

High Negation in Subjunctive Conditionals and Polar Questions

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1. Introduction

- It is known that negation anti-licenses Positive Polarity Items (PPIs) in its immediate scope in English and that it cannot precede definites (and other expressions) in German (Ladusaw 1979, Schwarz 2004):

- (1) a. John didn't_{Low} call anyone.
b. John didn't call someone. * $\neg > \exists$ (unless as denial)
- (2) a. Fritz hat Frage 3 **nicht**_{Low} beantwortet.
Fritz has question 3 not answered
'Fritz didn't answer question 3.'
b. * Fritz hat nicht Frage 3 beantwortet. (* unless as denial)
Fritz hat not question 3 answered

⇒ Instances of negation with such properties will be labeled 'LOW NEGATION'.

- But, in certain environments, negation doesn't anti-license PPIs in English and can precede definites in German: (3)-(4). (The low negation versions are grammatical here too.)

- (3) a. I am surprised that John didn't_{High} call someone_{PPI}. (Szabolcsi 2004)
b. Every boy that didn't_{High} call someone_{PPI} was doomed.
c. If we don't_{High} call someone_{PPI}, we are doomed.
- (4) a. Wir waren überrascht, dass Fritz **nicht**_{High} Frage 3 beantwortet hat. (Schwarz 2004)
b. Wir haben jeden abgelehnt, der **nicht**_{High} Frage 3 beantwortet hat.
c. Wenn Hans **nicht**_{High} Frage 3 beantwortet, wird er abgelehnt.

⇒ Instances of negation not anti-licensing PPIs in English and preceding definites in German will be labeled 'HIGH NEGATION'.

- It has been proposed that what characterizes the environments allowing for high negation is downward monotonicity (Krifka 1992, Szabolcsi 2004):

- (5) High negation is allowed iff it appears in a downward entailing context.

- However, there are two constructions where downward monotonicity is not sufficient to allow for high negation; that is, there are two constructions where, though they are downward entailing, high negation correlates with the presence of an additional effect:

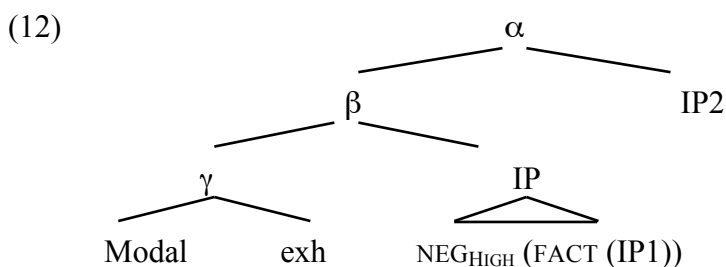
- In subjunctive conditionals ⇒ Counterfactuality
- In polar questions ⇒ Epistemic bias

- In SUBJUNCTIVE CONDITIONALS, antecedent falsity is a defeasible implicature: (6).
But, in the presence of high negation, antecedent falsity has been argued to be uncancellable (Meibauer 1990, Schwarz 2004, Schwarz and Bhatt 2006, Ippolito and Su 2009): (7) and (9) and the contrast between high and low negation in (8) and (10).

- (6) If Jones had taken arsenic, he would have shown the symptoms that he indeed showed.
So, it is likely that he took arsenic. (Anderson 1951)
- (7) Good that there was oil in the tank! If there hadn't_{HIGH} been some_{PPI} oil in the tank, the furnace would have exploded.
- (8) a. If there hadn't_{LOW} been any / had been **no**_{LOW} oil in the tank, the furnace would have made exactly the noise that it in fact did. So, it's likely that the tank was empty.
b. # If there hadn't_{HIGH} been some_{PPI} oil in the tank, the furnace would have made exactly the noise that it in fact did. So, it's likely that the tank was empty.
- (9) (Good that Fritz answered question 3! ...)
Wenn er **nicht**_{HIGH} Frage 3 beantwortet hatte, wäre er durchgefallen.
If he not question 3 answered had, would-be he failed
'If he hadn't answered question 3
- (10) A: Was glaubst du, warum Fritz durchgefallen ist?
B: Ich bin mir nicht sicher, aber ...
a. ... wenn Fritz Frage 3 **nicht**_{LOW} beantwortet hatte, wäre er durchgefallen.
b. # ... wenn Fritz **nicht**_{HIGH} Frage 3 beantwortet hatte, wäre er durchgefallen.

(11) $[\text{If}_{\text{SUBJ}} [\text{NEG}_{\text{HIGH}} p], q]$ is acceptable only if interpreted counterfactually, i.e., only if p is true.

- Following a suggestion in Schwarz (2006), Ippolito and Su (2009) propose that NEG_{HIGH} in (11) associates with a factive operator FACT presupposing that its complement ("there was some oil in the tank" in (8b)) is true. FACT shields the PPI from the anti-licensor NEG_{HIGH} .



(13) $[\text{exh}] = \lambda Q_{\langle \text{st}, \langle \text{st}, t \rangle \rangle} . \lambda p . \lambda q . Q(p)(q)=1 \wedge \forall (q)(p)=1$

- POLAR QUESTIONS can be used in an epistemically unbiased way: (15).
But high negation correlates with the mandatory presence of an epistemic bias: (16) and the contrast between high and low negation in (17)-(18) (Ladd 1981, Büring and Gunlogson 2000, Romero and Han 2004):

- (15) Is Jane coming?
(16) Isn't Jane coming?

(17) Scenario: The speaker is organizing rides after a party and is looking for people that didn't drink alcohol that night. The speaker is going through the list of guests. She has no previous belief or expectation about what they drank.

A: Jane and Mary did not drink.

S: OK. What about John? Did he **not**_{Low} drink any alcohol? ⇒ Possibly unbiased

S': # OK. What about John? Didn't_{High} he drink some_{PPI} alcohol?

⇒ Mandatory bias for "He drank alcohol"

(18) a. Hat Hans Maria **nicht**_{Low} gesehen? ⇒ Possibly unbiased

Has Hans Maria not seen

'Did Hans not see Maria?'

b. Hat Hans **nicht**_{High} Maria gesehen? ⇒ Mandatory bias for "Hans saw Maria"

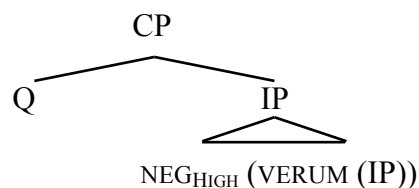
Has Hans not Maria seen

'Didn't Hans see Maria?'

(19) $[Q \text{ NEG}_{\text{HIGH}} p]$ is acceptable only if interpreted as a biased question, i.e. only if interpreted as conveying the speaker's epistemic bias towards p .

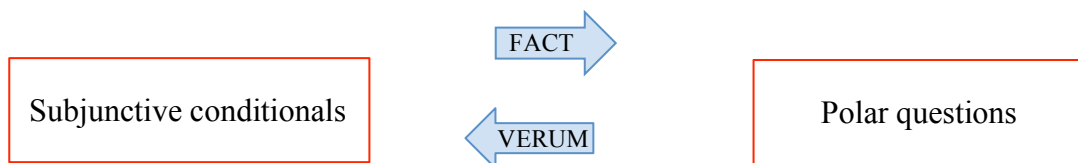
■ Romero and Han (2004) derive the epistemic bias described in (19) from the presence of the operator VERUM. VERUM shields the PPIs from the anti-licensor NEG_{HIGH}.

(20)



(21) $[[\text{VERUM}]] = \lambda p_{\langle s, t \rangle} . \lambda w_s . \forall w' \in \text{Epi}_x(w) [\forall w'' \in \text{Conv}_x(w') [p \in \text{CG}_{w''}]]$

■ The **goal** of this paper is to provide an unified analysis of the special meaning effect associated with high negation in both environments.



- FACT, if applied to polar questions, would yield the wrong result: (16) and (18b), though biased towards p , are information-seeking questions and do not presuppose p .
- We will pursue the VERUM line.

■ We will do so by:

§2 examining the behaviour of so-called Common Ground (CG) management operators,

§3 elaborating on previous analyses of high negation in polar questions, and

§4 making a new proposal for high negation in subjunctive conditionals.

- (28) [illocutionary operator [CG-managing operator(s) [proposition]]]
- (29) Q-morpheme:
- a. At-issue content: $\lambda p_{\langle s,t \rangle}. \{p, \neg p\}$
 - b. CG-man. content: $\lambda p_{\langle s,t \rangle}. \{p, \neg p\}$
- Second, GC-management content is not semantically embedded otherwise. Hence, if a DiP appears syntactically in a non-root environment, it must “latch onto” some semantic material p (underlined) that is presupposed (30), appositive (31) or has some other root-like status (Jacobs 1989, Hinterhölzl and Krifka 2013).
- (30) Karl hat seinen Job verloren, [CP weil er **ja** in der Gewerkschaft war].
 ‘Karl lost his job [CP because he was JA in the union]’
- (31) Hat sie [DP diese **ja** schon oft erhobenen Vorwürfe] wiederholt?
 ‘Did she repeat [DP these JA already often raised accusations]?’


3. High negation in polar questions

- In this section we modify the analysis of biased polar questions in Romero and Han (2004) by adding two innovations from section 2:
 - Separation between at-issue content and CG-management content
 ↳ Solution to **Problem 1** on answers
 - FALSUM instead of \neg VERUM
 ↳ Solution to **Problem 2** on no independent motivation for \neg VERUM
- Polar questions with *really* and focus stress in Romero and Han (2004):
Really and focus stress as unidimensional VERUM in (21), contributing to the at-issue content.

(32) a. Is Jane really coming?
 b. LF: [Q [VERUM [Jane is coming]]]

(33) At-issue content: { FOR-SURE-IN-CG(Jane is coming),
 \neg FOR-SURE-IN-CG(Jane is coming) }

 - **Problem 1:** Assuming that the at-issue content (33) provides the cells of the partition the addressee is requested to choose from, the wrong answer meaning is derived.

(34) a. Yes = FOR-SURE-IN-CG(Jane is coming)
 b. No = \neg FOR-SURE-IN-CG(Jane is coming) 

- New version of polar questions with *really* and focus stress:
Really and focus stress as bidimensional VERUM in (24), distinguishing between its at-issue and its CG-management content.

- (35) a. Is Jane really coming?
 b. LF: [Q [VERUM [Jane is coming]]]
- (36) a. At-issue content: { Jane is coming, ¬(Jane is coming) }
 b. CG-man. content: { FOR-SURE-IN-CG(Jane is coming),
 ¬FOR-SURE-IN-CG(Jane is coming) }
 - **No problem 1:** The at-issue content (36a) provides the cells of the partition to chosen from, corresponding to the answers “Yes” and “No”.
- (37) a. Yes = Jane is coming
 b. No = Jane is not coming 😊
 - **Epistemic bias:** The CG-management content (36b) derives the epistemic bias à la Romero and Han (2004): the speaker wonders whether the addressee has fully convincing evidence for adding p to the CG, suggesting that the speaker is biased towards ¬p and would need strong evidence to be convinced that p should be added to CG.

- Polar questions with high negation and PPI in Romero and Han (2004):
 Preposing of negation signals presence of unidimensional VERUM; scope ¬VERUM.

- (38) a. Isn't Jane coming too?
 b. LF: [Q [¬ VERUM [Jane is coming]]]
- (39) At-issue content: { FOR-SURE-IN-CG(Jane is coming),
 ¬FOR-SURE-IN-CG(Jane is coming) }
 - **Problem 1:** wrong meaning is derived for the answers.
- (40) a. Yes = FOR-SURE-IN-CG(Jane is coming)
 b. No = ¬FOR-SURE-IN-CG(Jane is coming) 🚫
 - **Problem 2:** The meaning ¬VERUM postulated for high negation in (38) is not attested in other environments. E.g., high negation plus PPI in denials does not have the reading in (41).
- (41) A: Jane is coming too.
 B: Jane ISN'T coming too. ≠ ¬FOR-SURE-IN-CG(Jane is coming) 🚫

- New version of polar questions with high negation and PPIs:
 High negation followed by PPI as FALSUM, bidimensional FALSUM in (26).

- (42) a. Isn't Jane coming (too)?
 b. LF: [Q [FALSUM [Jane is coming]]]

- (43) a. At-issue content: $\{ \neg(\text{Jane is coming}), \neg\neg(\text{Jane is coming}) \}$
 That is: $\{ \text{Jane is coming}, \neg(\text{Jane is coming}) \}$
 b. CG-man. content: $\{ \text{FOR-SURE-NOT-IN-CG}(\text{Jane is coming}), \neg\text{FOR-SURE-NOT-IN-CG}(\text{Jane is coming}) \}$
- **No problem 1:** right meaning of answers derived from at-issue content. (Cf. Kramer & Rawlins 2010, Holmberg 2013)
- (44) a. Yes = Jane is coming
 b. No = Jane is not coming ☺
- **No problem 2:** the meaning *FALSUM* is the same for high negation with PPI in polar questions and in declarative denials.
- (45) A: Jane is coming too.
 B: Jane ISN'T coming too. = FOR-SURE-NOT-IN-CG(Jane is coming) ☺
- **Epistemic bias:** The CG-management content (43b) derives the epistemic bias in a way parallel to the previous case: the speaker wonders whether the addressee has fully convincing evidence for not adding *p* to the CG, suggesting that the speaker is biased towards *p* and would need strong evidence to be convinced that *p* should not be added to CG.

■ Summary:

(46)	At-issue content	⇒	information seeking question
	CG-management content	⇒	speaker epistemic bias

4. High negation in subjunctive conditionals

- It has been noted that there is a connection between questions and conditional antecedents, in that clauses that have the internal syntax of an interrogative clause can semantically serve as antecedents of several types of conditionals sentences (Rawlins 2008, Onea and Steinbach 2011): (47).

(47) Whether Mary comes or not, the party will be fun.

- We argue that a connection in the opposite direction exists as well: an antecedent clause *[if α]* signals that there is an open issue as to whether or not *α* is the case in the relevant domain of worlds, that is, it signals that the domain *D* of worlds provided by the Modal Base and the Ordering Source that the conditional quantifies over in (48)-(49) can be partitioned into $\{ \alpha, \neg\alpha \}$.

(48) Indicative conditional:
 If Mary went to the party yesterday, it was fun. $D \subseteq CG$

(49) Subjunctive conditional:
 If Mary had gone to the party yesterday, it would have been fun. $D \subseteq CG$

a. Interpreted as counterfactual: $D \not\subseteq CG$

b. Interpreted as in Anderson (1951)'s example: $D \subseteq CG$

- We tentatively implement this idea using Questions under Discussion (QUD) (Roberts 1996). Crucially, the polar QUD is built out of the CG-management content of α : (50).

(50) A conditional antecedent $[if_D \alpha]$ presupposes that $[[Q]]([[\alpha]])^{CG\text{-man-content}}$ partitioning domain D is a QUD.

- Proposal for high negation in subjunctive conditionals:

High negation is the overt realization of **FALSUM** not only in polar questions but also in subjunctive conditional antecedents. This gives us the LF (52) for sentence (51) and the compositional step in (53).

(51) If there hadn't_{High} been some_{PP1} oil in the tank, the furnace would have exploded.

(52) $[_{CP} \text{ If } [_{FALSUM} [_{IP} \text{ there had been some oil in the tank}]]] \dots$

(53) $[[\text{If}_{FALSUM} [_{IP} \text{ there had been some oil in the tank}]]]$

a. At-issue content: $\lambda w. \neg(\text{there was oil in tank})$

b. Presupposed QUD: $\{ \lambda w. \text{FOR-SURE-NOT-IN-CG}_w(\text{there was oil in tank}), \lambda w. \neg\text{FOR-SURE-NOT-IN-CG}_w(\text{there was oil in tank}) \}$

- Infelicity of high negation in subjunctive conditionals in Anderson's style examples:

(54) # If there hadn't_{High} been some_{PP1} oil in the tank, the furnace would have made exactly the noise that it in fact did. So, it's likely that the tank was empty. (=9b)

- At the at-issue level, the conditional sentence correctly quantifies simply over worlds where there wasn't oil in the tank, i.e. the worlds in (53a).
- Additionally, the QUD in (53b) is presupposed, wondering whether the addressee has fully convincing evidence against adding p (p= 'there was oil in the tank') to the actual CG, which again suggests that the speaker is biased towards p and would have to be convinced otherwise.



This speaker bias towards p (= 'there was oil in the tank') clashes with Anderson-style scenarios, where the speaker is trying to argue that $\neg p$ (= 'the tank was empty'). Hence the infelicity of high negation in Anderson-style examples.

- Felicity of high negation in counterfactually interpreted subjunctive conditionals:

(55) Good that there was oil in the tank! If there hadn't_{High} been some_{PP1} oil in the tank, the furnace would have exploded. (=7)

- At the at-issue level, the conditional sentence correctly quantifies over worlds satisfying (53a).
- Additionally, the QUD in (53b) partitioning a larger domain ($D \not\subseteq CG$) is presupposed, wondering whether the addressee has fully convincing evidence against adding p (p= 'there was oil in the tank') to the hypothetical CG, which again suggests that the speaker is biased towards p in the broader space of possibilities.



The speaker bias towards p (= 'there was oil in the tank') in the broader space of possibilities does not clash with counterfactuality, i.e. it does not clash with p being taken as true in the worlds of the actual CG.

■ Further prediction 1 of the proposal: Modus Tollens

Modus Tollens examples like (56) also show that counterfactuality is not an entailment or presupposition. For, if it were, the conclusion in (56) would feel redundant.

Interestingly, high negation in Modus Tollens examples is acceptable: (57)-(58).

- (56) If John had killed the victim, he would have used a knife. But the victim was killed with a stiletto. Thus, it wasn't John who killed the victim.
- (57) If there hadn't_{High} been some_{PP1} oil in the tank, the furnace would not have lit. But it did light. Thus, there was some oil in the tank.
- (58) Wenn Fritz **nicht**_{High} Frage 3 beantwortet hätte, wäre er durchgefallen. Aber er ist nicht durchgefallen. Also hat er Frage 3 beantwortet.
 'If Fritz hadn't answered question 3, he would have failed. But he didn't fail. Thus, he answered question 3.
- Prediction of the factive analysis: (57)-(58) with high negation are incorrectly predicted infelicitous, just like (59), since they presuppose the truth of p (= 'there was oil in tank' / 'Hans answered Q3') and thus make the conclusion p redundant.
- (59) # If it hadn't been for the fact that there was some oil in the tank, the furnace would not have lit. But it did light. Thus, there was some oil in the tank.
- Prediction of the VERUM/FALSUM analysis: (57)-(58) with high negation are correctly predicted felicitous, since having an epistemic bias for p and making an argument to convince the addressee of p are two compatible things.

■ Further prediction 2 of the proposal:

Given that *really*/VERUM behaves parallel to high negation/FALSUM in polar interrogatives and that certain effects in conditionals follow from a polar QUD with FALSUM, parallel effects are expected for conditionals associated with a polar QUD with VERUM: (60)-(63).

- (60) Anderson-style context:
 # If there **really** had been sand in the tank, the furnace would have made exactly the noise that it in fact did. So, it's likely that there was sand in the tank.
- (61) Modus Tollens:
 If there **really** had been oil in the tank, the furnace would have lit. But it didn't light. Thus, there was no oil in the tank.
- (62) # Wenn **wirklich** Sand im Tank gewesen wäre, hätte der Ofen genau das Geräusch gemacht, das er tatsächlich gemacht hat. Also war Sand im Tank.
- (63) Wenn **wirklich** Öl im Tank gewesen wäre, hätte der Ofen sich entzündet. Aber er hat sich nicht entzündet. Also war kein Öl im Tank.

■ Summary:

(64)	At-issue content	⇒	overt restrictor for quantification over worlds
	Presupposition built from	⇒	speaker epistemic bias for p
	CG-management content		presupposition of counterfactuality of ¬p

5. Conclusions and open issues.

- By building on Romero and Han's (2004) and Repp's (2013) analysis of high negation in polar interrogatives and extending it to subjunctive conditionals, a unified FALSUM-/VERUM-account of the effects of high negation and *really* in the two environments has been developed that correctly derives the following effects:
 - Polar questions of shape [*Q not_{High} p?*] convey an epistemic speaker bias towards p.
 - Polar questions of shape [*Q really p?*] convey an epistemic speaker bias towards ¬p.
 - Subjunctive conditionals of shape [*If not_{High} p, q*] convey an epistemic speaker bias towards p that makes the conditional infelicitous in Anderson-style scenarios (where the speaker argues for the antecedent, ¬p) and felicitous in Modus Tollens examples (where speaker argues for the negation of the antecedent, p)
 - Subjunctive conditionals of shape [*If really p, q*] convey an epistemic speaker bias towards ¬p that makes the conditional infelicitous in Anderson-style scenarios (where the speaker argues for the antecedent, p) and felicitous in Modus Tollens examples (where speaker argues for the negation of the antecedent, ¬p)

- Neither Ippolito and Su (2009) nor the present proposal have anything to say about high negation in the environments in (65) (=3)).
 - (65) a. I am surprised that John didn't_{High} call someone_{PP1}. (Szabolcsi 2004)
 - b. Every boy that didn't_{High} call someone_{PP1} was doomed.
 - c. If we don't_{High} call someone_{PP1}, we are doomed.

- (66) High negation is allowed iff it appears in a downward entailing context or it stands for FALSUM.

- Examples of high negation where downward monotonicity is not required are also left for future research:
 - (67) If John had been in good company, he wouldn't_{High} have called someone_{PP1}.
 - (68) Wenn Fritz dumm wäre, hätte er **nicht**_{High} Frage 3 beantwortet.
If Fritz dumm were, would-have he not question 3 answered
'If Fritz was dumm, he would not have answered question 3.'

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