The rules of definition

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Prefatory remarks

What is the theory of definitions?

- The theory of definitions aims to prescribe and describe *how to define theoretical terms* that may be of interest in a careful philosophical discussion or inquiry.

- The aim is to provide an analysis of *rigorous definitions*, rather than information about the use of terms by a linguistic community.

- It provides a list of rules that indicate the possible flaws of a definition, so it is at once normative and descriptive.
The central question

- Consider the form $A \equiv_{df} B$

- We know that it is not sufficient that $\text{Ext}[A] = \text{Ext}[B]$

- Example: *Humans are featherless bipeds*

- Hence, we know that additional constraints must be added to obtain adequate definitions.

- What are these constraints?
Earlier program: the paradox of analysis

Consider:

\[ x \text{ is a brother} \equiv_{df} x \text{ is a male sibling} \]

Either the definiens has the same meaning as definiendum and the definition is trivial or the meanings are different and the definition is inadequate.

Church advocated a Fregean solution for this “paradox” so maybe we could discuss this puzzle for definitions in intensional logic? (Update: Seems now that this was wrongheaded)
Outlook

- We start with a logical analysis of “…=df…”
- We distinguish between three components in a rule, namely
- A rule is specified by a principle + a criterion + a motivation
- The theory consists in a set of six rules that are jointly sufficient to identify out flawed definitions.
The logical form of a definition is given by the schema $A \overset{\text{df}}{=} B$
where $A$ and $B$ are expressions (terms),
and the sign “... $\overset{\text{df}}{=} ...$” is a non symmetric binary relation
which is read from left to right as
expression $A$ is defined by expression $B$
and from right to left as $B$ is abbreviated as $A$. 
The components of a rule

- **principle**: a general statement stating a norm
  e.g. people should not drive too fast
- **criterion**: what does it mean to verify the norm
  e.g. drivers should respect the speed limits ($x$ km/h)
- **motivation**: why there should be such a rule
  e.g. fast driving $\rightarrow$ higher accident rates
Rule 1: extensionality

- (1.1) Principle: *In a definition, the extension of the definiens must be the identical with the extension of the definiendum.* In short schrift, \( \text{Ext} [A] = \text{Ext} [B] \)

\[ A = B \iff \forall x \ (x \in A \iff x \in B) \]

- (1.2) Criterion: Check whether the following clauses are verified:
  
  (1) \( \forall x \ x \in A \supset x \in B \) and
  
  (2) \( \forall x \ x \in B \supset x \in A \)

  The truth of (1) and (2) ensures that the extensions are equal.

- (1.3) Motivation: A definition that does not respect the first rule would not be a correct *description* of the denotation of the definiendum. This is the requirement of material adequacy of the definition.
Rule 2: essential property

- (2.1) Principle: *The definiens must indicate an essential property of the extension of the definiendum.*

- (2.2) Criterion: A given property is essential for an individual $x$ if that individual possesses that property in each possible world where it exists. Alternately, we could say that a definition is in accordance with the second rule if the equality of extensions formulated in accordance with the first rule expresses a necessary proposition, a truth in each accessible possible world.

- (2.3) Motivation: A definition that does not conform to the second rule is not a good *explanation* of the object denoted by the definiendum.
Rule 3: circularity

- (3.1) Principle: A definition should not be circular.
- (3.2) Criterion: A definition respects the requirement of non-circularity if it is grounded. A sentence is grounded if its truth value can be established regardless of the truth or falsity of other sentences, or if its truth value can be established based on the truth or falsity of other sentences that are grounded. (Kripke 1974)
- (3.3) Motivation: A definition can be interpreted as an instruction on how to recover whatever is defined in primitive terms alone. As we have seen, a viciously circular definition will generate a failed attempt to achieve this task. (Methodology for systems of definitions, methodology of deductive sciences)
Groundedness is introduced by Kripke in connection with his account of paradoxes. In Kripke’s theory, a sentence is grounded if its truth value can be established regardless of the truth or falsity of other sentences, or if its truth value can be established based on the truth or falsity of other sentences that are themselves grounded. See, S. Kripke (1975).

Other notions of groundedness can be formulated. Groundedness is meant to preclude cases of vicious circularity. In a grounded definition, the process of evaluating the definiens terminates. The obvious idea is that the computation of the definition should terminate. This seems to be the essential difficulty with circularity.
Rule 4: negative definitions

- (4.1) Principle: A definition should not be negative if it can be positive.

- (4.2) Criterion: An expression is negative if it contains a negation. (a matter of logical syntax)

- (4.3) Motivation: The rule has no independent motivation in view of the other rules. A negative definition is often too general since the complement of a set with respect to the universe of discourse is usually of fairly large dimension. So, a negative definition would not respect the first rule. Moreover, a negative definition runs contra to the second rule since a negative definition fails to single out a property, hence an essential property of the extension of the definiendum.

Remark: Rule 4 is a derived rule! It would be obeyed by any definitions that respect the other rules of the classical set.
Rule 5: synonymous expressions

(5.1) Principle: A *definition should not be the statement of a simple synonymous expression.*

(5.2) Criterion: The definiens should not consist of a *simple* expression synonymous with the definiendum. It cannot, for instance, be the mere expression of a single synonymous word. It should be complex and provide some indication of “what it means to fall under the concept expressed by the definiendum.”

(5.3) Motivation: Synonyms don’t make good definienses because they neither describe nor explain the nature of what is defined. One horn of the paradox of analysis.
Rule 6: metaphorical language

- (6.1) Principle: A *definition should not be formulated in figurative or obscure language.*
- (6.2) Criterion: The definiens should not be a metaphor or use cryptic language.
- (6.3) Motivation: If definitions are sought for the purpose of conceptual clarification, the language game in which we seek to formulate correct definitions must be as clear, literal and precise as possible.

Grice's maxim of cooperation: "speakers and hearers should make contributions such as it is required, at the stage at which it occurs, by the accepted purpose or direction of the talk exchange in which they are engaged".
Is there a theory?

- We seek a theory that occupies a territory that is neither...

- (1) lexicography: as if correct definitions would simply register the use of competent speakers and the theory of definition blends into an empirical science, namely, field linguistics. nor

- (2) scientific methodologies: as if the sciences would supply their own standards for rigorous definitions and provide their own prescriptions. So either there could be no universal prescriptions for definitions or there would be no stable theory of definition of the type we are seeking.
but contrariwise

- Some version of this informal theory of definition is (or should be) presupposed in any rigorous discourse.
- Philosophical activity can proceed as if these matters were resolved; but eventually the task must be undertaken to make what is presupposed explicit and see what can be formulated precisely.
modern criteria : eliminability and conservativeness

What is the relationship between
the classical rules and the modern requirements
of eliminability and conservativeness?

(Belnap, N. *On rigorous definitions*, *Philosophical studies*, Vol 72, 1993, 115-146)
(7.1) Principle: Any sentence containing the definiendum could be paraphrased by a sentence expressing the same proposition without it.

(7.2) Criterion: If the definition is understood as part of theory, the definition conveys no new knowledge.

(7.3) Motivation: Axiomatic methodology: The content of a theory should be expressed by the axioms, not by definitions. Pragmatic: “A definition should explain all the meaning that the word has.” (Belnap 1993)
conservativeness

- (8.1) Principle: *The introduction of a definition in a theory should yield no consequences that were not already obtainable.*

- (8.2) Criterion: A definition should be noncreative, it should not bring about new consequences to the "theory" in which it is introduced.

- (8.3) Motivation: “A definition should explain *only* the meaning that the word has.” (Belnap 1993). A definition should be merely a convenience: useful but dispensable. No content should be *smuggled in* through definitions for rhetorical purposes.

- The rule originates from methodology, is expressed in logic and admits a pragmatic interpretation: definitions that are not conservative may yield loaded definitions.
Kiitos paljon!