The Logico-philosophical Tradition

Pieter A. M. Seuren

The Oxford Handbook of the History of Linguistics
Edited by Keith Allan

Print Publication Date: Mar 2013 Subject: Linguistics, Historical Linguistics
Online Publication Date: Jul 2013 DOI: 10.1093/oxfordhb/9780199585847.013.0024

Abstract and Keywords

The Aristotelian notion of proposition laid the foundations for subsequent theories of grammar and of truth and falsity. Eubulides (ca 405–330 BCE), one of the founders of the Stoa, anticipated most of the main themes of twentieth-century semantics (the Liar paradox, intensional contexts, presuppositions, vagueness). During the Middle Ages, logic was studied intensively, but labored under metaphysical and religious a-prioris. Subsequent centuries were relatively poor in this regard, until the twentieth century, when logic turned mathematical and clashed with natural intuitions. The main aim was to model natural language after the ideal of logical language, without much regard for the ecology of natural language or for its structural and other formal properties. Pragmatics was introduced to bridge the gap. Some now advocate a more integrated ecological perspective, deriving the logic of language from the meanings of the logical operators in natural language.

Keywords: definite descriptions, discourse, paradoxes, presupposition, proposition, speculative grammar, supposition theory

23.1 The Proposition

HISTORY is not about the past but about understanding the present. This applies in particular to modern formal semantics, which cannot be understood without going back to at least its Aristotelian roots. Latching on to Plato's teaching, Aristotle developed his theory of truth as correspondence, basing it on his notion of *proposition*.

The notion of proposition has had many interpretations and definitions through the centuries (Nuchelmans 1973, 1980, 1983). Let us briefly summarize its origin. We find the *notion* of proposition, but not the *term*, first discussed at large in Plato's dialogue *The Sophist*, where Plato (427–347 BCE) discusses the notion of truth as correspondence between, on the one hand, the (possibly linguistically expressed) thought content of mentally assigning a property to an entity and, on the other, that which 'is'—the metaphysical notions of 'being' and 'not-being' taking up a large part of the text. This thought content then becomes by its very nature the bearer of a truth value, true or not true (false).

Aristotle (384–322 BCE), in his *On Interpretation* (*Int*) and *Prior Analytics* (*PrAn*), takes up some issues dealt with in Plato's *Sophist*, in particular the notion of the mental act of assigning a property to an entity, for which he then thinks up the Greek term *prótasis*, literally 'the act of putting forward,' or *propositio* in Latin. The term *prótasis* occurs for the first time on page one of Aristotle's *Prior Analytics* (written after *Int*), where it is defined as 'an affirmative or negative expression (lógos) that says something of something' (*PrAn* 24a16). Aristotle wavers between a verbal and a cognitive notion of proposition, but he always takes the proposition to be the primary bearer of a truth (p. 538) value. In his *Metaphysics* (1027b25) he clearly opts for the cognitive notion: 'For falsity and truth are not properties of actual things in the world…but properties of thought.'

So let us define a *proposition* as *the mental act of assigning a property to one or more entities*. A proposition differs from a sentence in that (a) a proposition is a *hic et nunc*, unique occurrence, whereas a sentence is a type-level linguistic unit, realizable as an utterance, and (b) a sentence type, as well as its expression as a token utterance, is more than a mere proposition, in that a sentence (utterance) must of necessity incorporate a proposition into a larger whole, the *intent*, in which a proposition is subordinated to a *speech act operator* of assertion, question, command, wish, etc. (Seuren 2009: ch. 4). This latter point was well known to Aristotle, who wrote (still using the term *lógos* instead of *proposition*) (*Int* 17a2–4):

> But not every *lógos* is an assertion. Only a *lógos* that has the quality of being true or false is an assertion. But this is not always the case. For example, a *lógos* can be a wish, in which case it is neither true nor false. We will disregard the others, as

> they are more properly dealt with in the study of rhetoric or poetry. Our present investigation concerns assertions only.

This is why the logico-philosophical tradition has, rightly or wrongly, always concentrated exclusively on the propositional aspect of grammar and semantics, leaving the speech act factor out of account. Since Austin (1962), speech act theory has been considered part of *pragmatics* rather than *semantics*, but this is justifiable only if semantics is equated with logic, or considered to be part of it, as is usually done in possible world semantics (PWS) introduced by Richard Montague during the 1960s. To the extent that semantics is not equated with the strictly formal logical framework of PWS but is more oriented towards the cognitive and socially binding aspects of sentences as linguistic types instantiated by utterance tokens, speech act theory comes into view as a separate chapter in semantics. In the present historical survey of the logico-philosophical tradition, speech act theory has no place, since it is not or hardly part of the logical or the philosophical tradition in language studies.[1] Speech act theory was first developed by philosophers (Lewis 1946, Austin 1962), but was soon appropriated by pragmaticists (Levinson 1983).

A proposition thus consists of an entity representation and a property representation. The former mentally represents that to which the property is assigned, Aristotle's *hypokeímenon*, Latinized as *subiectum* ‘that which lies underneath’; the latter (p. 539) represents the property assigned, Aristotle's *katēgoroúmenon*, Latinized as *praedicatum*.[2] The notion of proposition thus defined is of central importance to the study of language because the whole conglomerate of interrelated systems forming human natural language, what the French call *le langage*, is in the service of allowing speakers to commit themselves socially with regard to assigning properties to entities (of whatever nature) and expressing such assignments in some perceptible symbolic form under a speech act or commitment operator. If one does not understand the propositional principle, one will be unable to understand language.

23.2 Discourse and Topic-comment Modulation (TCM)

What was never realized until the 1850s is that the mental act of assigning a property to an entity is by definition context-bound, since the entity is selected from what the current thought is about and a new utterance tends to be presented as an answer to a question that has arisen, explicitly or implicitly, from what has been said before (Seuren 1985: 295–304). In modern terms: the entity forms the *topic* and the property assigned is the *comment*, and sentences are taken to have, besides a grammatically defined *syntactic structure*, a discourse-driven *topic-comment modulation* or TCM, usually but far from always expressed through intonational means.

Unaware of this discourse parameter, the first grammarians, working in ancient Alexandria from the third century BCE onward, transferred the Aristotelian *logico-philosophical* analysis of the proposition into subject and predicate to the *grammatical* analysis of sentences. From then on, a sentence was considered to consist of a *subject* constituent and a *predicate* constituent, the former referring to a world entity (of whatever nature or complexity), the latter to the property mentally assigned. The predicate constituent could encompass subsidiary terms such as a direct or indirect or prepositional object. With Greek and Latin as model languages, the subject term was thus definable as the term occurring in the nominative case, the direct object as the term occurring in the accusative case, etc.

(p. 540) During the 1850s, a number of (mostly German) scholars realized, however, that this grammatical analysis did not match the Aristotelian definition of the proposition. Steinthal (1823–99) formulated the problem thus (1860: 101–2):[3]

> One should not be misled by the similarity of the terms. Both logic and grammar speak of subject and predicate, but only rarely do the logician and the grammarian speak of the same word as either the subject or the predicate. […] Consider the sentence *Coffee grows in Africa.* There can be no doubt where the grammarian will locate subject and predicate. But the logician? I do not think the logician could say anything but that 'Africa' contains the concept that should be connected with 'coffee grows.' Logically one should say, therefore, 'the growth of coffee is in Africa.'

Steinthal and his fellow scholars, such as Georg von der Gabelentz (1840–1893) or Wilhelm Meyer-Lübke (1861–1936), still failed to isolate the discourse parameter, but this was soon remedied by scholars like Philipp Wegener (1848–1916), Theodor Lipps (1851–1914), and above all the Cambridge scholar George Stout (1860–1944), who posited that a new assertive utterance tends to be meant and interpreted as an answer to an implicit or explicit question that has arisen in the current discourse.

Between roughly 1870 and 1930, the question of the incongruity of syntactic structure on the one hand and the original (discourse-bound) Aristotelian analysis of a proposition into subject and predicate on the other dominated the debate in the theory of language (as opposed to the theory of language change). Distinctions were made between linguistic, psychological, and logical subject and predicate, but no clear conclusions could be drawn owing to the imprecision of the concepts at issue. Around 1930, the debate petered out for lack of clarity and the general attention shifted to matters to do with formal linguistic structure rather than meaning.

Nowadays, some eighty years later, the nineteenth-century subject–predicate debate has been largely forgotten. Only in the Prague School of linguistics, led by Peter Sgall and Eva Hajičová, has knowledge of this tradition been preserved, partly because of the political and cultural isolation of eastern Europe between 1939 and 1990. It was here that

term pairs were developed like *theme* and *rheme*, or, more commonly, *topic* (*focus*) and *comment*.

Around 1970, the issue was revived in the West in the guise of pragmatically oriented research into what is called *information structure*, a term meant to cover what is considered to be the vague border area of pragmatics and grammar, closely connected with TCM. Yet this revival took place without any awareness of the history preceding it and of its basic significance for the theory of language. The Aristotelian and nineteenth-century background to the notions of TCM and information structure has been completely forgotten. This has contributed to a state of affairs in which key notions such as TCM, topic, focus, comment are not properly defined. Knowledge of history would show the practitioners that *topic* and *comment* correspond to Aristotle's (p. 541) *subject* and *predicate*, respectively, though these terms are now reserved for standard grammatical analysis.

23.3 Eubulides and the Paradoxes

During Aristotle's own lifetime, his truth theory was attacked by the philosopher Eubulides (*c.*405–330 BCE), who came from Miletus in Asia Minor but taught philosophy in Megara, not far from Athens (Seuren 2005). He is one of the founders of the highly influential school of the Stoa, which lasted until the very end of antiquity, running over into early Christianity. He is the almost forgotten author of four so-called ‘paradoxes,’ known under different names, according to the sources, but reducible to the following four: *the Liar, Electra, Sorites*, and *the Horns*. They were all meant to show the inadequacy of Aristotle's theory of truth as correspondence. Aristotle, who was a bitter personal enemy of Eubulides, had no answer to these paradoxes and managed, using his enormous influence, to make the world believe that they were flippant pranks, of no value to philosophy. But for the Liar paradox, which was popular in medieval philosophy as an ‘insoluble’ and was rediscovered in modern logic but without attribution to Eubulides, the Eubulidean paradoxes have been largely forgotten or at best survive as mere anecdotal lore, even though they define central elements in twentieth-century semantics. William and Martha Kneale, in their book on the history of logic, express their doubt that

> Eubulides produced them in an entirely pointless way, as the tradition suggests. He must surely have been trying to illustrate some theses of Megarian philosophy, though it may be impossible for us to reconstruct the debates in which he introduced them. (Kneale and Kneale 1962: 114–15)

Yet despite the Kneales, the name Eubulides rings no bell among modern philosophers, logicians or semanticists.

The paradoxes are all illustrated with the help of one or more counterexamples to Aristotle's truth theory, which states (a) that every proposition is by nature either true or false, without any possible middle or any possible third truth value, and (b) that a proposition is true just in case it 'corresponds' with reality and false otherwise. Let us look at each paradox in turn.

The Liar paradox consists in the fact that a well-formed sentence like (1a), which refers to itself, must be false if true and true if false:

(1)

a. This very sentence is false.
b. This very sentence is numbered (1b).

Modern logicians say that (1a) violates the principle that object language and metalanguage must not be mixed in one sentence. Since the phrase *this very sentence* belongs to the metalanguage, (1a) is illicit. However, natural language is replete with such (p. 542) 'violations' without any semantic difficulties: a sentence like (1b) also violates the principle but does not produce a paradox. The logicians' answer thus amounts to overkill.

The proper answer seems to be that (1a) is *uninterpretable* because it does not express a proposition: the predicate *false* in (1a) requires as part of its meaning description a proposition as reference object of its subject term, but the phrase *this very sentence*, when taken to refer to the proposition underlying (1a), leads to an infinite regress, so that no proposition comes about for lack of subject-term reference. In (1b), by contrast, the phrase *this very sentence* refers to the linguistic product, which is there, can be referred to and be numbered. This makes (1b) fully interpretable and, in fact, true.

The Electra paradox is illustrated by a story. On his return home from the Trojan war, Agamemnon, king of Mycenae, is killed by his wife Clytemnestra, who has set up house with a lover. This puts the son Orestes in a moral predicament, because he has to avenge his father's death by killing the murderer. But that means killing his mother, which again is a horrible crime. To make up his mind, he leaves Mycenae for a while and decides that he must kill his mother. He returns to the palace in Mycenae, disguised as a beggar. His sister Electra does not recognize him, and puts him in the kitchen with something to eat. Eubulides, the storyteller, now asks whether, given that (2a) is true, (2b) is also true:

(2)

a. Electra knows that the beggar is in the kitchen.
b. Electra knows that her brother Orestes is in the kitchen.

According to Aristotle, (2b) must be true if (2a) is true, because the terms *the beggar* and *Orestes* refer to the same person and truth and falsity depend on how the world is, not on the words used to establish reference—the principle of *substitution salva veritate* (SSV)

formulated by Leibniz around 1700. Yet natural intuition says that, in the story, (2a) is true but (2b) false. This problem, which was rediscovered by Frege in his famous 1892 article without his knowing about Eubulides, has been the central factor in the coming about of present-day formal semantics, whose practitioners are still, on the whole, unaware of the fact that Frege's discovery in 1892 was preceded by Eubulides' Electra paradox.

The Sorites paradox, or paradox of the heap (Greek *sōrós* 'heap'), is an attack on Aristotelian bivalence and a defence of 'vague' or 'fuzzy' truth values: one grain of sand does not make a heap; nor do two or three, but ten thousand do. Where exactly does it begin to be true that there is a heap of sand? Observations such as these have had wide repercussions in modern semantics and logic (for fuzzy logic see Zadeh 1975), even though the name Eubulides is hardly ever mentioned in this context.

The paradox of the horns lies at the basis of presupposition theory. It is illustrated by the following fallacy:

> **(3)** What you haven't lost you still have. You haven't lost your horns. *Ergo*: you still have horns.
> **(p. 543)**

If this were a correct argument, every person would 'have horns,' that is, be a cuckold.[4] Aristotle had no answer other than saying that this was silly. Modern presupposition theory (Seuren 2010: 311–77) tells us that *You have lost your horns* presupposes that the addressee had horns before and that its negation *You haven't lost your horns*, with unmarked *n't*, preserves this presupposition. Hence the, so far correct, conclusion. But the Greek (and English) negation word also occurs in a non-default, marked meaning that cancels any presuppositions. In this interpretation of *n't*, the conclusion does not follow. Since most people do not 'have horns' in whatever sense, they escape the conclusion by appealing to the non-default sense of the negation word. But this solution of the paradox involves two negations, giving distinct truth conditions and hence a non-bivalent logic.

Again, most modern presupposition theorists, including Frege (1892) and Strawson (1950, 1952, 1954, 1964), were or are unaware of the Eubulidean origin of presupposition theory. During the Middle Ages, presuppositions were not distinguished as a category in their own right but were treated under the rubric 'exponibles' (Seuren 2010: 314–16), in that a sentence like *I have lost my keys* is to be 'exposed' into the two sentences *I had my keys before* (the presupposition) and *I do not have my keys now* (the assertion). By that time, knowledge of Eubulides had already been lost.

The four Eubulidean paradoxes thus summarize the main problem areas that gave rise to modern formal semantics.

23.4 The Correspondence Question

23.4.1 The Correspondence Question in the Middle Ages

When Aristotle says that a proposition is true just in case it corresponds with reality and false otherwise, the question arises of what is meant by the term ‘reality’ and what sort of mapping is intended by the term ‘correspond.’ The question of what constitutes reality has, of course, occupied metaphysics through the centuries. The question of correspondence, by contrast, became a central element in the philosophy of language around 1250 when, after a millennium of near-oblivion, Aristotle's texts became fully accessible to the Latin-speaking world first through translations into Latin from the Arabic and later through direct translations from the Greek originals.

The first and highly influential answer was given by the essentialist ‘modist’ school of philosophy, which flourished from *c.*1250 to *c.*1320, when it was superseded by the new nominalists (Bursill-Hall 1972, Covington 1982, Seuren 1998: 31–9). The modists held that there is, in principle, a one-to-one correspondence between the *ontological categories* of the world or ‘modes of being,’ the *cognitive categories* of the mind or ‘modes (p. 544) of understanding,’ and the *grammatical categories* of language (i.e. Latin) or ‘modes of signifying.’ This way, the correspondence relations between mind, language, and the world seem simple and transparent. But the doctrine required the acceptance of an extremely rich ontology comprising not only individual entities such as Socrates or the Eiffel Tower, but also universals such as mankind, complex entities such as the military-industrial complex or the average citizen, and even changeable entities such as my phone number or the prime minister, and, in order to accommodate predicate logic, quantified entities such as all humans or some children.

The modists produced a philosophical theory of grammar, *Grammatica Speculativa*, best known through the *Grammatica Speculativa* by Thomas of Erfurt, written around 1300 (Bursill-Hall 1972, Pinborg 1967).[5] To a large extent, speculative grammar was an effort at constructing an ontology that would fit the patterns of the Latin language and was supposed to be reflected as such in the mind. Language was thus regarded as the empirical key to the more remote areas of ontology and cognition.

The essentialist modist ontology, however, was too luxuriant for the taste of the nominalists, such as the Englishmen Walter Burleigh (*c.*1275–after 1344) or William of Ockham (1288–1347), or the Frenchman Jean Buridan (*c.*1300–after 1358). They insisted on a minimalist ontology without universals as ontological entities, and attributed the complexities of reference to a processing machinery in the mind. They thus created a complex theory of reference (‘suppositio’),[6] according to which a term can do its reference work in a wide variety of ways.

It is important to realize that, for them, both the subject and the predicate count as ‘terms,’ so that predicates may ‘refer’ (‘supposit’) the way subject terms do, though, in principle, predicates ‘refer’ to entities of a higher order than the subject terms: predicates always ‘refer’ to classes.[7]

One thus finds a large number of, sometimes quite baroque, classifications or taxonomies of modes of reference. One such taxonomy, among many competing ones, is presented by Ockham in his *Summa Logicae* (in the example sentences, the terms at issue are printed in italics):

(p. 545) Suppositio:

I personalis
A *discreta* (*That man* is walking)
B *communis* (*A man* is a human being)
1 *determinata* (*Some man* is a human being)
2 *confusa*
a *confusa tantum* (Every man is *a human being*)
b *confusa distributiva* (*Every man* is a human being)
i *mobilis* (*Every man* is a human being)
ii *immobilis* (*Every man except Jim* is a human being)

II *simplex* (*Man* is a species)
III *materialis* (‘*Table*’ is a noun)

The first thing that strikes one is that quantified terms are taken to ‘refer.’ Modern quantification theory has shown, to the satisfaction of most, that they do not, and that the logical and semantic analysis of quantification requires an analytical machinery with quantifiers and variables. Given such a machinery, the question of modes of reference is simplified considerably—though far from solved—in that the entire complex class of *suppositio personalis communis* (IB) can be dispensed with.

A complicating factor is, moreover, that Latin, unlike the modern European languages, has no articles: no form distinction is made between a noun phrase meaning ‘the man’ and one meaning ‘a man’ or ‘some man’ or simply ‘man.’ This linguistic idiosyncrasy has unnecessarily confused and complicated medieval theories of reference, while at the same time calling for such a theory.

One important reason for the new nominalists to lay the burden of explanation on the mind rather than on a luxuriant ontology was drawn from the fact that modes of reference are not automatically selected given the type of sentence (proposition) a reference is made in. Speakers and listeners *choose* a mode of reference through an act of interpretation. Mostly, the choice will be determined by the desire to let the sentence (proposition) be true. But an inappropriate selection may be made when a speaker intends the utterance to be a pun or a joke. In fact, as shown in De Rijk (1967), *fallacies* often arise through a silent change of the reference mode. Thus, when I say ‘*Table*’ *is a*

noun and *I bought a table*, the conclusion that *I bought a noun* is fallacious. Likewise, when I say *Some man is brave* and *Man is a species*, the conclusion that *A species is brave* is fallacious. It is clear that such reference mode changes are *mental* occurrences and cannot be explained in a modist framework, where the mind is a passive reflection of reality.

Nominalism has, on the whole, won the day. Modern philosophers are keen on minimizing their ontologies and attributing the complexities of language to the workings of the mind.

(p. 546) 23.4.2 The Correspondence Question in the Twentieth Century

Between, say, 1600 and 1900, nothing much happened regarding the question of the correspondence relation between what is thought or said on the one hand and what is the case on the other. Since 1900, however, there has been a revival of the medieval debate, though no longer from the perspective of the triangular relation between language, thought, and reality but rather from the more restricted binary perspective of language and reality, the mind being largely ignored. The key names are Gottlob Frege (1848–1925) and Bertrand Russell (1872–1970).

23.4.2.1 Frege

For Frege, the cognizing mind was still an important factor, though he felt uneasy about it. Language was but a sideshow for him; his real interest lying in the development of formal arithmetic. Yet his contributions to natural language semantics have been monumental, for three main reasons: (a) his development of a formal logical language, (b) his (re)discovery of the blocking of SSV (*substitution salva veritate*) in intensional (partiscient) contexts, and (c) his broaching of the question of presuppositions. We deal with (a) and (b) here; the question of presuppositions is discussed in §23.5.

Frege developed a formal language to make explicit the logical processes of the properly thinking mind, and by implication their reflexes as found in natural language. The formal language he developed for this purpose, his *Begriffsschrift* (Frege 1879), was a direct inspiration for Whitehead and Russell in their *Principia*. The foremost innovation in these formal languages is the fact that they distinguish a new category of logical constants, the quantifiers.

Then, Frege presented some problems regarding SSV. SSV had been formulated by Leibniz (1646–1716) in various writings. Give or take a few textual variations, SSV runs as follows:

> Eadem sunt quae sibi mutuo substitui possunt salva veritate. [Entities are identical when terms referring to them can be mutually substituted without change in truth value.]

If truth consists in a correspondence between what is said and what is the case, as Aristotle wants it, it should make no difference whether term *a* or term *b* is used to refer to a given entity, as long as the entity is successfully referred to. Thus, whether I say (4a) or (4b), if the one is true the other is too and likewise for when they are false, precisely because the terms *morning star* and *evening star* refer to the same object, the planet Venus:

(4)

a. The morning star is inhabited.
b. The evening star is inhabited.

Frege spotted two problems with regard to SSV. The first is to do with true identity statements such as (5):

(p. 547) (5) The morning star is the evening star.

Substitution gives either *The morning star is the morning star* or *The evening star is the evening star*. But these two sentences are necessarily true, while (5) is only contingently true and may express an empirical discovery. This points to a complication.

The second problem, which restates Eubulides's Electra paradox, is even more unsettling. It consists in the fact that in clauses embedded under verbs with epistemic content (one may speak of *partiscient verbs*), SSV no longer holds. Thus (6a) may be true while (6b) is false and vice versa, depending on whether Harry does or does not know that the two 'stars' are the same object:

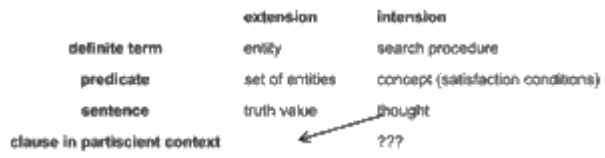
(6)

a. Harry believes that the morning star is inhabited.
b. Harry believes that the evening star is inhabited.

This sentence pair corresponds directly with (2) above. Clauses under partiscient verbs such as *believe* or *know* are said to be 'intensional contexts' ('partiscient contexts' is a better term), and SSV fails to apply in such contexts. The question is: why? The whole framework of twentieth-century possible world semantics (PWS) was set up to answer this question.

Frege's answer was that one must distinguish between the 'extension' (*Bedeutung* reference) and the 'intension' (*Sinn* sense) of (a) terms, (b) predicates and (c) sentences, as in Fig. 23.1. He thus extended the traditional distinction between extension and intension from predicates to definite terms and sentences (propositions). Traditionally, a predicate's extension was (is) the class of entities it can be truthfully applied to, and its intension the conditions to be fulfilled for the predicate to yield truth when applied to, an entity. Frege extended this distinction to definite terms, whose extension he took to be

the entity referred to and whose intension the procedure followed by the mind to arrive at the intended reference object, the mental 'search procedure,' and to sentences, whose extension he took to be their truth value and whose intension the underlying thought.



Click to view larger

Fig. 23.1 Frege's position with regard to extensions and intensions

In addition, he posited the special category of clauses in intensional (partiscient) contexts, whose extension Frege took to be identical with the intension the clause would have if used independently: its underlying thought. The intension of a clause in a partiscient context Frege left undefined. Now, since *The morning star is inhabited* and *The evening star is inhabited* have different intensions (underlying thoughts), they have (p. 548) different extensions when used as subordinate clauses under a partiscient predicate, as in (6a, b). Therefore, these clauses, and *a fortiori* their subject terms, do not allow for SSV.

This analysis has been criticized mainly for two reasons. First, twentieth-century semanticists objected to the 'idealist' notions of thought and concept, replacing these with quasi-extensional notions of possible worlds and truth conditions defined in terms of them. Then, to take truth values as the extension of sentences goes against the nominalist minimalist conception of the world: truth values are not elements in the world we speak about. Frege, who was not a nominalist, could put up with this, but later generations of nominalist semanticists objected. The remedy proposed in PWS was to consider a proposition *P* to be the set of possible worlds in which *P* is true. However, as is widely known (Dowty et al. 1981: 175), this answer runs foul of the objection that sentence pairs like (7a,b) or (8a,b), whose embedded clauses express necessary truths, as in (7), or necessary falsities, as in (8), must be equivalent pairs because the extensions of their embedded propositions equal the set of all possible worlds (for (7)) or the null set of possible worlds (for (8)):

(7)

a. Harry believes that all bachelors are unmarried.
b. Harry believes that the square root of 144 is 12.

(8)

a. Harry believes that all bachelors are married.
b. Harry believes that the square root of 144 is 13.

This, of course, is not so in natural language: the (a)-sentences may be true and the (b)-sentences false or vice versa. This problem, known as the problem of propositional attitudes, has not been solved so far, which means that the possible world approach may have to be rejected *in toto*.

23.4.2.2 Russell

Russell never said anything much on the question of SSV in partiscient contexts. He concentrated on the question of reference to nonexisting entities, as in his famous sentence (9a), which he analysed as (9b) (Russell 1905):

(9)

a. The present king of France is bald.
b. ∃x [KoF(x) ∧ Bald(x) ∧ ∀y [KoF(y) → x = y]]
(there is an *x* such that *x* is king of France and *x* is bald and for all *y*, if *y* is king of France, *y* is identical with *x*)

France having no king, now or in 1905, the question is: is (9a) true or false? The question is justified, as Aristotle requires every sentence (proposition) to be either true or false and nothing else (strict bivalence). Russell answered that it is false, because there is no *x* such that *x* is king of France, which suffices for the falsity of (9b). Flushed with enthusiasm over the discovery of the quantifiers and preparing for the seminal work *Principia Mathematica* he was to write a few years later together with Alfred North Whitehead (1861–1941), he dissolved the definite referring phrase *the present king* *(p. 549)* *of France* into a construction with quantifiers, dismissing the normal syntactic analysis of (9a) into a referring subject term and a predicate.

This analysis acquired the grand name of Russell's Theory of Descriptions. It quickly became standardly accepted among philosophers of language and formally inclined semanticists, despite the weighty arguments against it. One objection is that it eliminates the reference function of definite noun phrases—a central function of natural language. (9b) reads as *Some king of France is bald and identical to all kings of France*—not at all what (9a) means. Then, Russell's analysis fails to account for the maintenance of reference through texts, as appears from (10):

(10) Harry believes that I bought a Ferrari and he fears that the Ferrari will be stolen.

If analysed according to Russell, there are at least two possibilities, depending on where the existential quantifier is placed. (For the sake of brevity, the uniqueness clause ‘for all *y*, if *y* is king of France, *y* is identical with *x*’ is omitted in (11a,b). The argument remains unaffected when it is properly incorporated.) In (11a), one quantifier stands over the whole sentence; in (11b), the quantifier occurs twice. Both violate the true meaning of the sentence. (10) is not about a specific really existing Ferrari, which is what (11a) says, nor does it say that Harry believes that I bought a Ferrari and fears that a Ferrari will be stolen, which is what (11b) says:

(11)

a. ∃x [Ferrari(x) ∧ Believe(H, Buy(I,x) ∧ Fear(H, Be Stolen(x)]
(there is an *x* such that (*x* is a Ferrari and Harry believes that I bought *x* and Harry fears that *x* will be stolen))
b. Believe(H, ∃x [Ferrari(x) ∧ Buy(I,x)] ∧ Fear(H, ∃x [Ferrari(x) ∧ Be Stolen(x)]
(Harry believes that there is an *x* such that (*x* is a Ferrari and I bought *x*) and Harry fears that there is an *x* such that (*x* is a Ferrari and *x* will be stolen))

Further play with quantifier positions is possible, but no quantifier placement will render the meaning of (10).

A similar problem arises with sentences of the following types:

(12)

a. If Pedro has a donkey, he feeds it.
b. All farmers who have a donkey feed it.
c. If a farmer has a donkey, he feeds it.

Such sentences are called ‘donkey sentences’ because of their appearance in Peter Geach's influential book (1962).[8] Again, the problem is one of quantifier scope and variable binding. The overall conclusion must be that the celebrated Russellian formal language of predicate calculus is inadequate for the rendering of the meanings of natural language sentences.

(p. 550) It took the best part of the twentieth century for the world of philosophy and semantics to realize that Russell's theory is untenable as an analysis of definite descriptions. The problem of donkey sentences made Hans Kamp and others realize that sentences have inbuilt devices that link them up with preceding discourse. In order to account for donkey sentences, he developed his Discourse Representation Theory or DRT (Kamp 1981, Kamp and Reyle 1993). DRT is one of a series of approaches, each positing a memory store for the representation of propositional content built up during previous discourse. Each new utterance is considered to be an addition, in the technical jargon an ‘increment,’ to the store as built up thus far. Apart from its failure to integrate cognition into natural language semantics (owing to its lasting allegiance to PWS), the main shortcoming of DRT is its failure to deal with presuppositions, without which no discourse-oriented semantic theory can be adequate (see §23.5).[9]

23.4.2.3 Model-theoretic or Possible World Semantics

Model-theoretic or possible world semantics (PWS) came about as an attempt to apply to natural language the method of model-theoretic semantics developed for logical languages around the middle of the twentieth century. The main figure, in this context, is Richard Montague (1930–71), who developed an ingenious method to reduce surface sentences of English to equivalent formulae in the Russellian language of predicate

calculus and hence to compute their truth values for any set of worlds given term denotations and predicate extensions in each world (Montague 1970, 1973). In this method, the meaning of a sentence equals the proposition expressed by it, which again equals the set of possible worlds in which it receives the value ‘true.’

During the 1970s and after, this theory was thought to constitute a breakthrough in the semantics of natural language and gained widespread popularity, mainly because of what was seen as its mathematical sophistication. Now, in the early twenty-first century, the initial enthusiam has been subsided somewhat, mainly because it is becoming ever more apparent that this theory, though mathematically sophisticated, fails to account for the cognitive element in natural language, without which any semantic theory will fail. We have already seen, in §23.4.2.1, that PWS is essentially unable to solve the problem of propositional attitudes, a failure that is entirely due to the programme of reducing all cognitive content to sets of possible worlds and the inability to account for cognitive content in terms of cognitive content—that is, of virtual reality.

The philosophical and psychological foundations of PWS are shaky, as it considers the mind to be a mere reflection of the world and not an autonomous processing device whose output is input to language and language use. Being a branch of mathematics and not of linguistics, it professes the ideal of full formalization, not realizing that most elements of cognition are too complex to allow for formalization, given the techniques (p. 551) available. The result is a stilted and artificial theory that may be useful in the context of computer languages but has little relevance for the semantics of natural language.

23.5 The Discourse Factor

That language is made for coherent texts and not just for isolated sentences is an insight that broke through relatively late. It has already been shown that the Aristotelian notion of proposition was, unbeknownst to Aristotle and the many generations after him, a discourse notion, closer to topic-comment than to syntactic subject-predicate structure. We have also seen that, around 1850, this led to a dilemma of two-tiered structure but that the analytical means available were insufficient, with the result that the subject–predicate debate petered out around 1930, though it came to life again around 1970, in the form of pragmatically oriented studies in ‘information structure’—by which time the Aristotelian past had been totally forgotten.

During the same period it began to be clear that the discourse factor is essential from a semantic point of view. Natural language sentences are tailored to fit into certain contexts and not others: a sentence S imposes conditions on any preceding discourse **D** for **D** to remain coherent after the incrementation of S. This is manifest in three ways: (a)

topic-comment modulation (TCM); (b) maintenance of reference relations (anaphora); (c) presuppositions.

TCM has been discussed above. It must be added that, contrary to widespread belief, TCM is of a semantic, not just a pragmatic, nature. This appears from the fact that TCM differences in clauses embedded under an emotive factive verb such as *be angry* or *be surprised* or *resent*, as in (13), or in factive clauses under *because* or *although*, as in (14), give rise to different truth conditions (see Seuren 2010: 406–8):

(13)

a. Joan resented that HARRY had sold the car.
(Joan resented that it was HARRY who had sold the car.)
b. Joan resented that Harry had sold THE CAR.
(Joan resented that it was THE CAR that Harry had sold.)

(14)

a. Joan left the firm because HARRY had sold the car.
(Joan left the firm because it was HARRY who had sold the car.)
b. Joan left the firm because Harry had sold THE CAR.
(Joan left the firm because it was THE CAR that Harry had sold.)

Clearly, (13a) may be true while (13b) is false, and vice versa, and likewise for (14a) and (14b). In emotive and motivational factive contexts, therefore, substitution of TCM makes a truth-conditional, and thus a semantic difference. This fact is as relevant as Frege's discovery that SSV in partiscient contexts makes a truth-conditional, and thus a semantic, difference. Yet it has not so far been incorporated into semantic theory.

(p. 552) As regards maintenance of reference or (external) anaphora relations, it has been shown above that the standard Russellian language of predicate calculus is unable to account for these phenomena, unless this language allows for definite terms (including definite pronouns). And even then it will not be up to this task. The reason is that maintenance of reference through texts cannot be captured in terms of a fully formalized system, since available world knowledge, as well as default and probability factors, play an important role. A sentence like (15), for example, is understood in such a way that the person referred to by the phrase *the 56-year-old bachelor* is identical with the person referred to by the phrase *a Swiss banker*:

(15) Last night a Swiss banker was arrested at Heathrow Airport. The 56-year-old bachelor declared that he had come to Britain to kidnap the Queen.

Had the subject term of the second sentence been, for example, *the driver*, the sentence would have been uninterpretable, not for any formally definable reason but simply

because our default knowledge makes no connection between a banker and a driver in the context given.

Like speech act theory, presupposition theory started late, around 1950. Both arose in the context of the so-called ordinary language philosophy practised at Oxford between 1945 and 1970. Attention was drawn to presuppositions in Frege's seminal (1892) article, but it was not until Strawson (1950) that modern presupposition theory came off the ground. Strawson rejected Russell's Theory of Descriptions and proposed that referring phrases should be recognised as such. For him, the existence entailment of a sentence like (9a) or (16a) is a matter of presupposition, not of existential quantification. For Strawson, an uttered sentence lacks a truth value when its presupposition is not satisfied. That this is not so follows from the examples given below.

Presuppositions are lexically defined coherence conditions of sentences on proper discourses (see Seuren 2010: ch. 10). Examples are given in (16), where the presupposition follows the » symbol.

(16)

a. John is bald » John exists
b. John is divorced. » John was married before.
c. John knows that it is raining » It is raining.
d. Only John laughed. » John laughed.

One empirical test is that a presupposition followed by its carrier sentence after *and* or *but* gives a coherent bit of text:

(17)

a. John exists and he is bald.
b. John was married before and/but he is divorced.
c. It is raining and John knows it is.
d. John laughed and only John laughed.

Another empirical test is that the presupposition is preserved under ordinary default negation:

(p. 553) (18)

a. John is not bald. » John exists
b. John is not divorced. » John was married before.
c. John doesn't know that it is raining » It is raining.
d. Not only John laughed. » John laughed.

Yet in most but not all cases it is possible to insert an emphatic negation that cancels the presupposition and thus allows for the addition of the negated presupposition. This is possible for (18a,b,c), but not for (18d)—the reason being that the negation in (18d) occurs in a noncanonical position (before *only*):

(19)

a. John is NÓT bald. He does not exist!
b. John is NÓT divorced. He never got married!
c. John does NÓT know that it is raining. It ISN'T raining!
d. *NÓT only John laughed.

The fact that grammatical and lexical conditions may prevent the occurrence of the presupposition-cancelling negation, as in (19d) and many other cases (Seuren 2010: 334–42), shows that this is not a matter of pragmatics, as maintained, for example, in Wilson (1975), but that there are two logically distinct negations: an unmarked default negation and a marked metalinguistic, discourse-correcting negation. It follows that the logic of language must be taken to be trivalent, with two distinct kinds of falsity: 'minimal falsity' for cases where the presupposition remains intact and 'radical falsity' for cases where the presupposition is cancelled—a conclusion independently reached in Dummett (1973: 425–6). The resulting trivalent logic is elaborated in Seuren (2010: 354–72).

Like anaphora, presupposition does not allow for a fully formalized treatment, nor are they pragmatic consequences following from the use of sentences. This appears from the fact that presuppositions are retrievable from their carrier sentences regardless of context, which shows that they are part of the language system.[10] It follows that presuppositions can be inserted *post hoc*, a phenomenon usually called 'accommodation.' For example, when I utter (20a), I need not first say (20b), even though (20b) is a presupposition of (20a). The reason is that our world knowledge tells us that it is normal for people to have a nose:

(20)

a. John broke his nose.
b. John had a nose.

When such a post hoc accommodation is not supported by world or contextual knowledge, the text becomes incoherent. Thus, accommodation of (21b) is blocked (the text becomes incoherent) unless the context has explained what John is doing with a wheel:

(21)

a. John broke his wheel.
b. John had a wheel.

Accommodation is a powerful means made available by natural language to economize on the effort of speaking: presuppositions need not be explicitly uttered, as they are (p. 554) retrievable from their carrier sentences. But this implies that presupposition theory, like anaphora theory, is not fully formalizable. It is probably for this reason that 'standard' formal semantics, which insists on full formalization, has always preferred to leave anaphora and presupposition phenomena to pragmatics and has always resisted analyses that treat them as semantic phenomena.

Notes:

(1) There is a small body of PWS literature on speech acts, notably Hintikka (1974), Hamblin (1976, 1987), Karttunen (1977), Stalnaker (1978), Hoepelman (1981), and Groenendijk and Stokhof (1984), but this literature focuses on the delimitation of sets of possible worlds in the context of information state modelling—a formal specification of what is asserted, asked, ordered, etc., and thus a study of propositions rather than of speech acts. Little or nothing, however, is said about what making an assertion, issuing an order, or asking a question actually amounts to in terms of socially binding human interaction and relations.

(2) Note that the term *hypokeímenon* (*subiectum*) denotes the entity to which the subject term refers, while the *katēgoroúmenon* (*praedicatum*) is a constituent in a proposition, *casu quo* a sentence. Aristotle had no term for the sentence constituent we now call the *subject* (*term*). During the Middle Ages, the term *subiectum* came to be used mainly for the propositional or grammatical constituent, while the term *suppositum* 'that which has been placed below,' an alternative Latin translation of the Greek *hypokeímenon*, was mainly used for the world entity that the subject term refers to. Yet sometimes the terms *subiectum* and *suppositum* were used the opposite way. For a more detailed exposition see Seuren (1998: 121–3, 2009: 85–94).

(3) For a survey and ample discussion of the question of the incongruity between the Aristotelian notion of the proposition and syntactic structure, see Seuren (1998: 120–33, 2010: 378–91).

(4) It is safe to assume that Eubulides, who was versed in rhetoric and always up for a good laugh, chose this undignified example to irritate the extremely formal and prudish Aristotle.

(5) The term 'speculative' should not be taken in its modern sense. It just means 'theoretical' (Covington 1982: 47–8). The link with Latin *speculum* 'mirror' (Lyons 1968: 15), as reality was seen as being 'mirrored' in language and cognition, seems to lack justification.

(6) The term *suppositio* 'placing below' in the general sense of 'relation between a term and an entity'—roughly equivalent to what we call 'reference,' or perhaps rather 'extension,' today—probably originates from the term *suppositum* 'that which has been

placed below' or 'reference object' described in n. 2 above. Geach's conjecture that *suppositio* was 'apparently in origin a legal term meaning "going proxy for"' (Geach 1962: 56) may well apply to a later reinterpretation of the verb *supponere* (*supposit* in the modern medievalist English jargon). Ockham writes (*Summa Logicae* 193; translation mine): 'We use the word *suppositio* in the sense of "the placing <of a term> for something else," by which is meant that when a term in a proposition "stands" for something in the sense that it is used […] for something that verifies its use, it takes the place of that something.'

(7) For this *term logic* (logica terminorum), see the masterful study De Rijk (1967).

(8) What is not generally known is that Geach took his donkey examples from Walter Burleigh, who, in his *De puritate artis logicae* of *c.*1328, gave examples like (Burleigh 1988: 92) *Omnis homo habens asinum videt illum* ('Every man owning a donkey sees it'). See Seuren (2010: 300–301) for further comment.

(9) The attempt made by Van der Sandt (1992) to equate presuppositions with anaphora must be considered futile (for a detailed critique see Seuren 2010: 372–7).

(10) See also §26.4.2 below.

Pieter A. M. Seuren

Pieter A. M. Seuren started out as a classicist (Latin, Greek, Ancient History) at Amsterdam University, graduating in 1958. After a brief period as a teacher of classical languages, he entered Academe, as an assistant in various Dutch universities. In 1967 he became Lecturer in Linguistics at the University of Cambridge, and in 1970 at Oxford University. From 1974 till 1999 he was professor of Philosophy of Language and Theoretical Linguistics at the Radboud University of Nijmegen. Since his retirement in 1999 he has been a research fellow at the Max Planck Institute for Psycholinguistics at Nijmegen.