

Almost: scope and covert exhaustification
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1 Introduction

- The modifier *almost* indicates, intuitively, that the modified constituent is close to being true, but is not in fact true.
 - (1) *John ate **almost** all the cookies.*
 - (i) John ate many or most of the cookies. (PROXimal component)
 - (ii) John did not eat all the cookies. (NEGative component)
- NEG has been analyzed as an entailment of *almost* (Hitzeman, 1992; Horn, 2011) because, among other reasons, it cannot be cancelled by following discourse. This is noted by Sadock (1981) as a problem for his classic account which derives NEG as a quantity implicature.
 - (2) a. ?Not only did John eat **almost** all the cookies, he ate all of them.
b. Not only did Bill eat **some** of the cookies, he ate all of them.
- This seems right — if NEG is entailed, it cannot simply be cancelled by the discourse, it is part of the meaning of *almost*.
- This paper presents an analysis for *almost* in which NEG is entailed, and adds two independently motivated assumptions in order to account for the sometimes puzzling behaviour of the negative inference.

2 A puzzle for entailment accounts

- Nouwen (2006) points out that NEG disappears in certain environments, which is unexpected if it's part of the conventional meaning. I present one instance of this disappearing act in (3):
 - (3) If John eats **almost all** of the cookies, he will be ill.
- One can infer from (3) that in case John eats all the cookies, he will be ill. But this is a stronger meaning than would be expected if the antecedent were paraphrased as the conjunction of PROX and NEG.
 - (4) a. Predicted by entailment analysis of (3):
⇒ If John eats **close to all but not all** of the cookies, he will be ill.
b. Intuitive meaning of (3):
⇒ If John eats **close to all or all** of the cookies, he will be ill.
- To sharpen this intuition, consider a case where the consequent is at odds with the antecedent:
 - (5) # If John eats almost all of the cookies, he will have some left.

So why is the “not all” NEG inference missing from the antecedents in (3) & (5)? I propose the following:

- (6) a. *Almost* must take scope over the entire conditional proposition rather than just over the antecedent, which is why it appears to be missing.
- b. In (3) & (5), high scope for *almost* yields an ill-formed meaning, which can be rescued by strengthening the prejacent of *almost* with a covert exhaustification operator.
- c. The ultimate contribution of NEG of high scope *almost* and the strengthened prejacent ends up being entailed by PROX, and so cannot be distinguished from it.

3 The Hypothesis: truth-conditional *almost*

- I will take as a starting point a denotation proposed by Penka (2006):

$$(7) \llbracket \text{almost}_{\approx} \rrbracket = \lambda w \lambda p_{\langle s,t \rangle} \underbrace{\neg p(w)}_{\text{NEG}} \ \& \ \underbrace{\exists q \in \approx [q(w)]}_{\text{PROX}}$$

- *Almost* takes as arguments a proposition p (its **prejacent**, or sister at LF) and \approx , a (syntactically covert) variable ranging over sets of propositions.¹ Let’s see this in action for a simple case:

(8) John ate almost_{\approx} **all** of the cookies.
 LF: almost [John ate **all** of the cookies]

- In (8), *all* is the **associate** of *almost*, while its **prejacent** is *John ate all the cookies*. \approx is a set of propositions of the form *that John ate x of the cookies*, where x is drawn from the Horn scale-mates of *all*.

(9) $\approx = \{\text{that John ate **all** of the cookies, that John ate **most** of the cookies, that John ate **many** of the cookies, ...}\}$

- Among these alternatives, the prejacent is the strongest as it entails every other alternative in the set. Combining *almost* with its prejacent therefore negates the strongest alternative and requires that some other alternative be true:

(10) NEG : \neg J ate **all** of the cookies
 PROX : J ate **all** of the cookies \vee John ate **most** of the cookies \vee John ate **many** of the cookies
 \equiv J ate many of the cookies

- In (10), note that the existential in PROX (shown as a disjunction for clarity) reduces to truth of the weakest alternative in \approx .

¹I assume, after Penka (2006), that the associate of *almost* is focus-marked, and the alternatives in \approx are drawn from the focus-semantic value of the prejacent, in the sense of Rooth (1985).

(11) Entailment between \approx -alternatives in (10)

- a. J ate all the cookies \Rightarrow J ate most of the cookies \Rightarrow J ate many of the cookies
 b. J ate most of the cookies \Rightarrow J ate many of the cookies
 c. J ate many of the cookies

- Choosing either alternative (11b) or (11c) is compatible with the negation of the strongest alternative (11a), and so the conjunction of NEG and PROX yields the desired *close to but not all* meaning for (10).
- Using a quantifier from the bottom of the scale, i.e. one which is entailed by all of its scale-mates, should yield a contradiction. This predicts the ungrammaticality of *almost some*.

(12) John ate almost \approx **some** of the cookies.

NEG: \neg J ate **some** of the cookies

PROX: J ate **some** of the cookies \vee John ate **many** of the cookies \vee John ate **most** of the cookies
 \equiv J ate **some** of the cookies

- Being in an upward-entailing environment, the prejacent with *some* is the weakest proposition in \approx , so PROX reduces to the prejacent.

(13) Entailment between \approx -alternatives in (12)

- a. J ate some of the cookies
 b. J ate many of the cookies \Rightarrow J ate some of the cookies
 c. J ate most of the cookies \Rightarrow J ate many of the cookies \Rightarrow J ate some of the cookies

- But the prejacent, (13a), is negated by NEG. Since all the alternatives in (13) entail (13a), the conjunction of NEG and PROX is logically contradictory, and so predicted to be ungrammatical (cf. Gajewski (2002)).
- So far, we have captured the fact that *almost* is good with universal quantifiers, but not with existential quantifiers.

(14) \checkmark almost [... all ...]
 * almost [... some ...]

3.1 Predictions of this account

- More generally, the denotation in (7) predicts that *almost* is good with a strong prejacent, but bad with a weak prejacent.

$$(15) \quad \checkmark \text{ almost } [\dots]_{\text{strong}} \\ * \text{ almost } [\dots]_{\text{weak}}$$

- Extrapolating from (15), we predict that *almost* is not banned from associating with existential quantifiers. If a downward-entailing operator intervenes between the two at LF, this would create a strong prejacent for *almost*, and should be ok.

$$(16) \quad \checkmark \text{ almost } [\text{OP}_{\text{DE}} [\dots \exists \dots]_{\text{weak}}]_{\text{strong}}$$

- Horn (2005, 2011) points out that examples of *almost + any*_{NPI} are “readily googleable.”

- (17) a. ... the extra money when you do get called is so huge that you have to push if there’s **almost any** chance that you’ll be called.
b. Gyrocopters can land on the spot if there’s **almost any** wind at all.

- In (17), we see that *almost + any*_{NPI} appears in the antecedent of a conditional, a downward-entailing environment. If *almost* takes the entire conditional as its prejacent, then we will have just the configuration in (16).

- Conversely, the version of (16) with a universal quantifier is predicted to be contradictory.

$$(18) \quad * \text{ almost } [\text{OP}_{\text{DE}} [\dots \forall \dots]_{\text{strong}}]_{\text{weak}}$$

4 The Puzzle: where did NEG go?

- Turning back now to our puzzle: why is there no negative inference in associated with *almost* in (3)?

(3) If John eats **almost all** of the cookies, he will be ill.

- I suggested above that the negative inference is not missing, but is obscured by the fact that *almost* takes scope over the entire conditional proposition rather than the embedded antecedent proposition.

(19) LF for (3):
 $\text{almost}_{\approx} [\text{If John eats } \mathbf{all} \text{ the cookies he will be ill}]$

- This LF yields the following meaning for (3):

(20)_{NEG}: \neg If J eats **all** the cookies, he will be ill
PROX: If J eats **all** the cookies, he will be ill \vee If J eats **most** the cookies, he will be ill \vee If J eats **many** the cookies, he will be ill
 \equiv If J eats **all** the cookies, he will be ill

- This creates a logical contradiction between NEG and PROX.

(21) Entailment between \approx -alternatives in (20)

a.		If ... all ...
b.	If ... most ... \Rightarrow	If ... all ...
c.	If ... many ... \Rightarrow	If ... most ... \Rightarrow If ... all ...

- The LF in (5) is precisely the configuration in (18), which is predicted to be bad, because the prejacent is weak. So how can this be the correct scope for *almost*, as I am claiming?
- Inspired by the account of Crnič (2012) for another alternative-evaluating operator, *even*, I propose that the prejacent in (5) can be covertly strengthened to avoid contradiction.

5 Covert exhaustification

- Recent work in the proposal of scalar implicatures has led to the proposal of a covert operator, similar in meaning to *only* (Fox and Spector, 2009; Chierchia et al., 2011; Sauerland, 2012). I adopt the formulation from Crnič (2012):

(22) $\|\mathbf{exh}_C\|(p,w) = 1$ iff $p(w)=1$ & $\forall q \in C[p \not\subseteq q \rightarrow q(w)=0]$

- This operator strengthens its prejacent with respect to a set of alternatives by conjoining the negation of all propositions which are not entailed by the prejacent.

(23) John ate some cookies.

LF: \mathbf{exh}_C [John ate **some** of the cookies]

(24) $C = \{\text{that John ate **some** of the cookies, that John ate **all** of the cookies}\}$

$\llbracket(23)\rrbracket = \text{John ate some of the cookies} \ \& \ \neg \text{John ate all of the cookies}$

- In addition to strengthening the meaning of its prejacent, it also yields a proposition that is not entailed by any of the alternatives in C. This can resolve the contradiction that we encountered in (5):

(5) LF for (3):

almost_{\approx} [If John eats **all** the cookies he will be ill]

(25) LF for (3) with covert exhaustification of the prejacent:

almost_{\approx} [\mathbf{exh}_C [If John eats **all** the cookies he will be ill]]

- The prejacent of *exh* is entailed by all its alternatives, as we saw in (20). However, once its meaning is strengthened, the problematic entailments in (21) are broken. (26) shows the result of exhaustifying the prejacent *If John eats all the cookies he will be ill*:

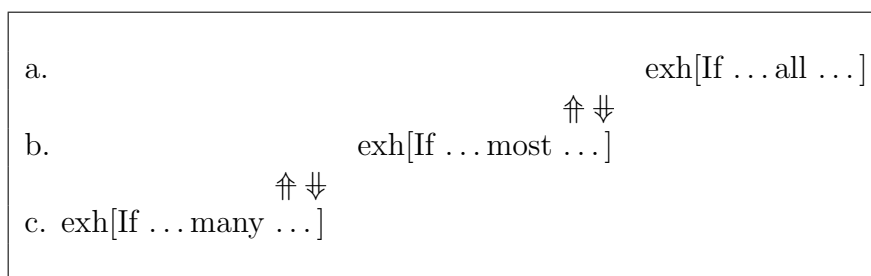
(26) $\llbracket \llbracket \text{exh}_C[\text{If John eats all the cookies he will be ill}] \rrbracket =$
 If John eats **all** the cookies he will be ill & \neg If John eats **most** of the cookies he will be ill
 & $\neg \dots$

- Now the prejacent of *almost* in (25) will include *exh*, and so will the alternatives that make up \approx :

(27) $\approx = \{ \text{exh}_C[\text{If John eats all the cookies he will be ill}], \text{exh}_C[\text{If John eats most the cookies he will be ill}], \text{exh}_C[\text{If John eats many the cookies he will be ill}] \}$

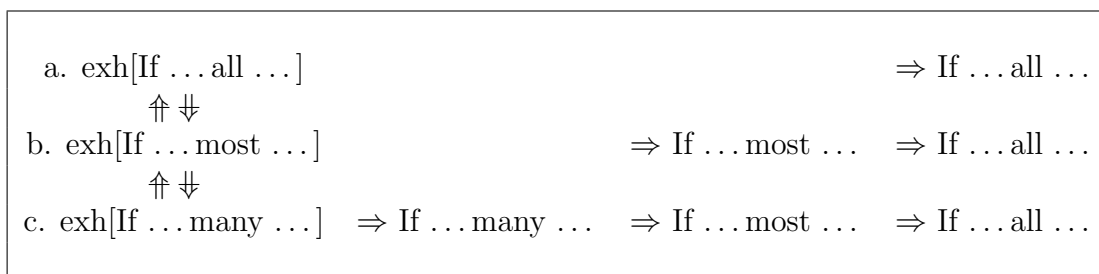
- The alternatives in \approx are no longer related by entailment, as shown in (28).

(28) Entailment between alternatives in (27)



- The PROX component of *almost* requires that one of these alternatives hold. NEG only rules out the prejacent. Hence, PROX and NEG are now compatible.
- Now we can see why the negative inference appears to be missing from (3) — it actually takes scope over the entire conditional. In addition, the alternatives in (27) are mutually exclusive, so if alternative (27b) or (27c) is true, the prejacent (27a) is false. Hence whichever alternative fulfills PROX, NEG is true (since it is the negation of the prejacent).
- But if the entailments among alternatives has been broken, why do we infer *close to all or all* from (3)?
- Though *exh* strengthens its prejacent, it still entails its prejacent. For each alternative, the non-exhaustified meaning still entails [If ... all ...].

(29) Entailments of each alternative in (26).



- No matter which alternative ends up fulfilling PROX, it will entail [If ... all ...].

5.1 A note on the distribution of *exh*

- This analysis assumes that a rescuing *exh* will take scope over the entire conditional, but in fact *exh* can also rescue high-scope *almost* if its scope is only over the clause embedded in the antecedent.
- It would also be possible for *exh* to rescue (5) by attaching to the embedded clause. This would break the entailments among the alternatives evaluated by *almost* and should yield the *close to but not all* interpretation, which is unavailable in (3).
- I propose that this parse is unavailable due to independent constraints on the distribution of *exh*, discussed in the covert exhaustification literature as the Economy Condition (EC) (Fox and Spector, 2009; Chierchia et al., 2011; Crnič, 2012). Compare (26) with application of *exh* to just the antecedent:

(30) $\llbracket \text{exh} \rrbracket (\llbracket \text{J eats all of the cookies} \rrbracket) \equiv \llbracket \text{J eats all of the cookies} \rrbracket$

- Because at this point *all* is strongest among its alternatives, *exh* cannot strengthen the meaning, and returns the same proposition unchanged. This vacuous application of *exh* violates (some forms of) the EC. On the other hand, matrix-level *exh* does strengthen its prejacent, as shown in (26), and does not violate the EC. This analysis of *almost* suggests that the EC is sensitive to **local** vacuity.

6 Conclusion

- I have proposed that the negative inference that accompanies *almost* is part of its truth-conditional meaning.
- In cases like (3) where the negative inference seems to go missing, it has simply been obscured due to (a) *almost* taking high scope, which causes a downward-entailing operator to intervene between *almost* and its associate, and (b) a covert operator *exh* which rescues an otherwise illicit structure caused by *almost* taking high scope.
- Finally, taking my account seriously lends support to the existence of *exh*, and sheds light on the formulation of the Economy Condition which governs the distribution of *exh*: *exh* cannot be inserted if it applies only vacuously to its prejacent.

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