Lifetime Effects as Presuppositional Scalar Strengthening

Yasutada Sudo

Jacopo Romoli

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Overview

Phenomenon: Past stative predicates tend to trigger inferences.

(1) a. Ann was angry. ⇝ Ann is no longer angry.
b. Ann was my sister. ⇝ Ann is dead.

Claims:

- These inferences are **temporal implicatures**.
- Past tense competes with present tense.
- **Two scalar strengthening mechanisms** (Spector & Sudo, t.a.):

1. **Assertive scalar strengthening** ⇝ (1a)
2. **Presuppositional scalar strengthening** ⇝ (1b)

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Temporal Implicatures

Existential Theory of Tense

Past tense introduces a time prior to the utterance time in context c, $\texttt{time}(c)$ (Kusumoto 1999, Thomas 2012).

(2) Ann arrived.

$$\exists t \left[\underbrace{t \prec \{ \texttt{time}(c) \}}_{\text{Past}} \wedge \texttt{arrive}(\texttt{ann}, t) \right]$$

Assumptions

- Uncountably many moments, of which $\texttt{time}(c)$ is one
- Time intervals (t, etc.) are convex sets of moments, partially ordered by $\prec$.
- (We'll introduce domain restriction on $\exists t$ later)

Cessation Implicature

With a stative predicate like be angry, past tense tends to generate an additional inference (**cessation implicature**).

(3) Ann was angry. $\rightsquigarrow$ Ann is no longer angry

$$\exists t\,[t \prec \{\,\mathtt{time}(c)\,\} \wedge \mathtt{angry}(\mathtt{ann}, t)]$$

This just says that there was a past time interval at which Ann was angry, and doesn't say anything about her state at $\mathtt{time}(c)$.

We will analyze the cessation implicature via **assertive scalar strengthening**.

Lifetime Effects

Certain stative predicates give rise to so-called **lifetime effects**:

(4) Ann was my sister $\rightsquigarrow$ Ann is dead.

$$\exists t\,[t < \{\,\mathtt{time}(c)\,\} \wedge \mathtt{sister}(\mathtt{ann}, \mathtt{spkr}(c), t)]$$

The semantics doesn't say anything about Ann's present state.

We will analyze the lifetime effects via **presuppositional scalar strengthening**.

Generalizations

- **Individual-level predicates**: Temporally invariant properties
- **Stage-level predicates**: Non-permanent properties

Generally:

- Past + Individual-level predicates ⇒ **lifetime effects**

(5) a. Ann was my sister.
b. Bill was British.
c. Chris had a Czech friend.

- Past + Stage-level predicates ⇒ **cessation implicatures**

(6) a. Ann was angry.
b. Bill was bored.
c. Chris lived in Canada.

Apparent Exceptions to the Generalization

Individual-level vs. stage-level is not lexically determined. Canonically individual-level predicates function as stage-level predicates in certain contexts.

(7) Ann was British. She became Russian and now lives in Moscow.

When a particular past tense is contextually salient, lifetime effects do not arise.

(8) On that day, I was introduced to Gregory and Eva-Lotta. Gregory was from America. (Musan 1995:19)

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Old and New Analyses

Previous analyses (Musan 1995, 1997, Magri 2009, 2011, Thomas 2012): Lifetime effects arise as a result of interactions between cessation implicatures and contextual assumptions.

Our analysis:

Following Spector & Sudo (to appear) we assume two kinds of scalar strengthening.

- Cessation implicatures are **assertive scalar inferences.**
- Lifetime effects are **presuppositional scalar inferences.**

Two Scalar Strengthening Mechanisms

Scalar Inferences

Scalar items like some and or give rise to **scalar inferences** (alt.: scalar implicatures).

(9) a. Ann read **most** of the books. ⇝ Ann didn't read all
b. Ann speaks Bangla **or** Chinese. ⇝ Ann doesn't speak both

Scalar inferences are not part of the lexical semantics of the scalar items, as they are not always present:

(10) a. I don't think Ann read **most** of the books.
⇝ I don't think Ann read not all of the books.
b. I don't think Ann speaks Bangla **or** Chinese.
⇝ I don't think Ann doesn't speak both of the languages.

(NB: these inferences become available, when the scalar items are stressed)

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Analyses of Scalar Inferences

Scalar inferences have traditionally been analyzed as pragmatic inferences, but some claim that they are generated by a grammatical means.

- **(Neo-)Gricean approach**
  Horn (1972, 1989), Gazdar (1979), Soames (1982), Sauerland (2004), Russell (2006), Spector (2006, 2007), Geurts (2009, 2010), etc.
- **Grammatical approach**
  Chierchia (2004), Chierchia, Fox & Spector (2012), Fox (2007), Magri (2009, 2010), Sauerland (2012), etc.

We don't need to be committed to either view.

For expository purposes, we assume that scalar inferences are generated by a grammatical operator.

Exhaustivity Operator (Exh)

According to the grammatical approach, scalar inferences are generated by the operator Exh (alt.: $\mathcal{O}$).

$$[\![\text{Exh}(\varphi)]\!]^w = 1 \text{ iff } [\![\varphi]\!]^w = 1 \wedge \forall \psi \in \text{Alt}(\varphi)[[\![\psi]\!] \subset [\![\varphi]\!] \rightarrow [\![\psi]\!]^w = 0]$$

Exh negates all alternatives ψ of φ that are stronger than φ (= asymmetrically entail φ). (See Fox 2007, Chierchia, Fox & Spector 2012 for refinements)

(11) Exh(Most of the invited speakers are male)

a. φ = Most of the invited speakers are male

b. $\text{Alt}(\varphi) = \{$ Some of the invited speakers are male, All of the invited speakers are male $\}$

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a. φ = Most of the invited speakers are male

b. $\text{Alt}(\varphi) = \left\{ \begin{array}{l} \text{Some of the invited speakers are male}, \\ \text{All of the invited speakers are male} \end{array} \right\}$

Interaction b/w SI and Presuppositions

Most studies of scalar inferences ignore (semantic) presuppositions (but see Gazdar 1979, Van der Sandt 1988).

Gajewski & Sharvit (2012) and Spector & Sudo (to appear) discuss examples containing both **a scalar item** and a presupposition trigger like (12) and (13).

(12) Ann is aware that **most** of the invited speakers are male.

(13) Ann is unaware that **most** of the invited speakers are male.

What are the scalar inferences of these sentences?

Presuppositional Scalar Strengthening

Gajewski & Sharvit (2012) observe that (14) has **a scalar inference in the presupposition, but not in the assertion**.

(14) Ann is unaware that **some** of the invited speakers are male.

Presupposition of α	::	$\langle\!\langle \alpha \rangle\!\rangle$
Assertive/at-issue content of α	::	$[\![\alpha]\!]$

$\langle\!\langle (14) \rangle\!\rangle$ = that some **but not all** of the invited speakers are male

$[\![(14)]\!] = \neg \mathrm{K}_{\mathrm{ann}}$(that some of the invited speakers are male)

$\neq \neg \mathrm{K}_{\mathrm{ann}}$(that some but not all of the invited spkrs are male)

Interaction b/w SI and Presuppositions (cont.)

Spector & Sudo (to appear) observe that (15) has two readings:

(15) Ann is aware that **most** of the invited speakers are male.

1. Presuppositional Strengthening Reading:

$\langle\!\langle (15) \rangle\!\rangle$ = that most but **not all** of the speakers are male

$[\![(15)]\!] = K_{ann}$(that most (but not all) of the speakers are male)

2. Assertive Strengthening Reading:

$\langle\!\langle (15) \rangle\!\rangle$ = that **all** of the speakers are male

$[\![(15)]\!] = K_{ann}$(that most of the speakers are male)
$\wedge \neg K_{ann}$(that all of the speakers are male)

(NB: **2.** becomes more prominent when the scalar item is stressed)

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$\langle\!\langle (15) \rangle\!\rangle$ = that **all** of the speakers are male

$[\![(15)]\!] = \mathrm{K}_{\mathrm{ann}}$(that most of the speakers are male)
$\wedge \neg \mathrm{K}_{\mathrm{ann}}$(that all of the speakers are male)

(NB: **2.** becomes more prominent when the scalar item is stressed)

Two Scalar Strengthening Mechanisms

We assume that scalar items trigger strengthening via one of **two scalar strengthening mechanisms** (Spector & Sudo to appear).

Suppose ψ is the only alternative of φ.

1. **Presuppositional Strengthening ($\mathbb{P}$)**: If $\langle\!\langle \psi \rangle\!\rangle \subset \langle\!\langle \varphi \rangle\!\rangle$, then

$$\langle\!\langle \mathbb{P}(\varphi) \rangle\!\rangle = \langle\!\langle \varphi \rangle\!\rangle \wedge \neg \langle\!\langle \psi \rangle\!\rangle$$
$$[\![\mathbb{P}(\varphi)]\!] = [\![\varphi]\!]$$

2. **Assertive Strengthening ($\mathbb{A}$)**: If $[\![\psi]\!] \subset [\![\varphi]\!]$ whenever both $\langle\!\langle \psi \rangle\!\rangle$ and $\langle\!\langle \varphi \rangle\!\rangle$ are satisfied, then

$$\langle\!\langle \mathbb{A}(\varphi) \rangle\!\rangle = \langle\!\langle \varphi \rangle\!\rangle \wedge \langle\!\langle \psi \rangle\!\rangle$$
$$[\![\mathbb{A}(\varphi)]\!] = [\![\varphi]\!] \wedge \neg [\![\psi]\!]$$

(See Spector & Sudo, to appear for more precise definitions)

Examples: Presuppositional Scalar Strengthening

$\langle\!\langle \mathbb{P}$(Ann is aware that **most** of them are male)$\rangle\!\rangle$

= $\langle\!\langle$Ann is aware that **most** of them are male$\rangle\!\rangle$

$\wedge \neg \langle\!\langle$Ann is aware that **all** of them are male$\rangle\!\rangle$

= that most but **not all** of them are male

$[\![\mathbb{P}$(Ann is aware that **most** of them are male)$]\!]$

= $[\![$Ann is aware that **most** of them are male$]\!]$

= that Ann knows that most of them are male

Examples: Assertive Scalar Strengthening

$\langle\!\langle \mathbb{A}$(Ann is aware that **most** of them are male)$\rangle\!\rangle$

= $\langle\!\langle$Ann is aware that **most** of them are male$\rangle\!\rangle$

$\wedge \langle\!\langle$Ann is aware that **all** of them are male$\rangle\!\rangle$

= that (most and) **all** of them are male

$[\![\mathbb{A}$(Ann is aware that **most** of them are male)$]\!]$

= $[\![$Ann is aware that **most** of them are male$]\!]$

$\wedge \neg [\![$Ann is aware that **all** of them are male$]\!]$

= that Ann knows that most of them are male, but **does not know that all of them are male**

Gajewski & Sharvit's Observation

For (16), $\mathbb{A}$ does not lead to strenghthening, because there is no alternative that is stronger in the assertion:

(16) Ann is unaware that **some** of them are male.

This sentence **Strawson-entails** (17), i.e. whenever the presuppositions of both are satisfied, (16) entails (17):

(17) Ann is unaware that **all** of them are male.

So (17) cannot be negated.

Gajewski & Sharvit's Observation

On the other hand, $\mathbb{P}$ will succeed.

- $\langle\!\langle$Ann is unaware that **some** of them are male.$\rangle\!\rangle$
  = that some (possibly all) of them are male
- $\langle\!\langle$Ann is unaware that **all** of them are male.$\rangle\!\rangle$
  = that all of them are male

So:

$\langle\!\langle\mathbb{P}$(Ann is unaware that **some** of them are male)$\rangle\!\rangle$
= that some but not all of them are male

Assumption: If only one of $\mathbb{P}$ and $\mathbb{A}$ leads to scalar strengthening, that reading is preferred.

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Summary: Two Scalar Strengthening Mechanisms

1. **Presuppositional Strengthening ($\mathbb{P}$)**: If $\langle\!\langle \psi \rangle\!\rangle \subset \langle\!\langle \varphi \rangle\!\rangle$, then

$$\langle\!\langle \mathbb{P}(\varphi) \rangle\!\rangle = \langle\!\langle \varphi \rangle\!\rangle \wedge \neg \langle\!\langle \psi \rangle\!\rangle$$
$$[\![\mathbb{P}(\varphi)]\!] = [\![\varphi]\!]$$

   (Negate the presupposition of ψ)

2. **Assertive Strengthening ($\mathbb{A}$)**: If $[\![\psi]\!] \subset [\![\varphi]\!]$ whenever both $\langle\!\langle \psi \rangle\!\rangle$ and $\langle\!\langle \varphi \rangle\!\rangle$ are satisfied, then

$$\langle\!\langle \mathbb{A}(\varphi) \rangle\!\rangle = \langle\!\langle \varphi \rangle\!\rangle \wedge \langle\!\langle \psi \rangle\!\rangle$$
$$[\![\mathbb{A}(\varphi)]\!] = [\![\varphi]\!] \wedge \neg [\![\psi]\!]$$

   (Make sure that the presupposition of ψ is satisfied and negate the assertive content of ψ)

Temporal Scalar Inferences

Assumptions

1. Existential theory for tense: (Kusumoto 1999, Thomas 2012)

$$[\![\text{Ann was angry}]\!] = \exists t\,[t \prec \{\,\mathtt{time}(c)\,\} \wedge \mathtt{angry}(\mathtt{ann}, t)]$$

$$[\![\text{Ann is angry}]\!] = \exists t\,[\mathtt{time}(c) \in t \wedge \mathtt{angry}(\mathtt{ann}, t)]$$

2. Stative predicates like be my sister and be angry presuppose that the subject is alive during the time at which the predicate holds. (Musan 1995, 1997, Thomas 2012)

3. Presuppositions existentially project through existential quantifiers (Beaver 2001, Chemla 2009).

$$\langle\!\langle \text{Ann was angry} \rangle\!\rangle = \exists t\,[t \prec \{\,\mathtt{time}(c)\,\} \wedge \mathtt{alive}(\mathtt{ann}, t)]$$

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Lifetime Effects

(18) Ann was my sister. $\rightsquigarrow$ Ann is dead

a. $\langle\!\langle$Ann was my sister$\rangle\!\rangle = \exists t\,[t \prec \{\,\mathtt{time}(c)\,\} \wedge \mathtt{alive}(\mathtt{ann}, t)]$

b. $\langle\!\langle$Ann is my sister$\rangle\!\rangle = \exists t\,[\mathtt{time}(c) \in t \wedge \mathtt{alive}(\mathtt{ann}, t)]$

Claim: Lifetime effects arise via $\mathbb{P}$.

We assume that stative predicates never hold for a single moment (Altshuler & Schwarzschild 2012):

If $\mathtt{alive}(x, \{\,m_1\,\})$, then there's always m_2 such that $\{\,m_2\,\} \prec \{\,m_1\,\}$ and $\mathtt{alive}(x, \{\,m_2\,\})$.

(This doesn't mean x was always alive, thanks to uncountability.)

Then, (18b) is stronger than (18a). $\mathbb{P}$ yields an inference that Ann is dead now.

Lifetime Effects

$\mathbb{A}$ would yield a cessation implicature but it would contradict contextual assumptions.

$\langle\!\langle \mathbb{A}$(Ann was my sister)$\rangle\!\rangle$ = Ann was alive and is alive

$[\![\mathbb{A}$(Ann was my sister)$]\!]$ = Ann was my sister but no longer is **!!!**

This reading becomes available when such contextual assumptions are not made:

(7) Bill was British, and became American in 1975.

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(7) Bill was British, and became American in 1975.

Cessation Implicature

With predicates like be angry both readings are in principle available.

Lifetime Effects

$\langle\!\langle \mathbb{P}(\text{Ann was angry}) \rangle\!\rangle$ = Ann was alive but is not alive now

$[\![\mathbb{P}(\text{Ann was angry})]\!]$ = Ann was angry

Cessation Implicature

$\langle\!\langle \mathbb{A}(\text{Ann was angry}) \rangle\!\rangle$ = Ann was alive and is alive

$[\![\mathbb{A}(\text{Ann was angry})]\!]$ = Ann was angry but no longer is now

But if it is known that Ann is (possibly) alive now, the reading with $\mathbb{P}$ will be infelicitous.

Domain Restriction

Recall Musan's example:

(8) On that day, I was introduced to Gregory and Eva-Lotta. Gregory was from America. (Musan 1995:19)

We assume that tenses have domain restriction D that is constant across alternatives:

(19) $\langle\!\langle$Gregory was from America$\rangle\!\rangle$
$= \exists t \subseteq \mathrm{D}\,[t \prec \{\,\mathtt{time}(c)\,\} \wedge \mathtt{alive}(\mathtt{ann}, t)]$

(20) $\langle\!\langle$Gregory is from America$\rangle\!\rangle$
$= \exists t \subseteq \mathrm{D}\,[\mathtt{time}(c) \in t \wedge \mathtt{alive}(\mathtt{ann}, t)]$

D represents the contextually relevant maximum time interval. Suppose $\mathtt{time}(c) \notin \mathrm{D}$. Then (20) is trivially false, due to the first conjunct, rather than the second.

Summary

Lifetime Effects are presuppositional scalar inferences:

$\langle\!\langle \mathbb{P}(\text{Ann was my sister}) \rangle\!\rangle$ = Ann was alive but is not alive now

$[\![\mathbb{P}(\text{Ann was my sister})]\!]$ = Ann was my sister

Cessation Implicature are assertive scalar inferences:

$\langle\!\langle \mathbb{A}(\text{Ann was angry}) \rangle\!\rangle$ = Ann was alive and is alive

$[\![\mathbb{A}(\text{Ann was angry})]\!]$ = Ann was angry but no longer is now

$\mathbb{A}$ + an individual-level predicate contradicts contextual assumptions.

Stage-level predicates are in principle compatible with both operators.

Present Tense

Why does present tense not generate an inference?

(21) Ann is angry.

a. $\langle\!\langle (21) \rangle\!\rangle = \exists t\,[\mathtt{time}(c) \in t \wedge \mathtt{alive}(\mathtt{ann}, t)]$

b. $[\![(21)]\!] = \exists t\,[\mathtt{time}(c) \in t \wedge \mathtt{angry}(\mathtt{ann}, t)]$

(22) Ann was angry.

a. $\langle\!\langle (22) \rangle\!\rangle = \exists t\,[t \prec \{\,\mathtt{time}(c)\,\} \wedge \mathtt{alive}(\mathtt{ann}, t)]$

b. $[\![(22)]\!] = \exists t\,[t \prec \{\,\mathtt{time}(c)\,\} \wedge \mathtt{angry}(\mathtt{ann}, t)]$

Due to the assumption that stative predicates like `angry` always hold for multiple moments:

- $\mathbb{P}$ won't generate any inference, because (21a) entails (22b).
- Similarly $\mathbb{A}$ won't generate an inference, because (21b) (Strawson-)entails (22b).

Comparison with Previous Analyses

Musan (1995, 1997)

Musan (1995, 1997) claims that lifetime effects arise as a result of cessation implicatures and their conflict with contextual assumptions.

This analysis, however, predicts that lifetime effects do not obtain in negative contexts where scalar inferences disappear. This is incorrect:

(23) a. It's not true that Ann was my sister.
b. Was Ann your sister?
c. If Ann was his sister, she inherited a fortune.

⇝ Ann is dead

Our analyses treat these cases on a par with simple sentences like Ann was my sister: They all have the same presupposition, due to presupposition projection.

Ignorance Contexts

Putting the details aside, Magri (2009, 2011) predicts that lifetime effects don't arise in contexts where it is not commonly known whether the subject is alive or dead.

Thomas (2012) observes that this is incorrect.

(24) I don't know whether Ann is dead or alive, but ?? she was my sister.

Thomas suggests a pragmatic explanation: The hearer would infer that the speaker knows whether Ann is dead or alive

But why should such an inference be drawn in (24), given the speaker asserts that she is ignorant about it?

According to our analysis, lifetime effects arise in such ignorance contexts as well, because some scalar inference needs to be drawn, whenever possible.

Thank you!

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