A Linguistic Interlude

How do current approaches to natural logic deal with notions such as
  Presupposition
  Entailment
  Conventional and conversational implicatures?

The logic of complement constructions
  that-clauses, to- and -ing-complements
Presupposition

Presuppositions are background assumptions that are taken for granted in a given context of discourse. The hallmark of a presupposition is that it does not change when a sentence is questioned or negated.

There is a diverse collection of lexical items and syntactic constructions that make it explicit that something is being presupposed.

Notation: $A \models B$ “A presupposes B”

Examples:
The cleft-construction in English:

$$\text{It was Leon Czolgosz who assassinated President Taft.}$$
$$\models \text{President Taft was assassinated.}$$

Factive adjectives:

$$\text{It is odd that many adults play Pokémon.}$$
$$\models \text{Many adults play Pokémon.}$$
Presupposition (\(\sqsupseteq\)) is a “stronger” relation than entailment (\(\models\)). Presuppositions of negated and interrogative sentences have the same presuppositions as their declarative counterparts.

It was Leon Czolgosz who assassinated President Taft.
It wasn’t Leon Czolgosz who assassinated President Taft.
Was it Leon Czolgosz who assassinated President Taft?
\(\sqsupseteq\) President Taft was assassinated.

It is odd that many adults play Pokémon.
It isn’t odd that many adults play Pokémon.
Is it odd that many adults play Pokémon?
\(\sqsupseteq\) Many adults play Pokémon.

Entailments do not survive under negation and questioning.
Czogolsz assassinated Taft. \(\models\) Taft was assassinated.
Czogolsz did not assassinate Taft. \(\not\models\) Taft was assassinated.
Did Czogolsz assassinate Taft? \(\not\models\) Taft was assassinated.
The “projection problem”

Presuppositions triggered by a subordinate clause are typically “projected up.” They become presuppositions of the main clause, but not always.

If it was Czolgosz who assassinated Taft, the anarchists will be blamed for it. \( \models \) Taft was assassinated.

If Taft was assassinated, it was Czolgosz who assassinated him. \( \not\models \) Taft was assassinated.

Either John will not come or he will come with his dog.
\( \models \) John has a dog.

Either John doesn’t have a dog or he left his dog home.
\( \not\models \) John has a dog.
Accommodation vs. Cancellation of presuppositions

In a dialogue, if the sentence spoken by A to B carries a presupposition that is not in known to B, the addressee may quietly accept, it at least for the purpose of the conversation, or B may explicitly cancel it.

A: It was Czolgosz who assassinated Taft.
B: Taft was not assassinated, Czolgosz shot McKinley.

Cancellation of a presupposition involves a dialogue. Examples such as

It wasn't Czolgosz who assassinated Taft because Taft was not assassinated.

are incoherent except as a part of an ongoing discussion.
# Presupposition triggers

| Cleft and pseudo-cleft constructions | It was X who did Y.  
| What X wants is to Y. |
|---|---|
| **Factive adjectives** | It is odd/strange/sad that S |
| Temporal clauses headed by certain complementizers. | It happened after X left.  
| Ever since X left, life is dull. |
| **Definite descriptions and possessives** | the present king of France  
| John’s dog |
| **Focus particles** | even, only, too/either, almost |
| **Aspectual verbs** | X stopped/continued lying. |
| **Factive verbs** | know/regret/forget that S |
| **Counterfactive verbs** | pretend that S, pretend to V |
| **Semi-factive verbs** | find out, discover, realize |
Examples

Factive verbs and adjectives
In the course of the conversation the Iraqis realized that the President was not aware that there was a difference between Sunni and Shiite Muslims.
\[\iff \text{There was a difference between Sunni and Shiite Muslims.}\]
Why is it shocking that the top 1% of Americans pay 40% of the income tax?
\[\iff \text{The top 1% of Americans pay 40% of the income tax.}\]

Counterfactive verbs
Abraham pretended that Sarah was his sister.
\[\iff \text{Sarah was not his sister.}\]
He did not pretend to have any knowledge as to what an Anabaptist was.
\[\iff \text{He did not have any knowledge as to what an Anabaptist was.}\]
Problems with the Data

The first five classes of presupposition triggers, clefts and pseudo-clefts, factive adjectives, temporal clauses definite descriptions, possessives and focus particles are unproblematic compared with the much larger class of other supposed presupposition triggers.

In the case of factive verbs, a distinction needs to be made with what the author of the sentence is committed to vs. what commitments she attributes to the person that the factive clause is predicated of.

Not knowing that his shot had only wounded the target Jamie Hood (said that he) regretted killing the officer.

In the case of semi-factives (= coming-to-know verbs), tense and person matters.

If she discovers that I lied to her, we are in trouble.

If I discover that I was wrong, I will tell her.
Summary

For nearly a century, presuppositions were discussed by logicians, Frege, Russell, Strawson, with a very limited set of data: definite descriptions and aspectuals. They were mainly concerned with truth conditions in the case of presupposition failure.

When the linguists got into the act in the late 1960s and early 1970s, within a few years they came up with a whole zoo of presupposition triggers but failed to differentiate between them. They should have set up different cages for the different species.

The quest for a unified theory of presuppositions has not been a success.
A quote from *Word Play* (Karttunen, 2007):

“In my joint last paper on presuppositions (Karttunen and Peters 1979), Stanley Peters and I proposed to do the sensible thing, namely to divide up the heterogeneous collection of phenomena that had been lumped together under this misbegotten label. We suggested that many cases that had been called presupposition are best seen as instances of what (Grice 1975) had called *conventional implicature*. Conventional implicatures are propositions that the speaker or the author of the sentence is committed to by virtue of choosing particular words or constructions to express himself. However, whether those implicatures are true or not does not have any bearing on whether the sentence is true or false. For example, because of the word *even*, (16) commits the author to the view that Bill is an unlikely person to agree with Mary.

(16) Even Bill agrees with Mary.

But the meaning contributed by *even* plays no role in determining the truth conditions of the sentence. (16) is true if Bill agrees with Mary and false otherwise.

Our good advice went unheeded for a long time but in recent work by Christopher Potts (2004) we see an attempt to build the sort of two-dimensional semantics Stanley and I sketched out that separates conventional implicatures from truth-conditional aspects of meaning.”

A quote from *Presupposition* (Beaver & Geurts, 2011):

“Our own suspicion, if we may end on an opinionated note, is that these first attempts to separate presupposition types from each other may turn out to be too cautious. There are several philosophically and linguistically interesting dimensions along which the set of presupposition triggers can be partitioned, such as referentiality, anaphoricity, ease of accommodation, ease of cancellation, and maintenance of truth under presupposition failure. So perhaps what will eventually emerge is not a straightforward dichotomy, but a more complex taxonomy of different types of trigger. And at that point, perhaps we may re-ask the question of whether the things that the different so-called “presupposition triggers” are triggering are in fact presuppositions, in any of the theoretical senses of the term “presupposition” that we have considered in this article.”

http://plato.stanford.edu/entries/presupposition/
Implicatives

John managed to open the bottle.
   ⊨ John opened the bottle. (entailment)
   ⊨ It was difficult for John to open the bottle. (presupposition)

John didn’t manage to solve the problem.
   ⊨ John didn’t solve the problem.
   ⊨ It was difficult for John to solve the problem.

John failed to pass the exam.
   ⊨ John did not pass the exam.
   ⊨ John tried to pass the exam.

John didn’t fail to show up on time.
   ⊨ John showed up on time.
   ⊨ John was expected to show up on time / John made an effort to be on time.
Two-way implicatives

<table>
<thead>
<tr>
<th>++/--</th>
<th>positive entailment in positive context, negative entailment in negative context</th>
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<tbody>
<tr>
<td></td>
<td>manage (to)</td>
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<td></td>
<td>remember (to)</td>
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<td>happen (to)</td>
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<td>care (to)</td>
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<td>see fit (to)</td>
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<tr>
<th>--/+--</th>
<th>positive entailment in negative context, negative entailment in positive context</th>
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<tr>
<td></td>
<td>fail (to)</td>
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<td>neglect (to)</td>
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<td>forget (to)</td>
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<td>decline (to)</td>
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<td>avoid (ing)</td>
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<td></td>
<td>refrain (from)</td>
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<td></td>
<td>shy away (from)</td>
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<table>
<thead>
<tr>
<th>He remembered to stop.</th>
<th>He did not forget to stop.</th>
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<tr>
<td>(\vdash) He stopped.</td>
<td>(\vdash) He stopped.</td>
</tr>
<tr>
<td>He didn’t bother to answer.</td>
<td>He declined to answer.</td>
</tr>
<tr>
<td>(\vdash) He did not answer.</td>
<td>(\vdash) He did not answer.</td>
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## One-way implicatives

<table>
<thead>
<tr>
<th>++ positive entailment in positive contexts</th>
<th>+- negative entailment in positive contexts</th>
<th>-- negative entailment in negative contexts</th>
<th>++ positive entailment in negative contexts</th>
</tr>
</thead>
<tbody>
<tr>
<td>cause NP (to) force NP (to)</td>
<td>prevent NP (from) preclude NP (from)</td>
<td>can be able (to)</td>
<td>hesitate (to)</td>
</tr>
<tr>
<td>She forced Dave to leave. ⊨ Dave left.</td>
<td>The rain prevented us from running. ⊨ We did not run.</td>
<td>He was not able to sleep. ⊨ He did not sleep.</td>
<td>She didn’t hesitate to speak her mind. ⊨ She spoke her mind.</td>
</tr>
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Invited inferences

Conditionals are often interpreted as biconditionals:
   If the weather is nice, we will go on a picnic.
   \( \rightarrow \) If the weather is not nice, we won’t go on a picnic.

But the “invited inference” can be explicitly cancelled without contradiction:
   If the weather is nice, we will go on a picnic, but if it isn’t we may go anyway.

Similarly, one-way implicatives are often read as two-way implicatives:
   The president was able to attend the meeting.
   \( \rightarrow \) The president attended the meeting.

But there is no contradiction in
   The president was able to attend the meeting but he chose to go to play golf instead.
I didn’t have a chance to read your paper.

I didn’t read your paper.

I am glad I had a chance to read your paper.

I read your paper.

Jack didn’t have the chutzpah to steal the wallet.

Jack didn’t steal the wallet.

Jack had the chutzpah to steal the wallet.

Jack stole the wallet.
Waste + \{ Chance Noun (\textit{chance/opportunity}) \quad +--\-
Asset Noun (\textit{money}) \quad ++/-- \}

\begin{itemize}
\item[\textit{+-/+}]
  Mr. Spitzer \textit{wasted the opportunity to drive} a harder bargain.
  \item[\textit{\vdash}] Mr. Spitzer did not drive a harder bargain.
  Galileo \textit{did not waste the chance to aim} a funny mock-syllogism at Grassi's flying eggs.
  \item[\textit{\vdash}] Galileo aimed a funny mock-syllogism ...
\end{itemize}

\begin{itemize}
\item[\textit{++/--}]
  I regret having \textit{wasted the time to read} it and even more, \textit{wasted the money to buy} it.
  \item[\textit{\vdash}] I read it. I bought it
  I \textit{would not waste the money to buy} Vista for a computer that has XP on it.
  \item[\textit{\vdash}] I would not buy Vista ...
\end{itemize}
Stacking implicatives

Leona Helmsley managed to have the gumption to leave most of her estate to her, .. wait for it, ... dog!

\[ \vdash \] Leona Helmsley left most of her estate to her dog.

The patent attorney did not bother to take the time to understand the slightly angled feature.

\[ \vdash \] The patent attorney did not understand the slightly angled feature.

I am not sure how I managed to forget to take his picture.

\[ \vdash \] I did not take his picture.
Relevance for Natural Logic

None of the systems we know of handles adequately the full range of phenomena historically (mis)classified under the term *presupposition*.

MacCartney’s NatLog system cannot make inferences based on presuppositions because

1. Presuppositions are unaffected by negation.
2. There is no mechanism for dynamically computing the presuppositions of compound sentences (“the projection problem”).
3. There is no mechanism for separating the commitments of the author from the commitments attributed to others (“factive verbs”).

The Bridge System can cope with the issue (1) but not with (2) or (3).

The NatLog and Bridge systems can derive the entailments of implicative constructions but not the presuppositions.