL FUNCTIONALISM
  - Look to science (e.g., cognitive psychology, biological psychology)

A Concern

- ‘Chauvinism’ was an objection to the type-type identity theory
  - Beings with different brains or no brains couldn’t have mental states

- ‘Excessive Liberalism’ is an objection to machine functionalism
  - A bucket of river water warming in the sun can probably be described as instantiating any computational description you care to think of

Getting the balance right is tricky…