

Presupposition

Paul J.E. Dekker

1 Introduction

A presupposition is normally a proposition that is or has to be taken for granted, or ‘supposed’, before (‘pre-’) a certain statement or other linguistic act can be made sense of. A presupposition is not so much the ground you stand on, or the thinking that you rely on, but more like what comes before the ground you stand on, or what comes before the thinking that you rely upon. The notion of presupposition is therefore in essence quite a philosophical subject. By the same token, presuppositions are things which one can try to communicate, without actually stating them. “Has Alfred stopped smoking pot?” Even if you do not know the answer to a question like this, it can be used to communicate, not question, that Alfred used to smoke pot.

Notwithstanding, the term has gotten its main import as a decent technical term, in philosophy and linguistics, and that is how we will mainly deal with it in this lemma. We will not go into the rhetorical uses, and abuses of the concept. In this introductory section we will speak of the prehistory of the subject and in the remainder we follow, roughly, the historical development. In section 2, the original logico-philosophical interests in and despises of presupposition are discussed. In section 3, we give a short overview of the major systematic treatments of presupposition in logic and linguistics in the seventies of the previous century. In section 4, we focus on more pragmatic and dynamic theoretical treatments of presuppositions which evolved from that, and on some of the most debated issues in this area. In section 5 we very briefly discuss some recent developments.

While the subject of presupposition is as old as the phenomenon of speaking and thinking, it has not become known as such until rather recently. Some idea of presupposition has been commonly attributed to the philosopher Aristotle, although it seems he has never identified it as such. One of the standard (Aristotelian) logical insights is that both of the following statements:

- (1) All eudeontologists are herbivores.
- (2) No eudeontologists are herbivores.

carry the entailment that there are eudeontologists. And so do the following statements:

- (3) Not all eudeontologists are herbivores.
- (4) Some eudeontologists are herbivores.

While the examples (1) and (3) seem to be contradictory, as do the examples (2) and (4), they all four seem to entail that there are eudeontologists. If there were no eudeontologists, all four examples would be deemed unfortunate. The conclusion then seems to be that a sentence can fail to be true, and that also its negation fails to be true, so that there is a gap which has to be bridged for the sentence to be true or false. The gap that has to be filled is the sentence’s presupposition. Only if the sentence’s presuppositions are satisfied, will we be able to say that the sentence is true or false.

Besides the above-mentioned existential presupposition, Aristotle (384—322 BC) may be attributed the concept of categorial presupposition as well. Certain predicates cannot be predicated of all kinds of substances, because they are of the wrong type. (Aristotle 1975, 2b8-2b22) Nevertheless, the concept of presupposition was not as such recognized by Aristotle. He has been rather explicit that there is this principle of the excluded third, which means that a sentence is either true or false, or at least that its affirmation or its negation must be true. (Aristotle 1975, 17a26ff)

It has been said that Aristotelian logic has remained unchallenged for 2.5 millenium, and that the concept of presupposition has not been identified for the very same period in the Western tradition. Some possible and notable exceptions are some philosophers and theologicians like Eubulides, Thomas Aquinas and Petrus Hispanus. Eubulides (4-th century BC) was one of Aristotle’s contemporaries and antagonists. He has proposed the subject of presupposition as a challenge for

Aristotelian logic in a form which has become famous as that of the horned man. “Another was, if you have not lost a thing, you have it; but you have not lost horns; therefore, you have horns.” (Laertius 1853, Book VII, chapter “Life of Chrysippus”, section XI), see also (Laertius 1853, Book II, chapter “Life of Euclides”, section IV) This reads like a prehistorical practical joke, but it was a severe problem for Aristotelian logic. If we, like Aristotle seemed to do, endorse the principle of bivalence, at least one of the following sentences must be true:

- (5) You have lost your horns.
- (6) You have not lost your horns.

Both sentences, however, seem to entail that you have or had horns. If the principle of bivalence holds, one of the sentences must be true, and, therefore, logic tells us that you have or had horns. Since we could have embedded any kind of presupposition besides you having horns, this means that logic would entail any proposition, a pretty disastrous result.¹

Thomas Aquinas, a 13-th century theologian and philosopher, apparently adopted a metaphysical or epistemological concept of presupposition, though clearly not a linguistic one: “As a result, every science has presuppositions which the learner must believe.” (Aquinas 2000–2009, Faith, Reason, and Theology, Questions I–IV of the Commentary on Boethius’ *De Trinitate*) “For in every science, the nature of its object is presupposed.” (Aquinas 2000–2009, *Summa Theologiae*, Treatise on Sacred Doctrine) Larry Horn (Horn 1985; Horn 1996), and many others following him, have credited Pedro Julião (aka. Petrus Hispanus, or Pope John XXI, also 13-th century) the acknowledgment of some notion of presupposition as opposed to a notion of denotation. However, Pieter Seuren (Seuren 2005) has pointed out that not only the reference to Peter of Spain is mistaken, but also that there is no mention in the text of a notion of presupposition as we understand it nowadays.

2 Logico-Philosophical Treatments

The concept of presupposition as we understand it nowadays has been first identified, formally, by the end of the 19-th century, in the work of Gottlob Frege (1848–1925), in an analytical, and rather positivist, frame of mind. It appears he has first spotted the problem in his *Foundations of Arithmetic*. “Der Ausdruck “der grösste ächte Bruch” hat z. B. keinen Inhalt, weil der bestimmte Artikel den Anspruch erhebt, auf einen bestimmten Gegenstand hinzuweisen.” (Frege 1884, p.87–8) (“The expression “the largest real fraction” has, for instance, no content, because the definite article raises the claim to refer to a definite object.”) (Note, the translations from German are mine, PD.) In his ground-breaking “Über Sinn und Bedeutung” Frege literally employed the terms “Voraussetzung”, i.e., presupposition: “(...) wir setzen eine Bedeutung voraus. (...) Nun können wir uns in jener Voraussetzung freilich irren, und solche Irrtümer sind auch vorgekommen.” (Frege 1892, p. 31–2) (“We presuppose a reference. (...) We can easily be mistaken about such presuppositions, and such mistakes have occurred.”) “Wenn man also behauptet, “Kepler starb im Elend”, so ist dabei vorausgesetzt, daß der Name “Kepler” etwas bezeichne; aber darum ist doch im Sinne des Satzes “Kepler starb im Elend” der Gedanke, daß der Name “Kepler” etwas bezeichne, nicht enthalten. (...) Daß der Name “Kepler” etwas bezeichne, ist vielmehr Voraussetzung ebenso für die Behauptung “Kepler starb im Elend” wie für die entgegengesetzte.” (Frege 1892, p. 40) (“If one asserts, “Kepler died in misery”, it is presupposed that the name “Kepler” denotes something; but the thought that the name “Kepler” denotes something, is therefore not contained in the sense of the sentence “Kepler died in misery”. (...) It is more a presupposition for the assertion “Kepler died in misery” that the name “Kepler” denotes something, as likewise for its opposite.”) With the logicistic ideal, Frege was not particularly fond of the possibility of presupposition failure, and called it a “Mangel”, a ‘deficiency’, of natural language: “Dies liegt also an einer Unvollkommenheit der Sprache, von der übrigens auch die Zeichensprache der Analysis nicht ganz frei ist (...). (Frege 1892, p. 41) (“This is to blame a deficiency of language, from which also the analytic language

1. (Seuren 2005), following (Kneale & Kneale 1962), claims that, with six other challenges, Eubulides has defined the agenda of 20-th century semantics.

is not free.”) In mathematics, logic, and science, propositions, or sentences, ought to be true or false and presupposition failure prohibit them from being so. In this, Frege was both idealistic and realistic about the inherent deficiencies of natural language. In his legacy, in a note titled “Meine grundlegenden logischen Einsichten”, dated 1915, we read: “Die logische Arbeit ist gerade zu einem grossen Teil ein Kampf mit den logischen Mängeln der Sprache, die uns doch wieder ein unentbehrliches Werkzeug ist.” (Frege 1969, p. 272) (“Most of the logical work consists in a struggle with the logical defects of language, which in its turn is an indispensable tool.”)

Bertrand Russell, and Ludwig Wittgenstein along with him, also seem to have realistically acknowledged the problem of presupposition, but idealistically sought to exclude it, either in a reformation of natural language (Russell), or even in the logical analysis of language itself (Wittgenstein). Bertrand Russell (1872–1970) is famous, among others, for his theory of descriptions from 1905, which seems to have been the dominant theory until Peter Strawson (on whom more in section 4) attacked it in 1950. A couple of years later, in 1957, Russell, quite irritated, replied: “This brings me to a fundamental divergence between myself and many philosophers with whom Mr. Strawson appears to be in general agreement. They are persuaded that common speech is good enough not only for daily life, but also for philosophy. (...) He [Strawson, PD] admits that the sentence [“the King of France is wise”] is significant and not true, but not that it is false. This is a mere question of verbal convenience. He considers that the word “false” has an unalterable meaning which it would be sinful to regard as adjustable, though he prudently avoids telling us what this meaning is. For my part, I find it more convenient to define the word “false” so that every significant sentence is either true or false.” (Russell 1957, p. 387–9)

Despited these logical and logical positivist reservations, logicians like Jan Lukasiewicz (in 1920), Dmitri A. Bochvar (in 1937), and Stephen Cole Kleene (in 1938, 1952), amo. have studied many valued logics, which explicitly recognize the systematic possibility that a sentence be neither true nor false, or be assigned another value than those two. Bochvar proposed the third value to be understood as ‘uninterpretable’, or ‘nonsense’. The consequence of this being that if part of a sentence is rendered nonsense, then the interpretation of the whole crashes and it is rendered nonsense as well. Bochvar’s interpretation has a very intuitive understanding, and it has interesting mathematical and computational applications but the basic idea, understood as an account of presupposition (which it was not intended to be), falls short when we start considering more involved, quantified or modal structures. It seems to generate the prediction that an existentially quantified sentence will fail to be true or false if the sentence is uninterpretable under one of the assignments to the variable quantified over. Thus, “Someone’s bike is stolen.” would not need to be true if someone’s bike is stolen, but it would be rendered uninterpretable if someone failed a bike.

Bochvar’s system has also become known as a weak Kleene logic, in contra-distinction with a strong Kleene logic, presented by Kleene himself. In Kleene’s (strong) system, the third value is interpreted as ‘undecided’ or ‘to be determined’ and this makes a conceptually different interpretation of the connectives. If, in this system the values of one subordinate formula is not yet determined, we may still be able to assign a determinate value to the whole. So, for instance, if one conjunct of a conjunction is known to be false, we can establish that the whole conjunction will come out false, no matter what the other conjunct has as a value. Likewise, if one member of a disjunction is true, the whole can be known to be true as well. Obviously, a strong Kleene logic, like a weak Kleene one, agrees with a classical propositional logic, as long as the embedded formulas are all defined, or decided. But it also allows for determinate truth values for formulas one of whose constituent formulas are not (yet) determined. Conceptually, and also computationally, this is an attractive feature. However, it is not obvious how to generalize this intuition when we start considering more involved, quantified or modal structures. It seems to generate the prediction that an existentially quantified sentence may come out not to be false, even if it is undefined for many, if not for all, of the assignments to the variable quantified over. Thus, “Someone’s bike is stolen.” would not be false if none of those who are ‘known’ to have a bike, got their bike stolen.

Sure enough, multi-valued approaches need not be implemented and generalized as suggested above. Recent work, by, for instance, Danny Fox (Fox 2008), builds in a sophisticated and empirically very interesting way on that tradition. Some of the work goes back to (Soames 1989),

which convincingly shows that presuppositions are not symmetrically projected in coordinations. The presuppositions of a second conjunct or disjunct are not automatically those of a whole conjunction or disjunction. Asymmetric truth-tables to that effect have already been proposed by Stanley Peters (Peters 1977). The presuppositions of a second conjunct may get satisfied by those of the first, in an asymmetric way; the presuppositions of a conditional consequent clause may get satisfied by the material in the antecedent clause of the conditional; and a second disjuncts presuppositions may get satisfied by the denial or negation of the first. As a matter of fact, Peters' and Soames' truth tables predate some of the dynamic semantic insights which will be discussed in section 4.

3 The Linguistic Decade

Before such a dynamic or pragmatic turn could take over, however, the phenomenon had to be studied in much more detail, and much more extensively. Here is a little piece of discourse, filled with a couple of standard presupposition triggers, most of them identified in the seventies of the previous century.

- (7) Pete found the lost pack of cigarettes. He managed to hide it from his parents. Ron realized what a good boy Pete was. All kids thought they were alone. HARRY smoked. It was Bert who lit the cigarette. Mary smoked, too. No, only BOYS smoked. Amelia had stopped smoking.

The first sentence presupposes that there was some special pack of cigarettes. The second presupposes that there is a referent for the pronoun "it", apparently the pack of cigarettes, for the pronoun "he", apparently Peter, who has parents, and who first tried, and then succeeded in hiding the cigarettes for them. The third sentence (counterfactually) presupposes that Pete was a good boy. The fourth presupposes that there was a definite group of kids being talked about. The fifth presupposes that at least someone smoked. The sixth is that someone lit the fatal cigarette. The seventh presupposes that somebody else but Mary smoked, and the eighth that boys smoked. The last sentence presupposes that Amelia has been smoking before.

The presuppositions above are triggered in quite a different number of ways, and people disagree as to whether we can speak of a unitary phenomenon. See (Seuren 1985; Zeevat 1992) for critical discussion. Another problem, however, has been how triggered presuppositions project from embedded positions. A ground-breaking paper on this was produced by Lauri Karttunen (Karttunen 1973), and an excellent overview of this problem is given in (Soames 1989). Karttunen introduced the terminology of 'plugs', 'holes' and 'filters'. So-called 'holes' are sentential operators which inherit the presuppositions of the sentences they are applied to. Thus, all of the following constructions seem to come with the presupposition that Alfred has a niece:

- (8) Alfred didn't meet his niece.
 (9) Maybe he managed to make an appointment with his niece.
 (10) But if he made an appointment with his niece, she didn't show up.

The general idea is that all three sentences entail that Alfred has a niece, even though it is not asserted as such. The conclusion is that "not", "maybe", and "if" are holes, which let presuppositions 'speak up'. This is quite different from so-called 'plugs' which are claimed to literally block presuppositions.

- (11) Alfred said he did meet his niece.
 (12) He really believes he ate ice with his niece.

Even though these sentences strongly suggest that Alfred has a niece, one cannot be blamed for speaking falsely if Alfred fails a niece. This means, that a presupposition of a sentence *S* need not be a presupposition of a sentence *say that S*, or *believe that S* and it has therefore been claimed that 'saying that' and 'believing that' are presupposition 'plugs'. Presupposition 'filters' are the most difficult and disputed kind. *If*...-clauses are typical examples of filters, which sometimes do and sometimes do not inherit the presuppositions of the consequent clauses. Compare the following two sentences.

- (13) If Ben marries Lisa, his sons will be in good hands.

(14) If Ben gets children with Lisa, his sons will be in good hands.

Most people agree that the first, and not the second, presupposes that Ben has sons. The conclusion seems to be that an *if*-clause may help to filter out a presupposition of a superordinate clause. The data are not very much undisputed though, as will probably appear from the next section.

As a next step to the next section, we may have to note that the linguists in the seventies already agreed that presupposition is not a purely logical phenomenon. Ruth Kempson (Kempson 1975) argued that presupposition is basically a pragmatic phenomenon, and the conclusions of the leading theorists like Gerald Gazdar, Lauri Karttunen and Stanley Peters are equivocal. These authors treat presupposition in conjunction with conventional implicatures, which cannot be done without reference to a theory of pragmatics. Cf., e.g., (Gazdar 1979). Karttunen and Peters have eventually presented an account of presupposition by separating presupposition (or ‘implicature’) and assertion (‘extension’) along different dimensions. (Karttunen & Peters 1979) See (Dekker 2008) for a recent dynamic implementation of their views.

4 The Dynamic Semantic Turn

Making some steps back in history, it may be said to have been Peter F. Strawson (1919–2006) who has first, formally, identified the concept of presupposition under this name, after Frege did under the name of “Voraussetzung”. (Strawson 1952, p. 175) Before this, in 1950, Strawson had supplied his famous response to Russell’s theory of descriptions, noting that it is not sentences that are true or false, and terms that refer, but that it is the uses of sentences which are true or false, or neither, and people’s uses of terms that refer, or fail to refer—and uses which may yield truth-value gaps. (Strawson 1950, p. 327–8) Above we have already seen Russell’s touchy reaction on these insights.

Strawson’s emphasis on the use-based nature of truth, reference, and presupposition, has dominated large parts of the philosophical/linguistic literature ever since. Strawson’s core ideas became more fashionable in linguistics with the work of Keith Donnellan (Donnellan 1966; Donnellan 1978) who once more emphasized the referential *uses*, as opposed to their Russellian, attributive uses, of definite descriptions. In his seminal paper on presupposition and assertion, Robert Stalnaker continued this line of thought in the early seventies. Stalnaker emphasizes that “People, rather than sentences or propositions are said to have, or make, presuppositions in this [pragmatic, PD] sense. (...) To presuppose a proposition in the pragmatic sense is to take its truth for granted, and to assume that others involved in the context do the same.” (Stalnaker 1970, p. 279) The understanding of presuppositions has gained more emphasis in (Stalnaker 1978) where the notion has been more or less formally implemented in terms of updates of common grounds, or in terms of a dynamic notion of meaning. In the latter paper, assertions are seen to be, basically, proposals to add propositions to a propositional ground assumed to be common to all participants in a conversation.

The eighties and the nineties of the previous century have witnessed several attempts to formalize these pragmatic conceptions of presupposition further, but in different, and rival directions, all of them with their own intuitively appealing inclinations. Lauri Karttunen (Karttunen 1974), Irene Heim (Heim 1983), David Beaver (Beaver 1995), and Robert van Rooij (van Rooij 2005), among others, have elaborated and refined analyses based on the idea that presupposition relates to information presumed to be given in a discourse situation. The idea is very simple and intuitively appealing. Consider the following examples.

(15) Julio’s son will be a star.

(16) Julio has a son, and Julio’s son will be a star.

(17) If Julio has a son, Julio’s son will be a star.

(18) Julio’s son will be a star, and Julio has a son.

Example (15), but not example (16), presupposes that Julio has a son; and example (17) does not, and (18) does, presuppose that Julio has a son. A dynamic semantic treatment of assertion and presupposition neatly accounts for these facts, because such treatments build on the assumption that when the second constituent of a coordinated (conjoined, or implicational) structure is evaluated, including its presuppositions, this is against the background of what the first constituent has

implied. And not the other way around. This intuitively explains the asymmetry in the examples above. The main tenets of such dynamic treatments consist in the idea that participants in a conversation maintain some kind of a common ground, of what they tend to be commonly given information, which gets updated any time a contribution to the discourse has been made and has remained unchallenged. Notice that this notion of a ‘common ground’ is a technical, and can be suppositional, for instance, if the consequent clause of a conditional sentence is evaluated relative to a suppositional update of the common ground with the antecedent clause.

Within the framework of *Discourse Representation Theory* (*DRT*) a similar, dynamic, treatment of presupposition and of presupposition projection has been given by Rob van der Sandt, Bart Geurts and Hans Kamp. (van der Sandt 1988; van der Sandt 1992; Geurts 1999; Kamp 2001) In these, and similar frameworks, the current states of discourses and dialogues are presented as representations of the information conveyed at the current state of a discourse. Like in the dynamic theories of interpretation, presuppositions are supposed to be satisfied, but they are not directly identified as propositions, but, again, as representations of them. This enables them to be handled more as independent structures. Within *DRT*, presuppositions are not interpreted as such, but they are handled as representational items that need to be ‘resolved’ in the context. Consider a complicated structure, like the one induced by the following sentence:

(19) Lucy thinks it is not likely that if she fails her exam, she will not be able to feed her cat.

The crucial, and triggering, part here is “feed her cat” which comes with the presupposition that some y is Lucy’s cat. Maybe we all know Lucy has a cat, or maybe we all know Lucy thinks so, or maybe we all know that if what Lucy believes is true, and she also fails her exam, she has a cat. Or, even, maybe we all know, that Lucy thinks that if she fails her exam than most likely she will not have a cat and be able to feed it. These are all interpretative options made available in *DRT*, surviving from the presupposition that some y is Lucy’s cat, on a most suitable place in the *Discourse Representation Structure*, where it renders “Lucy’s cat” as a known entity right there where the term has to be interpreted. In *DRT* the different resolutions are achieved by moving the representation of y being a cat of Lucy’s, around in the *Discourse Representation Structure* until it ends in the rationally most comfortable place.

The difference between information being given in an update semantics, or being *represented* in a representational framework, like that of *DRT*, may seem marginal, but it has given rise to harsh disputes about the actual implementation of these ideas. A most typical example of the difference is the phenomenon of conditional presuppositions. The strength and beauty of the update approach is that it comes with its own logic, which, almost automatically it seems, explains the facts about presupposition projection. It has been argued, however, that the predictions are too soft to be realistic. Upon the dynamic approach, an assertion of one of the following sentences:

(20) Lucy is taking a shower now, and she forgot to feed her cats.

(21) If Lucy is taking a shower now, she forgot to feed her cats.

is not predicted to presuppose that Lucy has cats, but only that if she is taking a shower now she has cats. The predictions are rather counterintuitive. It seems the representational format of *DRT* is quite capable of handling the problem. Upon their most favourable readings both sentence get resolved by unconditionally getting the information that Lucy has cats, by resolution or by accommodation. Of course, several good arguments have been made to rescue the dynamic approach. (Geurts 1996) gives a critical overview of the problems, and (van Rooij 2007) a constructive reply. Despite the apparent contradictory predictions of the two frameworks, which might be overcome, it seems only (Zeevat 1992) has been able to avoid both horns of the dilemma, and combine the benefits of both types of dynamic approaches.

One problem, which the dynamic semantic approach shares with the previously mentioned, many-valued approaches, consists in the treatment of presuppositions in modal and quantified structures. A most straightforward implementation of the dynamic ideas seem to entail that, again,

(22) A fat man was pushing his bicycle.

presupposes that all fat men do actually have a bicycle, an unwanted result for sure. Several attempts have been made within *DRT*, and dynamic semantic alternatives, to deal with these

problems, but no consensus has been reached. It seems that the intuitive and empirical data available do not point at a direction into which to solve the issue.

5 Recent Developments

Philosophers and linguists have equally impressively emphasized the phenomenon of presupposition as a pragmatic one, but it has not been their task or aim to give an analytic, syntactic or semantic treatment of it. Not unsurprisingly, the phenomenon has recently revived in more pragmatic and cognitively oriented approaches to discourse semantics and in empirical studies. In this last section we briefly summarize some recent results and findings.

Reinhard Blutner has developed a *DRT*-style account of presupposition in the framework of bi-directional optimality theory. Optimality theory has been a very successful paradigm in phonology and syntax (Prince & Smolensky 1997), and the bi-directional version of it has been very fruitful in semantics as well. In a bi-directional framework, optimalization strategies of both speakers and hearers are taken into account. When it comes to presupposition, and put very bluntly, speakers ought not to say stuff that the hearers can figure out from themselves, but, also, the speakers should say the things which they presuppose and which the hearers cannot be assumed to figure out for themselves.

Similar in spirit is a recent series of papers in which Philippe Schlenker has argued for a ‘transparent’ pragmatic theory of presupposition, which is not built on a dynamic notion of meaning, but on a bi-valent truth value assignment. Instead, Gricean-style pragmatic is invoked to deliver most of the kinds of presuppositions that Karttunen, Heim and Beaver have argued for. (Schlenker 2008) A special issue of *Theoretical Linguistics* is devoted to proponents and opponents of this revolutionary, or as some claim, reactionary, approach. Recently (Thomason, Stone & DeVault To Appear) proposed another computational perspective on presuppositions, in terms of ‘enlightened updates’, dealing with common sense reasoning about speakers and hearer’s intentions, acts, and plans.

Definitely theoretically oriented, but much more empirically motivated, are recent studies conducted by Jennifer Spenader, Bart Geurts and Nausicaa Pouscoulous, and Emmanuel Chemla. Many discussions about presupposition, like many discussions about the semantics of expression in natural language, get hampered by almost undecidable questions about natural language intuitions concerning complicated examples brought up from the philosopher’s arm-chair, or the linguist’s keyboard. Until recently, hardly no empirical tests have been done on these intuitions, but fortunately the aforementioned authors have started to fill this embarrassing gap. In the present state of the art, however, it seems difficult to draw any specific conclusions, as the findings are not yet very decisive.

Other open questions, for which we are not going to claim an answer, and which are very much related, remain pretty open. There is still a debate about whether or not presupposition can be conceived of as a property of sentences, utterances, or speakers? Is there after all one notion of presupposition, or do the various so-called ‘triggers’ get interpreted differently? Can we do with a (partial) logic to interpret presuppositions, or do we have to implement a module in a (classical) system of interpretation that is especially designed to deal with presuppositions. An age-old question, first fully addressed by Gerald Gazdar, is how do presuppositions and implicatures relate? A final, old, question, the subject of current empirical research, is how presuppositions really project when they are embedded in modal and quantified structures. Obviously, it is also not so easy to gather empirical data, just as much as it is not so easy to gather analytical arm-chair data.

Further Reading

The reader may get a good sense of the wealth of discussion and examples on the topic of presupposition from the following overview papers and collections: (Soames 1989; Horn 1996; Beaver

1997; Bäuerle, Reyle & Zimmermann 2010). A special issue of *Theoretical Linguistics*, 2008, Volume 34/3, has been devoted to the subject, as well as an ESSLLI workshop on “New Directions in the Theory of Presupposition” in Bordeaux, 2009, organized by Nathan Klinedinst and Daniel Rothschild (<http://essllipresupposition2009.blogspot.com/>).

References

- Aquinas, Thomas 2000–2009. Aristotle on Interpretation. In: *The Collected Works of St. Thomas Aquinas*, <http://www.corpusthomisticum.org/>: Corpus Thomisticum.
- Aristotle 1975. *Categories and De Interpretation*. Oxford: Oxford University Press.
- Bäuerle, Rainer, Uwe Reyle & Thomas Ede Zimmermann 2010. *Presuppositions and Discourse: Essays Offered to Hans Kamp*, volume 21 of *CRISPI*. Bingley, UK: Emerald Group.
- Beaver, David 1995. *Presupposition and Assertion in Dynamic Semantics*. Ph.D. thesis, CCS, Edinburgh. Published in 2001 by CSLI Publications, Stanford.
- Beaver, David 1997. Presupposition. In: Johan van Benthem & Alice ter Meulen (eds.) *Handbook of Logic and Language*, Amsterdam: Elsevier.
- Bochvar, Dmitry Anatol'evich 1939. Ob odnom trehznachom iscisenii i ego primeneii k analizu paradoksov klassitskogo rassirennogo funkcional nogo iscisenija. *Matematiciskij sbornik* 4. English translation, 1981, “On a Three-valued Logical Calculus and Its Applications to the Analysis of the Paradoxes of the Classical Extended Functional Calculus” in: *History and Philosophy of Logic* 2, pp. 87–112.
- Dekker, Paul 2008. A Multi-dimensional Treatment of Quantification in Extraordinary English. *Linguistics and Philosophy* 31(1), pp. 101–127.
- Donnellan, Keith 1966. Reference and Definite Descriptions. *Philosophical Review* 75, pp. 281–304.
- Donnellan, Keith 1978. Speaker Reference, Descriptions and Anaphora. In: Peter Cole (ed.) *Syntax and Semantics, Vol 9. Pragmatics*, New York: Academic Press. pp. 47–68.
- Fox, Danny 2008. Two short notes on Schlenker’s theory of presupposition projection 34(3), pp. 237–252.
- Frege, Gottlob (ed.) 1884. *Die Grundlagen der Arithmetik: eine logisch-mathematische Untersuchung über den Begriff der Zahl*. Breslau: Wilhelm Koebner Verlag.
- Frege, Gottlob 1892. Über Sinn und Bedeutung. *Zeitschrift für Philosophie und philosophische Kritik* NF 100, pp. 25–50.
- Frege, Gottlob 1969. *Nachgelassene Schriften und Wissenschaftlicher Briefwechsel*. Hamburg: Meiner Verlag. Edited by Hans Hermes and Friedrich Kambartel and Friedrich Kaulbach.
- Gazdar, Gerald 1979. *Pragmatics. Implicature, Presupposition, and Logical Form*. New York: Academic Press.
- Geurts, Bart 1996. Local Satisfaction Guaranteed: A Presupposition Theory and its Problems. *Linguistics and Philosophy* 19(3), pp. 259–294.
- Geurts, Bart 1999. *Presuppositions and Pronouns*, volume 3 of *CRISPI*. London: Elsevier.
- Heim, Irene 1983. On the Projection Problem for Presuppositions. In: M. Barlow, D. Flickinger & M. Wescoat (eds.) *Proceedings of WCCFL II*. Stanford, California. Reprinted in Steven Davis (ed.) 1991, *Pragmatics: A Reader*, Oxford University Press.
- Horn, Laurence R. 1985. Metalinguistic Negation and Pragmatic Ambiguity. *Language* 61, 121–174.
- Horn, Laurence R. 1996. Presupposition and Implicature. In: Shalom Lappin (ed.) *The Handbook of Contemporary Semantic Theory*, Oxford: Blackwell. 299–319.
- Kamp, Hans 2001. Presupposition Computation and Presupposition Justification: One Aspect of the Interpretation of Multi-Sentence Discourse. In: Myriam Bras & Laure Vieu (eds.) *Semantics and Pragmatic Issues in Discourse and Dialogue*, Amsterdam: Elsevier. pp. 57–84.
- Karttunen, Lauri 1973. Presuppositions of compound sentences. *Linguistic Inquiry* 4, pp. 169–193.
- Karttunen, Lauri 1974. Presupposition and Linguistic Context. *Theoretical Linguistics* 1(1), pp. 181–193.

- Karttunen, Lauri & Stanley Peters 1979. Conventional Implicature. In: Choon-Kyu Oh & David A. Dinneen (eds.) *Syntax and Semantics 11 – Presupposition*, New York: Academic Press. pp. 1–56.
- Kempson, Ruth M. 1975. *Presupposition and the Delimitation of Semantics*. Cambridge: Cambridge University Press.
- Kleene, Stephen Cole 1938. On Notation for Ordinal Numbers. *The Journal of Symbolic Logic* 3(4), pp. 150–155.
- Kleene, Stephen Cole 1952. *Introduction to Metamathematics*. Amsterdam: North-Holland.
- Kneale, William & Martha Kneale 1962. *The Development of Logic*. Oxford: Clarendon Press.
- Laertius, Diogenes 1853. *The Lives and Opinions of Eminent Philosophers*. <http://classicpersuasion.org/pw/diogenes/>.
- Lukasiewicz, Jan 1920. O logice trójwartościowej. *Ruch filozoficzny* 5, pp. 170–171. English translation, 1970, “On three-valued logic”, in L. Borkowski (ed.), *Selected works by Jan Łukasiewicz*, NorthHolland, Amsterdam, 1970, pp. 8788.
- Peters, Stanley 1977. A Truth-Functional Formulation of Karttunen’s Account of Presupposition. In: Susan F. Schmerling & Carlota S. Smith (eds.) *Texas Linguistic Forum*, 6, University of Texas at Austin.
- Prince, Alan & Paul Smolensky 1997. Optimality: from neural networks to universal grammar. *Science* 275, pp. 1604–1610.
- van Rooij, Robert 2005. A Modal Analysis of Presupposition and Modal Subordination. *Journal of Semantics* 22(3), pp. 281–305.
- van Rooij, Robert 2007. Strengthening conditional presuppositions. *Journal of Semantics* 24(3), pp. 289–304.
- Russell, Bertrand 1957. Mr. Strawson on Referring. *Mind* 66, pp. 385–389.
- van der Sandt, Rob A. 1988. *Context and Presupposition*. London: Croom Helm.
- van der Sandt, Rob A. 1992. Presupposition Projection as Anaphora Resolution. *Journal of Semantics* 9(4), pp. 333–377.
- Schlenker, Philippe 2008. Be Articulate: A Pragmatic Theory of Presupposition Projection. *Theoretical Linguistics* 34(3), pp. 157–212.
- Seuren, Pieter A.M. 1985. *Discourse Semantics*. Oxford: Blackwell.
- Seuren, Pieter A.M. 2005. Eubulides as a 20-th Century Semanticist. *Language Sciences* 27, pp. 75–95.
- Soames, Scott 1989. Presupposition. In: Dov Gabbay & Franz Guenther (eds.) *Handbook of Philosophical Logic*, Dordrecht: Kluwer, volume IV, Topics in the Philosophy of Language. 553–616.
- Stalnaker, Robert 1970. Pragmatics. *Synthese* 22, pp. 272–289. Reprinted in Donald Davidson and Gilbert Harman, 1972, *Semantics of Natural Language*, Reidel, Dordrecht, pp 272–289.
- Stalnaker, Robert 1978. Assertion. In: Peter Cole (ed.) *Syntax and Semantics 9 – Pragmatics*, New York: Academic Press. pp. 315–332.
- Strawson, Peter F. 1950. On referring. *Mind* 59, pp. 320–344.
- Strawson, Peter F. 1952. *Introduction to Logical Theory*. London: Methuen & Co.
- Thomason, Richmond H., Matthew Stone & David DeVault To Appear. Enlightened Update: A computational architecture for presupposition and other pragmatic phenomena. In: Donna Byron, Craige Roberts & Scott Schwenter (eds.) *Presupposition Accommodation*, Ohio: Ohio State Pragmatic Initiative.
- Zeevat, Henk 1992. Presupposition and Accommodation in Update Semantics. *Journal of Semantics* 9(4), pp. 379–412.