Topic 8 - Advanced Topics

Presuppositions

Formal Semantics of Natural Language
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Plan

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I – Assertions vs. presuppositions

Entailments

(1) a. Tina is tall and thin ⇒ Tina is thin

b. Tina ran to the station ⇒ Tina ran

c. Tina danced ⇒ Tina moved

Entailment*: (i) Indefeasible; (ii) speakers intuitively accept S_2 whenever they accept S_1.*

The following relations are also entailments:

(2) a. The king of France is bald ⇒ France has a (unique) king

b. Tina has stopped smoking ⇒ Tina used to smoke

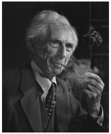
c. It was Tina who shot Malcolm X ⇒ Someone shot Malcolm X

d. Tina regretted visiting LA ⇒ Tina visited LA

Is there a reason to distinguish the entailments in (1) and (2)?

The Russell-Strawson debate

(1) The king of France is bald

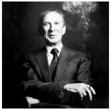


Bertrand Russell (1872-1970):

(1) is quantificational. It is logically equivalent to:

"exactly one entity has the property *King of France*, and that entity is bald"

- Thus, if there is no unique King of France, (1) is *false*.



P. F. Strawson (1919-2006):

Any use of (1) raises the following **presupposition**:

"exactly one entity, call it x, has the property *King of France*"

Under this presupposition, (1) means:

"x is bald"

- Thus, if there is no unique King of France, (1) is neither *true* nor *false*.

Russell vs. Strawson

(1) a. The king of France is bald.

Russell: $\exists x.KOF^* = \{x\} \wedge \mathsf{bald}(x)$

Strawson: $\exists x.KOF^* = \{x\}$ **:** $\exists x.KOF^* = \{x\} \wedge \mathsf{bald}(x)$

b. Tina has stopped smoking.

Russell: $US(\mathsf{tina}) \wedge \neg S(\mathsf{tina})$

Strawson: $US(\mathsf{tina})$ **:** $\neg S(\mathsf{tina})$

US=used to smoke; S=smokes now

c. It was Tina who shot Malcolm X.

Russell: shoot(malcolmx)(tina)

Strawson: $\exists x.$shoot(malcolmx)(x) **:** shoot(malcolmx)(tina)

Trivalent Strawsonian semantics (1)

assertible: $\begin{cases} \text{true:} & 1 \\ \text{false:} & 0 \end{cases}$ non-assertible: $*$

Tina has stopped smoking

$$(US(\text{tina}) : \neg S(\text{tina})) = \begin{cases} 1 & US(\text{tina}) \wedge \neg S(\text{tina}) \\ 0 & US(\text{tina}) \wedge S(\text{tina}) \\ * & \neg US(\text{tina}) \end{cases}$$

Tina used to smoke

$$(\top : US(\text{tina})) = \begin{cases} 1 & US(\text{tina}) \\ 0 & \neg US(\text{tina}) \end{cases}$$

Notation: $[\![\top]\!] = 1$ in every model $[\![\bot]\!] = 0$ in every model

Trivalent Strawsonian semantics (2)

$[\![\mathrm{S}]\!]^M = (\varphi : \psi)$

φ indicates whether S is *assertible* in M

ψ indicates whether S is *true* in M

Definition – the colon operator ('transplication'):

$$(\varphi : \psi) = \begin{cases} \psi & \varphi = 1 \\ * & \varphi = 0 \end{cases}$$

where φ and ψ are bivalent truth-values.

Russell or Strawson?

(1) a. *The king of France is bald* ⇒ b. *France has a (unique) king*
(2) a. *Tina has stopped smoking* ⇒ b. *Tina used to smoke*
(3) a. *It was Tina who shot Malcolm X* ⇒ b. *Someone shot Malcolm X*

Russell:

No semantic presuppositions – (1)-(3) are ordinary entailments.

When sentence (1b/2b/3b) is false, sentence (1a/2a/3a) is also false.

Strawson:

When sentence (1b/2b/3b) is false, the truth-value of sentence (1a/2a/3a) is undefined (or "undefined").

Who is right?

Exercise - Russell's/Montague's determiner

- Define the logical determiner function $\textsc{the}^R$, of type $(et)((et)t)$, that implements Russell's semantics of the English definite article.
- The following expression is the Russellian-Montagovian treatment of the sentence *the king of France is bald*:

  $\textsc{the}^R(KOF)(\textsc{is}(\mathsf{bald}))$

  Use your definition of $\textsc{the}^R$ to simplify this expression.

II – Presupposition projection

Non-projection of ordinary entailments

(1) a. Tina is tall and thin $\Rightarrow$ Tina is thin
b. Tina ran to the station $\Rightarrow$ Tina ran
c. Tina danced $\Rightarrow$ Tina moved

Disappear under non-MON↑ operators:

Negation:

(2) a. It is not the case that Tina is tall and thin $\not\Rightarrow$ Tina is thin
b. It is not the case that Tina ran to the station $\not\Rightarrow$ Tina ran
c. Tina didn't dance $\not\Rightarrow$ Tina moved

Questions:

(3) Is Tina tall and thin? $\not\Rightarrow$ Tina is thin **caveat on questions**

Conditionals:

(4) If Tina is tall and thin, she'll join the basketball team $\not\Rightarrow$ Tina is thin

Possibility modals:

(5) Possibly, Tina is tall and thin. $\not\Rightarrow$ Tina is thin

Presuppositional entailments

(1) It was Tina who shot Malcolm X ⇒ Someone shot Malcolm X

(2) The king of France is bald ⇒ France has a (unique) king

(3) Tina has stopped smoking ⇒ Tina used to smoke

(4) Tina regretted visiting LA ⇒ Tina visited LA

Do these entailments project like other entailments?

Presupposition projection 1 – Hard

Clefts:

(1) It was Tina who shot Malcolm X ⇒ Someone shot Malcolm X

Projection of (1):

Negation: It wasn't Tina who shot MaX ⇒ Someone shot MaX

Question: Was it Tina who shot MaX? ⇒ Someone shot MaX

Conditional: If it was Tina who shot MaX, we'll catch her ⇒ Someone shot MaX

Possibility: Possibly, it was Tina who shot MaX ⇒ Someone shot MaX

Empirical claim (1):

The existential presupposition of clefts projects freely out of non-MON↑ environments.

Presupposition projection 2 – Soft

Definites:

(2) Sue met the Libyan astronaut ⇒ Libya has an astronaut

Projection of (2):

Negation: It is not the case that Sue met the Ly. ast. $\overset{?}{\Rightarrow}$ Ly. has an ast.

Question: Did Sue meet the Ly. ast.? $\overset{?}{\Rightarrow}$ Ly. has an ast.

Conditional: If Sue met the Ly. ast., she's excited now $\overset{?}{\Rightarrow}$ Ly. has an ast.

Possibility: Possibly, Sue met the Ly. ast. $\overset{?}{\Rightarrow}$ Ly. has an ast.

Empirical claims (2):

- Existence presuppositions of definites are **easily projected**.
- A clear contrast from existence entailments of indefinites:
  If Sue met ***a*** *Libyan astronaut, she's excited now*
  $\not\Rightarrow$ *Libya has an astronaut*
- Existence entailments of definites are not projected as clearly as existence entailments of clefts.

Presupposition projection 3 – Soft

Aspectual verbs:

(3) Sue stopped smoking $\Rightarrow$ Sue used to smoke

Projection of (3):

Negation: It is not the case that Sue stopped smoking $\stackrel{?}{\Rightarrow}$ Sue used to smoke

Question: Did Sue stop smoking? $\stackrel{?}{\Rightarrow}$ Sue used to smoke

Conditional: If Sue stopped smoking, Dan is happy $\stackrel{?}{\Rightarrow}$ Sue used to smoke

Possibility: Possibly, Sue stopped smoking $\stackrel{?}{\Rightarrow}$ Sue used to smoke

Empirical claim (3):

Similarly to definites, there's evidence that presuppositions of aspectual verbs project as a default.

Presupposition projection 4 – Soft

Factives:

(4) Tina regretted visiting LA $\Rightarrow$ Tina visited LA

Projection of (3):

Negation: Tina didn't regret visiting LA $\overset{?}{\Rightarrow}$ Tina visited LA

Question: Did Tina regret visiting LA? $\overset{?}{\Rightarrow}$ Tina visited LA

Conditional: If Tina regretted visiting LA, she wrote Dan $\overset{?}{\Rightarrow}$ Tina visited LA

Possibility: Possibly, Tina regretted visiting LA $\overset{?}{\Rightarrow}$ Tina visited LA

Empirical claim (4):

Similarly to definites and aspectual verbs, there's evidence that presuppositions of factives project as a default.

Challenge for Russell

(1) If Tina has stopped smoking, Harry is happy
$\overset{?}{\Rightarrow}$ Tina used to smoke

(2) If Tina used to smoke and doesn't smoke now, Harry is happy
$\not\Rightarrow$ Tina used to smoke

Russell's strategy expects no contrast between (1) and (2):

$[(US(\text{tina}) \wedge \neg S(\text{tina})) \rightarrow H] \not\Rightarrow US(\text{tina})$

US = used to smoke S = smokes now H = Harry happy

Similar advantages for Strawsonian semantics, with all presuppositions

Entailment and presupposition in trivalent semantics

Projection distinguishes presuppositions from other entailments. To model this distinction, we define informally:

Entailment $S_1 \Rightarrow S_2$:

if S_1 is assertible and true, then S_2 is assertible and true as well.

Presupposition $S_1 \rightsquigarrow S_2$:

if S_1 is assertible (i.e. true or false), then S_2 is true.

- Sub-species of entailment

When S_1 entails S_2 but does not presuppose S_2, we say that S_2 is part of the **assertion** in S_1.

Tina is tall and thin asserts *Tina is thin*.
Tina likes smoking asserts *Tina likes something*

The king of France is bald presupposes *there is a king of France*
Tina has stopped smoking presupposes *Tina used to smoke*

The king of France is bald asserts *someone is bald*
Tina has stopped smoking asserts *Tina does not smoke*

Tarskian Truth-Conditionality Criterion

Empirically, S_1 *entails* S_2 if whenever S_1 is assertible and true, S_2 is assertible and true.

TCC: $S_1 \Rightarrow S_2$ iff $\forall M.$ if $[[S_1]]^M = 1$ then $[[S_2]]^M = 1$.

Note: Tarskian TCC generalizes our bivalent TCC.

$\Rightarrow$		$[[S_2]]$ *	$[[S_2]]$ 0	$[[S_2]]$ 1
	*	y	y	y
$[[S_1]]$	0	y	y	y
	1	n	n	y

Example 1: Tina has stopped smoking $\Rightarrow$ Tina used to smoke

A = $(US(\text{tina}) : \neg S(\text{tina}))$ B = $(\top : US(\text{tina}))$

Whenever **A** is assertible and true, **B** is also assertible and true

Example 2: Tina has stopped smoking $\Rightarrow$ Tina doesn't smoke

A = $(US(\text{tina}) : \neg S(\text{tina}))$ C = $(\top : \neg S(\text{tina}))$

Whenever **A** is assertible and true, **C** is also assertible and true

Example 3: Tina doesn't smoke $\not\Rightarrow$ Tina has stopped smoking

C = $(\top : \neg S(\text{tina}))$ A = $(US(\text{tina}) : \neg S(\text{tina}))$

C can be assertible and true while **A** is not assertible

Equivalence – example

A Tina has stopped smoking $(US(\text{tina}) : \neg S(\text{tina}))$

$\Leftrightarrow$

B Tina used to smoke and doesn't smoke now $(\top : US(\text{tina}) \wedge \neg S(\text{tina}))$

A is assertible and true iff **B** is assertible and true

If **A** is assertible and false then **B** is assertible and false

If **A** is not assertible then **B** is assertible and false

Conclusion: The trivalent propositions **A** and **B** are equivalent, although their presuppositions and assertions are different.

1. We have seen a case where A = $(\varphi_1 : \psi_1) \Leftrightarrow$ B = $(\varphi_2 : \psi_2)$, although there are models where $[[\mathbf{A}]] \neq [[\mathbf{B}]]$.
2. This happens because the 0 and $*$ values are treated as identical as far as the **TCC** concerns. But...
3. They may project differently from **complex propositions**!
4. When $[[\varphi]] = [[\psi]]$ in every model, we denote $\varphi \equiv \psi$.

III – Weak Kleene connectives

Weak Kleene connectives

AND	$*$	0	1
$*$	$*$	$*$	$*$
0	$*$	0	0
1	$*$	0	1

Idea: We see $*$ as a "contaminating" value, which does not allow us to deduce anything if there is a presupposition failure somewhere.

Notation: $\wedge, \vee, \rightarrow, \neg$ bivalent connectives
AND, OR, IF, NOT trivalent connectives

OR	$*$	0	1
$*$	$*$	$*$	$*$
0	$*$	0	1
1	$*$	1	1

IF	$*$	0	1
$*$	$*$	$*$	$*$
0	$*$	1	1
1	$*$	0	1

NOT	$*$	0	1
$*$	$*$	1	0

Weak Kleene – Example

Tina jogs regularly and has stopped smoking

$\varphi = (\top : J(\text{tina}))$ AND $(US(\text{tina}) : \neg S(\text{tina}))$

- In any model where $[\![US(\text{tina})]\!] = 0$, we have:
  $[\![\varphi]\!] = *$.
  In any model where $[\![US(\text{tina})]\!] = 1$, we have:
  $[\![\varphi]\!] = [\![J(\text{tina}) \wedge \neg S(\text{tina})]\!]$.
- Thus: $\varphi \equiv (US(\text{tina}) : J(\text{tina}) \wedge \neg S(\text{tina}))$
- Falsity of $US(\text{tina})$ leads to a failure of any proposition made of it.

Problem for Weak Kleene

- In Weak Kleene, any local presupposition failure leads to a global failure.

  If $[\![S]\!] = *$, then any sentence that contains S denotes $*$.

- In natural language, local presupposition failures may sometimes be "filtered" out.

Example: (1) Tina used to smoke and has stopped smoking.
(2) Tina used to smoke.

The (1)⇒(2) puzzle:

- One conjunct of (1) asserts (2), the other conjunct presupposes (2).
- **Empirical claim**: (1) asserts (2) and doesn't presuppose (2).

IV – Filtering and Strong Kleene connectives

Presuppositions filtered out

(1) Tina used to smoke and has stopped smoking.
(2) Tina used to smoke.

Empirical claim: (1) asserts (2) and doesn't presuppose (2).

Recall (3b)⇒(3c):

(3) a. Tina has stopped smoking.
b. If *Tina has stopped smoking* then Harry is happy.
c. Tina used to smoke.

This qualifies (3c) as a presupposition of (3a).

We test presuppositions of (1) in the same way as in (3):

(4) a. Tina used to smoke and has stopped smoking (=(1))
b. If *Tina used to smoke and has stopped smoking* then Harry is happy.
c. Tina used to smoke. (=(2))

(4b)$\not\Rightarrow$(4c).

Support for claim: (1) asserts (2), and doesn't presuppose (2).

Problem for Weak Kleene!

Strong Kleene connectives (1)

AND	$*$	0	1
$*$	$*$	0	$*$
0	0	0	0
1	$*$	0	1

OR	$*$	0	1
$*$	$*$	$*$	1
0	$*$	0	1
1	1	1	1

IF	$*$	0	1
$*$	$*$	$*$	1
0	1	1	1
1	$*$	0	1

NOT	$*$	0	1
$*$	$*$	1	0

Idea: We see $*$ in one argument as "ignorance" – it still allows us to deduce the result from the value of the other argument.

A value $\nu_{op}(\varphi)/\nu_{op}(\psi)$ **determines** the result of a **bivalent** operator op if whenever that value is assigned to φ/ψ, there's one result for $\varphi\ op\ \psi$.

- $\wedge$ 0 in either argument determines the result to be 0
- $\vee$ 1 in either argument determines the result to be 1
- $\rightarrow$ 0 in left argument determines the result to be 1

Strong Kleene and projection

Incremental view on (the asymmetric version of) Strong Kleene:

- in $S_1\, op\; S_2$, process S_1
- if S_1 fails – **failure**
- if $[\![S_1]\!]$ determines op's value: **evaluate** $[\![S_1\; op\; S_2]\!]$, **ignoring** S_2
- otherwise: **process** S_2

Examples for filtering:

(1) John used to smoke **and** stopped smoking.

if *John used to smoke* is 0 → trigger ignored → result: 0
if *John used to smoke* is 1 → presupposition satisfied

(2) John never smoked **or** stopped smoking.

if *John never smoked* is 1 → trigger ignored → result: 1
if *John never smoked* is 0 → presupposition satisfied

(3) **If** John used to smoke **then** he stopped smoking.

if *John used to smoke* is 0 → trigger ignored → result: 1
if *John used to smoke* is 1 → presupposition satisfied

Weak Kleene vs. Strong Kleene

Stephen Cole Kleene (1909-1994)

- simple
- inadequate

- more complex
- adequate?

The “Proviso” problem

(1) Tina jogs and has stopped smoking.

if *Tina jogs* is 0 → trigger ignored → result: 0

if *Tina jogs* is 1 → the presupposition *Tina used to smoke* is projected

Open question: Is this an adequate analysis?

The "Proviso" problem (cont.)

According to Weak Kleene:

Tina jogs and has stopped smoking $\rightsquigarrow$ Tina used to smoke

According to Strong Kleene:

Tina jogs and has stopped smoking $\Rightarrow$ Tina used to smoke

Tina jogs and has stopped smoking $\rightsquigarrow$ Tina doesn't jog, or used to smoke
= if Tina jogs, she used to smoke

- the examined presupposition (*Tina used to smoke*) appears conditionalized with a "proviso" (*if Tina jogs*)

Two approaches to this "proviso" problem:

- Try to explain why presuppositions are often without provisos.
- Deny that conditionalized presuppositions are needed at all.

Other problems

- Hard vs. soft triggers (Abusch 2010)
- (A-)symmetric filtering (Mandelkern et al. 2017)
- Accommodation (Von Fintel 2008)
- The status of conditional presuppositions (Beaver 2001, Mandelkern 2016)
- Frameworks (Beaver 1997, Schlenker 2008, Winter 2019)
- More experimental work (Schwarz 2015)

References

Abusch, D. (2010), 'Presupposition triggering from alternatives', *Journal of Semantics* **27**(1), 37–80.

Beaver, D. I. (1997), Presupposition, *in* van Benthem & A. ter Meulen, eds, 'Handbook of Logic and Language', Elsevier, Amsterdam, pp. 939–1008.

Beaver, D. I. (2001), *Presupposition and Assertion in Dynamic Semantics*, CSLI Publications, Stanford, CA.

Mandelkern, M. (2016), Dissatisfaction theory, *in* 'Proc. of SALT 26', pp. 391–416.

Mandelkern, M., Zehr, J., Romoli, J. & Schwarz, F. (2017), Asymmetry in presupposition projection: The case of conjunction, *in* 'Procedings of SALT 27', pp. 504–524. Extended version (`http://users.ox.ac.uk/~sfop0776/Discovered.pdf`) to appear in *Linguistics & Philosophy*.

Schlenker, P. (2008), 'Be articulate: A pragmatic theory of presupposition projection', *Theoretical Linguistics* **34**(3), 157–212.

Schwarz, F., ed. (2015), *Experimental Perspectives on Presuppositions*, Springer.

Von Fintel, K. (2008), 'What is presupposition accommodation, again?', *Philosophical perspectives* **22**, 137–170.

Winter, Y. (2019), Presupposition projection and repair strategies in trivalent semantics, *in* 'Proceedings of the 16th Meeting on the Mathematics of Language', pp. 27–39. More linguistic argumentation to appear in Y. Winter, "On Presupposition Projection with Trivalent Connectives", *proceedings of SALT 2019*.