Polarity Particles as Propositional Anaphors

Manfred Krifka[1]
Humboldt-Universität Berlin
Zentrum für Allgemeine Sprachwissenschaft (ZAS) Berlin

Semantics and Linguistic Theory (SALT) 23,
University of California at Santa Cruz, May 3-5, 2013

1. Introduction

(1) *But let your communication be, Yea, yea; Nay, nay;*
for whatsoever is more than these cometh of evil. (Matthew 5:37)

(2) A: *You stole the cookie.* B: *Yes.*
Did you steal the cookie? *No.*

(3) A: *You did not steal the cookie.* B: *Yes.* B: *No, I didn't.*
Did you not steal the cookie? *No.* *Yes, I didn't.*
Yes, I didn't.
No, I did.

2. Recent approaches to polarity particles

2.1 Syntactic approaches: Kramer & Rawlins (2009)

Proposal: *Yes* and *no* are adverbials corresponding to the heads of ellipsis clauses (here: prejacent), which correspond to contextually salient propositions.

(4) A: *Ede stole the cookie.*
B: [$_{\Sigma P}$ *Yes* [$_{\Sigma P}$ Σ [$_{TP}$ ~~*he did*~~ [t_{he} ~~*steal the cookie*~~]]]]

Ellipsis phrase ΣP with head Σ, adverbial *yes*.

(5) A: *Ede did not steal the cookie.*
B: [$_{\Sigma P}$ *No*$_{[u\ NEG]}$ [$_{\Sigma P}$ Σ$_{[u\ NEG]}$ [$_{TP}$ ~~*he didn't*~~ $_{[i\ NEG]}$ [t_{he} ~~*steal the cookies*~~]]]]

1 This work was supported by Bundesministeriums für Bildung uns Forschung (Förderkennzeichen 01UG0711) and Deutsche Forschungsgemeinschaft (SFB 632 Informationsstruktur) for support. Thanks for the audience at various presentations of preliminary versions of this paper, including the Network „Questions in Discourse" in Frankfurt in February 2012, the Workshop „Variables at the Interface between Form and Meaning" of the SFB 833 at Tübingen in Juli 2012, a presentation at ZAS in Berlin in December 2012, and at the Sklarszka Poreba meeting in March 2013. Special thanks to Manfred Bierwisch, Sophia Döring, Hans-Martin Gärtner, Andreas Haida, Clemens Mayr, Sophie Repp, Floris Roelofsen, Emilio Servidio, Hubert Truckenbrodt, Tue Trinh, Heiko Seeliger, Kazuko Yatsushiro und Malte Zimmermann for valuable suggestions.

No double negation interpretation: *n't* has an interpretable NEG feature that agrees with an uninterpretable NEG feature provided by *no* (Zeijlstra 2004).

(6) A: *Ede did not steal the cookie.*
B: [$_{\Sigma P}$ *Yes* [$_{\Sigma P}$ $\Sigma_{[u\ NEG]}$ [$_{TP}$ *he didn't* $_{[i\ NEG]}$ [t_{he} ~~*steal the cookies*~~]]]]

Yes is featureless, compatible with [u NEG] head of ellipsis clause.

Problems:

- Why is (7) not possible, as *yes* is featureless, compatible with negation?

(7) A: *Ede stole the cookie.*
B: #*Yes, he didn't steal the cookie.*

Nature of the problem: The elliptical clause refers to a contextually given proposition; the polarity particle is just parasitic on the elliptical clause.

- Distribution of elliptical clauses and polarity particles do not match:

(8) *Did Ede steal the cookies?*
a. *If he did, he must pay them back*.
b. **If yes, he did, he must pay them back.*
c. *If* ??*yes / so, he must pay them back.*

2.2 Semantic approach: Farkas & Roelofsen (ms., 2012)

2.2.1 Preliminary version

Polarity particles pick out contextually salient propositions (couched in communication theory of Farkas & Bruce 2010, neglected here).

(9) A: *Ede stole the cookie.* Contextually salient proposition: φ = 'Ede stole the cookie'
B: *Yes.* Confirms φ.
No. Rejects φ.

With polarity questions, two propositions are introduced, one the negation of the other (cf. Hamblin 1973; F&R use inquisitive semantics, neglected here).

(10) A: *Did Ede steal the cookie?* Interpretation: {φ, ¬φ}

This is not sufficient to explain the usage of *yes* and *no*. F&R assume in addition that the proposition that is "explicitly mentioned" is highlighted, and hence made salient.

(11) A: *Did Ede steal the cookie?* {**φ**, ¬φ}; contextually salient: φ, due to highlighting.
B: *Yes.* a. Confirms highlighted proposition, here φ.
No. b. Reverses highlighted proposition, i.e. asserts ¬φ.

This is still not sufficient to explain the usage of *yes* and *no* in negated questions. F&R assume that propositions are marked as non-negated or negated, and refine the conditions for *yes* and *no*:

(12) A: *Did Ede not steal the cookie?* {φ, ¬**φ**}, where ¬φ is identifiable as negated proposition.
B: *Yes.* a. Confirms highlighted proposition, here ¬φ.
a′. Reverses highlighted negative proposition, i.e. asserts φ.
No. b. Reverses highlighted proposition, i.e. asserts φ.
b′. Confirms highlighted negative proposition, here ¬φ.

Explains why polarity particles cannot be used in alternative questions:

(13) A: *Did Ede steal the cookie, or not?* {**φ**, **¬φ**}, both propositions highlighted.
B: *#Yes.* No unique highlighted proposition.
#No.

Problems:

- Highlighting of propositions is an extraneous semantic feature in Hamblin / Inquisitive Semantics
- Marking of proposition as negated is also an extraneous feature in truth-conditional semantics; requires representational theory (e.g. Situation Semantics: Ginzburg & Sag 2000)

2.2.2 Final version

F&R reintroduce the notion of prejacent, in addition to antecedent clause.

(14) [Antecedent clause] ... [$_{\text{PolP}}$ [$_{\text{Pol}}$ *yes/no*] [$_{\text{CP}}$ Prejacent]]
└anaphoric link┘

Two features, each with two values, are introduced:

(15) a. Absolute Polarity: [+]/[–] polarity of Prejacent is non-negated / negated
b. Relative Polarity: [SAME]/[REVERSE] polarity of Prejacent is the same/reverse of Antecedent
(also, SAME presupposes unique highlighted antecedent presuppositions)

Polarity particles express feature combinations:

(16) a. *yes* realizes [SAME] or [+]
b. *no* realizes [REVERSE] or [–]

Answer patterns:

(17) A: *Did Ede steal the cookies?*
B: a. [$_{\text{PolP}}$ *yes* [SAME / +] [$_{\text{CP}}$ *he stole the cookies*]] [SAME] or [+] expressed
b. [$_{\text{PolP}}$ *no* [REVERSE / –] [$_{\text{CP}}$ *he did not steal the cookies*]] [REVERSE] or [–] expressed

(18) A: *Did Ede not steal the cookies?*
B: a. [$_{\text{PolP}}$ *yes* [SAME] [$_{\text{CP}}$ *he did not steal the cookies*]] [SAME] expressed, [+] not expressed
b. [$_{\text{PolP}}$ *yes* [+] [$_{\text{CP}}$ *he stole the cookies*]] [+] expressed, [SAME] not expressed
c. [$_{\text{PolP}}$ *no* [REVERSE] [$_{\text{CP}}$ *he did steal the cookies*]] [REVERSE] expressed, [–] not expressed
d. [$_{\text{PolP}}$ *no* [–] [$_{\text{CP}}$ *he did not steal the cookies*]] [–] expressed, [REVERSE] not expressed

Problems:

- Anaphoric link via prejacent reintroduces problem (8).
- Complexity of the overall system: Two binary features, requirement of prejacent.
- Prejacent can be elided in (17), as both interpretations of the particles lead to the same result. But not obvious why the prejacent in (18)(d) can be elided more easily than in the other cases.

3. Polarity Particles as Anaphora

3.1 Propositional discourse referents (prop-DRs)

Propositional discourse referents, e.g. Webber (1978), Asher (1986), Cornish (1992), Frank (1996).

(19) [*Ede stole the cookie*]. *Bill knows* [*it*].
↪ d_{prop} ↑d
d_{prop} is anchored to the proposition 'Ede stole the cookie'.

Related but different notions: Event anaphora; speech act anaphora.

(20) a. *Ede stole the cookie. Bill saw it*.
b. A: *Ede stole the cookie.* B: *That's a lie!*

Introduction of propDR by a propositional syntactic category (TP):

(21) [$_{ForceP}$ ASSERT [$_{TP}$ *Ede steal*-PAST [$_{vP}$ t_{Ede} t_{steal} *the cookie*]]]
↪ $d_{speech\ act}$ ↪ d'_{prop} ↪ d''_{event}

(22) [$_{ForceP}$ *did*-QUEST [$_{TP}$ *Ede* t_{did}-PAST [$_{vP}$ t_{Ede} t_{steal} *the cookie*]]]
↪ $d_{speech\ act}$ ↪ d'_{prop} ↪ d''_{event}

Negation also creates a propositional syntactic category (NegP); introduction of two propDRs

(23) [$_{NegP}$ *Ede did-n't* [$_{TP}$ t_{Ede} t_{did} *steal the cookie*]]
↪d'_{prop} ↪d_{prop}

Evidence for introduction of two propositional discourse referents with negation:

(24) *Two plus two isn't five.* a. *Everyone knows that*.
[$_{NegP}$ 2+2 *is-n't* [$_{TP}$ t_{2+2} t_{is} 5]] ↑$d'_{\neg[2+2=5]}$
↪$d'_{\neg[2+2=5]}$ ↪$d_{[2+2=5]}$ b. *That would be a contradiction.*
↑$d_{[2+2=5]}$

This is dependent on syntactic negation; no introduction of non-negated propDR in (25):

(25) *Two plus two is unequal to five.* a. *Everyone knows that.*
[$_{TP}$ 2+2 *is unequal* 5] b. *#That would be a contradiction.*
↪$d_{[2+2\neq5]}$

Previous assumptions for propDRs:

- anchored to propositions (e.g. Heim 1992)
- anchored to world-sequence pairs (Geurts 1996, Frank 1996)
- anchored to DRSes: Asher (1986, 1993)

Assumptions here:

- PropDRs refer to variable assignments and a proposition.
- They are marked as negated when introduced by a NegP phrase.
  (DRs are representational entities, cf. gender marking in gender languages).

(26) [$_{NegP}$ *Ede did-n't* [$_{TP}$ t_{Ede} t_{did} *steal the cookie*]]
↪ d'_{prop}[neg] ↪d_{prop}

3.2 Propositional anaphora

Different syntactic categories for propositional anaphora:

- *it* and *that*: DPs
- *so, not*: TP (pace Cornish 1992, who considers them adverbials)
- *yes* and *no*: ForceP (pace Ginzburg & Sag 2000, who call them "propositional lexemes" but assign them the category of adverbials)

(27) *Did Ede steal the cookie? If *it / so / *yes, he must be punished.*
[*if* [$_{TP}$ α]], hence α ≠ [$_{DP}$ *it*], α ≠ [$_{ForceP}$ *yes*]

(28) *Did Ede steal the cookie? Bill believes it / so / *yes.*
believe [$_{DP}$ α], cf. *I believe this*, or *believe* [$_{CP}$ α], cf. *I believe (that) he did it*; hence α ≠ [$_{ForceP}$ *yes*]

Differences with polarity particles *ja, nein, doch* in German, which are TPs:

(29) *Hat Ede den Keks gestohlen? Wenn ja, muss er bestraft werden.*

(30) *Hat Ede den Keks gestohlen? Ich glaube ja / nein.*

Proposal for *yes* and *no*:

(31) a. *yes* picks up salient propDR d and asserts it: ASSERT(d)
b. *no* picks up salient propDR d and asserts its negation: ASSERT(¬d)

Polarity particles with (elliptical) clauses as appositive structures:

(32) A: [$_{ForceP}$ *did*-QUEST [$_{TP}$ Ede t_{did}-PAST [$_{vP}$ t_{Ede} t_{steal} the cookie]]]
↪ d_{prop} ↪ d'_{event}
B: a. [$_{ForceP}$ *yes*], = ASSERT(d)
↑d_{prop}

b. [$_{ForceP}$ ASSERT [$_{TP}$ *he did* [[$_{vP}$ t_{he} ~~*steal the cookie*~~] / [$_{DP}$ *it*]]]]
↑d'_{event} ↑d'_{event}

c. [$_{ForceP}$ *yes*], [$_{ForceP}$ ASSERT [$_{TP}$ *he did* [[$_{vP}$ t_{he} ~~*steal the cookies*~~] / [$_{DP}$ *it*]]]]
↑d_{prop} ↑d'_{event} ↑d'_{event}

Adverbial answers, e.g. *maybe, probably*:

(33) B: [$_{ForceP}$ ASSERT [$_{TP}$ *maybe* [$_{TP}$ ~~*he stole the cookie*~~]]]
↑d_{prop}

(34) B: #[$_{ForceP}$ *yes*], [$_{ForceP}$ ASSERT [$_{TP}$ *maybe* [$_{TP}$ *he stole the cookie*]]]
inappropriate, as first part asserts d, second asserts ◇d

(35) *Maybe yes, maybe no*:
Meta speech act, signals that there are reasons to answer with *yes* and reasons to answer with *no* (cf. for meta speech acts Cohen & Krifka 2011).

Polarity particles in German are TPs that can be asserted:

(36) A: *Hat Ede den Keks gestohlen?*
B: [$_{ForceP}$ ASSERT [$_{TP}$ *ja*]]

(37) A: *Does Ede steal cookies?* A: *Stiehlt Ede Kekse?*
B: *yes, sometimes.* B: [$_{\text{ForceP}}$ ASSERT [$_{\text{TP}}$ *ja*]] [$_{\text{ForceP}}$ ASSERT [$_{\text{TP}}$ *manchmal* [$_{\text{TP}}$ e]]
**sometimes yes.* [$_{\text{ForceP}}$ ASSERT [$_{\text{TP}}$ *manchmal* [$_{\text{TP}}$ *ja*]]]

4. Optimal Choice of Polarity Particles

4.1 Polarity particles as reactions to assertions of negated proposition

Recall interpretation of *yes* and *no*, cf. (31):

(38) a. [$_{\text{ForceP}}$ *yes*] requires salient discourse referent d_{prop}, interpreted as ASSERT(d)
b. [$_{\text{ForceP}}$ *no*] requires salient discourse referent d_{prop}, interpreted as ASSERT(¬d)

Recall introduction of discourse referents in negated clauses:

(39) [$_{\text{ForceP}}$ ASSERT [$_{\text{NegP}}$ *Ede did-n't* [$_{\text{TP}}$ t_{Ede} t_{did} *steal the cookie*]]]
↪d'_{prop} ↪d_{prop}

Four possibilities of interpretation in this context.

(40) a.	*Yes.*	ASSERT(d)	'Yes, he did!'	Requires rejecting accent, with clause.
b.	*Yes.*	ASSERT(d′)	'Yes, he didn't.'	Natural answer, but with clause.
c.	*No.*	ASSERT(¬d)	'No (he didn't).'	Natural answer, clause not necessary.
d.	*No.*	ASSERT(¬d′)	'No, he did!'	Requires rejecting accent, with clause.

These judgements arise due to certain preferences:

(41) a. *NEGDR: Penalizes picking up a negatively marked discourse referent.
b. *DISAGR: Penalizes disagreement with other speaker.

(42) Calculation of optimal forms in an OT tableau, antecedent: assertion (39).

	expression	reference	resulting meaning	*DISAGR	*NEGDR	Favorite
a	*yes*	d	'He did.'	*		
b	*yes*	d′	'He didn't.'		*	(☜)
c	*no*	d	'He didn't.'			☜
d	*no*	d′	'He did.'	*	*	

In general: Appositive elliptical clauses (*he did / he didn't*) are required for non-optimal solutions, for clarification.

4.2 Polarity particles as reactions to question with negation

Introduction of discourse referents in negated clauses, here: Question with propositional negation.

(43) [$_{\text{ForceP}}$ *did* QUEST [$_{\text{NegP}}$ *Ede not* [$_{\text{TP}}$ t_{Ede} *steal the cookie*]]]?
↪d'_{prop} ↪d_{prop}

Four possibilities of interpretation in this context; judgements (a)/(b) cf. Holmberg (2012).

(44) a.	*Yes.*	ASSERT(d)	'Yes, he did.'	Natural answer, preferably with clause.
b.	*Yes.*	ASSERT(d′)	'Yes, he didn't.'	Less natural, possible with clause.
c.	*No.*	ASSERT(¬d)	'No, he didn't.'	Natural answer, clause not necessary.
d.	*No.*	ASSERT(¬d′)	'No, he did.'	Quite bad, even with clause.

For non-biased questions, *DisAgr is not operative. But a question based on a negated proposition is not unbiased; otherwise the simpler variant with a non-negated proposition would have been used (*Did Ede steal the cookie?*). Yet it is less biased than an assertion. So we assume that *DisAgr is ranked lower.

(45) Calculation of optimal forms in an OT tableau, antecedent: question (43).

	expression	reference	resulting meaning	*NegDR	*DisAgr	Favorite
a	*yes*	d	'He did.'		*	(☜)
b	*yes*	d′	'He didn't.'	*		((☜))
c	*no*	d	'He didn't.'			☜
d	*no*	d′	'He did.'	*	*	

Introduction of discourse referents with syntactically high negation (Ladd 1981), cf. Krifka (to app.):

(46) A: *Didn't Ede steal some cookie?*
[$_{\text{ForceP}}$ *did*-REQUEST [$_{\text{NegP}}$ *not* [$_{\text{ForceP}}$ *Ede* ASSERT [$_{\text{TP}}$ t_{Ede} *steal some cookie*]]]]
↪d_{prop}

Only one propDR is introduced; negation interpreted as speech-act operator;
speaker requests from addressee to denegate the assertion that Ede stole some cookie.

Predicted answer pattern:

(47) B: a. *Yes (he did).* b. *No (he didn't).*
c. **No, he did.* d. **Yes, he didn't.*

4.3 Polarity particles in German

In German there is in addition to *yes* and *no* a third particle, *doch* (cf. also French *si*), that requires a syntactically negated discourse referent.

(48) A: *Ede hat den Keks gestohlen.* 'Ede stole the cookie.'
B: *Ja.* 'He did steal the cookie.'
Nein. 'He did not steal the cookie.'
**Doch.*

(49) A: *Ede hat den Keks nicht gestohlen.* 'Ede did not steal the cookie.'
B: *Ja.* 'He did not steal the cookie.'
Nein. 'He did not steal the cookie.'
Doch. 'He did steal the cookie.'

(50) A: *Es fehlt ein Keks.* 'A cookie is missing.'
B: *Ja.* 'A cookie is missing.'
Nein. 'No cookie is missing.'
**Doch.*

(51) *Ede hat den Keks wahrscheinlich nicht gestohlen. Falls <u>doch</u>, muss er bestraft werden.*
'Ede probably did not steal the cookie. But if he did, he must be punished.'

Assumption for *doch*:

- Presupposes that two propDRs are introduced, one the negation of the other: d, d′ = ¬d
- Picks up the non-negated discourse referent, d.

(52) *Ede hat möglicherweise keinen Keks gestohlen. Wenn doch, müssen wir ihn finden.*
'Ede may not have stolen a cookie. If DOCH, we have to find it.'
Notice that *doch* makes accessible the DR introduced by *a cookie*,
hence picks up non-negated propDR anchored to *Ede hat einen Keks gestohlen*

The particle *doch* comes with a specific presupposition, which blocks the uses of other particles in case the presupposition is satisfied.

Following Beaver (2004) I assume a meta-constraint BLOCK that is marked by the presence of an expression for which the indicated interpretation is strongly preferred.

(53) Calculation of optimal forms in an OT tableau; negated antecedent clause in German;
DISAGR is irrelevant if ordered under BLOCK.

	expression	reference	resulting meaning	*PRES	BLOCK	*NEGDR	Favorite
a	*ja*	d	'He did.'		*		
b	*ja*	d′	'He didn't.'			*	(☜)
c	*nein*	d	'He didn't.'				☜
d	*nein*	d′	'He did.'			*	(☜)
e	*doch*	d	'He did.'				☜; blocking of a
f	*doch*	d′	'He didn't.'	*		*	

Predicted answer patterns:

(54) A: *Ede hat den Keks nicht gestohlen.*
B: a. ??*Ja, er hat ihn gestohlen.* b. *Ja, er hat ihn nicht gestohlen.*
c. *Nein (er hat ihn nicht gestohlen).* d. *Nein, er hat ihn gestohlen.*
e. *Doch (er hat ihn gestohlen).* f. **Doch (er hat ihn nicht gestohlen).*

The presence of a third particle, *doch*, creates a more expressive system of polarity particles, obviating the need to add full or elliptical clauses as in English
(where the reliance on the clausal strategy is a Celtic feature, cf. Vennemann 2009).

4.4 Narrow-scope negation

Holmberg (2012) observes preference for agreeing answer in cases like (55):

(55) A: *John sometimes / purposely did not show up for work.*
B: *Yes, he didn't.*
[?] *No, he didn't.*

Explanation: Negation does not form a NegP under the scope of a quantifier, hence does not introduce a negated propDR.

A case of ambiguous negation in German, disambiguated by *doch.*

(56) A: *Jeder Zahnarzt ist nicht reich.*
i. 'For every dentist it holds: he or she is not rich.'
ii. 'It is not the case that every dentist is rich.'
B: *Doch.* 'Every dentist IS rich.' (= ¬(ii.)).

Explanation: Only reading (ii) inroduces a negated propDR, hence *doch* is applicable only for this case.

4.5 Alternative questions

Alternative questions are often not based on a questioned proposition, hence no *yes/no* answers:

(57) A: *Did Ede steal the cookie or the lollipop?* 'What did Ede steal, the cookie or the lollipop?'
B: *#Yes. / The lollipop.*

If the questioned alternatives are propositions, then answers *yes/no* become ambiguous, and there is no optimization process to select the right answer.

(58) A: [*Is the door open*]*, or* [*is it closed*]*?*
↪ d_{open} ↪ d_{closed}
(notice that $d_{closed} = \neg d_{open}$, but d_{closed} is not a negated propDR)
B: *#No. / ✓It is open.*

But as Farkas & Roelofsen (2012) observe, answer *no* is quite good in (59):

(59) A: [*Is the door open*] *or* [~~*is the door*~~ [$_{NegP}$ *not* [t_{door} ~~*open*~~]*?*
↪$d1_{open}$ ↪d2′[neg] ↪$d2_{open}$
B: [(?)]*No. /* [(?)]*Yes.*

Explanation:

- The question proposes the two alternative propositions, identifiable by propDRs d1 and d2′, the negation of d2, which is identical to d1.
- Answer *no/yes* picks out d1 for the first option, d2 as optimal for the second.
- In both cases, this results in the same meaning, 'The door is not open.'

4.6 Agreement/disagreement systems

Disagreement is a marked conversational move; hence marking of disagreement is to be expected:

- Special intonation contour, e.g. "smart Aleck" prosody: *Yes he did!*
- Specialized particles, e.g. Romanian *ba* according to Farkas & Roelofsen (2012).

But sometimes we do not have to assume disagreement marking as the core meaning, e.g. for *doch*. E.g. in (52) there is no obvious disagreement.

Possible analyses of *hai / iie* in Japanese, used as reaction to assertions or to questions:

(60) a. A: *John wa hashitte imasu ka?* 'Is John running?'
  a. B: *Hai* (, *hashitte imasu*). 'Yes (, he is running)'
  b. B: *Iie* (, *hashitte imasen*) 'No (, he is not running)'

  b. A: *John wa hashitte imasen ka?* 'Is John not running?'
  a. B: *Hai* (, *hashitte imasen*). 'Yes (, he is not running)'
  b. B: *Iie* (*, hashitte imasu*). 'No (, he is running)'

Theoretical options:

- Questions in Japanese are always biased; *iie* is a disagreement marker.
- Negation in Japanese does not form a NegP, hence does not introduce a negated propDR. Cf. Yabushita (1998) for arguments for that option.

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