Presupposition

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Introduction

A presupposition is a semantic property of a sentence making that sentence fit for use in certain contexts and unfit for use in others. This property is partly based on the fact that if a sentence B presupposes a sentence A ($B \gg A$), then B entails A ($B \models A$): whenever B is true, A is necessarily also true, given the same situation referred to, in virtue of the *meanings* of B and A. Presuppositions (*P-entailments*) are thus a subclass of entailments. Entailments that are not presuppositional are *classical* or *C-entailments.* (1) illustrates a C-entailment ($\models_c$); (2a–d) illustrate P-entailments ($\gg$):

(1) Jack has been murdered. $\models_c$ Jack is dead.

(2a) Jack lives in Manchester. $\gg$ Jack exists.
(2b) Jill has forgotten that Jack is her student. $\gg$ Jack is Jill's student.
(2c) Jack is divorced. $\gg$ Jack was once married.
(2d) Only Jack left. $\gg$ Jack left.

(2a) illustrates *existential presupposition.* (2b) exemplifies *factive presuppositions* (Kiparsky and Kiparsky, 1971): the factive predicate (*have forgotten*) requires the truth of the *that*-clause. (2c) is a case of *categorial presupposition*, derived from the lexical meaning of the main predicate (*be divorced*). (2d) belongs to a *remainder category*, the presupposition in question being due to the particle *only*.

There are various differences between P-entailments and C-entailments. When $B \gg A$, A is somehow 'prior' to B, restricting the domain within which B is interpretable. Presuppositions present themselves specifically, whereas C-entailments are 'unguided' and thus lack the function of restricting the interpretation domain. This makes presupposition relevant for the cognitive aspects of linguistic information transfer.

There is also a logical difference, especially regarding *negation*, the central operator in any logic. In standard logic a sentence that is false for any reason whatsoever is made true by the preposed negation. In language, however, negation is sensitive, in default uses, only to C-entailments, leaving the P-entailments intact. Suppose (2d) is false on account of a C-entailment's falsity, for example because other people left as well. Then (3a), the negation of (2d), is true and (3b) is coherent, as expected. Not so when a P-entailment of (2d) is false, as in (3c), where the presupposition 'Jack left' is denied. (3c) is incoherent because *Not only Jack left* still presupposes that Jack left ('!!' indicates incoherence):

(3a) Not only Jack left.
(3b) Not only Jack left: other people left as well.
(3c) !!Not only Jack left: Jack did not leave.

This raises the question of the truth value of (3a) in cases where, say, Jack did not leave. In standard logic, the entailment from both (2d) and its negation (3a) to *Jack left* means that if Jack did not leave, both (3a) and (2d) are false simultaneously, which violates the Principle of Contradiction ('a sentence and its negation cannot be true or false simultaneously'). Standard logic thus rules out falsity for *Jack left*, because its falsity leads to a contradiction. This makes *Jack left* a necessary truth. But *Jack left* is, if true, contingently so. Therefore, standard logic is inadequate for presuppositions.

Many feel that this calls for a rejection of the Principle of the Excluded Third or PET ('any sentence expressing a proposition is either true or false, without any values in between or outside') and for the introduction of a *third truth value* into the logic of language. Others prefer to keep standard bivalent logic intact and seek a *pragmatic* way out in terms of conditions of use. This question is discussed in the next section.

Operational Criteria

Presuppositions are detectable ('observable') irrespective of actual token use. Like C-entailments, P-entailments can be read off isolated sentences, regardless of special context. Yet they evoke a context. (2a) requires it to be contextually given that there exists someone called 'Jack' and thus evokes such a context, asserting that he lives in Manchester; (2b) evokes a context where Jack is Jill's student, asserting that Jill has forgotten that; (2c) requires a context where Jack was once married, and asserts that the marriage has been dissolved; and (2d) requires a context where Jack left, while asserting that no one else left. This, together with the entailment criterion, provides a set of operational criteria to recognize presuppositions.

First, if $B \gg A$ then $B \models A$. The usual heuristic criterion for an entailment $B \models A$ is the incoherence of the juxtaposition of *not(A)* with *B*. On the whole, this suffices as a criterion. For example, (4a) does not entail, and therefore does not presuppose, (4b), because (4c) is still coherent.

(4a) Lady Fortune neighs.
(4b) Lady Fortune is a horse.
(4c) Lady Fortune is not a horse, yet she neighs.

But this criterion overkills when the entailing sentence is qualified by an epistemic possibility operator, like English *may*, as in (5a), which does not entail (5b), even though (5c) is incoherent. Epistemic possibility requires compatibility of what is said to be possible with what is given in discourse or knowledge. Therefore, if $B \models A$, then with *not(A)* in the knowledge base, *possibly(B)* results in inconsistency, although *possibly(B)* does not entail *A*. The entailment criterion can be refined, without loss of generality, by testing the (in)coherence of the juxtaposition of *possibly (not(A))* with *B*, as in (5d). Because (5d) is coherent, (5a) $\not\models$ (5b):

(5a) Jack may have been murdered.
(5b) Jack is dead.
(5c) !! Jack is not dead, yet he may have been murdered.
(5d) Jack may not be dead, yet he may have been murdered (and thus be dead).

To distinguish P-entailments from C-entailments further criteria are needed. First there is the *projection criterion*: if $B \gg A$ and B stands under an entailment-canceling operator like *possibly* or *not* or *believe*, A survives not as a P-entailment but as a more or less strongly invited presuppositional inference (>). Generally, $\mathbf{O}(B_A) > A$, where 'B_A' stands for 'B presupposing A' and '**O**' for an entailment-canceling operator. In standard terminology, the presupposition A is *projected* through the operator **O**. The conditions under which presuppositions of embedded clauses are projected through higher operators constitute the *projection problem of presupposition*.

Projection is typical of P-entailments, as in (6), not of C-entailments, as in (7):

(6) Jill believes that Jack is divorced > Jack was once married.

(7) Jill believes that Jack has been murdered $\not>$ Jack is dead.

The projection criterion is mostly used with negation as the entailment-canceling operator. Strawson (1950, 1952) held, incorrectly, that presupposition is always preserved as entailment under negation. In his view, a sentence like:

(8) The present king of France is not wise.

still presupposes, and thus entails, that there exists a king of France, who therefore, if (8) is true, must lack wisdom. Although presupposition is, in fact, normally weakened to invited inference under negation, Strawson's 'negation test' became the standard test for presupposition. Provided the condition of 'entailment' is replaced by that of 'at least invited inference,' the test is sound.

Then there is the *discourse criterion*: a discourse bit *A and/but* B_A (with allowance for anaphoric processes) is felt to be orderly and well planned – that is, *sequential*. The condition of sequentiality is used to characterize stretches of acceptable text that have their presuppositions spelled out ('√' signals sequentiality):

(9a) √There exists someone called 'Jack,' and he lives in Manchester.
(9b) √Jack is Jill's student, but she has forgotten that he is.
(9c) √Jack was married, but he is divorced.
(9d) √Jack left, and he is the only one who did.

C-entailments and inductive inferences behave differently. When they precede their carrier sentence the result may still be acceptable, yet there is a qualitative difference, as shown in (10a,b), where a colon after the first conjunct is more natural ('#' signals nonsequential but coherent discourse):

(10a) #Jack is dead: he has been murdered.
(10b) #Jack earns money: he has a job now.

The discourse criterion still applies through projection: *A and/but* $\mathbf{O}(B_A)$ is again sequential (the entailment-canceling operators are printed in italics):

(11a) √Jack really exists, and Jill *believes* that he lives in Manchester.
(11b) √Jack is Jill's student, but she has *probably* forgotten that he is.
(11c) √Jack was once married, and he is *not* divorced.
(11d) √Jack left, and he is *not* the only one who did.

These tests reliably set off P-entailments from C-entailments.

The Logical Problem

The Threat to Bivalence

The first to see the threat posed by presuppositions to standard logic was Aristotle's contemporary Eubulides of Miletus (Kneale and Kneale, 1962: 113–117). He formulated (besides other paradoxes such as the Liar) the paradox of the *Horned Man* (Kneale and Kneale, 1962: 114): "What you have not lost you still have. But you have not lost your horns. So you still have horns." This paradox rests on presupposition. Read *B* for *You have lost your horns* and *A* for *You had horns.* Now $B \gg A$ (the predicate *have lost* induces the presupposition that what has been lost was once possessed).

Eubulides implicitly assumed that P-entailments are preserved under negation: $B \models A$ and $not(B) \models A$. Under PET, this would make *A* a logically necessary truth, which is absurd for a contingent sentence like *You had horns.* To avoid this, PET would have to be dropped, very much against Aristotle's wish. Although Aristotle himself was unable to show Eubulides wrong, there is a flaw in the paradox. It lies in the incorrectly assumed entailment in the first premise "What you have not lost you still have." For it is possible that a person has not lost something precisely because he never had it.

The same problem was raised by Strawson (1950, 1952), but with regard to existential presuppositions. Like Eubulides, Strawson assumed full entailment of presupposition under negation and concluded that PET had to go. For him, nonfulfillment of a presupposition leads to both the carrier sentence and its negation lacking a truth value altogether. Frege (1892) had come to the same conclusion, though from a different angle. In a sentence like:

(12) The unicorn ran.

analyzed as 'Run(the unicorn)', the subject term lacks a referent in the actual world, though the existence of such a referent is presupposed. That makes it impossible to test the truth of (12): since there is no unicorn, there is no way to check whether it actually ran. Therefore, Frege (and Strawson) concluded, (12) lacks a truth value.

This posed a profound problem for standard logic in that the applicability of standard logic to English would have to be made dependent on contingent conditions of existence – a restriction no logician will accept. In the effort to solve this problem two traditions developed, the *Russell tradition* and the *Frege–Strawson tradition.*

The Russell Tradition

In his famous 1905 article, Russell proposed a new analysis for sentences with definite terms, like (13a). Putting the new theory of quantification to use, he analyzed (13a) as (13b), or 'there is an individual *x* such that *x* is now king of France and *x* is bald, and for all individuals *y*, if *y* is now king of France, *y* is identical with *x*':

(13a) The present king of France is bald.
(13b) $\exists x\, [KoF(x) \wedge Bald(x) \wedge \forall y\, [KoF(y) \rightarrow x = y]]$

In order to save bivalence, Russell thus replaced the time-honored subject-predicate analysis with an analysis in which the definite description *the present king of France* no longer forms a constituent of the logically analyzed sentence, but is dissolved into quantifiers and propositional functions.

The negation of (13a) should be (13b) preceded by the negation operator, i.e. (14a). However, Russell held, speakers often prefer, for reasons best known to themselves, to interpret *The present king of France is not bald* as (14b), with internal negation over 'Bald(x)':

(14a) $\neg\exists x\, [KoF(x) \wedge Bald(x) \wedge \forall y\, [KoF(y) \rightarrow x = y]]$
(14b) $\exists x\, [KoF(x) \wedge \neg Bald(x) \wedge \forall y\, [KoF(y) \rightarrow x = y]]$

This makes sentences like (8) ambiguous.

This analysis, known as Russell's *Theory of Descriptions*, was quickly accepted by logicians and philosophers of language, as it saved PET. At the same time, however, it drove logicians and linguists apart, as it defies any notion of sentence structure. Moreover, the 'uniqueness clause' in (13b), $\forall y\, [KoF(y) \rightarrow x = y]$, saying that only one king of France exists, is meant to account for the uniqueness expressed by the definite article. In fact, however, the definite article implies no claim to uniqueness of existence, only to discourse-bound uniqueness of reference. Then, this analysis is limited to definite descriptions and is unable to account for other kinds of presupposition. Factive and categorial presuppositions, and those derived from words like *all*, *still*, or *only*, fall outside its coverage.

An important objection is also that negation can only cancel presuppositions when it is a separate word (not a bound morpheme) and in construction with a finite verb. In all other cases, the negation fully preserves P-entailments. Thus, (3a), with *not* in construction with *only*, preserves the presupposition induced by *only*. Moreover, sentence-initial factive *that*-clauses preserve presuppositions even though the negation is constructed with the finite verb:

(15a) That Jack left surprised Jill $\gg$ Jack left.
(15b) That Jack left did not surprise Jill $\gg$ Jack left.

Likewise for cleft and pseudocleft sentences:

(16a) It was Jack who left / The one who left was Jack $\gg$ Someone left.
(16b) It wasn't Jack who left / The one who left wasn't Jack $\gg$ Someone left.

When cases like these, overlooked by the authors discussed, are taken into account and the logic is kept bivalent, the presuppositions of sentences like (2d) and (3a), (15a,b), or (16a,b) would again have to be necessary truths.

The same goes for:

(17a) All men are mortal ≫ There exist men.
(17b) Not all men are mortal ≫ There exist men.

In standard Predicate Calculus, however, (17a) does not entail (and thus cannot presuppose) that there exist men, whereas (17b) does, because 'not all F is G' is considered equivalent with 'some F is not G,' which entails the existence of at least one F. Yet both (17a) and (17b) satisfy the operational criteria given earlier. Standard Predicate Calculus thus seems to fit the presuppositional facts badly.

To account for other than existential presuppositions some have proposed to change Russell's analysis into:

(18) $\exists x\,[\mathrm{KoF}(x)] \wedge \mathrm{Bald(he)}$

or 'there is a king of France, and he is bald'. *He* is now no longer a bound variable but an anaphoric pronoun. With a logical mechanism for such anaphora (as in Kamp, 1981; Groenendijk and Stokhof, 1991), this analysis can be generalized to all categories of presupposition. A sentence B_A is now analyzed as *A and* B_A, and *Not*(B_A), though normally analyzed as *A and Not*(B_A) with small scope *not*, can also, forced by discourse conditions, be analyzed as *Not (A and* B_A*)*, with large scope *not*. This analysis, which saves PET, is known as the *Conjunction Analysis* for presupposition.

Anaphora is needed anyway, because Russell's analysis fails for cases like (19), where quantifier binding is impossible for *it*, which is in the scope of *I hope*, whereas *I hope* is outside the scope of *I know*:

(19) I know that there is a dog and I hope that
it is white.

The Conjunction Analysis, however, still cannot account for the fact that (20a) is coherent but (20b) is not:

(20a) There is a dog and it is white, and there is a dog
and it is not white.
(20b) !!There is a dog and it is white and it is not
white.

(20a) speaks of two dogs, due to the repetition of *there is a dog*, but (20b) speaks of only one. Yet the Conjunction Analysis cannot make that difference, because the repetition of *there is a dog* makes no logical or semantic difference for it. Attempts have been made to incorporate this difference into the logic (e.g., Kamp, 1981; Heim, 1982; Groenendijk and Stokhof, 1991) by attaching a memory store to the model theory that keeps track of the elements that have so far been introduced existentially.

Even then, however, the Conjunction Analysis still postulates existence for term referents whose existence is denied:

(21) Santa Claus does not exist.

The Frege-Strawson Tradition

Strawson (1950, 1952) was the first to oppose the Russell tradition. He reinstated the traditional subject-predicate analysis and discussed only existential presuppositions. Negation is considered presupposition-preserving. Sentences with presupposition failure are considered truth-valueless. Strawson's definition of presupposition is strictly logical: $B \gg A =_{\mathrm{Def}} B \models A$ and $Not(B) \models A$. This analysis requires a *gapped bivalent propositional calculus* (GBPC), shown in **Figure 1**.

Insofar as truth values are assigned, GBPC preserves standard logic. Moreover, * is 'infectious': when fed into a truth function it yields *. Remarkably, GBPC limits the applicability of logic to situations where the presuppositions of the sentences involved are true. The applicability of GBPC thus varies with contingent circumstances.

Wilson (1975) and Boër and Lycan (1976) side with Russell and criticize Strawson, showing examples of presupposition-canceling under negation: (22a–c) are coherent, though they require emphatic, discourse-correcting accent on *not*:

(22a) The present king of France is NOT bald: there is
no king of France!
(22b) Jill has NOT forgotten that Jack is her student:
Jack isn't her student!
(22c) Jack is NOT divorced: he never married!

For these authors, classical bivalent logic is adequate for language; P-entailments differ from C-entailments only pragmatically. There would be a point if (a) a pragmatic explanation were available, and (b) presuppositions were always canceled under negation. But neither condition is fulfilled.

		∧ B			∨ B		
~A	A	T	F	*	T	F	*
F	T	T	F	*	T	T	*
T	F	F	F	*	T	F	*
*	*	*	*	*	*	*	*

Figure 1 Strawson's gapped bivalent propositional calculus (GBPC). Key: ~, presupposition-preserving negation; T, truth; F, falsity; *, unvalued.

In fact, the presupposition-canceling 'echo' negation NOT of (22a–c) is impossible for cases that preserve P-entailments under negation:

(23a) !!NOT only Jack left: he didn't leave!
(23b) !!NOT all students protested: there weren't any students!
(23c) !!That Jack left did NOT surprise Jill: he didn't leave!
(23d) !! The one who left was NOT Jack: nobody left!

Likewise for the negation required with *negative polarity items* (NPIs) in assertive main clauses (NPIs are printed in italics):

(24a) !!Jack does NOT *mind* that he is in trouble: he isn't in trouble!
(24b) !!Jack has NOT come back *yet*: he never went away!
(24c) !!Jill has NOT seen Jack *in weeks*: she doesn't exist!

This analysis is thus fatally flawed.

The Trivalent Solution

One may envisage a three-valued logic, identical to standard bivalent logic but for a distinction between two kinds of falsity, each turned into truth by a separate negation operator. Minimal falsity (F1) results when all P-entailments are true but not all C-entailments, radical falsity (F2) when one or more P-entailments are false. Correspondingly, *minimal negation* ($\sim$) turns F1 into truth (T) and T into F1, leaving F2 unaffected, whereas *radical negation* ($\simeq$) turns F2 into T and both T and F1 into F1.

In Kleene's (1938) *trivalent propositional calculus*, $\wedge$ yields T only if both conjuncts are T, F1 when either conjunct is F1, and F2 otherwise. Analogously, $\vee$ yields T when either conjunct is T, F1 only if both conjuncts are F1, and F2 otherwise. The corresponding tables are given in **Figure 2** (where the value F2 is named 'indefinite' or I). This logic preserves all theorems of standard logic when bivalent $\neg$ replaces trivalent $\sim$. Kleene's calculus lacks the radical negation ($\simeq$), but comes to no harm if it is added.

Kleene's calculus is used by some presuppositional logicians (e.g., Blau, 1978). It is empirically problematic in that it yields F1 for 'A $\wedge$ B' when either *A* or *B* is F2 whereas the other is F1, thus allowing presupposition failure in one conjunct while still considering the conjunction as a whole free from presupposition failure. This makes no sense in view of *and* as a discourse incrementer. Kleene's calculus is more suitable for vagueness phenomena with F2 as an umbrella value for all intermediate values between T and F (Seuren *et al.*, 2001).

In Seuren's presuppositional propositional calculus TPC2 (Seuren, 1985, 2001: 333–383; Seuren *et al.*, 2001) the operators $\wedge$ and $\vee$ select, respectively, the highest and lowest of the component values (F2 > F1 > T), as shown in **Figure 3**. Classical negation ($\neg$), added for good measure, is the union of $\sim$ and $\simeq$, but is taken not to occur in natural language, which has only $\sim$ and $\simeq$. In TPC2, F2 for either conjunct yields F2 for 'A $\wedge$ B', as required.

TPC2 is likewise equivalent with standard bivalent logic under the operators $\neg$, $\wedge$, and $\vee$ (Weijters, 1985). Thus, closed under ($\neg$, $\wedge$, $\vee$) standard bivalent logic is independent of the number of truth values employed, though any value 'false' beyond F1 will be vacuous. Moreover, in both generalizations with n truth values ($n \geq 2$), there is, for any value $i \geq 2$, a *specific negation* N^i turning i into T, values lower than i into F1, and leaving higher values unaffected. Thus, in TPC2, N^{F1} is $\sim$ and N^{F2} is $\simeq$. Classical bivalent $\neg$ is the union of all specific negations. Consequently, in the standard system, $\neg$ is both the one specific negation allowed for and the union of all specific negations admitted. Standard logic is thus the most economical variety possible of a generalized calculus of either type.

The Discourse Approach

Presupposition is not defined, only restricted, by its logical properties:

(25) If $B \gg A$, then $B \models A$ and $\sim B \models A$, and $\sim A / \simeq A \models \simeq B$.

(25) thus specifies necessary, but not sufficient, conditions for presupposition. Were one to adopt a purely logical definition, various paradoxical consequences would follow. For example, any arbitrary sentence would presuppose any necessary truth, which would make the notion of presupposition empirically vacuous.

			∧B			∨B		
¬A	~A	A	T	F1	F2	T	F1	F2
F1	F1	T	T	F1	F2	T	T	T
T	T	F1	F1	F1	F1	T	F1	F2
T	F2	F2	F2	F1	F2	T	F2	F2

Figure 2 Trivalent propositional calculus (TPC1).

				∧B			∨B		
¬A	≃A	~A	A	T	F1	F2	T	F1	F2
F1	F1	F1	T	T	F1	F2	T	T	T
T	F1	T	F1	F1	F1	F2	T	F1	F1
T	T	F2	F2	F2	F2	F2	T	F1	F2

Figure 3 Trivalent propositional calculus (TPC2).

Attempts have been made (Gazdar, 1979; Heim, 1982; Seuren, 1985, 2000) at viewing a presupposition A of a sentence B_A as restricting the interpretable use of B to contexts that admit of, or already contain, the information carried by A. Such an approach creates room for an account of the discourse-correcting 'echo' function of presupposition-canceling (radical) NOT. Horn (1985, 1989) correctly calls NOT *metalinguistic*, in that it says something about the *sentence* in its scope – though his generalization to other metalinguistic uses of negation is less certain. Neither TPC2 nor TPC1 can account for this metalinguistic property. This means that the argument of NOT is not a sentence but a quoted sentence. NOT('B_A') says about the sentence B_A that it cannot be sequentially incremented in a discourse refusing A.

Sequential incrementation to a discourse D restricts D to a progressively narrower section of the universe of all possible situations U, making the increment *informative*. Incrementation of A, or i(A), to D restricts D to the intersection of the set of situations in which D is true and the set of situations where A is true. The set of situations in which a sentence or set of sentences X is true is the *valuation space* of X, or /X/. For D incremented with A we write 'D + A'. D + A is the conjunction of D and A, where D is the conjunction of all incremented sentences since the initial U. The *sequentiality condition* requires:

(a) for any A, /D/ is larger than /D + A/
(informativity: remember that D is restricted by A);

(b) *if $B \gg A$ then i(A) must precede i(B) (not so when $B \models_c A$).*

If A has not already been incremented prior to i(BA) it is cognitively 'slipped in,' a process called *accommodation* or *post hoc suppletion*. A text requiring accommodation is not fully sequential, but still fully coherent.

On the assumption that D, as so far developed, is true, any subsequent sentence B must be valued T or F1, because F2 for B implies that some presupposition of B, and hence D as a whole, is not true. This assumption is made possible by the *Principle of Presumed Truth* (PPT), which says that it must be possible for any D to be true. The assumption that D is actually true blocks the processing of a new sentence that would be valued F2 in D. For example, let D contain i(~A). Now B_A is blocked, because A is valued F1 (assuming that D is true). But NOT('B') can be incremented and is true under PPT, as it says about B that it cannot be incremented.

Therefore, /D/ must contain situations with sentences as objects. Cognitively speaking, this is perfectly plausible, because speakers are aware of the fact that they utter words and sentences. That awareness enables them to refer back to words and sentences just uttered or expected to be uttered. Words and sentences as objects are a necessary corollary of any speech utterance. This corollary underlies the free mixing of object language and metalanguage in natural language. The prohibition issued by logicians against such mixing has no ground in natural language (Seuren, 2001: 125–130).

Natural language negation is, in a sense, ambiguous (depending on syntactic conditions) between presupposition-preserving (minimal) *not* and presupposition-canceling (radical) NOT. Many find this unacceptable, because ambiguities are normally language specific, whereas this ambiguity would appear to be universal. Yet the obvious question of what would be the overarching single meaning of the negation in all its uses has not, so far, been answered. Similar problems occur with other logical operators, especially with *and*, *or*, and *if*, as the following examples show:

(26a) Do as I say and you will be a rich man.
(26b) Don't come nearer, or you'll be a dead man.
(26c) That's awful, or should I say 'dreadful'?
(26d) Let's go home, or do you have a better idea?
(26e) If you're tired, I have a spare bed.

In the case of *not* and the other logical operators, speech act factors as well as factors of metalinguistic use play an important role. Unfortunately, the grammar and semantics of both speech acts and metalinguistic use are still largely unexplored. Horn (1985) pointed out that English *not* is often used metalinguistically, as in:

(27a) Not Lizzy, if you please, but the Queen is wearing a funny hat.
(27b) She wasn't happy, she was ecstatic!

And he classifies radical NOT with the other metalinguistic cases. However, as pointed out in Seuren (2001: 345–347), NOT, though metalinguistic, differs from the other cases in that it can only occur in construction with the finite verb (the 'canonical position'), whereas the other metalinguistic negations can occupy any position normal *not* can occur in. (28a) is coherent, with a canonically placed NOT, but (28b,c), likewise with NOT, are incoherent, as NOT is in a non-canonical position:

(28a) He did NOT only lose $500. He only lost $20.
(28b) !!NOT only did he lose $500. He only lost $20.
(28c) !!He NOT only lost $500. He only lost $20.

The question of the overall meaning description of the logical operators, in terms of which their strictly logical meaning would find a place, defines a research project of considerable magnitude – a project that has so far not been undertaken in a coordinated way.

The Structural Source of Presuppositions

The source of at least three of the four types of presupposition distinguished earlier lies in the satisfaction conditions of the main predicate of the carrier sentence. The satisfaction conditions of an n-ary predicate P^n are the conditions that must be satisfied by any n-tuple of objects for P^n to yield truth. Thus, for the unary predicate *white* the conditions must specify when any object can truthfully be called 'white'. For the binary predicate *wash* they must specify when it can truthfully be said of any pair of objects $<i,j>$ that '*i* washes *j*'.

A distinction is made between two kinds of lexical conditions, *preconditions* and *update conditions*. When a precondition is not fulfilled, the sentence is radically false; failure of an update condition yields minimal falsity. Fulfillment of all conditions gives truth.

The satisfaction conditions of a predicate P^n are specified according to the schema ($[[P^n]]$ is the extension of P^n):

(29) $[[P^n]] = \{<i^1,i^2,\ldots,i^n> : \ldots$(preconditions)$\ldots$ $|\ \ldots$(update conditions)$\ldots\}$
or: 'the extension of P^n is the set of all n-tuples of objects $<i^1,i^2,\ldots,i^n>$ such that … (preconditions) … and … (update conditions) …'.

The satisfaction conditions of the predicate *bald*, for example, may be specified as follows (without claiming lexicographical adequacy):

(30) [[Bald]] = {*i* : *i* is normally covered, in prototypical places, with hair, fur, or pile; or *i* is a tire and normally covered with tread | the normal covering is absent}

This caters for categorial presuppositions. Factive presuppositions are derived by the precondition that the factive clause must be true.

Existential presuppositions are derivable from the precondition that a specific term *t* of a predicate P^n refers to an object existing in the real world. P^n is then *extensional* with respect to *t*. *Talk about*, for example, is extensional with respect to its subject term, but not with respect to its object term, because one can talk about things that do not exist. The satisfaction conditions of *talk about* will thus be as in (31), where the asterisk on *j* indicates that *talk* is nonextensional with respect to its object term:

(31) [[talk about]] = $\{<i,j^*> : \ldots$ (preconditions) $\ldots$ $|\ \ldots$ (satisfaction conditions) $\ldots\}$

The predicate *exist* lacks any preconditions and is to be specified as nonextensional with respect to its subject term:

(32) [[exist]] = $\{i^* \mid i$ is an object in the actual world$\}$

A definite subject of the verb *exist* must be represented somewhere in **D**, normally in some intensional subdomain, e.g., the subdomain of things that Jack keeps talking about, as in:

(33) The man that Jack keeps talking about really exists.

The incremental effect of (33) is that the representation of the thing that is said to exist is moved up to the truth domain of D. This analysis requires the assumption of *virtual objects*.

The remainder category of presuppositions, induced by words like *only* or *still*, or by contrastive accent or (pseudo)cleft constructions, looks as if it cannot be thus derived. The choice here is either to derive them by *ad hoc* rules or to adopt a syntactic analysis in terms of which of these words and accents figure as (abstract) predicates at the level of semantic representation taken as input to the incrementation procedure.

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