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Proposition

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Not to be confused with Preposition.

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A **proposition** is a statement that can be either true or false.[1] It is a central concept in the philosophy of language, semantics, logic, and related fields. Propositions are the objects denoted by declarative sentences; for example, "The sky is blue" expresses the proposition that the sky is blue. Unlike sentences, propositions are not linguistic expressions, so the English sentence "Snow is white" and the German "Schnee ist weiß" denote the same proposition. Propositions also serve as the objects of belief and other propositional attitudes, such as when someone believes that the sky is blue.

Formally, propositions are often modeled as functions which map a possible world to a truth value. For instance, the proposition that the sky is blue can be modeled as a function which would return the truth value T if given the actual world as input, but would return F if given some alternate world where the sky is green. However, a number of alternative formalizations have been proposed, notably the **structured propositions** view.

Propositions have played a large role throughout the history of logic, linguistics, philosophy of language, and related disciplines. Some researchers have doubted whether a consistent definition of propositionhood is possible, David Lewis even remarking that "the conception we associate with the word 'proposition' may be something of a jumble of conflicting desiderata". The term is often used broadly and has been used to refer to various related concepts.

Relation to the mind [edit]

In relation to the mind, propositions are discussed primarily as they fit into propositional attitudes. Propositional attitudes are simply attitudes characteristic of folk psychology (belief, desire, etc.) that one can take toward a proposition (e.g. 'it is raining,' 'snow is white,' etc.). In English, propositions usually follow folk psychological attitudes by a "that clause" (e.g. "Jane believes *that* it is raining"). In philosophy of mind and psychology, mental states are often taken to primarily consist in propositional attitudes. The propositions are usually said to be the "mental content" of the attitude. For example, if Jane has a mental state of believing that it is raining, her mental content is the proposition 'it is raining.' Furthermore, since such mental states are *about* something (namely, propositions), they are said to be intentional mental states.

Explaining the relation of propositions to the mind is especially difficult for non-mentalist views of propositions, such as those of the logical positivists and Russell described above, and Gottlob Frege's view that propositions are Platonist entities, that is, existing in an abstract, non-physical realm.[2] So some recent views of propositions have taken them to be mental. Although propositions cannot be particular thoughts since those are not shareable, they could be types of cognitive events[3] or properties of thoughts (which could be the same across different thinkers).[4]

Philosophical debates surrounding propositions as they relate to propositional attitudes have also recently centered on whether they are internal or external to the agent, or whether they are mind-dependent or mind-independent entities. For more, see the entry on internalism and externalism in philosophy of mind.

In modern logic [edit]

In modern logic, propositions are standardly understood semantically as indicator functions that take a possible world and return a truth value. For example, the proposition that the sky is blue could be represented as a function f such that $f(w)=T$ for every world w, if any, where the sky is blue, and $f(v)=F$ for every world v, if any, where it is not. A proposition can be modeled equivalently with the inverse image of T under the indicator function, which is sometimes called the *characteristic set* of the proposition. For instance, if w and w' are the only worlds in which the sky is blue, the proposition that the sky is blue could be modeled as the set $\{w, w'\}$.[5][6][7][8]

Numerous refinements and alternative notions of proposition-hood have been proposed including inquisitive propositions and **structured propositions**.[9][6] Propositions are called **structured propositions** if they have constituents, in some broad sense.[10][11] Assuming a structured view of propositions, one can distinguish between **singular propositions** (also **Russellian propositions**, named after Bertrand Russell) which are about a particular individual, **general propositions**, which are not about any particular individual, and **particularized propositions**, which are about a particular individual but do not contain that individual as a constituent.[6]

Objections to propositions [edit]

Attempts to provide a workable definition of proposition include the following:

> Two meaningful declarative sentences express the same proposition, if and only if they mean the same thing.[citation needed]

which defines *proposition* in terms of synonymity. For example, "Snow is white" (in English) and "Schnee ist weiß" (in German) are different sentences, but they say the same thing, so they express the same proposition. Another definition of proposition is:

> Two meaningful declarative sentence-tokens express the same proposition, if and only if they mean the same thing.[citation needed]

The above definitions can result in two identical sentences/sentence-tokens appearing to have the same meaning, and thus expressing the same proposition and yet having different truth-values, as in "I am Spartacus" said by Spartacus and said by John Smith, and "It is Wednesday" said on a Wednesday and on a Thursday. These examples reflect the problem of ambiguity in common language, resulting in a mistaken equivalence of the statements. "I am Spartacus" spoken by Spartacus is the declaration that the individual speaking is called Spartacus and it is true. When spoken by John Smith, it is a declaration about a different speaker and it is false. The term "I" means different things, so "I am Spartacus" means different things.

A related problem is when identical sentences have the same truth-value, yet express different propositions. The sentence "I am a philosopher" could have been spoken by both Socrates and Plato. In both instances, the statement is true, but means something different.

These problems are addressed in predicate logic by using a variable for the problematic term, so that "X is a philosopher" can have Socrates or Plato substituted for X, illustrating that "Socrates is a philosopher" and "Plato is a philosopher" are different propositions. Similarly, "I am Spartacus" becomes "X is Spartacus", where X is replaced with terms representing the individuals Spartacus and John Smith.

In other words, the example problems can be averted if sentences are formulated with precision such that their terms have unambiguous meanings.

A number of philosophers and linguists claim that all definitions of a proposition are too vague to be useful. For them, it is just a misleading concept that should be removed from philosophy and semantics. W. V. Quine, who granted the existence of sets in mathematics,[12] maintained that the indeterminacy of translation prevented any meaningful discussion of propositions, and that they should be discarded in favor of sentences.[13]

Statements [edit]

In logic and semantics, the term **statement** is variously understood to mean either:

1. a meaningful declarative sentence that is true or false,[citation needed] or
2. a proposition. Which is the *assertion* that is made by (i.e., the meaning of) a true or false declarative sentence.[14][15]

In the latter case, a (declarative) sentence is just one way of expressing an underlying statement. A statement is what a sentence means, it is the notion or idea that a sentence expresses, i.e., what it represents. For example, it could be said that "2 + 2 = 4" and "two plus two equals four" are two different sentences expressing the same statement. As another example, consider that the Arabic numeral '7', the Roman numeral 'VII', and the English word 'seven' are all distinct from the underlying *number*.[16]

Philosopher of language Peter Strawson (1919–2006) advocated the use of the term "statement" in sense (2) in preference to proposition. Strawson used the term "statement" to make the point that two declarative sentences can make the same statement if they say the same thing in different ways. Thus, in the usage advocated by Strawson, "All men are mortal." and "Every man is mortal." are two different sentences that make the same statement.

In either case, a statement is viewed as a truth bearer.

Examples of sentences that are (or make) true statements:

- "Socrates is a man."
- "A triangle has three sides."
- "Madrid is the capital of Spain."

Examples of sentences that are also statements, even though they aren't true:

- "All toasters are made of solid gold."
- "Two plus two equals five."

Examples of sentences that are not (or do not make) statements:

1. "Who are you?"
2. "Run!"
3. "Greenness perambulates."
4. "I had one grunch but the eggplant over there."
5. "King Charles III is wise."
6. "Broccoli tastes good."
7. "Pegasus exists."

The first two examples are not declarative sentences and therefore are not (or do not make) statements. The third and fourth are declarative sentences but, lacking meaning, are neither true nor false and therefore are not (or do not make) statements. The fifth and sixth examples are meaningful declarative sentences, but are not statements but rather matters of opinion or taste. Whether or not the sentence "Pegasus exists." is a statement is a subject of debate among philosophers. Bertrand Russell held that it is a (false) statement.[citation needed] Strawson held it is not a statement at all.[citation needed]

As an abstract entity [edit]

In some treatments, "statement" is introduced in order to distinguish a sentence from its informational content. A statement is regarded as the information content of an information-bearing sentence. Thus, a sentence is related to the statement it bears like a numeral to the number it refers to. Statements are abstract logical entities, while sentences are grammatical entities.[16][17]

Historical usage [edit]

By Aristotle [edit]

In Aristotelian logic a proposition was defined as a particular kind of sentence (a declarative sentence) that affirms or denies a predicate of a subject, optionally with the help of a copula.[18] Aristotelian propositions take forms like "All men are mortal" and "Socrates is a man."

Aristotelian logic identifies a categorical proposition as a sentence which affirms or denies a predicate of a subject, optionally with the help of a copula. An Aristotelian proposition may take the form of "All men are mortal" or "Socrates is a man." In the first example, the subject is "men", predicate is "mortal" and copula is "are", while in the second example, the subject is "Socrates", the predicate is "a man" and copula is "is".[18]

By the logical positivists [edit]

Often, propositions are related to closed formulae (or logical sentence) to distinguish them from what is expressed by an open formula. In this sense, propositions are "statements" that are truth-bearers. This conception of a proposition was supported by the philosophical school of logical positivism.

Some philosophers argue that some (or all) kinds of speech or actions besides the declarative ones also have propositional content. For example, yes–no questions present propositions, being inquiries into the truth value of them. On the other hand, some signs can be declarative assertions of propositions, without forming a sentence nor even being linguistic (e.g. traffic signs convey definite meaning which is either true or false).

Propositions are also spoken of as the content of beliefs and similar intentional attitudes, such as desires, preferences, and hopes. For example, "I desire *that I have a new car*", or "I wonder *whether it will snow*" (or, whether it is the case that "it will snow"). Desire, belief, doubt, and so on, are thus called propositional attitudes when they take this sort of content.[10]

By Russell [edit]

Bertrand Russell held that propositions were structured entities with objects and properties as constituents. One important difference between Ludwig Wittgenstein's view (according to which a proposition is the set of possible worlds/states of affairs in which it is true) is that on the Russellian account, two propositions that are true in all the same states of affairs can still be differentiated. For instance, the proposition "two plus two equals four" is distinct on a Russellian account from the proposition "three plus three equals six". If propositions are sets of possible worlds, however, then all mathematical truths (and all other necessary truths) are the same set (the set of all possible worlds).[citation needed]

See also [edit]

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- Belief
  - Doxastic logic
- Categorical proposition
- Concept
- Probabilistic proposition
- Sentence (mathematical logic)
- Truthbearer - statements

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14. ^ Millican (1994) "Central to the [Strawsonian tradition] is the distinction between a *sentence* and *what is said* by a sentence - Strawson initially called the latter a *use* of a sentence, and sometimes a *proposition*, but his most frequent term for *what is said*, which Wolfram consistently adopts, is the *statement* expressed."
15. ^ Rouse (2005) "A statement is defined as that which is *expressible* by a *sentence*, and is either true or false... A statement is a more abstract entity than even a sentence type. It is not identical with the sentence used to express it... [That is,] different sentences can be used to express the same statement."
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