10. Presuppositions

10.1 Introduction

Philosopher David Lewis gives the following characterization of presuppositions:

> At any stage in a well-run conversation, a certain amount is presupposed. The parties to the conversation take it for granted; or at least they purport to, whether sincerely or just "for the sake of the argument".
>
> Presuppositions can be created or destroyed in the course of a conversation. This change is rule-governed, at least up to a point. The presuppositions at time t' depend, in a way about which at least some general principles can be laid down, on the presuppositions at an earlier time t and on the course of the conversation (and nearby events) between t and t'.
>
> Some things that might be said require suitable presuppositions. They are acceptable if the required presuppositions are present; not otherwise. 'the King of France is bald" requires the presupposition that France has one king, and one only; "Even George Lakoff could win" requires the presupposition that George is not a leading candidate; and so on. Lewis 1979

Usually when linguists talk about *presuppositions*, they are referring to a particular semantic phenomenon: utterance U bears some relation to meaning p (notated $\triangleright$).

(1) Bart realizes that it's Wednesday. (= U)
$\triangleright$ *It's Wednesday.* (=p)

This handout

a. tease apart semantic and pragmatic notions of presupposition
b. differentiate presuppositions and implicatures, and their interactions
c. update our metalanguage to incorporate presuppositions
d. explore notions of (prior and posterior) beliefs

10.2 What are Presuppositions?

We can start with the following definition of presupposition adapted from Stalnaker 1973, 1974.

(2) **Presuppositions**:
p is a (pragmatic) presupposition of utterance U if the prior assumption of p by interlocutors is necessary in order for U to be meaningful.

Under this definition pragmatic presuppositions are similar to conversational implicatures: both are relations between an utterance and a meaning.

a. *implicatures* → assumed in order to ensure U is cooperative.
b. *presuppositions* → assumed in order to ensure U is meaningful.

According to this view, presuppositions and implicatures are independent.

Presuppositions would include the preconditions for linguistic interaction:

(3) a. we are speaking English
b. we will obey norms of turn-taking in dialogue
c. we have goals/plans XYZ for this interaction
d. etc.

An example of dialogue where presuppositions are relevant:

(4) A: Where does C live?
B: She lives in Gallargues-le-Montueux from Sara Liddell

B's utterance is only meaningful assuming interlocutors can reliably identify *Gallargues-le-Montueux*.

However, when linguists talk about presuppositions, they are normally talking about *semantic presuppositions*, a particular sub-class of presuppositions.

(5) **Semantic presuppositions**:
U semantically presupposes p iff p is part of the encoded meaning of an expression (called a 'presupposition trigger') within U .

When we want to talk about presuppositions which are not semantic, as in (3), we can use the term *pragmatic presupposition*.

An example of a semantic presupposition, triggered by 'my':

(6) My giraffe ate my homework. ▷ *Sp has a giraffe*

So (semantic) presuppositions are right on the borderline of semantics and pragmatics.

a. They are encoded as part of the literal meaning of expressions (like *my*)
b. But they make reference to the prior beliefs of the interlocutors within the present interaction.

10.3 Properties of presuppositions

10.3.1 Prior assumption

According to the above view: we should be able to divide an utterance's meaning into presupposed and non-presupposed meaning, including asserted content.

(7) **Asserted content**:
p is the asserted content of U iff
a. (*Sp* believes/acts as if) p is new information.
b. p is part of the literal meaning of U

Clause (b) is to distinguish asserted content and implicated content (in Grice's terms *what is said* from *what is implicated*).

Leaving aside the issue of implicatures, what is asserted and what is presupposed in the following examples?

The presupposed content is implied to be assumed by interlocutors prior to U. The asserted content is new information being communicated.

(8) Sam quit smoking.
a. Presupposes: Sam smoked in the past
b. Asserts: Sam does not smoke at present

(9) Before Sam left, he sneezed.
a. Presupposes: Sam left at time t, where t is earlier than the time of evaluation
b. Asserts: prior to t, Sam sneezed

(10) *Joan*$_F$ likes spinach too.
a. Presupposes: some salient entity other than Joan likes spinach
b. Asserts: Joan likes spinach

Here are some real life examples, how should we divide the presupposed and asserted content?

(11) *Ricky Gervais*: (on headline "Man fails to break clothes pegs on face records") Why is that news? He failed. So did I. *I failed to break the long jump record today*, I didn't even participate. The Ricky Gervais Show, XFM

(12) *Stephen Fry*: How many moons does the earth have?
Alan Davies: The earth has one moon which is made of cheese. (wrong answer buzzer) But it does have one moon. *It's called THE moon*. I rest my case. QI

(13) Still searching for your favorite 90s playlists? Spotify ad

(14) It's [X]'s birthday today. Let her know you're thinking about her! Facebook notification

(15) Why do you post nudes on Reddit? Reddit Post

Thus, a definitional property of presuppositions: signalling the prior beliefs of the interlocutors, or at least, what the speaker believes the prior beliefs to be.

In each case above, the presupposition seems linked to the appearance of a particular trigger expression: *fail*, *the*, *still*, *know*, *why*, etc.

10.3.2 Presupposition accommodation and failure

According to Stalnaker 1973, 1974, if $U \triangleright p$, then p should be assumed by interlocutors prior to U, giving rise to a rule, like the following.

(16) **Trigger old info only** (TOIO):
Do not trigger a presupposition p unless p is in the common ground.

By common ground we mean the mutual, public beliefs of the interlocutors. More on this later.

How should we interpret TOIO? If we disobey, what happens? One strategy: treat TOIO like a Gricean maxim (see Thomason 1990 especially).

> Here it may be useful to think of [(16)] not as a knowledge-level rule governing behavior, but as a rule at the social level. It is possible for a rule to have acknowledged status as a social norm of a fairly idealized sort, and yet for it to be routinely flouted without any sense of violation. "Don't interrupt" might be an example, in contemporary American society. Thomason, Stone, and DeVault 2006

The intuition here is that violating TOIO doesn't lead to communication breakdown, but leads to *new inferences emerging*.

(17) Context: B has no idea about what kinds of pets A has.
B: Want to have lunch later?
A: I can't. I have to pick up my cat at the vet.

There's no sense in which A's utterance is infelicitous, despite an apparent violation of TOIO. A signals something like *(my goal is that) we should assume that p (=I have a cat) is common knowledge.*

We can identify two potential outcomes if TOIO is violated.

a. *Accommodation* (term from Lewis 1979): interlocutors behave as if p was a prior belief
b. *Failure*: p cannot be accommodated and U is infelicitous

When and why presuppositions fail or get accommodated is very poorly understood and one of the largest open problems in semantics/pragmatics.

One relevant factor: plausibility. Implausible meanings are less likely to be accommodated. For the following, take the presupposition to be unknown to the addressee.

(18) Is Lisa still dying her hair?

(19) Is Lisa still manufacturing synthetic wolf urine?

Another relevant factor: authority. If the speaker is an expert on the truth of p, p is more likely to be accommodated.

(20) A zoologist: Why are pangolins critically endangered?

(21) A small child: Why can pangolins fly?

Here's an attempt at deriving accommodation via Gricean style inference (see Chemla 2008).

(22) A: "I have to take my cat to the vet." (=U)
$U \triangleright$ *I have a cat* (=p).
Implicature: *A intends interlocutors to behave as if p is part of the common ground.* (=q).
a. Assume: A is being cooperative (including obeying TOIO).
b. Assume: A is an authority about the truth of p (i.e., knows whether she has a cat).
c. by (a), A would only utter U if p were part of the common ground.
d. by (c), A must either believe p is part of the common ground (i.e., that B believes p), or by (b) that B will take A's word for it.

According to this view sketched above, accommodation is an implicature, even though the presupposition p isn't.

Under this view, presupposition failure may be a breakdown in this reasoning.

Due to perpetual uncertainty about factors like authority and plausibility, presupposition failure is extremely hard to test empirically.

One (relatively) robust observation: if p is known to be false, U is infelicitous.

(23) ??The king of France is bald. (cf. Russell 1905)

This follows from (d) in (22). The addressee will not be willing to assume p if it is false.

What do we do if we as hearers reject the truth of presuppositions? One strategy: explicit denial of p.

(24) *Jonathan Ross*: I think they should make everyone keep their microphones on all the time.
Richard Ayoade: Hold on, most people don't have microphones.
Big Fat Quiz of the Year, 2013

Fintel 2004; Von Fintel and Matthewson 2008 propose presupposition denial as a diagnostic for presupposition-hood.

(25) **The *Hey Wait a Minute* (HWAM) test**:
If U can felicitously be followed by 'Hey wait a minute' plus a denial (or assertion of ignorance) of p, then $U \triangleright p$.

Looking at some above examples:

(26) A: Sam quit smoking.
B: Hey, wait a minute! I didn't know that Sam smoked.

(27) A: Before Sam left, he sneezed.
B: Hey, wait a minute! I didn't know that Sam left.

(28) A: *Joan* likes spinach too.
B: Hey, wait a minute! I didn't know that anyone else liked spinach.

Matthewson 2006 applies this diagnostic on the understudied language St'át'imcets, concluding that the language *does not have presuppositions.* Tonhauser et al. 2013 reject this conclusion as implausible.

Potts 2008 and Tonhauser et al. 2013 express doubt that the *HWAM* test reliably distinguishes presupposition and assertion.

Another observation: to negate the presupposition of a presupposition trigger, special focus stress on the trigger must be used.

(29) "mummified Basel woman – the great-great-great-great-great-great-great grandmother of UK Foreign Secretary Boris Johnson." Tush BBC, do the maths: Not THE "great great great – etc." but just ONE of 256 g-g-g-g-g-g-grandmothers. (Stephen Fry)

Horn 1989 describes this as *metalinguistic negation*.

(30) Sam didn't QUIT smoking, he never started.
implies "quit" is not the right word in the slot "Sam X'ed smoking" ("never started" is better).

Metalinguistic negation is another poorly understood phenomenon.

An interesting case study from Indonesian (Kroeger 2014). Kroeger claims Indonesian has two negators *tidak* and *bukan*, and that *tidak* is used to deny presuppositions.

(31) Dia tidak/??bukan berhenti merokok, karena memang tidak pernah merokok
3sg neg stop smoke because indeed neg ever smoke
He has not stopped smoking, because in fact he has never smoked.

Horn points out that metalinguistic negation is also used to deny implicatures.

(32) I didn't eat SOME of the cookies, I ate all of them.

(33) Jones didn't CAUSE Smith to DIE, he killed him.

But contra expectations, Kroeger points out that *bukan* (not *tidak*) is used to deny implicatures.

(34) Aku bukan/#tidak beli satu tau, aku beli 6 buah sekaligus!
1sg neg buy one know 1sg buy six cls at.once
I didn't buy one, you know, I bought six at one time!

Kroeger leaves this as an unsolved problem.

10.4 Distinguishing presuppositions from other meanings

10.4.1 Projection

The most effective diagnostic for presuppositions: projection.

Karttunen 1973 observes that the presuppositions of a trigger may or may not become presuppositions of the utterance.[1]

a. If the trigger is embedded under a *plug*, it is not the case that $U \triangleright p$.
b. If the trigger is embedded under a *hole* or unembedded, $U \triangleright p$.

[1] Karttunen also proposes a category of *filters* which we'll leave aside for now.

What are some examples of plugs? Verbs of speech acts: *say, mention, tell, ask, promise, warn, request, order, accuse, criticize, blame*.

(35) **The plug hypothesis**:
Where E triggers presupposition p, and E is embedded under a plug in sentence S,
we *cannot* conclude that an utterance of S $\triangleright p$.

(36) Jones said/mentioned/promised that Sam has quit smoking.
$\not\triangleright$ *Sam previously smoked.*

(37) Jones accused Smith of blocking the only entrance.
$\not\triangleright$ *There is only one entrance.*

It may of course be the case that we presuppose these meanings anyway, despite the plug. However, we can't automatically assume that.

Karttunen's notions of *holes* however, supplies us with the most important property of presuppositions: projection.

(38) **Projection** (or **the hole hypothesis**):
Where E triggers presupposition p, and E is embedded under a hole in S,
we *can* conclude that an utterance of S $\triangleright p$.

Some key holes: negation, questions, antecedents of conditionals, modals, and many more. We can break these down into individual hypotheses (see Chierchia and McConnell-Ginet 2000; Tonhauser et al. 2013).

Hypothesis N:
If p is a presupposition of sentence S, then p is a presupposition of the negated version of S.

(39) a. Sam stopped smoking. $\triangleright$*Sam previously smoked.*
b. Sam didn't stop smoking. $\triangleright$*Sam previously smoked.*

(40) a. Ed realizes that it is Wednesday. $\triangleright$*It's Wednesday*
b. Ed doesn't realize that it is Wednesday. $\triangleright$*It's Wednesday*

(41) a. I saw my dog outside. $\triangleright$*I have a dog*
b. I didn't see my dog outside. $\triangleright$*I have a dog*

NB: Some analyses of presupposition (e.g., Beaver and Krahmer 2001) take this to be the fundamental property of presuppositions and derive all the other properties from it.

Hypothesis Q:
If p is a presupposition of sentence S, then p is a presupposition of the interrogative version of S.

(42) a. Sam stopped smoking. $\triangleright$*Sam previously smoked.*
b. Did Sam stop smoking? $\triangleright$*Sam previously smoked.*

(43) a. Ed realizes that it is Wednesday. $\triangleright$*It's Wednesday*
b. Does Ed realize that it is Wednesday? $\triangleright$*It's Wednesday*

(44) a. You saw my dog outside. $\triangleright$*I have a dog*
b. Did you see my dog outside? $\triangleright$*I have a dog*

Hypothesis C:
If p is a presupposition of sentence S, then p is a presupposition of any sentence of the form *if S, then ....*

(45) If Sam stopped smoking, then his marathon time will improve.

(46) If Ed realizes it's Wednesday, he'll show up to the meeting.

(47) If you saw my dog outside, tell him to come in.

Importantly, the projection property (i.e., non-interaction with holes) *distinguishes presupposed and asserted content*.

(48)
a. Sam stopped smoking. $\models$ *Sam doesn't smoke now.*
b. Sam didn't stop smoking. $\models$ *Sam doesn't smoke now.*
c. Did Sam stop smoking? $\models$ *Sam doesn't smoke now.*
d. If Sam stopped smoking, his marathon time will improve. $\models$ *Sam doesn't smoke now.*

In sum, *Sam stopped smoking* gives rise to two meanings

a. *Sam used to smoke*
b. *Sam doesn't smoke now*

Projection tells us that (a) is a presupposition and (b) is an assertion.

10.4.2 Testing triggers with projection

We can use projection to diagnose meanings as presuppositions, assertions, or neither.

(49) It was Joan who stole the cookies. (cleft construction)
a. *someone stole the cookies*
b. *Joan stole the cookies*

(50) Sue believes that it is Tuesday.
a. *Sue believes that it is Tuesday.*
b. *It is Tuesday.*

(51) Bart managed to pass the test.
a. Bart passed the test presupposed asserted.
b. There was some obstacle to overcome to pass the test.

(52) Bart learned that Lisa passed the test.
a. Lisa passed the test.

(53) Bart learned that the solar system has nine planets.
a. The solar system has nine planets.

Question: does projection *exclusively* diagnose presuppositions? Could we say that every time we see projection, we have a presupposition?

Answer: no. There is a fourth class of meanings (besides assertion, presupposition, implicatures), often called *conventional implicatures* which (a) project and (b) do not require accommodation.

What is the projective behavior of the following meanings?

(54) I read a book by Chomsky, a famous linguist. appositives
   a. Chomsky is a famous linguist.

(55) I want some fucking broccoli. expressives
   a. The speaker is emotional about broccoli.

(56) He is an Englishman and therefore brave (from Grice 1975) causal connectives
   a. Being English implies bravery.

In none of the above cases is there a sense that the (a) meanings are assumed prior beliefs of the interlocutors (i.e., presuppositions).

I planned to have a whole week on conventional implicatures, if only there had been enough time! See Potts 2003, 2005, 2007 and Tonhauser et al. 2013 for starting points.

10.4.3 Distinguishing presuppositions and implicatures

According to our theory of (semantic) presuppositions, they are part of the conventional meaning of particular expressions (triggers).

Conversational implicatures are built on top of conventional meanings within a context.

Thus, conversational implicatures should be cancellable or suspendible, while presuppositions should not be.

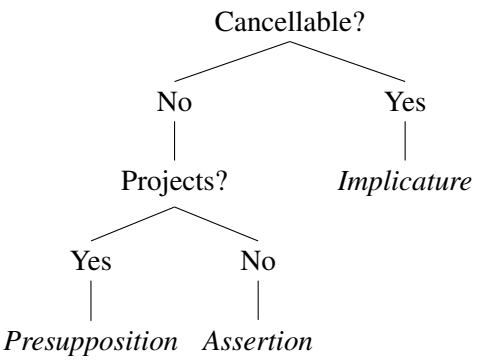
(57) Her homework was good. (p = *Her homework was not excellent.*)
   a. Her homework was good, in fact excellent.
   b. Her homework was good, but I'm not sure if it was excellent.

(58) Sam quit smoking. (p = *He previously smoked.*)
   a. #Sam quit smoking, in fact he never smoked before.
   b. #Sam quit smoking, but I'm not sure if he smoked before.

Cancelling or suspending a presupposition seems to lead to a contradiction, consistent with our theories of presuppositions (but not conversational implicatures) as part of conventionalized meaning.

A handy guide: what type of meaning is p?

(59)



10.5 What is meaninglessness?

Now the challenge is to formalize all this. The starting point comes from Frege 1892/1980, who argues that reference will fail without a suitable referent, e.g., *the King of France* will fail to refer to anything.

Strawson 1950 adapted this idea in his analysis of definites with *the* (contra Russell 1905).

> If we now consider not the whole sentence, "The king of France is wise", but that part of it which is the expression, "the king of France", it is obvious that we can make analogous, though not identical distinctions between (1) the expression, (2) a use of the expression and (3) an utterance of the expression. The distinctions will not be identical; we obviously cannot correctly talk of the expression "the king of France" being used to express a true or false proposition, since in general only sentences can be used truly or falsely; and similarly it is only by using a sentence and not by using an expression alone, that you can talk about a particular person. Instead, we shall say in this case that you use the expression to mention or refer to a particular person in the course of using the sentence to talk about him. But obviously in this case, and a great many others, the expression ["the king of France"] cannot be said to mention, or refer to, anything, any more than the sentence can be said to be true or false. Strawson 1950

Strawson's central idea (translated into modern linguistic terms): a sentence containing a presupposition trigger will *fail to be true or false* if the triggered presupposition is false.

Two ways of spelling out this idea formally:

a. Add a third truth value: # (e.g., Beaver and Krahmer 2001; Van Fraassen 1968)
b. Partial functions (e.g., Heim 1982, 1983; Heim and Kratzer 1998; Kamp 1981)

We've already seen partial functions so we'll go with option (b).

10.5.1 Presuppositions as partial functions

(60) **Partial and total functions**:
A function f is *total* iff every element in the domain of f has a value in the range of f. If f fails to meet this condition, it is called a *partial* function.

Which of the following is partial?

(61) $R = \begin{bmatrix} \text{☺} & \mapsto \mathbf{T} \\ \text{😎} & \mapsto \mathbf{F} \\ \text{😄} & \mapsto \mathbf{F} \\ \text{😇} & \mapsto \mathbf{T} \end{bmatrix}$ $R' = \begin{bmatrix} \text{☺} & \mapsto \mathbf{T} \\ \text{😎} & \mapsto \mathbf{F} \\ \text{😄} & \\ \text{😇} & \mapsto \mathbf{T} \end{bmatrix}$

(62) **Presupposition**:
If a partial function f is defined just for the set of input values X then f presupposes X.

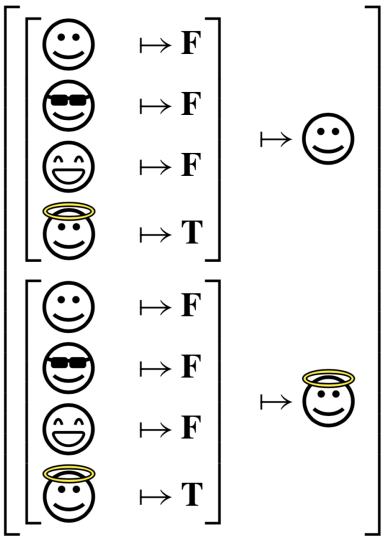
Earlier, we've assumed and taken advantage of an isomorphism between $\langle e,t\rangle$-type functions like $[\![\textbf{dog}]\!]$, and the corresponding characteristic set $[\![\textbf{dog}]\!]_*$. If we start allowing partial functions like R', we lose that correspondence. Why?

10.5.2 The definite article

Probably the most famous presupposition trigger: *the*. A standard analysis adapts Strawson 1950 (see Heim and Kratzer 1998; Partee 1986, 1995).

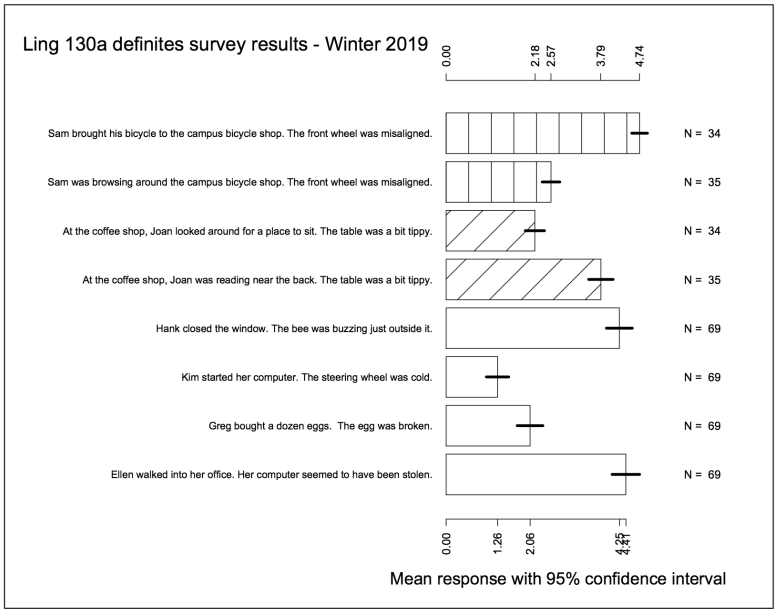
(63) **Definite article**:
$[\![\textbf{the}]\!] \in D_{\langle\langle e,t\rangle,e\rangle}$ is a partial function, only defined for any f, such that $|[\![f]\!]_*| = 1$, where defined, $[\![\textbf{the}]\!](f)$ is the sole member of $[\![f]\!]_*$.

(64) $[\![\textbf{the}]\!]^M =$



These are some survey results from Stanford undergrads judging naturalness of definite DPs in discourse.[2] What do they suggest about the classic analysis of definites?

(65)



[2] From Potts 2019, Lecture notes from 130A: Introduction to Semantics and Pragmatics.

Here's a simple update to the analysis incorporating a context dependent component.

(66) **Definite article** (v2):
$[\![\textbf{the}]\!] \in D_{\langle\langle e,t\rangle,e\rangle}$ is a partial function, only defined for any f, such that $|[\![f]\!]_* \cap C| = 1$, where C is a contextually defined domain restriction. Where defined, $[\![\textbf{the}]\!](f)$ is the sole member of $[\![f]\!]_* \cap C$.

What makes something C, i.e., in the relevant domain of discourse? This is somewhat of an open problem. Linguistic approaches include Fintel 1994; Stanley and Szabó 2000. Potts on the results above:

> [figuring out domain restriction] would likely be an interdisciplinary project involving linguists, vision researchers, perception researchers, attention researchers, and others.

How do we incorporate partial functions into a metalanguage?

(67) **Partial functions**:
$\lambda x : \phi.\psi$ maps x to ψ, *just in case*, $[\![\phi]\!] = \mathbf{T}$. see Heim and Kratzer 1998:§4

What does each function return for the following inputs?

(68) $\lambda x : \textbf{happy}(x).\textbf{cat}(x)$
a. $\textbf{felix}_e$ (a happy cat)
b. $\textbf{mopey}_e$ (a sad cat)
c. $\textbf{pizza}_{\langle e,t\rangle}$
d. $\textbf{grumpy}_e$ (a sad dog)
e. $\textbf{spot}_e$ (a happy dog)

Here's a definition for *the* with this notation.

(69) $\lambda P : \textbf{uniq}(P).\iota[P]$
a. $[\![\textbf{uniq}(P)]\!] = T$ iff $|[\![P]\!]_*| = 1$
b. $\iota[P]$ = the sole member of P (defined iff $\textbf{uniq}(P)$)

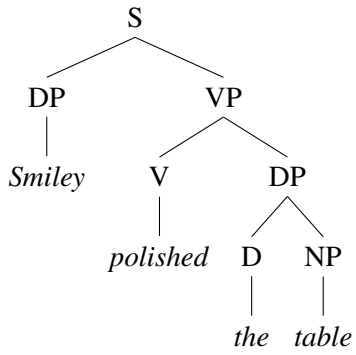
10.5.3 Deriving projection through negation

If the partial function theory of presuppositions has any merit, it should derive the observed behavior of presuppositions as predictions. For example, projection through negation.

(70) a. Smiley polished the table. ▷*there's a unique (salient) table*
b. Smiley didn't polish the table. ▷*there's a unique (salient) table*

Assume three models: M_1 with exactly one table, M_0 with no tables, M_2 with more than one table.

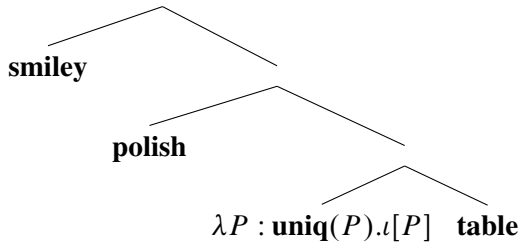
(71)



Let's first work out the types, then the meanings in each model. The projection of a presupposition follows from function application (+).

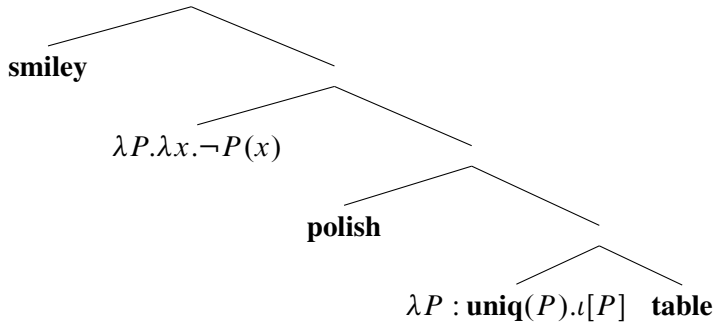
(72) **Function application & definedness**
If γ is a branching node with daughters α, β. $[\![\gamma]\!]$ is defined just in case $[\![\alpha]\!]$ and $[\![\beta]\!]$ are defined.

(73)



How do things change once negation is inserted (i.e., *Smiley didn't polish the table*).

(74)



10.5.4 Presuppositions and quantifiers

Now we can encode existential import into our meaning of quantifiers including *every*. Remember HW7: *every square circle is blue* and *every square circle is not blue* are both true. Why?

(75) *every* $\rightsquigarrow \lambda P : \exists x[P(x)].\lambda Q.\forall y[P(y) \rightarrow Q(y)]$

a. Every blue shape is a circle.
b. Every square circle is blue.
c. Every circle is blue.

d. It's not the case that every square circle is blue.

Certain quantifiers have more particular presuppositions. What's the difference betwen (a)/(b) here?

(76) a. Both times I visited, the line was too long.
b. Two times I visited, the line was too long.

(77) a. I found both bags of chips in the cupboard.
b. I found two bags of chips in the cupboard.

A proposal for *both*.

(78) *both* $\rightsquigarrow \lambda P : \mathbf{two!}(P).\lambda Q.\mathbf{every}(P)(Q)$
where $[\![\mathbf{two!}(P)]\!] = \mathbf{T}$ iff $|[\![P]\!]_* | = 2$ and $[\![\mathbf{every}(P)(Q)]\!] = \mathbf{T}$ iff $[\![P]\!]_* \subseteq [\![Q]\!]_*$

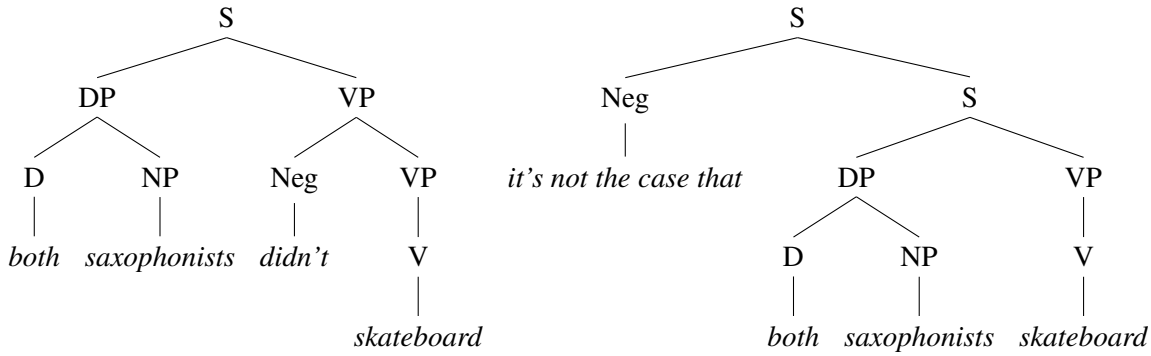
How about the following?

(79) *two* $\rightsquigarrow$

(80) *neither* $\rightsquigarrow$

Let's interpret the following trees:

(81)



It's not long before problems with this theory start arising, pointed out by Karttunen 1973. Cases like (83) are called *filters*.

(82) a. If baldness is hereditary, then all of Jack's children are bald.
b. If all of Jack's children are bald, then baldness is hereditary.

(83) If Jack has children, then all of Jack's children are bald.

What goes wrong with the partial function theory of presuppositions here?

See Beaver 2001; Beaver and Krahmer 2001; Heim 1982, 1983; Kamp 1981; Karttunen 1973, 1974; Schlenker 2007 for some ideas about ways to resolve this issue.

10.6 A case study in factive verbs

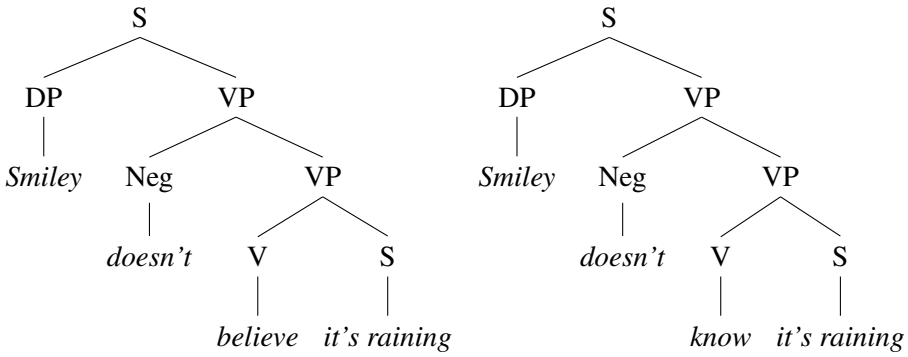
A classic analysis of *believe/think* vs. *know*, dating back to Kiparsky and Kiparsky 1970. Both are relations between an individual (an 'attitude holder') and a proposition.[3]

(84) $believe \rightsquigarrow \lambda p.\lambda x.\textbf{believe}(p)(x)$ type $\langle t,\langle e,t\rangle\rangle$

However, *know* is classically analyzed as a factive version of *believe*, i.e., for x to know p means that x is a (justified) true belief for x.

(85) $know \rightsquigarrow \lambda p : p.\lambda x.\textbf{believe}(p)(x)$ type $\langle t,\langle e,t\rangle\rangle$

(86)



But does *know* have a factive presupposition?

(87) a. Sam didn't know/believe it was Wednesday.
b. Does Sam know/believe it is Wednesday.
c. If it is his birthday, Sam doesn't know that it is.

(88) I don't know that hanging on to coal forever is viable (it's not). (Reddit comment)

(89) 'That woman who knew I had dyslexia—I never interviewed her.' – New York Times, September 16, 2000 [George W. Bush speaking of Gail Sheely] [. . .] Overlooked in all the merriment was the statement's inadvertent confirmation of the Sheely thesis: "That woman who knew I had dyslexia" makes clear that the reporter got it right—otherwise, Bush would have used 'said' or 'claimed'. (Mark Crispin Miller. 2001. The Bush Dyslexicon)

(90) For the first time in history, the U.S. has gone to war with an Arab and Muslim nation, and we know a peaceful solution was in reach. – From a 1991 Wall Street Journal article "U.S. Hails Invasion Of Kuwait and Iraq As "Dramatic Success'"

(91) Let me tell you something, when it comes to finishing the fight, Rocky and I have a lot in common. I never quit, I never give up, and I know that we're going to make it together. – Hillary Clinton, September 1, 2008.

(92) But I guess when you know something terribly important that the entire world thinks is hooey, it gets harder and harder to let it go. [The author is the target of a conspiracy theory, and this is a description of the conspiracy theorist's mental state.] Confessions of a Non-Serial Killer: Conspiracy theories are all fun and games until you become the subject of one. (Michael O'Hare, Washington Monthly)

[3] If you have studied philosophy of language previously, an extensional analysis (i.e., without possible worlds) for belief verbs will be hopelessly inadequate, however, we can leave this issue aside for now to make this one point.

Bibliography

Beaver, David I. 2001. *Presupposition and Assertion in Dynamic Semantics*. Stanford, CA: CSLI.

Beaver, David I., and Emiel Krahmer. 2001. "A partial account of presupposition projection". *Journal of Logic, Language and Information* 10 (2): 147–182.

Chemla, Emmanuel. 2008. "An epistemic step for anti-presuppositions". *Journal of Semantics* 25 (2): 141–173.

Chierchia, Gennaro, and Sally McConnell-Ginet. 2000. *Meaning and Grammar*. 2nd edition. Cambridge, MA: MIT Press.

Fintel, Kai von. 1994. "Restrictions on quantifier domains". PhD thesis, UMass Amherst.

— . 2004. "Would you believe it? The King of France is back! Presuppositions and truth-value intuitions". In *Descriptions and Beyond*, edited by Anne Bezuidenhout and Marga Reimer, 315–341. Oxford: Oxford University Press.

Frege, Gottlob. 1892/1980. "On sense and reference". In *Translations from the Philosophical Writings of Gottlob Frege*, edited by Peter Geach and Max Black, 56–78. Oxford: Blackwell.

Grice, H. Paul. 1975. "Logic and conversation". In *Syntax and Semantics, vol. 3: Speech Acts*, edited by Peter Cole and Jerry Morgan, 43–58. New York, NY: Academic Press.

Heim, Irene. 1982. "The Semantics of Definite and Indefinite Noun Phrases". PhD thesis, UMass Amherst.

— . 1983. "On the projection problem for presuppositions". In *Proceedings of the 2nd West Coast Conference on Formal Linguistics*, edited by Daniel P. Flickinger Michael Barlow and Michael T. Wescoat, 114–125. Stanford, CA: Stanford Linguistics Association.

Heim, Irene, and Angelika Kratzer. 1998. *Semantics in Generative Grammar*. Oxford: Blackwell.

Horn, Laurence R. 1989. *A Natural History of Negation*. Chicago: University of Chicago Press.

Kamp, Hans. 1981. "A theory of truth and discourse representation". In *Formal Methods in the Study of Language*, edited by Theo M. V. Janssen Jeroen Groenendijk and Martin Stokhof, 143–173. Amsterdam: Mathematical Centre.

Karttunen, Lauri. 1973. “Presuppositions and compound sentences”. *Linguistic Inquiry* 4 (2): 169–193.

— . 1974. “Presupposition and linguistic context”. *Theoretical Linguistics* 1 (1): 181–194.

Kiparsky, Paul, and Carol Kiparsky. 1970. “Facts”. In *Progress in Linguistics*, edited by Manfred Bierwisch and Karl Erich Heidolph, 143–173. The Hague: Mouton.

Kroeger, Paul. 2014. “External negation in Malay/Indonesian”. *Language* 90 (1): 137–184.

Lewis, David. 1979. “Scorekeeping in a language game”. *Journal of Philosophical Logic* 8:339–359.

Matthewson, Lisa. 2006. “Presuppositions and cross-linguistic variation”. In *Proceedings of the North East Linguistic Society 36*, edited by Christopher Davis, Amy Rose Deal, and Youri Zabbal, 63–76. Amherst, MA: GLSA.

Partee, Barbara H. 1986. “Noun phrase interpretation and type-shifting principles”. In *Studies in Discourse Representation Theory and the Theory of Generalized Quantifiers*, edited by J. Groenendijk, D. de Jongh, and M. Stokhof, 115–143. Dordrecht: Foris.

— . 1995. “Lexical semantics and compositionality”. In *Invitation to Cognitive Science, Part I: Language*, edited by Lila Gleitman and Mark Liberman, 311–360. Cambridge, MA: MIT Press.

Potts, Christopher. 2003. “The Logic of Conventional Implicatures”. PhD thesis, UC Santa Cruz.

— . 2005. *The Logic of Conventional Implicatures*. Oxford Studies in Theoretical Linguistics. Oxford: Oxford University Press.

— . 2007. “Conventional Implicatures, a Distinguished Class of Meanings”. In *The Oxford Handbook of Linguistic Interfaces*, edited by Gillian Ramchand and Charles Reiss, 475–501. Studies in Theoretical Linguistics. Oxford: Oxford University Press.

— . 2008. “Wait a minute! What kind of discourse strategy is this?” Ms., UMass Amherst.

Russell, Bertrand. 1905. “On denoting”. *Mind* 14:479–493.

Schlenker, Philippe. 2007. “Be articulate: A pragmatic theory of presupposition”. *Theoretical Linguistics* 34 (2): 157–212.

Stalnaker, Robert C. 1973. “Presuppositions”. *Journal of Philosophical Logic* 2 (4): 447–457.

— . 1974. “Pragmatic presuppositions”. In *Semantics and Philosophy*, edited by Milton K. Munitz and Peter Unger, 141–177. Dordrecht: Reidel.

Stanley, Jason, and Zoltán Gendler Szabó. 2000. “On quantifier domain restriction”. *Mind and Language* 15 (2–3): 219–261.

Strawson, Peter F. 1950. “On referring”. *Mind* 59 (235): 320–344.

Thomason, Richmond H. 1990. “Accommodation, meaning, and implicature: Interdisciplinary foundations for pragmatics”. In *Intentions in Communication*, edited by Jerry Morgan Philip R. Cohen and Martha E. Pollack, 325–363. Cambridge, MA: MIT Press.

Thomason, Richmond H., Matthew Stone, and David DeVault. 2006. “Enlightened update”. In *Presupposition Accommodation*, edited by D. Byron, C. Roberts, and S. Schwenter. Ohio State Pragmatics Initiative.

Tonhauser, Judith, et al. 2013. “Towards a taxonomy of projective content”. *Language* 89 (1): 66–109.

Van Fraassen, B. C. 1968. “Presupposition, implication, and self-reference”. *Journal of Philosophy* 65:132–152.

Von Fintel, Kai, and Lisa Matthewson. 2008. “Universals in semantics”. *The Linguistic Review* 25 (1-2): 139–201.