Polarity sensitivity across categories

Perspectives from an alternative-based approach

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@ The meaning of functional categories | Centre de Lingüistica Teòrica, UAB | Apr 15-17, 2021

Outline

Natural languages and logical languages

Montague: Natural languages are logical.

- No important theoretical difference between logical and natural languages:
  - $a \vee b$ is T iff a is T or b is T or both are T.
  - *Jo called Alice or Bob* if Jo called Alice or if Jo called Bob or if Jo called both.

Critics: Natural languages are supra(=beyond)logical.

- Important differences between logical and natural languages:
  - *Jo called Alice or Bob* suggests she didn't call both, and also that the speaker isn't sure who she called.

Grice: Natural languages are super(=beyond+very)logical.

- In a natural language dialogue, the listener reasons not just about what is said but also what is *not* said—that is, they reason about alternatives.

The Gricean view of natural language(s)

Very influential.

Important results for questions, focus, conditionals, etc.

Also for polarity sensitivity—our focus today.

Existing literature: Polarity sensitivity as a *supra*logical effect

(1)	a.	Jo called **un** student **oarecare**.	$\exists x \in D_e[S(x) \wedge C(j,x)]$
	b.	#Jo didn't call **un** student **oarecare**.	$^{\#}\neg\exists x \in D[S(x) \wedge C(j,x)]$
(2)	a.	#Jo called **any** student.	$^{\#}\exists x \in D_e[S(x) \wedge C(j,x)]$
	b.	Jo didn't call **any** student.	$\neg\exists x \in D_e[S(x) \wedge C(j,x)]$
(3)	a.	#Jo **lifted a finger** (to help).	$^{\#}H(j, d_{\min})$
	b.	Jo didn't **lift a finger** (to help).	$\neg H(j, d_{\min})$
(4)	a.	Everyone who **lifted a finger** to help was rewarded.	$\forall x[H(x, d_{\min}) \rightarrow R(x)]$
	b.	?Everyone who **lifted a finger** to help was wearing jeans.	$^{?}\forall x[H(x, d_{\min}) \rightarrow WJ(x)]$

Existing literature: Polarity sensitivity as a *super*logical effect

Grice himself did not offer a solution for polarity sensitivity.

However, the literature since has proposed a variety of Grice-inspired solutions:
– Chierchia (2013) (based also on other refs. therein) proposes that NPIhood comes from silent exhaustification via O_{DA} (+ ban on G-trivial results) or from E_{SA} and PPIhood comes from exhaustification via O_{ExhDA} (+ ban on non-properly-stronger results).
– Crnič (2011) suggests evaluativity is just another reflex of exhaustification via E_{SA}.

Existing literature: Open issues

- Manifestations of polarity sensitivity are observed in many categories of language:
  - disjunction
  - numerals
  - adjectives
  - modals
  - bare nominals
  - …
- However, it is not always clear whether these manifestations are truly related.
- Even when it feels like they must be, the existing alternative-based accounts often make subtly but substantially different assumptions about the truth conditions, alternatives, implicature calculation, and subsequent filters.
- As such, Grice's notion that supralogical is really superlogical is lost.

Plan today:

To test the limits of the idea that polarity sensitivity is indeed superlogical

We will review an alternative-based view of polarity sensitivity in *any* and *some*, and of polarity sensitivity and evaluativity in *lift a finger*. This will give us a baseline.

We will then examine polarity sensitivity patterns in other categories of language and observe what it would take to extend the alternative-based view to them also.

As we will see, we will end up revising our understanding of these categories, but also of polarity sensitivity.

Outline

The alternative-based approach (Chierchia 2013, Crnič 2011, 2012)

Items with polarity sensitivity make reference in their truth conditions to a domain or a scale.

This naturally activates subdomain and scalar alternatives.

This naturally triggers exhaustification via O(nly) and E(ven).

Exhaustification with O sometimes gives rise to G(rammatically)-trivial contradiction. This is generally banned. This is one source for NPIhood.

Exhaustification with O sometimes fails to lead to a P(roperly)S(tronger) meaning. This is sometimes (item-dependent) banned. This is the source for PPIhood.

(Typically available only for items from rich scales,) Exhaustification with E sometimes gives rise to logically / pragmatically impossible / implausible meanings. This is another source for NPIhood / the source for evaluativity.

Some illustrations

NPI *any*

(5) a. #Jo called any student. $^{\#}\exists x \in D_e[S(x) \wedge C(j,x)]$

$O_{DA+SA}(\exists x \in D_e \dots)$

$= \exists x \in D_e \cdots \wedge \neg\exists x \in D' \dots$

$= \bot$ (O leads to contradiction)

b. Jo didn't call any student. $\neg\exists x \in D_e[S(x) \wedge C(j,x)]$

$= O(\neg\exists x \in D_e \dots)$

$= \neg\exists x \in D_e \dots$ (O is vacuous)

polarity sensitivity due to obligatory $O_{ExhDA+SA}$ and general ban on LFs that lead to G-triviality

Some illustrations

PPI *un NP oarecare*

(6) a. Jo called un student oarecare. $\exists x \in D_e[S(x) \wedge C(j,x)]$

$O_{\text{ExhDA+SA}}\Box(\exists x \in D_e \ldots)$

$= \ldots$ (F(ree)C(hoice) effect)

b. $^{\#}$Jo didn't call un student oarecare. $^{\#}\neg\exists x \in D[S(x) \wedge C(j,x)]$

$O_{\text{ExhDA+SA}}(\neg\exists x \in D \ldots)$

$= \ldots$ (O_{ExhDA} does not lead to a properly stronger meaning)

polarity sensitivity due to obligatory ExhDA+SA and item-specific ban on LFs that do not lead to a properly stronger meaning

Some illustrations

NPI *lift a finger*

(7) a. #Jo lifted a finger (to help). $^{\#}H(j, d_{\min})$

$\mathrm{E}_{\mathrm{SA}} H(j, d_{\min})$

$= H(j, d_{\min}) \prec_{\mu} H(j, d_{\min+1})$ (impossible)

b. Jo didn't lift a finger (to help). $\neg H(j, d_{\min})$

$\mathrm{E}_{\mathrm{SA}}(\neg H(j, d_{\min}))$

$= \neg H(j, d_{\min}) \prec_{\mu} \neg H(j, d_{\min+1})$ (impossible)

polarity sensitivity due to obligatory E_{SA} and logical failure of probability relation between prejacent and the SA

Some illustrations

evaluative *lift a finger*

(8) a. Everyone who lifted a finger to help was rewarded. $\forall x[H(x, d_{\min}) \rightarrow R(x)]$

$E_{SA}\forall x[O_{SA}(H(x, d_{\min}) \rightarrow R(x)]$

$= \forall x[O_{SA}(H(x, d_{\min}) \rightarrow R(x)] \prec_{\mu} \forall x[O_{SA}(H(x, d_{\min+1}) \rightarrow R(x)]$

b. ?Everyone who lifted a finger to help was wearing jeans. $^{?}\forall x[H(x, d) \rightarrow W - J(x)]$

$E_{SA}\forall x[O_{SA}(H(x, d_{\min}) \rightarrow WJ(x)]$

$= \forall x[O_{SA}(H(x, d_{\min}) \rightarrow WJ(x)] \prec_{\mu} \forall x[O_{SA}(H(x, d_{\min+1}) \rightarrow WJ(x)]$

evaluativity due to obligatory E_{SA} relative to exactly understood SA, and pragmatic confusion about probability relation between the prejacent and the SA (because of non-availability of intuitions about helping and wearing jeans)

English *some*

English *some* is a PPI (Szabolcsi 2004, Nicolae 2012, Mihoc 2020, a.o.).

(9) a. Jo called **some** student. $\exists x \in D_e[S(x) \wedge C(j,x)]$

b. #Jo didn't call **some** student. $^{\#}\neg\exists x \in D_e[S(x) \wedge C(j,x)]$

Recipe based on obligatory O_{ExhDA}: Works.

Challenges:

- This recipe derives a total FC effect in positive contexts, yet *some* is compatible with both negative and positive specificity.
- Obligatory O_{ExhDA} is usually assumed to be available only to items with overt FC morphology.

Updates:

- Like other partial FC items, e.g., *algún*, *some* can choose to use just its SgDA. Additionally, it can also choose to use just its NonSgDA.
- FC morphology is not a prerequisite for obligatory O_{ExhDA}.

Observations, open issues: In singular *some* positive specificity might remove the typical FC effect, but leave room for another.

French *ou*

French *ou* is a PPI (Nicolae 2017).

(10) a. Jo a invité Alice ou Bob. $I(j,a) \vee I(j,b)$

b. #Jo n'a pas invité Alice ou Bob. $^{\#}\neg(I(j,a) \vee I(j,b))$

Recipe based on obligatory O_{ExhDA}: Works pretty straightforwardly.

Challenges:

- For disjunction, DA are usually derived structurally.
- The implementation of the recipe from Nicolae (2017) derives total FC and PPIhood in one fell swoop, whereas we know from indefinites that they should be kept apart.
- Disjunctions are ?never *partial* FC.

Updates:

- Disjunction is also actually based on a domain.

(11) Jo called a, b, …, or …

$$\bigvee_{x \in \{a,b,\ \ldots\}} C(j,x) \Leftrightarrow C(j,a) \vee C(j,b) \vee \ \ldots$$

Observations, open issues:

- In disjunction FC and PPIhood might also be independent.
- Why is disjunction ?always total FC?

English *or*

English *or* is not a PPI:

(12) a. Jo called Alice or Bob. $I(j,a) \vee I(j,b)$
b. Jo didn't call Alice or Bob. $\neg(I(j,a) \vee I(j,b))$

Recipe based on O_{ExhDA}: Works straightforwardly.

Challenges: None.

Updates: None.

Observations: All previous updates are endorsed.

English numerals, part 1

English *at least/most n* is a PPI (Geurts and Nouwen 2007 and refs. therein; see also Mihoc and Davidson 2021 for experimental evidence).

(13) a. Jo called at least 3 people. $max(\lambda n_d . \exists x[|x| = n \wedge P(x) \wedge C(j,x)]) \geq 3$

b. #Jo didn't call at least 3 people.
#$\neg(max(\lambda n_d . \exists x[|x| = n \wedge P(x) \wedge C(j,x)]) \geq 3)$

Recipe based on obligatory O_{ExhDA}: Not obvious how it should apply.
Challenges:

- DA derived very diversely, which unequal results, none quite like what we want.

Updates:

- *at least/most* (just like *more/less than*) make reference to a domain also:

(14) Jo called at least/most n people.
$\max(\lambda d . \exists x[|x| = d \wedge P(x) \wedge C(j,x)]) \in \overbrace{[\![\text{much/little}]\!](n)}^{\{..., n\}/\{n, ...\}}$

Observations, open issues:

- The domain can be a derived domain.
- Why does PPIhood prefer SMNs?

English numerals, part 2

English *no more/less than n* (negated CMNs), *at least/most n* (SMNs) are evaluative.

(15) Jo solved no less than 3 problems.
⇝ That's many!

(16) a. Everyone who solved at least 3 problems passed. $\forall x[S(\geq 3) \rightarrow P]$
b. #Everyone who solved at least 3 problems failed. $^{\#}\forall[S(\geq 3] \rightarrow F]$

Recipe based on E_{SA}: Not clear how it should apply.

Challenges:

- The literature insists CMNs and SMNs do not have classic Horn-style SA.
- CMNs and SMNs are typically not end-of-scale.

Updates:

- CMNs and SMNs do actually have classic, Horn-style SA (Mihoc 2021b).
- For the purpose of E_{SA}, CMNs and SMNs are in a sense end-of-scale (Mihoc 2021b).

Observations, open issues:

- Coupled with the DA we derived earlier, the effect of the SA is toned down, explaining the issues the literature worried about.
- Why does evaluativity prefer non-strict-order meanings?

Aspectual operators, part 1

English *still*, *yet*, *already*, *anymore* are all NPIs or PPIs (Israel 1997, Mihoc 2021a).

(17) a. Jo is **still** asleep.
b. #Jo isn't **still** asleep.

Recipe based on $O_{(Exh)DA}$: Not clear how it should apply.

Challenges:

- No consensus on the truth conditions.

Updates:

- New truth conditions that make available a domain and a scale:

still/anymore:

$$\exists t \in \overbrace{\text{NEG}(t_0)}^{\{t_0, t_{+1}, \ldots\}}[t \in \tau(e)]$$

already/yet:

$$\exists t \in \overbrace{\text{POS}(t_0)}^{\{\ldots, t_{-1}, t_0\}}[t \in \tau(e)]$$

Observations, open issues: Predictions in positive contexts not obviously correct.

Aspectual operators, part 2

English *still, yet, already, anymore* are evaluative (Israel 1997, Mihoc 2021a, a.o.).

(18) Jo is still asleep.
⇝ She is asleep later than expected.

(19) a. Jo is still young.
b. #Jo is still old.

Recipe based on E_{SA}: Works straightforwardly.

Challenges: Complicated predictions, need to check carefully.

Observations, open issues: Previous updates for non-end-of-scale items hold up!

Outline

Conclusion

We find similar manifestations of polarity sensitivity in many different categories of language: indefinites, minimizers, disjunction, numerals, aspectual operators, etc.

Because of surface differences between these categories, these manifestations tend to be treated apart.

In some cases the similarity of the phenomena may be illusory, so nothing is lost, but in other cases we may be missing important generalizations.

The overarching concern behind the strong unifying stance behind this talk is to make sure that we don't.

Outlook

There are many more categories that exhibit polarity sensitivity:

- modals

  (deontic *must*, *should*, *supposed to* scope above negation, but *have to* and *required to* scope under; epistemic *can* can scope under negation; see Iatridou and Zeijlstra 2013, Homer 2015 a.o.)

- adjectives

  (*# I slept much* vs. *I didn't sleep much*)

- bare nominals

  (e.g., French bare partitives or Korean and Bangla bare plurals can't take scope below negation; cf., e.g., Spector 2007, Ahn et al. 2021)

- etc.

Each is likely to pose new difficult challenges.

It might also turn out that, for example, polarity sensitivity in modals really has a different root altogether.

Nevertheless, with any attempt to unify, I believe we are bound to learn something.

Thank you!

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