Topic and Comment

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0. Proem

This study on topic and comment is my offering for Winfred Lehmann's festschrift on occasion of his 82nd birthday. Although Winfred lives in a rather different area of our great discipline from the one I inhabit, I have always considered him and his work with the greatest respect, and am proud to say that he has always looked upon me and my work with interest. Our personal acquaintance goes back to October 1970, when I visited the Austin campus for a week, having only heard of the great Lehmann but not knowing him personally. One morning I happened to be talking with the late Leroy Baker, another gentleman of American linguistics, now regretfully no longer with us, on a point of Latin phonology. Winfred heard us and stood in the doorway of Leroy's office, listening. Noticing his presence I asked him if he had any knowledge of Latin. His and Leroy's polite shudder made me realize my mistake: this was, of course, il Lehmann! Since then we have been good friends, exchanging publications and him visiting me at Oxford once, together with Mrs. Lehmann. I like to think that the basis of our mutual appreciation lies in our common dedication to independence and quality in the face of an outside world that often fails to understand.

The main purpose of this paper is to sketch the history of the topic-comment distinction and to present the outline of a possible semantic account of this distinction, and of the closely related cleft and pseudocleft constructions — the history because it is largely forgotten, the semantic account because none has been presented so far, topic and comment being still widely considered pragmatic phenomena. The semantic account proposed here is a new and, in my own perception, important element in my work on discourse semantics. How important it really is, is not for me to judge, but I wish my readers to know that my offering of this result on this occasion is a measure of my appreciation for the gentleman linguist we are honoring.

1 Some history

1.1 Aristotle's division between subject and predicate

Although this paper is about topic and comment we start with Aristotle's distinction of subject and predicate. The essentials of the

topic-comment distinction cannot be adequately understood unless one goes back to the origin, which is Aristotle's analysis of the proposition as consisting of a subject and a predicate.

One of Aristotle's great contributions to western culture has been his *mise-au-point* of the notion of truth. Before him, and still during his lifetime, the Sophists had been preaching that truth is largely of one's own making: If everyone believes you, you speak the truth. So to achieve truth all you have to do is sway opinions, and you need have no further qualms. This was, of course, grist to the mill of young aspiring politicians in the Greek city-democracies, where decisions were taken by majority vote in the people's gathering. And it was mainly by teaching such young politicians that the Sophists made their living.

Some, however, felt that this could not be the right conception of truth. Towards the end of the fifth century BC the Athenian Socrates, together with his follower Plato, began to reject the sophistic notion of truth and tried to replace it with one that was more satisfactory from a moral point of view. Plato made a last and major attempt in his dialogue *The Sophist*, but it was his student, the Macedonian Aristotle (384-322), who clinched the issue for the centuries to come. Early on in his *Metaphysics* Aristotle gives the Sophists short shrift:

> We begin by defining truth and falsity. Falsity consists in saying of that which is that it is not, or of that which is not that it is. Truth consists in saying of that which is that it is, or of that which is not that it is not (Aristotle, *Metaphysics* $1011^{b}26$).

Later on in the same book we read:

> When do we and when do we not have truth and falsity? We must be clear about the meaning of these terms. You are not white *because* we truly think you are, but it is because you are white that we speak the truth when we say that you are (Aristotle, *Metaphysics* $1051^{b}16$).

So, for Aristotle, truth and falsity depend on what is the case, not on what we say or think is the case. Only if what we say or think corresponds with what is actually the case do we get truth. Otherwise we get falsity. This concept of truth is known as the *correspondence view of truth*, and it has dominated philosophy ever since it was presented, even though subjectivistic notions of truth have never been completely eliminated.

It is not my purpose here to subject the Aristotelian notion of truth to a detailed critique. What is relevant here is that the correspondence view cannot be upheld without some form of analysis,

on two levels. First there has to be an analysis of what is *said* (or *thought*). Secondly, an *ontological* analysis is needed of *what is the case*, i.e. of situations in the world. Only when these two forms of analysis are given can one speak of a correspondence relation between what is said (or thought) on the one hand, and what is the case on the other.

Aristotle knew this, and he did indeed make a beginning.[1] His ontological analysis consists of a distinction between entities and properties. For him, entities can be not only individual but also complex entities — a much debated and badly vexed question in the philosophy of all ages since Aristotle, about which more below. The properties are distinguished and denoted by categories or predicates. To bring order in the wild and chaotic welter of properties he proposed, first in his *Categories* and then in his *Metaphysics*, the famous but not always well-understood theory of *categories*. This is a system of ten categories: *substance, quantity, quality, relation, place, time, position, state, action* and *affection*. To Aristotle, these represent the most primitive, axiomatic, non-composite predicates applicable to the (or any) world. They thus reflect Aristotle's ontology to the extent that any reality can be known and thought or spoken about. It is important to realize that these categories are *predicates*, i.e. instruments of thought or of its verbal expression. That Aristotle presents his ontology in terms of predicates is due to the simple but profound reason that no reality can be known other than through the channels of perception and thought given to us by nature.

The analysis of what is said (or thought) follows suit. The unit of analysis here is what Aristotle called the *proposition* (Greek *prótasis*). A proposition is the bearer of a truth value, the ultimate verbal or cognitive structure that is true or false depending on what is the case in the outside world. And a proposition, whether as a thought structure or as its verbal expression, consists of a predicate (which is always analyzable in terms of the ten axiomatic categories presented above) and a part that denotes (refers to) a given entity. The predicate is a linguistic element and it denotes or, if you like, refers to, a property. If the entity in question really has that property, the proposition is true; otherwise it is false.

The terms used by Aristotle for 'predicate' are *katēgoróumenon*, *katēgórēma* and *katēgoría*, all three derived from the Greek verb *katēgóreisthai* which means 'to brand something as something'. The first and second of these terms were translated into Latin as *praedicatum*, our *predicate*. The third remained Greek and is our word *category*, with a different but related meaning. The predicate is thus

[1] A much more sophisticated attempt has been made in this century by logicians who developed logical model-theory as a way of defining the correspondence relation between what is said and what is the case.

'that which is said of something'. The corresponding property (provided it is not a necessary property) Aristotle called *symbebēkós*, *accidens* in Medieval Latin.

The entity about which something is said is called the *hypokeímenon* ('the underlying thing'). This term was translated into Latin variously as *subiectum* and *suppositum* (and occasionally as *substratum*). Nowadays we use the term *subject* for that part of the sentence that refers to the entity in question, not for the entity itself as Aristotle did. Aristotle himself had no special term for what we call the subject of a sentence. By the end of the Middle Ages, the term *suppositum* (and also *substratum*) was normally used for the entity to which the predicate was meant to apply, i.e. the Aristotelian *hypokeímenon*. Thus, as one sees in fig. 1, for Aristotle a proposition consists of, as we say, a subject term followed by a predicate. The subject term symbolizes an entity; the predicate symbolizes a property. If the entity actually has the property symbolized by the predicate, the proposition is true. Otherwise it is false.

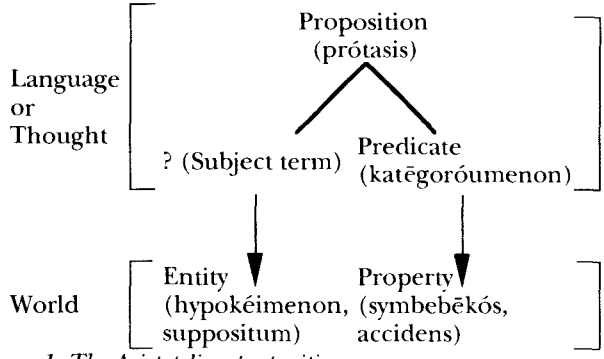

Figure 1. The Aristotelian proposition

1.2 The ontological problem: Medieval supposition theory

This analysis inevitably led to an ontological issue. Many sentences express propositions that assign a property not to an individual entity but to something which is composed of or involves individuals, sometimes in a very far-fetched way. Consider the following examples:

(1)a. The cat is a vertebrate
b. Tea originates from China
c. The average cabdriver is 37 years old
d. All cabdrivers speak English
e. Many cabdrivers speak English
f. Hardly any cabdriver speaks English
g. Her death surprised me
h. His sorrow was unbearable

i. The end was quick
j. The thieving went on and on

All these sentences contain a subject term which, in Aristotle's analysis, should refer to an entity. But what sort of entity is 'the average cabdriver', or 'the cat', or 'the thieving', etc.? According to many philosophers, any world populated by such entities will choke, and few philosophers are prepared to defend an ontology that contains all presumed 'entities' that come about as a result of linguistic processes of subject term formation.

In practice, a split developed between the *essentialists* who defend the reality of complex entities corresponding to general notions, like species ('cat', 'tea') or abstractions ('the true', 'the beautiful'), and the *nominalists* who keep their register of beings down to the minimum of just individual entities.[2] For the extreme nominalist Quine, the essentialists' "overpopulated universe is in many ways unlovely. It offends the aesthetic sense of us who have a taste for desert landscapes" (Quine 1953:4).

This debate raged with particular force during the later Middle Ages. After ± 1350, the mostly British nominalists took the lead and drove out the essentialists who had been dominant till then. Unable to deny the realities of language, the nominalists were forced to develop a theory to relate subject terms of sentences to the ultimate individual entities populating their world. This research program is known as *supposition theory*, 'suppositio' being the term for reference. It consisted of extremely elaborate classifications of ways of reference: personal, simple, material, discrete, communal, determined, confused, distributive, mobile, immobile, etc. (De Rijk 1967), each meant to account for a class of difficult cases, including those that involve quantification, such as (1d-f) above. Nowadays, these Medieval theories are largely forgotten. Yet, though modern quantification theory has provided a convincing answer for most quantificational cases, the predominantly nominalist theories of reference in modern philosophy of language have so far provided no solution for cases involving species or kinds, and even less for reifications. In fact, the entire machinery of reference as it is seen at work in language is as much an unsolved mystery now as it was in the Middle Ages. The main difference is that now some of us have a clearer idea of the complications involved.

[2]Surprisingly little is found in the philosophical literature on *reifications*, i.e. nominalizations (e.g. 'death', 'construction', 'theft)' or mental constructions like 'the average cabdriver'.

1.3 The 19th century debate on subject and predicate

Meanwhile the theory and practice of grammar writing developed further. As has been said, it became customary to reserve the term *subject* for that part of the sentence that is meant to refer to the entity, simple or complex, to which the predicate assigns a property. But a great deal more was happening. Renaissance grammars of Latin and of the new national languages of Europe already show a significant increase in detail and sophistication. But the breakthrough came in the 18th century when professional grammarians, especially in France (see Seuren 1998:63-74) produced voluminous works analyzing and describing French to a degree of detail and precision not seen so far.

Among the insights that broke through was the realization that, more often than not, predicates are structurally complex and can be reduced to a lexical main predicate, usually a verb, in construction with a number of terms. Thus, in a sentence like:

(2) The man sold the book to the student

the subject term is *the man* and the Aristotelian predicate is *sold the book to the student.* But the predicate is itself analyzable as the verb form *sold* plus the direct object (DO) *the book* and the indirect object (IO) *to the student.* Now both DO and IO are again referring expressions and can occur in subject position in other sentences (barring prepositions and/or possible differences in case assignment). It was thus found that it makes sense, in the analysis of language, to single out a lexical verb, in this case *sell,* and assign it a lexical argument frame, in the case of *sell* consisting of three argument terms, SU (the subject term), DO and IO.

Moreover, sentences may contain further, mostly adverbial, additions that would be part of the predicate in the Aristotelian analysis but clearly deserve special treatment, not as an element in the lexical argument frame of the main lexical predicate but in some other way:

(3) Yesterday the man sold the book to the student

Here, the element *yesterday* cannot be sensibly regarded as an argument term to the verb *sell.* What grammatical and semantic status should be assigned to it was not clear in the 18th century. Today most agree that it has the status of a sentential operator, though opinions differ as to what that should mean.

All this would not have been problematic had it not been found, halfway through the 19th century, that in the actual use of language it is very often not SU (i.e. the subject term as opposed to DO, IO and other sentence parts) that denotes the entity to which a property is

assigned. Often it is another constituent than SU, depending on how the discourse at hand is proceeding, and in particular depending on what is at issue, or, as many will say, on what the question is. Consider sentence (3). If the question is 'What did the man do?' then the man is the Aristotelian subject (*hypokeímenon*) and 'sold the book to the student yesterday' is the predicate. But if the question is 'Who did the man sell the book to yesterday?' then 'to the student' is the predicate, and the person who the man sold the book to yesterday is the *hypokeímenon*. Worse, if the question is 'What happened yesterday?' then the day of yesterday is the *hypokeímenon* and '(that) the man sold the book to the student' is the predicate, according to Aristotle's definition, as it assigns the property of the man having sold the book to the student to yesterday's day. Otto Jespersen aptly summed up the question as follows:

> The subject is sometimes said to be the relatively familiar element, to which the predicate is added as something new. "The utterer throws into his subject all that he knows the receiver is already willing to grant him, and to this he adds in the predicate what constitutes the new information to be conveyed by the sentence ... In 'A is B' we say, 'I know that you know who A is, perhaps you don't know also that he is the same person as B'" (Baldwin's *Dictionary of Philosophy and Psychology* 1902, vol. 2.364). This may be true of most sentences, but not of all, for if in answer to the question 'Who said that?' we say 'Peter said it', 'Peter' is the new element, and yet it is undoubtedly the subject (Jespersen 1924:145).

The first observations to this effect were made around 1850, mostly by German philosophers of language and philologists. Steinthal observes (1855:199) that in a sentence like 'The patient slept well' the grammatical subject (i.e. SU) is 'the patient' and the grammatical predicate is 'slept well'. But if the sentence is interpreted simply as the attribution of the property of sleeping well to the individual described as 'the patient' an important fact is overlooked, namely that often, 'what one wants to say is that the patient's sleep was good'. Therefore, an analysis is wanted, different from surface grammar, in which the patient's sleep is the subject, i.e. Aristotle's *hypokeímenon*, and the adverb 'well' is the predicate.

Somewhat later Georg von der Gabelentz observed:

> What does one wish to achieve when one speaks to another person? The answer is that one wants to arouse a thought in him. In my view this implies two aspects: first, one has to direct the interlocutor's attention (his thinking) to something, and secondly, one makes him think this or that about it. I call that of or about which I want my addressee to think the *psychological subject*, and

> that which he should think about it the *psychological predicate.* In the sequel it will become clear how much these categories often deviate from their grammatical counterparts (Von der Gabelentz 1869:378).

Later, in (1891^1,1901^2), he defended the view that the grammatical subject expresses what should be considered the *hypokeímenon* in a logical analysis (though he does not indicate what logic he has in mind), while the psychological subject consists in a mental representation of that which comes to mind first when one is in the middle of the speech process. This psychological subject will normally also come first in the spoken or written utterance. Thus, in the sentence (1901^2:370) *Mit Speck fängt man Mäuse* ('with bacon one catches mice') the psychological subject is *mit Speck* ('with bacon'), and the psychological predicate is what one does with bacon, namely catch mice. He does, however, point at the difficulty of providing observational support for his thesis:

> But if one wants to give the inductive proof for all this, one has to be careful with examples. For the phenomena to do with positions in the sentences of different languages are not unambiguous or equivalent (Von der Gabelentz 1901^2:370).

Around the same time we find Wilhelm Meyer-Lübke, a prominent philologist of the Romance languages, reacting to Von der Gabelenz, using the term 'logical' for what Von der Gabelenz had called 'psychological':

> I want to stress that 'subject' is used here in a purely grammatical sense, and designates, therefore, the agent of the action. Admittedly, this goes against the original meaning of this term, which, as one knows, originated in logic. From the point of view of logic there can be no doubt that in the sentence *il arrive deux étrangers* ['two foreigners arrive'] the subject is *il arrive* while *deux étrangers* is the predicate, as A. Tobler (Beiträge I, 191) rightly observes. But from the point of view of grammar the relation between Noun and Verb remains unchanged, no matter which comes first in the sentence (Meyer-Lübke 1899:352).

Interestingly, Meyer-Lübke specifies the grammatical subject (SU^1) of a sentence as designating 'the agent of the action', not unlike many modern attempts at providing a semantics for lexical argument functions in terms of thematic roles or 'theta-functions'.

Von der Gabelenz's notion of psychological subject was taken up and further developed by a number of scholars. The first was probably Philipp Wegener:

> It is the function of the subject [i.e. *die Exposition*] to state the position [i.e. *die Situation klar zu stellen*], so that the logical predicate becomes intelligible (Wegener 1885:21).

He was followed by Theodor Lipps, who introduced the notion that the 'psychological' predicate is in fact the answer to a question about the *hypokeímenon*:

> The grammatical subject and predicate of a sentence now agree now do not agree with those of the judgement. When they do not, the German language has intonation as a means of marking the predicate of the judgement. The subject and predicate of the associated judgement are best recognized when we bring to mind the question to which the sentence is an answer. That which the full and unambiguous question is about is the subject, while the information required is the predicate. The same sentence can, accordingly, serve to express different judgements, and hence different subjects and predicates (Lipps 1893:40).

Meanwhile, in Britain, some philosophers were working along the same lines. The Cambridge philosopher George Stout compares the progress of thought as expressed in language with the steps one takes while walking:

> Predication, from this point of view, just consists in the definition and specification of what is, at the outset, indefinite and indeterminate. It is because this process takes place gradually by a successive concentration of attention, that language is divided into sentences. The predicate of a sentence is the determination of what was previously indeterminate. The subject is the previous qualification of the general topic or universe of discourse to which the new qualification is attached. The subject is that product of previous thinking which forms the immediate basis and starting-point of further development. The further development is the predicate. Sentences are in the process of thinking what steps are in the process of walking. The foot on which the weight of the body rests corresponds to the subject. The foot which is moved forward in order to occupy new ground corresponds to the predicate. ... All answers to questions are, as such, predicates, and all predicates may be regarded as answers to possible questions. If the statement, "I am hungry" be a reply to the question, "Who is hungry?" then "I" is the predicate. If it be the answer to the question, "Is there anything amiss with you?" then "hungry" is the predicate. If the question is, "Are you really hungry?" then "am" is the predicate. Every fresh step in a train of thought may be regarded as an answer to a question. The subject is, so to speak, the formulation of the question; the predicate is the answer. (Stout 1909[3], vol.2:213-214).

Wilhelm Wundt, one of the founding fathers of modern psychology, also took part in this debate. For him, the grammatical subject (SU) always expresses the Aristotelian *hypokeímenon*. Grammatical structure thus faithfully reflects the logical analysis imposed by Aristotle on sentences.[3] This is, for him, the only legitimate use of the terms *subject* and *predicate*:

> The fact that the judgement consists of subject and predicate results from an analysis of judgements, and this is an insight that has rightly passed untrammeled from Aristotelian logic (even if present-day scientific thought has otherwise grown out of it) into the more modern forms of logic. The subject is the thing the proposition is about, that which forms the basis, *hypokeímenon*; the predicate is the content of the proposition, the *katēgórēma*, as Aristotle called it (Wundt 1922[1]:266).

Although it is probably correct, he says, to distinguish, as Von der Gablelenz did, between that which comes to mind first and that which is added as new information, that should not be labeled as the subject-predicate distinction. Instead, Wundt proposed the term 'dominant representation' (*dominierende Vorstellung*) for what Von der Gablelenz, Lipps, Stout, and others had called the psychological subject, but that term never gained wide acceptance:

> Suppose I transform the sentence *Caesar crossed the Rubicon* into *The Rubicon was crossed by Caesar*, does that mean that the subject *Caesar* has become a remote object, and has, conversely, the original object *the Rubicon* now become the subject? And when I say *The crossing of the Rubicon was achieved by Caesar*, has now the original predicate become the subject?
>
> These are the questions that have led, in our new linguistics, to a kind of distinction that has found a rather widespread acceptance, but which, in my eyes, has increased rather than solved the confusion resulting from the mixing of logic, grammar and psychology. If we are to believe G. von der Gabelentz we should distinguish between a logical, a grammatical, and a psychological subject and predicate. The logical subject and predicate keep the function they have in logic. The psychological subject is seen as "the representational complex that occurs first in the consciousness of speaker and hearer", while "the content that is added to this prior representation" should be the predicate. Or, as von der Gabelentz formulates it from the teleological point of view, the psychological subject is "that about which the speaker wants the hearer to think, to which he wants to direct his

[3]Wundt was apparently unaware of the fact that Aristotle assigned a logical structure only to sentences with a quantified subject term, never to sentences with a definite NP as subject.

> attention, while the psychological predicate consists of that which the hearer should think about the subject". ...
>
> When one says that the two sentences *Caesar crossed the Rubicon* and *The Rubicon was crossed by Caesar* have the same logical subject but different grammatical subjects, one has already lost sight of the notion of subject in the Aristotelian sense, namely as that on which the assertion is based, and surreptitiously introduced a psychological consideration, namely that the subject must be an agent. Obviously, the agent in both sentences is Caesar. But only in the first sentence, and not in the second, is he the basis on which the proposition is grounded. The former is an assertion about Caesar, the latter about the Rubicon (Wundt 1922[4]:269-70).

Although one may disagree with Wundt on several counts, he makes some important points, such as the difference between the genesis and the substance of a propositional thought, and the necessity to create a separate terminology for the grammatical distinction of subject and predicate on the one hand and the 'psychological' distinction of what comes to mind first on the other.

As one sees from the quotations given, there was a great deal of confusion about this issue around the turn of the century, and the parties involved were unable to settle on an agreed solution. In fact, the confusion was such that Theodor Kalepky exclaimed (1928:20): 'Such a confusion simply cries out for relief' (*Eine derartige Wirrnis schreit förmlich nach Abhilfe*).[1] After 1930 the subject-predicate debate, which had dominated linguistic theorizing for almost a century, disappeared from the limelight, mainly due to the lack of empirical support and the general unclarity of the issues concerned, but also because the new structuralism in linguistics had different interests.

The only place where the debate was continued was Prague, owing to a tradition of loyalty to good work done by local scholars. Anton Marty, a disciple of the German phenomenologist Franz Brentano and professor of philosophy at Prague around the turn of the century, made important contributions to the subject-predicate debate. According to him, logic deserves no place in semantics, all semantics being psychological. Besides an abstract propositional meaning, every sentence has an 'inner form' which expresses the way the propositional meaning is to be integrated into running discourse. He follows Lipps, Stout and others in saying that this 'inner form' is determined in principle by question-answer structure. Unlike Wundt, he maintains that the terms *subject* and *predicate* are most appropriately

[1]Kalepky belonged to a group of linguists who felt that a linguistic theory should be built up without any notion of subject and predicate at all. Others belonging to this movement were Svedelius (1897) and Sandmann (1954). This movement, however, petered out without leaving as much as a trace.

used at this 'inner form' level, since it is here that the Aristotelian meaning of these terms is immediately applicable. Despite some unclarities, this makes a great deal of sense, as we shall see in a moment.

Marty's work was continued by the Czech scholar Vilém Mathesius, professor of English at Prague University and founder, in 1926, of the Prague Linguistic Circle. Mathesius followed Wundt in wishing to see a separate terminology for subject and predicate on the level of grammatical analysis on the one hand, and the 'known-new' distinction found to exist at a more psychological level by Lipps, Stout and company on the other. Not wishing to upset existing terminology, he felt that the terms 'subject' and 'predicate' should go on being used in grammar, no matter what confusions had occurred in previous times, and proposed a new term pair for the Aristotelian distinction, which is realized at the 'psychological' level. For the latter he proposed a Czech term pair that has been rendered variously as 'theme' versus 'rheme', 'topic' (or 'focus') versus 'comment', the former pair member indicating the *hypokeímenon*, the latter the Aristotelian predicate. The structure into which both are combined is not called 'proposition' but the 'functional sentence perspective' (Mathesius 1939).

2 An assessment

After the second world war a period followed of almost total neglect of the subject-predicate, or topic-comment, issue. Only the Prague group continued the research, but until 1989 both their resources and their contacts with the outside world were severely restricted due to the anti-theoretical attitudes of the Communist regime and the political isolation imposed by it. The past fifteen or twenty years have seen a resurge of interest in the topic-comment issue, mainly among adherents of various forms of functional grammar and in circles of more psychologically oriented students of text structure or information structure, but not, or hardly, in mainstream theoretical linguistics.

Yet, when one reviews the history of the issue, especially over the period from 1850 till 1930, while taking into account the conditions that prevailed, one will appreciate not only the central theoretical importance of the questions discussed but also the intellectual power and the sharpness of insight of the main participants in the debate. For that reason it is worth our while to try and sum up the positive results that were obtained, chart the reasons of the confusion that resulted, and list the principal remaining empirical problems.

First, it seems that the subject-predicate distinction as defined by Aristotle leaves room for the interpretation that the choice of the subject is discourse-dependent, even if Aristotle himself was unaware

of this aspect and would probably have replied that this is not what he had in mind. The fact that we use the terms 'subject' (SU), along with 'direct object' (DO) and 'indirect object' (IO), to denote those sentence constituents that fill the argument places of any lexical predicate (verb, adjective or noun) is due to historical accident, and it is probably best not to change that bit of established terminology. But Lipps, Stout, Marty, Jespersen and others were right in stating that if one speaks of the mental act of assigning a property to an entity, i.e. Aristotle's proposition, there is a sense in which that act is discourse-dependent. This insight was non-existent before 1850, and widely accepted after 1930. After 1950 it was virtually forgotten.

Moreover, it seems that the normal progress of discourse is driven by a game of questions and answers (Seuren 1985:297-304).[5] The questions are usually not made explicit. Sometimes they are, as when a solicitous speaker says:

(4) Some time before World War I the Titanic sank. When did the Titanic sink? It sank in 1912.

But normally the question is left out, as the speaker anticipates the listener's query. We then speak of an implicit question, to which the following assertion (which may be a new sentence or part of an ongoing sentence) is an answer, just as Stout had it. A less solicitous speaker might have said (5a) or even (5b):

(5)a. Some time before World War I the Titanic sank. It sank in 1912.
b. Some time before World War I, in 1912, the Titanic sank.

Now, it would seem, the *hypokeímenon* of the propositional thought expressed as 'It sank in 1912', or simply as 'in 1912' is *the sinking of the Titanic*, which is a complex entity, if it is one at all, which nominalists will deny. And the property assigned to this 'entity' is that it took place in 1912 (One notes that we are not far removed from Steinthal's 'the patient's sleep was good'). We shall have more to say about this below, but for the moment we leave it at that.

Thirdly, it seems to make sense to propose a separate structural analysis for the *genesis* of a propositional thought, as opposed to its actual *substance*. The actual substance is best captured by the term 'proposition'. The structure of the process of genesis appears to

[5] The 'game' may be opened by what in the theatre is called a *feeder*, an utterance meant to set a discourse in motion without there being any anticipation of a question arising in the audience's mind. A special kind of feeder is the 'hot news' sentence: *The président has died!*

correspond to what is known as the *topic-comment* structure, the progress from what has been established in the discourse to what is added as new information. Although what counts in the end is the final product, the ordered series of propositions, the genetic process is still retrievable from (spoken) utterances, where constituent order and intonation reflect the genetic process, next to the main grammatical form whose main function is to carry across the objective propositional content.

It would seem that these insights, which shaped up gradually during the period concerned, are basic and important if we want to gain a better understanding of the structures and processes that are involved in the use of language. Yet the difficulties are daunting. Once the magnitude of the problems concerned becomes visible one easily understands why the participants in the subject-predicate debate were in many ways out of their depth, and why it was felt, around 1930, that the question had better be allowed to rest for a while. Now, seventy years later, we have at our disposal a much improved fund of technical and factual knowledge. Yet for us, too, it remains to be seen how we will fare in these deep waters.

One of the main drawbacks of the discussions that took place between 1850 and 1930 was the uncertainty surrounding the status and the contents of logical theory. A deep rift had developed between those, like George Boole and Augustus de Morgan, and later Gottlob Frege and Bertrand Russell, who transformed logic into a mathematical discipline, and the traditionalists, for whom logic was still the study of good reasoning, and thus the natural bedmate of psychology. After Boole's first algebraic formalization of Aristotelian logic around 1850, logic was in a bad way, since the removal of the defects from Aristotelian predicate calculus had left logic virtually limbless (see Seuren 1998:333). And although, around 1900, Frege and Russell's theory of quantification restored considerable strength to logic, these developments remained for quite a while restricted to a small circle of initiates. The majority of logicians in those days were still traditionalist. While these standardly drew a distinction between the actual psychological processes of reasoning on the one hand and the 'logical' product on the other (see Seuren 1998:133-7), a confusion of logical and psychological issues was equally standard. Generally, the traditionalists lacked adequate insight into the foundations of logic. It may be defensible, and in fact fruitful, to conceive of a logic that would be an element in a formal theory of cognition, and thus oppose the view standardly held in modern formal logic. But the point is that the traditionalists had no clear ideas

about the issues involved, whereas the mathematical logicians were a great deal better informed.[6]

We thus have a situation where those who considered the questions of subject and predicate held traditionalist logical views, which meant that they were inadequately informed about the foundations of logic and lacked the formal sophistication of their more mathematically minded colleagues. Their otherwise valuable insights into the context-dependency of propositional thought could thus hardly be put to any fruitful use. A typical example is the Cambridge philosopher Alfred Sidgwick's reaction to the formalization program in logic:

> [T]he 'logical character' of any name and of any proposition is to be sought not merely in that name or proposition taken as an independent entity, but as influenced by the special context in which it happens to be used. ... The chief habit of thought antagonistic to a regard for special context is, beyond dispute I suppose, that due to the attempt to make Logic formal, or (worse) symbolic. Whatever value these developments of Logic undoubtedly have is bought at a cost which deserves to be reckoned rather than ignored. But ... there is hardly a suspicion in the minds of formal logicians that they have any cost to pay (Sidgwick 1895:281-282).

Although Sidgwick has our full sympathy we must recognize that he never developed any kind of logic that would account for the context-dependency of 'names' (i.e. referring expressions) and propositions.

When we add to this the fact that the phonological study of intonation and the structural study of syntax were still at the very beginning, while no semantic theory of any note existed at all, it will be easier to understand why the great subject-predicate debate petered out the way it did.

Three main problems present themselves in this context. First there is the *ontological problem*, discussed in 1.2 above. The problem is relevant in so far as semantic theory must take a stand on the issue of how to represent complex entities of the kinds exemplified in (1a-j) above: Will semantic theory treat them as entities and leave the ontological reduction to the theory of reference (truth theory), or will

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[6] *In this context it is not surprising to find that the Aristotelian subject-predicate division was thought to have originated in Aristotle's logic, whereas it did originate in his theory of truth. Aristotle's proposition ('prótasis') was primarily set up to support his analysis of the notion of truth. The link-up with logic was made later, by the Stoics, who proposed that the proposition should be the unit of logical calculus but were unable to implement that program in a logically sound way (though they did establish propositional calculus as part of logic).*

all or some of the reduction have to take place in semantics proper? The problem is urgent in topic-comment theory in so far as topics seem even more inclined than ordinary referring expressions to take complex entities as their reference value.

Then there is the *grammatical problem*, brought about by the fact that the grammatical structure of a sentence more often than not fails to reflect its topic-comment structure as it results from and fits into ongoing discourse. If we accept the reality of topic-comment structure, the grammatical problem consists in locating it in the grammatical structure of sentences, where it seems to be only weakly represented by means of word order and intonation.

Finally, there is the *semantic problem*. This consists in specifying what exactly is expressed by the grammatical structure of a sentence besides the discourse-dependent topic-comment structure, i.e. Marty's 'abstract propositional meaning' or what is called 'judgement' by Wundt (but not Lipps!). Curiously, the semantics of the otherwise opaque topic-comment structure now seems easier to grasp than what is expressed by the grammatical structure of the sentence.

3 Outline of an integrated approach

Meanwhile, linguistics has given itself a long rest from the subject-predicate debate, and has only taken a marginal interest in questions of topic and comment. However, recent developments in semantics, in particular those related to the discourse-dependent, incremental character of linguistic comprehension and the realization that semantic theory must of necessity be an investigation of the workings of cognition, have raised hopes that a renewed scrutiny of the issues concerned will bear more fruit than has proved possible in the past. In this context I shall present a tentative outline program for an integrated account of topic-comment structure and propositional form in terms of incremental semantics, concentrating on the semantic problem just mentioned.

The principle of incremental or discourse semantics (Seuren 1985) is fairly simple, in contrast to its elaboration. It embodies the hypothesis that each new sentence in a running discourse adds information to a given discourse domain (DD), which is a store of information built up for the purpose of the discourse at hand as a result of earlier uttered sentences. The meaning of a sentence S is seen as the potential of S to add new information to any given discourse domain and thus update it. In other words, the meaning of S is a function from DDs to DDs. The new information actually added

by an uttered sentence S to the given DD is called the *increment* brought about by S, or i(S).[7]

The theory of discourse semantics must specify the format and structure of DDs, as well as the computational method that will produce an increment from a sentence, i.e. produce i(S) from S. All existing forms of discourse semantics have their DDs organized in such a way that they consist of 'addresses' that represent entities (individual or complex). These addresses contain the predicates that have been assigned to the entities represented by them during the discourse. Thus, to give a simple example, if there is a new sentence:

(6) Ann sold the car

there must already be addresses for Ann and the car, say a_1 and a_2, respectively (New addresses are introduced by means of existential *statements:* 'There was a person called "Ann"';'There was a car'). In the current form of discourse semantics the addresses look as follows:

(7)a. a_1 : *called* "Ann"(a)
b. a_2 : car(a)

Now it is the function of the definite article to select the address characterized by the predicate of the NP concerned, i.e. '*called* "Ann"' and 'car', respectively. That done, the predicate 'sell' is added to the two addresses in the appropriate way:

(8)a. a_1 : called "Ann"(a) | sell(a,a_2)
b. a_2 : car(a) | sell(a_1,a)

More machinery is needed, of course, for a more complete treatment (including a treatment of the tense and other operators) involving more complex cases (see Seuren 1994), but what is directly relevant here is that the incrementation procedure as just sketched takes as input the grammatical structure of the sentence, which is to a large extent determined by the lexical argument structure of the main verb, *in this case 'sell'. The question is:* What happened to the topic-comment structure of this sentence in the given context?

Suppose sentence (6) is uttered in a context where the (implicit or explicit) question is 'Who sold the car?' Then the answer is 'The one who sold the car was Ann', which gives the topic-comment

[7]Incremental or discourse semantics is motivated mainly by phenomena of anaphora and of presupposition, which have both proved indigestible to the logic-based and non-cognitive forms of model-theoretic formal semantics that were current till recently. See Seuren (1998:388-404) for a detailed account.

structure (9), realized, in the theory of Semantic Syntax (Seuren 1996) at the level of Semantic Analysis, which is input to the incrementation procedure:

(9) the x[x sold the car] sp_{ind} Ann

i.e. 'the specification of the x such that x sold the car is Ann' (more is said about the predicate sp_{ind} below).[8] Now, following Stout and Jespersen, the subject term is 'the x[x sold the car]', and 'sp_{ind} Ann' is the predicate. Under this interpretation, 'Ann' in (6) will be accented by means of an intonational peak.

We now define the *topic* of a sentence as: *that element in a situation whose specific identity is open to question.* The comment then provides the answer by specifying the element in question. Below we shall translate this into the language of mathematical functions, and say that the comment provides the value for an argument in a function, while the topic states the function and the argument.

The question is still, however, what role topic-comment structure plays in the story of discourse semantics. In order to deal with this question in a sensible way we must make a few terminological decisions. Let us call the purely truth-conditional cognitive increment of a sentence, as exemplified in (8a,b), the *flat proposition* (fprop) expressed by the corresponding sentence, i.c. (6). The flat proposition thus represents a possible situation in the, or a, world. It corresponds to Marty's 'abstract propositional meaning', or Wundt's 'judgement'. In a different terminology one may say that a flat proposition is an object-oriented representation of a situation. Existing forms of discourse semantics merely process flat propositions.

A topicalized structure like (9) also expresses a proposition. It conveys all the information conveyed by the corresponding flat proposition, i.c. (8a,b). In addition, however, it conveys information about the genesis of the flat proposition in the actual discourse or context in which it occurred. It does so by specifying the identity of the element that was the object of querying, i.c. the person called 'Ann'. Let us call a proposition which contains, besides the information conveyed by the corresponding flat proposition, also the topicalized 'genetic' or 'historical' information a *modulated proposition* (modprop). A modprop thus consists of an fprop plus a topicalization.

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[8]According to Seuren (1985:300-304), the structure of the TCS (9) runs parallel to the underlying grammatical structure of the question to which it is an answer:

(i) the x[x sold the car] sp_{ind} who?

Structurally, the comment *Ann* thus simply replaces the position filled by the querying WHO? in the question.

Its typical expression on the level of semantic structure is the topic-comment structure exemplified in (9).

Standard model-theoretic formal semantics, which maintains that semantics should deal with truth-conditional contents only, has always considered topicalization phenomena non-truth-conditional, and therefore non-semantic. As a result they were relegated to a generally ill-defined 'pragmatics' that would study the paraphenomena of usage. In our terminology this means that model-theoretic semantics deals merely with flat propositions. This restriction, however, is unwarranted. Certain predicates take clausal embeddings where the topic-comment structure is essential for truth or falsity. It is perfectly possible, for example, for each of (10a,b,c) to be true while the remaining two are false:

(10)a. John was surprised that ANN had sold the car
(he thought Ann was not a good saleswoman)
b. John was surprised that Ann had sold the CAR
(he thought Ann was too attached to it to sell it)
c. John was surprised that Ann had SOLD the car
(she normally gave away things)

This would not be possible if the *that*-clauses in (10a-c) were semantically equivalent. The conclusion is, therefore, that topic-comment structure does contribute to sentence meaning. This being so, discourse semantics must account for topic-comment structure, which means that the incrementation procedure must take the modulated proposition, not just the flat proposition, as input and deliver an increment value that reflects topicalization.[9]

Truth-conditional differences like those in (10) occur with predicates where expectation patterns play a role, as with 'be surprised' or 'expect', or some form of evaluation, as with 'good' or 'bad'. A sentence like (11) is thus fully consistent:

(11) It is fortunate that it was ANN who sold the car, but unfortunate that it was the CAR that was sold.

And further classes of cases may be found. Note, however, that not all predicates that take intensional embedding allow for such truth-conditional differences. Consider the sentence pair:

(12)a. John believes that ANN sold the car

[9]A different argument for the semantic nature of topic-comment modulation, based on the impossibility of negating cleft-sentences with loss of presupposition, is given in Seuren (1985:300).

b. John believes that Ann sold the CAR

Now it does not seem possible for the one to be true while the other is false. Yet they are felt to differ in meaning, an intuition which is reinforced by the observation that both (12a) and (12b) are ambiguous as to the scope of the topicalization. (12a) can be analyzed as either (13a) or (13b):[10]

(13)a. the x[John believes that x sold the car] sp_{ind} Ann
b. John believes that the x[x sold the car] sp_{ind} Ann

And likewise for (12b), and, for that matter, (10a-c).

We therefore conclude that topic-comment structure should be expressed in the incrementation value of a sentence. There is, however, also an argument supporting the view that the flat proposition of a sentence S is needed as i(S). This argument rests on the consideration that the topicalization element in a modulated proposition is superfluous, and therefore undesirable, in a purely extensional calculus of the truth value of any given proposition. A truth theory that takes an i(S) as input and delivers a truth value with regard to any given situation can do with the flat proposition, without any topic-comment modulation (One should not be confused by examples such as those given in (10) above, where the modulation is inside an intensional context: For the truth calculus this means that it is wrapped up, in a Frege-like fashion, as the i(S) referred to by the *that*-clause). We therefore face the task of developing a theory that has both modulated and flat propositions as i(S) for any given topic-comment modulated sentence in a discourse.

The question is now how best to do that. The first thing to realize is that a (purely extensional) modprop carries an existential presupposition. Thus, (9) presupposes that someone sold the car. In the theory of discourse semantics, presuppositions are by definition incremented before their carrier sentences. Therefore, in this case, the sentence 'Someone sold the car' must be incremented first. Given (7a,b), and well before (8a,b), a new address is thus added:

(14) $a_3 : \text{sell}(a,a_2)$

and the a_2-address is updated as:

(15) $a_2 : \text{car}(a) \mid \text{sell}(a_3,a)$

[10]The (a)-reading in (13) may assume a metalinguistic character in the sense of Horn (1985) when (12a) is used to correct a previous speaker.

The new a_3-address, i.e. (14), makes it possible for later reference to be made to 'the car-seller'. Various cognitive factors may now prompt the question 'Who is/was the car-seller?'. This question we consider incremented as follows:

(16) $a_3 : \text{sell}(a,a_2) \mid \text{sp}_{\text{ind}}(a,?)$

where 'sp_{ind}' is a predicate specifying the identity of the individual 'a' in 'sell (a,a_1)'. The question mark indicates that the value sought is not yet provided. It causes the processing machinery to be (partially) suspended until the value is provided (much in the way the machinery is (partially) suspended after the introduction of the disjunctive *or*-operator, which asks for a choice to be made between the two disjuncts). Now let the value be *Ann*. Then the answer to the question is *The one who sold the car is/was Ann* or *Ann sold the car*, incremented as:

(17) $a_3 : \text{sell}(a,a_2) \mid \text{sp}_{\text{ind}}(a,a_1)$

The increment '$\text{sp}_{\text{ind}}(a,a_1)$' *is the* DD-realization of the modulated structure (9). It is this kind of increment that serves as the extension of the sentential object term under predicates like 'be surprised', as exemplified in *(10)* above.[11]

We now assume that at this point, i.e. after an incrementation specifying the identity of an address under the predicate sp_{ind}, the two addresses involved are collapsed, all information now being united under the address that serves as the identification value, i.e. a_1. As a result of this 'flattening' operation, the a_3-address disappears, and the result is as shown in (8a,b) above, which contains only 'flat' information and is thus fit for feeding into the truth calculus.

It thus makes sense to distinguish three stages in the process of linguistic comprehension and interpretation:

— the IS (information structure) stage, which operates with modulated propositions reflecting the genesis of the thought concerned in the speaker's mind and helping the hearer to reconstruct part of that process;
— the DS (discourse-semantic) stage, which processes the incoming topic-modulated sentence, first as a modprop then as an fprop;

[11] It will have to be seen, of course, to what extent this method of incrementing modulated sentences will remain adequate for cases of more abstract reference involving complex entities. At this point an answer is needed to the ontological problem mentioned above.

— the TC (truth calculus) stage, which computes the truth value of any given proposition with regard to a given verification domain ('world').

One notes the absence of logic as standardly conceived of. This is because logical semantics consists in establishing a relation of truth or falsity directly between given linguistic structures (sentences) on the one hand and any 'world' on the other. Logical semantics would thus be representable in fig. 2 below as a base line connecting the Uttered Sentence with the World. But, as was correctly pointed out by Ogden & Richards in their famous semiotic triangle (1923:11), that cannot be a causal and must therefore be a merely 'imputed relation'. Therefore, if we wish to reconstruct the *causal* machinery enabling humans to come to conclusions about truth or falsity we must restrict ourselves to the *causal* relations between the Uttered Sentence and the cognitive discourse domain on the one hand, and between the DD and the World on the other.

The analysis given above can be represented schematically as fig. 2. The reader will notice that this is a further refinement of the semiotic triangle presented in Ogden & Richards (1923:11) just mentioned. Ogden & Richards conflated speaker and hearer into one, both representing the 'thought' component expressed in and retrieved from the linguistic sign. If we project the Speaker of fig. 2 onto the Hearer, conflating Expression and Comprehension, accept the 'imputed' logical base line and sharpen the top side of the trapezoid into an angle we have, in effect, Ogden & Richards' triangle again.

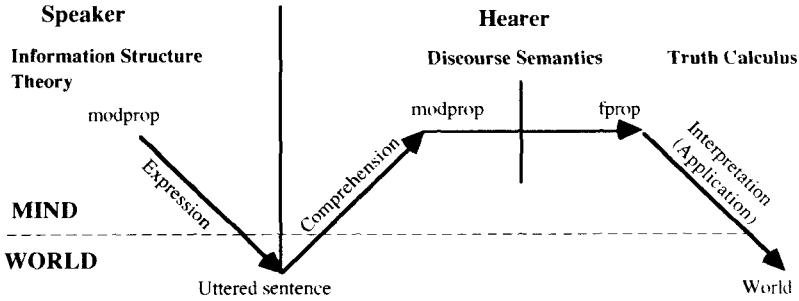

Figure 2 Discourse-semantic layout of speech process

4 The peculiar comment-predicate sp_x

It is important to say a few words, in this context, about the specific nature of topic-comment modulation, in particular about the predicate sp_x, even if we must admit that this whole area is fraught with terrible problems, most of which elude our analytical powers and

thus remain without a satisfactory answer. With this proviso, we accept that it seems safe to posit that all cleft and pseudocleft sentences, and hence all topic-comment modulated semantic structures of the type exemplified in (9), are characterized by the main predicate sp_x, normally realized as the verb 'be'. This predicate is specifically used to specify values for function arguments. Thus, for example, the topic-comment structure (18a), which may be regarded as an answer to the question (18b):

(18)a. the X[Bert sold X] sp_{cat} a car
— [Bert sold a car]

b. the X[Bert sold X] sp_{cat} what?
— [What did Bert sell?]

provides an answer to the question what category the thing is that Bert bought. We may regard (18a) as providing the value for the discourse-determined situation at hand in the function 'what Bert sold' (cf. Scharten 1997:63). The variable x in sp_x is here filled in by 'cat', which makes it clear that what is asked for is not the identification of an individual, as in (9), but of a category of individuals (The capital variable X ranges over sets. Likewise, the increment value of (18a,b) will necessitate a higher order notation, involving sets of individuals. But we shall leave this technical detail out of account here).

Besides sp_{ind} and sp_{cat} we also have sp_{val}, which specifies the value of a function other than from situations to individuals or categories. For example, a sentence like (19a), with the semantic analysis (19b), specifies the temperature of the room in question, (20a,b) specifies the cardinality of the set of John's children, and (21a,b) specifies the cardinality of the set of planets:

(19)a The temperature of the room is twelve degrees
b. the x[the temperature of the room is x] sp_{val} twelve degrees
(20)a. John has four children[12] / The number of John's children is four
b. the x[the cardinality of the set of John's children is x] sp_{val} four

[12]As argued in Scharten (1997), this shows the semantic, non-pragmatic, character of number specifications. In both the semantic and the pragmatic literature, sentences like (20a) are analysed as existentially quantified sentences and are accordngly taken to mean 'John has *at least* four children'. The much more obvious reading in which a value is assigned to the cardinality function for the set of John's children is entirely neglected, owing no doubt to the general neglect of parameters and value assignments in present-day formal semantics.

(21)a. There are nine planets / The number of planets is nine[13]

b. the x[the cardinality of the set of planets is x] sp_{val} nine

(19) can be considered a function from rooms to temperature values, or, alternatively, a function from moments of time to temperature values (as in 'The temperature of the room is now twelve degrees'). Examples (20) and (21) can be seen as a function from sets to cardinality values. In similar fashion cases can be analyzed involving functions for names, telephone numbers, dates, etc.

One notes that the (a)-sentences in (19)-(21) are all analyzed as if they were topic-comment-modulated sentences: The (b)-structures are entirely analogous to structures like (9) or (18a,b) above, but for the *sp*-predicate, which is sp_{ind} and sp_{cat} in (9) and (18a,b), respectively, but sp_{val} in (19)-(21). And it does indeed appear that (19)-(21) do not easily allow for topic-comment modulation in the form of a cleft construction, with the value specified ('twelve degrees', 'four', 'nine') as predicate/comment. The cleft sentences in (22) are definitely uneasy. With accentual peaks the sentences are clearly better, but then they invite a metalinguistic interpretation involving a correction of what has been said before:

(22) a. ?*It is twelve degrees that the temperature of the room is

b. ?*It is four children that John has / The number of John's children is FÓUR (not five, as you said)

c. ?*It is nine that the number of planets is / The number of planets is NÍNE (not six, as you said)

In general it must be observed that, but for a few notable exceptions, existing grammatical as well as formal semantic theories suffer from an almost total neglect of constructions involving the assignment of values to given parameters. This means that the whole area of measurable gradable adjectives like 'broad', 'deep', 'high', 'heavy', 'far', 'hot', 'old', etc., along with measure predicates like 'weigh', 'cost', 'span', 'contain', etc., has been left virtually untouched.

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[13]This sentence has been selected to show Quine's error in his famous essay 'Reference and modality' in Quine (1953:139-59). In this essay he treats the sentence 'The number of planets is nine' as an identity statement between the terms 'the number of planets' and 'nine', using this as a crucial example in his argument against quantifying into modal and other intensional contexts. Regardless of the truth or falsity of the conclusion, the argument must be reckoned to be invalid, given the error in the premiss built on this example sentence.

In a way this is an unfair handicap for anyone wishing to study topic-comment structure. Given this state of affairs I must invoke mitigating circumstances if I am accused of leaving too many ends fraying.

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