

Empirical Theory Construction and Definition

Elizabeth Steiner Maccia  
The Ohio State University  
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BUREAU OF EDUCATIONAL RESEARCH AND SERVICE / THE OHIO STATE UNIVERSITY



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### Purpose of Definition

The purpose of definition is to make explicit terms or variates. When terms are made explicit, both vagueness and ambiguity are eliminated. Vagueness refers to lack of certainty as to what characteristics of events are included in a given marking off, and ambiguity refers to not being certain which of two or more marking offs is being utilized.

### Components of a Definition

A definition consists of the term or terms to be defined (called 'the definiendum') and the term or terms by means of which the definiendum is defined (called 'the definiens'). The form of a definition is as follows:

\_\_\_\_\_ = Df . . . . .

where ' \_\_\_\_\_ ' will become the definiendum, and ' . . . . . ' the definiens.

### Defining, Empirical Analysis, Meaning Analysis, and Logical Analysis

The processes of defining, empirical analysis, meaning analysis, and logical analysis have been confused due to the distinction between nominal and real definitions. A nominal definition is a stipulation as to the meaning of some term or terms, while a real definition is said not to be a stipulation. An example of a stipulation would be:

- (1) Let the term 'Americium' be synonymous with the phrase 'the element having 95 nuclear protons'



The nominal definition would be:

- (2) Americium =  $\text{df}$  the element having 95 nuclear protons

An example taken as a real definition might be:

- (3)  $x$  is a living organism =  $\text{df}$   $x$  is a discrete mass •  
 $x$  is metabolically active •  $x$  reproduces

In what sense is 3 real? What might be intended is not to assert that ' $x$  is a living organism' has the same meaning as the expression on the right, but rather that really (as a matter of empirical fact) the three conditions are satisfied simultaneously by those and only those objects that are also living. The sentence, then, would have the characteristic of an empirical law (statement relating variates), and would not be a definition. This is a case of empirical analysis not of defining, and its result is a statement relating variates.

What might be intended is to assert that this is the way ' $x$  is a living organism' is really used in the language. That is to say, through meaning analysis the analysandum, the term already in use, is made explicit by means of an analysans, other terms already in use. This conception of a real (true) analytic definition rests upon assumptions of determinacy (the usage is well determined for every user) and uniformity of usage (the usage is the same for every user during the period of time under consideration). Meaning analysis can lead only to mean characterizations of approximately uniform patterns of usage and these mean characterizations may or may not be adequate for theoretical purposes. Meaning analysis per se cannot be substituted for defining. Usually what is necessary is to refine ordinary expressions.

Logical analysis (sometimes called 'explication') starts with meaning analysis, but goes beyond by proposing new and precise meaning. In a sense, in this procedure one moves from the real to the nominal (stipulative). Thus, logical analysis has as its objective, definitions adequate for theoretical purposes.

One may conclude that definitions for theoretical purposes are nominal.

### Criteria for Definition

It is not the case that the following criteria must be met:

1. a definition must be stated in terms of genus proximum and differentia specifica

To state a definition in such terms is to name the class (genus proximum) of which the definiendum is a subclass (species), and the difference which distinguishes it from other subclasses of the class (differentia specifica). For example,

minor = df person less than 21 years of age

where person is the class of which minor is a subclass and less than 21 years of age is the difference that distinguishes minor from other subclasses of persons.

Examples of adequate definitions which are not stated in terms of genus proximum and differentia specifica are contextual definitions. A definition which introduces a symbol *s* by providing synonyms for certain expressions containing *s*, but not for *s* itself,

is called 'a contextual definition'. Consider the following definition:

$x$  is harder than  $y = \text{Df } x \text{ scratches } y, \text{ but } \wedge$   
 $y \text{ does not scratch } x$

which is adequate, but is contextual. Since more theoretically fruitful conceptual apparatus involves not either...or concepts (classificatory concepts), but more or less concepts (relations and functions), contextual definitions not definitions by genus proximum and differentia specifica are more significant for theorizing.

2. a definition must be stated in affirmative terms

An example of an adequate definition which is not stated in affirmative terms is

$x$  is a mother of  $y = \text{Df } x \text{ is a parent of } y \text{ and}$   
 $\text{it is not the case that}$   
 $x \text{ is a father of } y$

It is the case that the following criterion must be met:

univocal eliminability of defined expressions:

For every sentence  $S$  containing defined expressions, there must exist an expansion in primitive terms, i.e. a sentence  $S'$  which satisfies the following conditions: (1)  $S'$  contains no defined term; (2)  $S'$  and  $S$  are deducible from one another with the help of the definition chains for the defined expressions occurring in  $S$ ; (3) if  $S''$  is another sentence which in the sense of (2) is definitionally equivalent to  $S$ , then  $S'$  and  $S''$  are logically deducible from each other and thus logically equivalent.

The meeting of this criterion precludes ambiguity and circularity.