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Semantics and logic

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Introduction

SEMANTICS is the study of meaning and LOGIC deals with meanings in a language system, not with actual behavior. (Hurford, 2007:142) According to Lyons (1977, p. 138) logical semantics is '' the study of meaning with the aid of mathematical logic. This term is generally employed by logicians in its narrow sense (.i.e., to refer to the investigation of meaning, or interpretation of expressions in specially constructed logical system. In this narrower sense, logical semantics may be referred to as ''pure semantics'' according to Carnap (1942, 1956). logical semantics is the study of meaning in formal and natural language using logic as an instrument formal and logical language are both seen as sets of sentences of which the truth conditions have to be specified relative to a model, an abstract representation of the world , we can call it as (truth-conditional semantics). (http://www.glottopedia.org/index.php/Logical semantics).

What is semantics

The study of meaning. In current usage semantics is usually taken to be the study of the language in words rather than the use of language in context, which is seen as the province of pragmatics. On this view semantics deals with lexical words, the relations between them, and how the meanings of words combine to yield the meaning of phrases, and the meanings of phrases combine to yield the meaning of clauses. (Brown & Miller, 2013, p. 399)

What is logic

Logics deal with meanings in a language system, not with actual behavior (Harford, 2007:142) . Logic is the study of reasoning and principles of valid inference . it involves analyzing the arguments to determine whether they valid or not. Many everyday uses of the words logic and logical could be replaced by expressions such as reasonable behavior and reasonable . Logic deals most centrally with PROPOSITIONS , its not apply directly to UTTERANCES (which are instances of behavior) (Harford et al., 2007, p. 142) .

Semantic and logic

Semantics and logic are two interrelated fields that together help us to understand the meaning and validity of language and arguments . According to Lyons (1977, p. 138) logical semantics is '' the study of meaning with the aid of mathematical logic. logical semantics is the study of meaning by using logic as an instrument for formal and logical language are both seen as sets of sentences of which the truth conditions have to be specified relative to a model, we can call it as (truth-conditional semantics).

Logic and language

The terms logic and logical are often used simply to mean 'reasonable' or 'sensible'. But there is a stricter sense of the terms to refer to formal logical systems which have much in common with mathematical systems, and which deal with the validity of inferences. For example: (1-1)

A-All men are mortal.

B-Socrates is a man .

C-Therefore Socrates is mortal .

Here the conclusion (the third sentence) follows from the PREMISES (the first two sentences). The inference is logically valid.

Notice, however, that this would not be true of:

A- All men are mortal .

B-Socrates is a mortal.

C- Therefore Socrates is a man.

A moment's reflection will show that here there is a false conclusion, for Socrates might be the name of my cat.(palmer, 1981:77) .Logic is the science that evaluated arguments. An argument is a group of statements including one or more premises and only one conclusion. Premises are the cluster of propositions that are interlinked to each other that provide support for the conclusion. Conclusion of an argument is the proposition that is affirmed (assured) on the basis of the other propositions of the argument as in:

A- Most actors are celebrities. (premise)

B- Van Damme is an actor. (Premise)

C- Therefore is Van Damme probably a celebrity. (conclusion)

Propositional logic

A PROPOSITION is that part of the meaning of the utterance of a declarative sentence that describes some state of affairs . propositional logic (also known as sentential logic or statement logic) is a branch of logic that deals with propositions which are statement that can be either true or false

e.g (John is either at home or in his office).

John is not at home.

Therefore John is in his office.

We have the two sentences John is in his office and John is at home and the information that (at least) one of these is true. Given that the second is false, we can conclude that the first is true.

Connectives

Sentential (or propositional) connectives are a class of words that are typically used to establish logical connections between simple sentences that are components of compound sentences. A sentential connective is a word or a phrase usually belongs to the traditional grammatical category of conjunction (and, or, therefore, because, as, but, even though and before) the following example show how connectives combine sentences in a logically distinct way as in:

A- John is a carpenter even though he reads fiction

B- . B- John is a carpenter and he reads fiction.

C- John is a carpenter or he reads fiction.

Different logical relations can form the different conclusion from (a) one does not expect a carpenter to read fiction, from (b) and (c) no such conclusion can be drawn (c) does not even imply that both

sentences are true, but at least only one of there is true.(palmer, 1981:180)We use the truth table to represent these operator.

-Negation

we have (not) which suggests negation, here we need only one sentence and its negation which will be represented this way
(¬p). If p is true then not p must be false
A. You are honest (p)
B. You are not honest (¬p)

The table will be like this

p	¬p
T	F
F	T

-Conjunction and compound

Here we have the operator (and) and its Symbol (∧) which implies conjunction & compound. This time we will be working on two sentences represented this way p∧q (which is also sometimes written p&q)

A. It is raining

B. The grass is wet

C. The bank has just robbed and the police are on the way

p	q	p ∧ q
T	T	T
T	F	F
F	T	F
F	F	F

*This proposition is true only if it is said at the time of speaking.

-Disjunction

the operators (or) and (either…or) their symbol is (v) which refers disjunction.
It is divided into two types.

— inclusive disjunction: we have two sentences, one of them could be true or both are true. Example, (It is raining or it is snowing), This statement would be true if it was raining at the time of speaking, or if it was snowing, or if both things (raining and snowing) were happening at the same time.

p	q	p ∨ q
T	T	T
T	F	T
F	T	T
F	F	F

_ exclusive disjunction: we have strict rules this time because it would be true only if just one disjunct is true and it would be false if both disjuncts are false. For example, Either I will go to a movie or I will go to a restaurant .

p	q	p∨e q
T	T	F
T	F	T
F	T	T
F	F	F

-implication (→)

First sentence (p) functions as a sufficient condition for (q) the second sentence. It is like using (if) in English but it doesn't always correspond to our intuitions about if in English. Example, a mother says to her children, 'If it rains this afternoon, I will make you chocolate. Under what circumstances would the mother be considered to have spoken falsely? Lets suppose that it doesn't rain (p is false) whether she will make chocolate or not, no one would accuse her of laying or breaking her promise. If it rains but she doesn't make chocolate that is the only case to consider her statement false.

p	q	p → q
T	T	T
T	F	F
F	T	T
F	F	T

-The equivalence ≡

Here p and q have the same truth value (p ≡ q)

Predicate logic, for example

I wear a hat if it's sunny.

I wear a hat only if it's sunny.

p	q	p≡q
T	T	T
T	F	F
F	T	F
F	F	T

(Saeed,2016:86-90).

Predicate logic

also known as first-order logic, is a formal system in mathematical logic that extends propositional logic by incorporating predicates and quantifiers. It allows for a more nuanced representation of statements about objects and their properties.
R (it is raining)
U (Jone take his umbrella)
and W (John gets wet) .
Suppose further that we have three hypotheses or expression that we assume are true :
r→u (if it rains , then john takes his umbrella)
u→w(if john take an umbrella , then he does not get wet)

r→w (if it does not rain , john does not get wet)
What is true for John is also true for Mary , and Sue ,and so on. (turing , 1963 :230-265).

Intension and extension

Every word that we use has both a thing that it means (an extension, designation or reference) and a way that we express that meaning (an intension, meaning or sense). the morning star and the evening star (Venus) , 15/3 and 5 have the same extensions, but different intensions. When the only thing we want to refer to is important that extension, when on subtitles/closed captions matter the context is called intensional
For example, the intention of "ship" as a true or stable is "vehicle for conveyance on water," whereas its extension embraces such things as cargo ships, passenger ships, battleships, and sailing ships.

True conditional semantics

Truth-conditional semantics is a theory in philosophy and linguistics that explains the meaning of sentences by identifying the conditions under which they would be true. The central idea is that understanding a statement involves understanding what it would take for that statement to hold true in the world. For example, (there is a cat on the mat) is true only if, there is a cat on the mat, Its symbol is written as: "φ" is true if φ. Our clear intuitions about truth-conditional meanings are one of the reasons we concentrate on them. Since our goal is to develop a theory of natural language semantics and test it against empirical evidence, data clarity is important to our work. We are unable to derive much knowledge from data that are not clear.