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TABLE OF CONTENTS

Presuppositions and Quantifiers[1]

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Van Fraassen's definition of a semantic presupposition (Van Fraassen, 1969) says that

1) sentence A presupposes sentence B if and only if A is neither true nor false unless B is true.

This is equivalent to

2) Sentence A presupposes sentence B if and only if
   a) if A is true then B is true
   b) if not-A is true then B is true.[2]

One consequence of this definition is that every tautology is presupposed by every sentence. This leads to the question: which are the relevant presuppositions of a given sentence?

What we would like to find for every simple[3] sentence A is a minimal and finite set $\{B_1, \ldots, B_n\}$ of basic presuppositions, such that all the other presuppositions of A are entailed by $\{B_1, \ldots, B_n\}$. Let us assume that the relevant or basic presuppositions of a sentence depend on the structure of the sentence itself: on its verbs, the types of noun phrases, quantifiers, etc.

Since presuppositions are only defined with respect to complete sentences let us say that those presupposition-guaranteeing properties or parts of a sentence (which we are about to search for) induce a presupposition. I will also use the term "presupposition inducer" or "P-inducer." We can now define the set of basic presuppositions in terms of the P-inducers of a simple sentence: The set of basic presuppositions contains all presuppositions which are P-induced.

In this paper I will only discuss which types of noun phrases induce existential presuppositions.

An example of an existential P-inducer are proper names; that is, any simple sentence containing some proper name Y presupposes another sentence of the type:

There exists Y.

An indefinite article + noun, on the other hand, never induces an existential presupposition; it may only lead to an assertion of existence.

Consider the following sentences as evidence for this distinction between the induction of an existential presupposition in case of a name and an existential assertion in case of an indefinite NP:

3)	A: John kissed Mary	$>$ B:	There exists Mary
3')	A: John didn't kiss Mary	$>$ B:	There exists Mary
4)	A: John kissed a girl	$>$ B:	There exists a girl
4')	A: John didn't kiss a girl	$\not>$ B:	There exists a girl[4]

(Where $>$ means entails and $\not>$ means does not entail)

According to definition (2) the sentences in (3A) presuppose (3B).

(4) on the other hand is an instance of existential assertion, i.e. the existential entailment is lost if the noun phrase in question is in the scope of negation. Other types of noun phrases which are not P-inducers are any+noun and no+noun.

Now consider the following underlined types of noun phrases:

5) John (kissed/didn't kiss) the girl(s) at the party
> B: There existed girls at the party

6) John (kissed/didn't kiss) every girl at the party
> B: There existed girls at the party

7) John (kissed/didn't kiss) some girls at the party
> B: There existed girls at the party

8) John (kissed/didn't kiss) all girls at the party
> B: There existed girls at the Party.

Sentences (5-8) demonstrate that the definite article+noun, every+noun, some+noun, and all+noun are, like names, types of existential P-inducers.

Sentences like:

9) Moses doesn't exist

constitute a class of apparent counterexamples, because the proper name 'Moses' induces an existential presupposition while the verb phrase denies Moses existence. This paradox dissolves if we adopt Kripke's theory of description. According to Kripke a proper name like Moses is a rigid designator which designates the same object or individual in all possible worlds. The properties of this object might change from world to world, but, for example, in a possible world where Moses had stayed in Egypt, Moses would still be Moses. In the framework just outlined, existence in the sense of physical existence is simply another property which an object may or may not have. Sentence (9) presupposes that Moses has a referent, but not that Moses has a physically existing referent.

Let us extend this refined notion of existential presupposition to the other P-inducers which are not rigid designators, i.e. the "there exists" - phrase in the B-sentences of (3-8) is to be understood in the sense of asserting an abstract referent - not in the sense of asserting physical existence.[5]

As result of adopting this more abstract notion of existential presupposition sentences such as

10) The present King of France is bald

do not necessarily suffer from a presupposition failure. We may assume that the definite description in (10) denotes some hypothetical King who lacks the property of being physically existent. The deviance of (10) then derives from the fact that the predicate being bald requires that its argument denotes a referent which is physically existent.

A related matter is Karttunen's examples of Plugs, e.g.

11) Harry promised Bill to introduce him to the present King of France.

Karttunen observes that in (11) the existential presupposition in the sense of physical existence is "filtered out". However, if we use instead the more abstract notion of existential presupposition, (11) might still presuppose the existence of a referent. In that case there would be no difference between (11) and a similar sentence containing a rigid designator, for example:

12) Harry promised Bill to introduce him to Santa Claus.

The existential presupposition (in our sense) does not fail in (12) since Santa Claus is a perfectly good referent. As an alternative to Karttunen's interpretation we might say that what is "filtered out" by a verb like 'promise' are the contingent correlations which hold between semantic entities relative to the real world. Take for example

13) John kissed the second movement of Beethoven's Ninth

versus

14) John promised to kiss the second movement of Beethoven's Ninth.

Since we all agree that the second movement of the Ninth exists (as a concept), neither (13) nor (14) suffer from failure of an (abstract) existential presupposition. The deviance of (13) can be derived from the fact that kiss (in its literal sense) requires subject and object NPs that denote referents which have the property of being physically existent in the same possible world. With a sentence like (13) as complement of promise or want, etc. the deviance disappears, because John is perfectly entitled to promise or want things which are impossible because of certain contingent facts of reality.

A notion of existential presupposition in the sense of physical existence therefore coincides with a selectional restriction. (A famous example of violation of selectional restrictions is Chomsky's sentence "colorless green ideas sleep furiously".) The notion of abstract existential presupposition, on the other hand, refers to a welldefined semantic notion. In connection with the concept of P-inducing noun phrases it will allow us to account for the difference in acceptability between sentences like (15) and (18) vs. (16) and (17).

What is necessary to obtain a true presupposition failure? Examples of a truthvalueless sentence are the sentences in (15):

15) *John didn't kiss {the girl(s) / every girl / some girls / all girls} at the party - in fact there weren't any.

The in fact clause does not contradict any property such as physical existence of the presupposed referent; what is denied for the given context is the existence of such a referent altogether.[6] It is because the examples in (15) do not permit the supply of some imagined referent that they are clear examples of a presupposition failure. Notice that the corresponding sentences without P-inducers are bivalent:

16) John didn't kiss {a girl / girls / any girls} at the party - in fact there weren't any.

That it is really existence of a referent which is crucial for existential entailment and not some property like physical existence is illustrated by the fact that

17) John kissed {the girl(s) / every girl / some girls / all girls} at the party - even though there weren't any <u>real ones</u>

is acceptable despite the fact that (17) requires some extra-ordinary context - we may assume that the party was a seance attended only by men. As contrast consider

18) *John kissed {the girl(s) / every girl / some girls / all girls} at the party - even though there weren't any

which is unacceptable since the 'there weren't any' - clause denies the existence of any kind of referent.

Let us now look at modal and opaque contexts. In these contexts the <u>indefinite article+noun</u> and <u>any+noun</u> lose their existential entailment just as they do in the scope of negation (c.f. (4)). Further, the types of P-inducers under consideration (i.e. <u>names</u>, <u>every+noun</u>, <u>some+noun</u>, <u>all+noun</u>, <u>the +noun</u>) presuppose existence in opaque contexts just as in transparent contexts. Consider for example:

<u>modal context</u>

19) This job can be done by {a student / students / any student} $\not>$ There exist students

20) This job can be done by {Bill / the students / every student / some students / all students} > There exist Bill (or students)

<u>opaque context</u>[7]

21) John wants to catch {a greeneyed unicorn / greeneyed unicorns / any greeneyed unicorn} $\not>$ There exist greene. unic.

22) John wants to catch {Mathilde / every greeneyed unic. / some greene. unicorns / all greene. unicorns} > There exist greene. unic.

The question now is: how should we formally represent those types of noun phrases which always induce an existential presupposition - in contrast to the other types of noun phrases which never induce an existential presupposition?

In symbolic logic the traditional representation of both some+noun and a+noun is a formula involving a nonrestricted existential quantifier, such as

$$\exists x(g(x).f(x))$$

The representation of both, all+noun and any+noun is a formula involving a nonrestricted universal quantifier, such as

$$\forall x(g(x).f(x))$$

These representations are unsatisfactory in the light of the fact that some and all induce existential presuppositions while a and any do not. I propose that in addition to the socalled 'nonrestricted' quantification we should employ a second type of quantification - 'restricted' quantification - which lends itself to interpretation as a presupposition inducer. This restricted quantification has the form

23) $$\exists x \epsilon G[f(x)]$$

Let us assume that an 'elementary' formula like (23) is truthvalueless[8] if the domain[9] G of the quantifier is empty. Otherwise the formula is either true or false. We define elementary formulae as wellformed formulae which do not contain any logical connectives (i.e.& , V,⊃) and are not unanalyzed propositions. All other wff. are called compound formulae. For compound formulae let us assume the rules of van Fraassen's semitruthfunctional connectives. I follow Herzberger (1970) and Karttunen (1973a)in presenting van Fraassen's system in form of truthtables.

24)

&	T	F	#
T	T	F	#
F	F	F	F
#	#	F	{#, F}[10]

V	T	F	#
T	T	T	T
F	T	F	#
#	T	#	{#, T}

⊃	T	F	#
T	T	F	#
F	T	T	T
#	T	#	{#, T}

Let us call a sentence in English a 'simple' sentence if its corresponding logical formula is elementary. Note that a simple sentence may have relative clauses or sentential complements as long as they can be represented in the logical formula without use of logical connectives.

Our assumption that an elementary formula is truthvalueless if the domain of a quantifer is empty applies to restricted as well as nonrestricted quantification. In case of nonrestricted quantification, however, the domain of the quantifier is the whole universe and could be empty only in the degenerate case of an empty universe.

What is the relation between a set (as used in restricted quantification) and a predicate (as used in nonrestricted quantification)? Letting g denote the property of being a girl, the extension of g is the set G of all girls:

25) $$\forall x(g(x) = x \epsilon G)$$

Let us call G* the power set of G. The members of G* are all the sets γ, such that γ is a set of girls:

26) $$G^* = \{\gamma \mid \gamma \subset G\}$$

In addition to g and γ let us define

$k(x,y)$ = x kiss y

J = John

P = $\{x \mid x$ = individual present at a certain party$\}$. $P \neq \{\emptyset\}$

We can now represent

27) John kissed girls at the party

as $\exists x \epsilon P[(g(x).k(J,x)]$

If there is no referent in P of which g(x) holds (27) has the truth-value false. The representation of

28) John kissed some girls at the party

is, however $\exists \gamma, \gamma \subset P(\exists x \epsilon \gamma\ [k(J,x)])$

Now if γ is empty, (28) is not false but truthvalueless.

The crucial sentence

29) John didn't kiss <u>every girl</u> at the party - in fact there weren't any.

is represented as $\exists \gamma, \gamma \subset P, \sim(\forall x \epsilon \gamma\ [k(J,x)])$ - in fact $\sim\exists x(g(x).x \epsilon P)$[11]

and is truthvalueless, as required. The reason is that because of $\sim\exists x(g(x).x \epsilon P)$ the $\gamma \subset P$ must be the empty set (see (26)).

The corresponding sentence without a P-inducer

30) John didn't kiss <u>any girl</u> at the party - in fact there weren't any

is represented as $\forall x \epsilon P \sim[g(x).k(J,x)]$ - in fact $\sim\exists x(g(x).x \epsilon P)$

and this can be true.

Let us now have a look at the available quantifier expressions in our formal language and their counterpart in English. (Assume that l(x) means x laughs).

31) <u>Types of noun phrases which are not P-inducers</u>

{a girl laughs / girls laugh}	is represented as	$\exists x(g(x).l(x))$
	or equivalently as	$\sim\forall x(g(x) \supset \sim l(x))$
{a girl doesn't laugh / girls don't laugh}	is represented as	$\exists x(g(x).\sim l(x))$
	or equivalently as	$\sim\forall x(g(x) \supset l(x))$
no girls laugh	is represented as	$\sim\exists x(g(x).l(x))$
	or equivalently as	$\forall x(g(x) \supset \sim l(x))$
{any girl laughs / no girl doesn't laugh}	is represented as	$\sim\exists x(g(x).\sim l(x))$
	or equivalently as	$\forall x(g(x) \supset l(x))$

Space does not permit me to go into the arguments for treating <u>no=not...any</u> (or, equivalently <u>no...not=any</u>).

A reason for the representation (31) is that a sentence does not have an existential entailment if the $\exists x$ in the logical representation is inside the scope of negation. If, however, the $\exists x$ is outside the scope of negation we do find an existential entailment for the related sentence. The entailments are obtained by simplification of the conjunctive formulae.

In the class of nounphrases which are P-inducers we must distinguish between every+noun and some+noun on the one hand and names, definite noun phrases, and noun phrases with a possessive or demonstrative pronoun on the other hand, because the latter involve some notion of uniqueness in addition to the induction of an existential presupposition. The logical representation of this additional uniqueness feature will not concern us here.

Noun phrases which induce a simple existential presupposition (namely every, all, some and several + noun) are illustrated in (32).

32) P-inducers which do not involve uniqueness

{some girls laugh / not all girls don't laugh} is represented as $\exists x \epsilon G[l(x)]$ or equivalently as $\sim\forall x \epsilon G \sim[l(x)]$

etc.

The convention that the formulas of (32) are truthvalueless if G is empty insures that the existential presupposition of the corresponding sentences is systematically represented. (31) and (32) illustrate that the use of both nonrestricted and restricted quantification makes it possible to express all relevant existential entailments and presuppositions directly in the formal language. Using two types of quantification also alleviates the chronic shortage of formal quantifier expressions suitable for representing the large number of English quantifier words (we still have not yet differentiated between all, every and both, or some and several).

The mechanism of this logic provides a logical foundation for the description and explanation of those phenomena which Karttunen described indirectly by means of his filter conditions.

For Karttunen, Filters are the logical connectives if...then, and, and either...or. The problem is the following: the consequent of

33) If baldness is hereditary, then all of Jack's children are bald

as well as of

34) If Jack has children, then all of Jack's children are bald

presupposes

35) Jack has children.

The question is: why does only (33) as a whole presuppose (35) while (34) as a whole doesn't.

This disappearance of a presupposition is called 'filtering'. One of Karttunen's filter conditions (Karttunen 1973a) says:

"Let S stand for any sentence of the form 'if A then B'.

a) If A presupposes C ($A \gg C$), then S presupposes C ($S \gg C$)
b) If B presupposes C ($B \gg C$), then S presupposes C ($S \gg C$)

unless A semantically entails C ($A > C$)."

(34) is a sentence to which the underlined part of his condition applies. The condition accounts for the fact that (34) is bivalent even if John doesn't have children.

However, the bivalence of (34) can alternatively be derived directly from the logical relations which hold in (34): if the antecedent is true then we can logically derive the nonemptiness of the set of John's children (i.e. existential presupposition fulfilled). For the case that the antecedent is false let us consider the form $\ulcorner \sim A \vee B \urcorner$ which is logically equivalent to $\ulcorner A \supset B \urcorner$. Since the antecedent is false, $\sim A$ is true. Therefore the whole disjunction is true (and a foriiori bivalent) according to Van Fraassen's system.

Although Van Fraassen's system works in case filtering takes place, Karttunen dismissed Van Fraassen's system as a logical foundation for his filter conditions for the following reason:

35) Paris is the capital of France and the present King of France is bald

as well as

36) Marseille is the capital of France and the present King of France is bald

intuitively presuppose that there exists a present King of France. But (36) is false in Van Fraassen's system while (35) is truthvalueless. I think that these truthvalues are intuitively satisfying insofar as sentence (36) must be false because one conjunct is false (Marseille is not the capital of France), while sentence (35) is not necessarily false since one conjunct is true and the other is neither true nor false.

But on the other hand, if both sentences presuppose that there exists a present King of France and if this presupposition fails in both sentences then both must be truthvalueless according to Van Fraassen's definition of a presupposition. Assuming that this definition is the right one, Karttunen concludes that Van Fraassen's logic does not give satisfactory results for natural language.

The dilemma can be alternatively resolved if we keep Van Fraassen's logic but change the definition of a presupposition as follows:

37) A presupposes B if and only if

a) A is an elementary formula
b) A entails B
c) not-A entails B

This definition differs from Van Fraassen's in that it restricts the notion of a presupposition to elementary formulae; compound formulae do not have presuppositions, even though the presuppositions of their elementary subformulae will be reflected in the truthvalue (through the mechanism of the logic).

Our definition stands in contrast to the socalled "cumulative hypothesis" (Morgan, 1969) which assumes that complex sentences usually have the presuppositions of their parts. Karttunen's system of 'plugs and filters' is an attempt to describe exceptions to the cumulative hypothesis.

I will now show that there is a class of sentences which can not be handled by the filter conditions and which furthermore exhibit a semantic relation between the truthvalue of the whole sentence and the truthvalues of it's parts that is not covered by Van Fraassen's definition of a presupposition.

Consider the following sentence:

38) Either John has stopped beating his wife or John hasn't yet begun beating her.

The first disjunct of (38) presupposes

39) John has beaten his wife previously.

while the second conjunct of (38) presupposes

40) John has not beaten his wife previously.

If both (39) and (40) were presuppositions of (38) then (38) would be analytically truthvalueless - in contrast to our intuition. Therefore let us see if Karttunen's filter condition gets rid of one of the two contradicting presuppositions.

<u>Karttunen's filter condition for disjuncts:</u>

41) Let S stand for any sentence of the form "A or B'.

a) If $A \gg C$, then $S \gg C$.

b) If $B \gg C$, then $S \gg C$, unless $\ulcorner \sim A \urcorner > C$.[12]

(Where $\gg$ means <u>presupposes</u> and $>$ means <u>entails</u>)

The only way that one of the two contradicting presuppositions (39) [lets call it C] and (40) [lets call it $\sim C$] get filtered out in Karttunen's system requires that $\ulcorner \sim A \urcorner > \ulcorner \sim C \urcorner$ but this is not the case:

$\sim A$ (i.e. "John did not stop beating his wife") does not entail $\sim C$ (i.e. "John did not beat his wife previously").

In fact, $\sim A$ (as well as A) entails the contrary of $\sim C$, namely C.

Another example is

42) Either Bill didn't notice that John stayed at home all the time or John returned to his home secretly after 10 A.M.

(Let's assume that the speaker is interested in John's whereabouts last night.) (42) has a similar structure to (39), namely

43) $\sim A(\gg C) \ \vee \ B(\gg \sim C)$

where

A: Bill noticed that John was at home all the time

B: John returned secretly after 10 A.M.
C: John was at home all the time.

Since in a sentence like (42) neither all the presuppositions of A nor of B turn out to be presuppositions of ⌜~A v B⌝ (as predicted by the filter condition) part (a) as well as part (b) of filter condition (41) is insufficient.

Let us now see how Van Fraassen's logic would handle sentences of type (43) - using the following truthtable.

44)

C	~C	~A	B	~AvB
T	F	TvF	#	Tv#
F	T	#	TvF	Tv#

We see that a sentence like (38) or (42) will be either true or truthvalueless. (42) is true if one conjunct is true and the other is truthvalueless. If one conjunct is false and the other truthvalueless, (42) is truthvalueless.

It is curious to note that the negation of (42) leads to an analytically non-true sentence.

45) (negation of (42))
*Bill noticed that John was at home all the time and John did not return after 10 A.M.

((45) is unacceptable if we assume choice negation in the second conjunct)

The truthtable for (45) is

46)

C	~C	A	~B	A & ~B
T	F	TvF	#	Fv#
F	T	#	TvF	Fv#

(45) will be false, if John was at home all the time but Bill didn't notice it or if John wasn't at home all the time but did return.[13]

It is important to notice that if C is truthvalueless then both A and B will be truthvalueless (because $A \gg C$ and $B \gg \sim C$) and therefore (43) and (45) will be truthvalueless. In other words, not the truth but the <u>bivalence</u> of C is a necessary (but not sufficient) condition for the bivalence of (43) and (45).

Now we have two alternatives:

i) The semantic relation between (42) and (43C) or (45) and (43C) is interpreted as an instance of another necessary condition for bivalence (- in addition to presuppositions as defined in (I)).

ii) Or we adopt definition (37) and treat (42) and (45) simply as a result of the interaction between the presuppositions of the simple subsentences and the mechanism of Van Fraassen's logic.

The ultimate consequence of choosing between (i) and (ii) is that in the first case we retain the basis for the cumulative hypothesis-and consequently for filters, while alternative (ii) does not allow for the cumulative hypothesis (since the notion of a presupposition is restricted to simple sentences by definition).

Since the filter conditions turned out to be inadequate and cannot be easily extended to account for a sentence like (42) (because the conditions are based on a definition of presuppositions which does not apply in a case like (42)) alternative (ii) is the proper choice. This choice has the advantage that those grounds for objection to Van Fraassen's logic discussed in connection with (35) and (36) are eliminated.

The linguistic concept of P-inducers - as proposed in the first part of this paper goes beyond definition (37) in that it relates presuppositions not only to simple sentences but to types of noun phrases and certain verbs (factive verbs seem likely to be P-inducers). P-inducers are supposed to allow us to discover the set of basic presuppositions of a simple sentence, which is a necessary step to determine the truthvalue of this sentence. A simple sentence will be bivalent if it does not contain any P-inducers.

The close relationship between certain sentence elements and presuppositions (which is the basis for the concept of P-inducers) seems to be intuitively one more reason to define presuppositions on a level that is below the level of a whole complex sentence.

Footnotes

1) I would like to thank Stanley Peters and Jack Murphy for showing me in which direction to turn when I reached theoretical impasses. Without their patient and insightful help I would still be bogged down in the many paradoxes which traditionally plague this topic.

Furthermore, I would like to thank Lauri Karttunen for taking the time to make some detailed and helpful comments on the semi-final version of this paper and Mike Daly for his invaluable help in editing.

2) The relation between A and B in (2a,b) is called necessitation or semantic entailment (Van Fraassen, 1969). Definition (2) is equivalent to

A presupposes B if and only if

a) A entails (necessitates) B
b) (not-A) entails (necessitates) B.

3) By 'simple sentence' I mean a sentence that does not contain the connectives "or", "if...then", or "and". This restriction to 'simple sentences' will be motivated in connection with the discussion of Karttunen's "Filters".

4) In (4') A does not entail B because A can be true even if B is false. In (3), (3') and (4) on the other hand, the truth of the B-sentence is a necessary condition for the truth of the corresponding A-sentence.

5) Names differ form other P-inducers in that names denote the same referent in all possible worlds. A definite description like "the girls at the party" induces an existential presupposition, but the referents may differ with possible worlds.

6) Van Fraassen (1968) mentions two different kinds of negation:

choice negation: (not-A) is true (respectively, false) if and only if A is false (respectively true);

exclusion negation: (not-A) is true if and only if A is not true, and false otherwise.

If we want to talk about presupposition we must assume the first kind of negation (otherwise every valid sentence is presupposed by every valid sentence). In the course of this paper we will always assume choice negation.

7) Another class of P-inducers seem to be the factive verbs. Notice that factive verbs presuppose the truth of their complement even if they are embedded under opaque verbs:

a) *John {promises / believes} that Mary regrets that two and two is five.

*John wants Mary to regret that two and two is five.

But:

b) John {promises / believes / wants} that two and two is five.

Since for example 'promise' is said to be a "Plug" the corresponding (a) sentence should supposedly not be illformed.

The only instances where presuppositions are "filtered out" arise with 'verbs of saying'. However, the complements of these verbs are known to be systematically ambiguous between being interpreted as a name or as a proposition. Since names do not have truthvalues this exception is to be expected.

8) The restriction to elementary formulae is necessary because of the characteristics of Van Fraassen's logic, which provides for bivalence in complex formulae even if some of their constituents are truthvalueless (for example ⌜Tv#⌝ is T, ⌜F.#⌝ is F etc.).

9) The domain G of the quantifier is a set of referents.

10) If A and B are both truthvalueless A.B will be false if it is a contradiction in twovalued logic and truthvalueless otherwise.

11) We might represent "in fact" in the logic by the connective'&'

12) Since the here discussed sentences do not require iteration of the filter condition,)I quote Karttunen (1973a).

13) (43) and (45) have still another presupposition, let's call it D,

D: John was at home after 10 A.M.

which is presupposed by A, entailed by C and entailed by B. We have here an instance of a basic presupposition C such that it entails the non-basic presupposition D. Since D is entailed by C the truthvalue of D is irrelevant for the truthvalue of (43) or (45).

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