

On NPI-Licensing and the Semantics of Causal Sentences

Synopsis: This paper aims to account for the licensing of minimizers and weak NPI-*any* in causal sentences (see (1)-(3)). (1) shows that, under negation, *any* is licensed in the reasoning adverbial clause but not in the main clause of a *because*-sentence. (2) and (3) show that minimizers, such as *even lift a finger*, are not licensed in negated or polar-interrogative *because*-sentences. In this paper, I provide a unified account for (1)-(3) by investigating the semantics and syntactic properties of *because*-sentences.

- (1) a. John did not marry Sue because she had **any** money, (but because....)
 b. *John did not marry **any** woman because he had money, (but because....)
- (2) a. *John did not marry Sue because she **even lifted a finger** to help him, (but because...)
 b. *John did not **even lift a finger** to help Sue because he married her, (but because....)
- (3) a. *Did John marry Sue because she **even lifted a finger** to help him?
 b. *Did John **even lift a finger** to help Sue because he married her?

Previous Analyses: Among (1)-(3), only (1) is discussed in the literature. Linebarger (1987) proposes that, while ungrammaticality in (1b) is due to the intervention of *because* between *any* and negation, (1a) is rescued by the rise of the negative implicature (NI) from the reasoning adverbial clause in a negated *because*-sentence. This analysis results in the wrong prediction in (4): in (4) *any* is licensed though the NI of the reasoning adverbial clause is cancelled in the following conversation sequence.

- (4) John did not marry Sue because she has *any* money. As you know, she has a job with an incredible high pay and she just inherited a pretty good wealth from her father.
 However, he married her because she has an adorable personality.

Kadmon and Landman (1993) propose that *any* in (1a) is licensed via the cancellation of the relevant factivity presupposition by metalinguistic negation. However, this leaves unexplained why *any* in (1b) cannot be licensed in the same way. Moreover, this analysis may conflict with Horn's (1985) observation that metalinguistic negation does not license NPIs.

Chierchia (2004) attributes ungrammaticality of (1b) to the factivity on the main clause of a *because*-sentence: the factivity presupposition (*John married some woman*) on the main clause prevents the strengthening of the strong meaning of (1b) (see (5)) after domain widening. Nevertheless, it is not clear how this analysis accounts of the licensing of *any* in (1a).

- (5) [John married *any* woman] \wedge NOT [CAUSE(John had money, John married *any* woman)]

Moreover, none of these three analyses accounts for (2) and (3). An adequate account that can accommodate (1)-(3) is thus needed.

Proposal: I propose that the key to the solution lies in an adequate semantics of *because*.

The inadequacy of the Lewis-style semantics: It is widely assumed that *because* carries factivity on both of its arguments and the truth condition of a *because*-sentence is paralleled with that of a corresponding counterfactual conditional (see (6)) (see Lewis (1973), Dowty (1979)).

- (6) $\llbracket \text{because} \rrbracket (p)(q) = 1$ if p is true and q is true and $\neg p \square \rightarrow \neg q$ is true, and $\llbracket \text{because} \rrbracket (p)(q) = 0$ if p is true and q is true and $\neg p \square \rightarrow \neg q$ is not true. Otherwise, it is undefined; (where $A \square \rightarrow B$ is true iff the worlds most similar to the actual world in which A holds and B holds as well are more similar to the actual world than any world in which A holds but B does not).

According to (6), the main clause (q) of a *because*-sentence is a S(trawson-)D(ownward-)E(ntailing) context. This is problematic in that: (i) it is not clear that the entailment relation of *because*-sentences goes this way, and (ii) following von Stechow (1999) and Heim (1984), this

semantics incorrectly predicts that weak-NPIs like *any* and *ever* could be licensed in the main clause of a *because*-sentence (see (7)).

(7) *John ate *any* potatoes because he was craving for starch.

A Modal semantics for *because*: The semantics of *because* I propose as the basis to account for (1)-(3) is in (8). According to (8), the main clause of a *because*-sentence (q), but not the reasoning adverbial clause (p), carries a factivity presupposition. p and q are both U(pward-)E(ntailing) contexts. When under negation, p is a DE-context whereas q retains its UE-property due to the presence of the presupposition on modal base (that is, $\cap A(w) \subseteq q$).

(8) $\llbracket \text{because} \rrbracket^{A,R}(p)(q)(w)$ is defined only if (i) $w \in q$ and $w \in \text{Max}(\cap A(w))(R(w))$, and (ii) $\cap A(w) \subseteq q$; when defined, $\llbracket \text{because} \rrbracket^{A,R}(p)(q)(w) = 1$ iff for all $w' \in \text{Max}(\cap A(w))(R(w))$: $w' \in q \cap p$ (where $\cap A(w)$ is the set of accessible worlds from w and $\text{Max}(\cap A(w))(R(w))$ is the set of the ‘best’-worlds in $\cap A(w)$ relative to the ordering source $R(w)$)

Accounting for (1): The licensing of *any* in (1) directly follows from the semantics of *because* in (8). Following Ladusaw’s (1979) DE approach and Progovac’s (1993) non-UE approach, since the reasoning adverbial clause is a DE-context under negation, *any* is licensed in (1a). On the other hand, the main clause (under negation) is an UE-context and hence cannot license *any*, as (1b) shows. This analysis shows that it is the presupposition on modal base (that is, $\cap A(w) \subseteq q$) rather than the factivity (that is, $w \in q$) that is responsible to the intervention effect in (1b).

Accounting for (2): Following Heim (1984), I assume that minimizers are the combination of (an overt or covert) *even* and the low endpoint on the pragmatic scale (see the semantics of *even* in (9)). The set of alternatives C is strictly determined by the focus and scope of *even* at LF (see Wilkinson (1996), Lahiri (1998), a.o.).

(9) $\llbracket \text{even} \rrbracket(C)(p)(w)$ is defined only if $\forall q [q \in C \ \& \ q \neq p \rightarrow q \succ_{\text{likely}} p]$ (Scalar P(repupposiiton))
If defined, $\llbracket \text{even} \rrbracket(C)(p)(w) = 1$ iff $p(w) = 1$

For any two propositions p and q and $p \neq q$, $q \succ_{\text{likely}} p$ if p entails q ($\{w: p(w) = 1\} \subseteq \{w: q(w) = 1\}$). Moreover, the contrast in (10) shows that, although *even* can move across *because* at LF, it cannot scope over *not...because* via LF-movement.

- (10) a. I called Mary because she was sick (and not because I like her); I gave her a ride because she was sick (and not because I like her); I *even* did her shopping for her because she was sick (and not because I like her).
b. I didn’t call Mary because she was sick (but because I like her); I didn’t give her a ride because she was sick (but because I like her); #I didn’t *even* do her shopping for her because she was sick (but because I like her).

Based on these assumptions, (2) can be accounted for in the following way: (2a) and (2b) each has two possible LFs (see (11a-b) and (12a-b) respectively). Since the reasoning adverbial clause is an UE context, ScalarP can be satisfied in neither of (11a-b). Hence, (2a) is ungrammatical. Likewise, given that the main clause of a *because*-sentence is an UE context (under negation), ScalarP fails in both (12a) and (12b). Therefore, (2b) is ungrammatical as well.

(11) a. $\neg \llbracket \text{because} [\text{even} [\text{Sue helped John to the } [\text{minimal}]_F \text{ degree}] [\text{John married Sue}]] \rrbracket$

b. $\neg \llbracket \text{even} \llbracket \text{because Sue helped John to the } [\text{minimal}]_F \text{ degree} \rrbracket [\text{John married Sue}] \rrbracket$

(12) a. $\neg \llbracket \text{because John married Sue} \rrbracket \llbracket \text{even} [\text{John helped Mary to the } [\text{minimal}]_F \text{ degree}] \rrbracket \rrbracket$

b. $\neg \llbracket \text{even} \llbracket \text{because John married Sue} \rrbracket [\text{John helped Mary to the } [\text{minimal}]_F \text{ degree}] \rrbracket \rrbracket$

Accounting for (3): I follow Guerzoni's (2004) analysis that *even* can have scope interaction at LF with the trace of *whether*, which serves as the place holder for the polarity operators. The possible answers inconsistent with ScalarP are excluded. Furthermore, I assume that, based on the contrast in (10), *even* cannot move across the trace of *whether* in a *yes-no* question of a *because*-sentence. According to these assumptions, (3a) and (3b) have the possible LFs (13a-b) and (14a-b) respectively. Since the reasoning adverbial clause is an UE-context, ScalarP fails in all the possible answers generated via the LFs (13a) and (13b) (see (13a') and (13b')). Given that there is no felicitous answer to (3a), (3a) is ungrammatical.

(13) a. [Whether_i [t_i [[because [*even*[Sue helped John to the **[minimal]_F degree]]][John married Sue]]]]]**

a'. {[[because [*even* [Sue helped John to the **[minimal]_F degree]]][John married Sue]],
[not[[because [*even* [Sue helped John to the **[minimal]_F degree]]][John married Sue]]}]}****

b. [Whether_i [t_i [*even*[[because Sue helped John to the **[minimal]_F degree]]][John married Sue]]]]]**

b'. {[*even*[[because Sue helped John to the **[minimal]_F degree]]][John married Sue]]],
[¬[*even*[[because Sue helped John to the **[minimal]_F degree]]][John married Sue]]}]}****

As for (3b), given that the main clause is an UE-context, ScalarP fails in all the possible answers generated via the LFs (14a) and (14b) (see (14a') and (14b')). Since there is no felicitous answer to (3b), (3b) is ungrammatical.

(14) a. [Whether_i [t_i [[because John married Sue][*even*[John helped Sue to the **[minimal]_F degree]]]]]**

a'. {p₁=[[because John married Sue][*even* [John helped Sue to the [minimal]_F degree]]];
p₂=[not [[because John married Sue][*even* [John helped Sue to the [minimal]_F degree]]]]}]}

b. [Whether_i [t_i [*even*[[because John married Sue][John helped Sue to the **[minimal]_F degree]]]]]]]**

b'. {p₁=[*even* [[because Sue helped John to the [minimal]_F degree][John married Sue]]];
p₂=[¬[*even* [[because Sue helped John to the [minimal]_F degree][John married Sue]]]]}]}

Further Predictions: The analysis above correctly predicts that minimizers are licensed in the reasoning adverbial clause of a *because*-sentence if *even* scopes over negation through base-generation rather than LF-movement. As (13a) shows, since *even* already scopes over negation at overt syntax, the licensing of minimizers is not blocked by *because*, for the reasoning adverbial clause of a negated *because*-sentence is a DE context.

(13) a. John *even* did not marry Sue because she *lifted a finger* to help him, (but because...).

b. LF: [*even* [¬[[because Sue helped John to the **[minimal]_F degree]]][John married Sue]]]]]**

Moreover, it also correctly predicts that the *y-n* question in (14a), where *even* scopes over the trace of *whether* at overt syntax, is grammatical and negatively biased. As the LF (14b) shows, since the reasoning adverbial clause is a DE context under negation, ScalarP is satisfied in the negative answer to (14a).

(14) a. S: Did John *even* marry Sue because she *lifted a finger* to help her? #A:Yes. A: No.

b. [Whether_i [*even*[t_i[[because Sue helped Mary to the **[minimal]_F degree]]][John married Sue]]]]]]]**

The improvement on grammaticality in (15) can also be explained by the analysis above. (15) differs from (2a) and (3a) in that there is no overt *even* in the examples in (15). The contrast between (15) and (2a) and (3a) can be explained by assuming that speakers interpret the examples in (15) as involving a covert *even* which scopes over negation and the trace of *whether* at overt

syntax. The imperfection in (15) can be attributed to the difficulty on processing this covert focus-sensitive particle speakers meet.

- (15) a. ?John didn't marry Sue because she *lifted a finger* to help him, (but because....)
 b. ?Did John marry Sue because she *lifted a finger* to help him?

Most important of all, the analysis above predicts that (16a) and (16b) are still ungrammatical even if it is assumed that there is a covert *even* scoping over negation and the trace of *whether* at overt syntax. Since the main clause of a *because*-sentence retains its UE property under negation, minimizers can never be licensed in the main clause of a *because*-sentence.

- (16) a. *John didn't *lift a finger* to help Sue because he married her, (but because....).
 b. *Did John *lift a finger* to help Sue because he married her?

On the Counterfactual-Conditional Inference: One shortcoming of the semantics of *because* in (6) is that this semantics, unlike the Lewis-style one in (4), does not straightforwardly capture the long observed relation between a *because*-sentence (*because p, q*) and a corresponding counterfactual conditional (*if ¬p, ¬q*). However, I derive this inference from a causal sentence by placing constraints on the ordering source $R(w)$ and suspending the presupposition on the modal base $(\cap A(w))$ in (4) (namely, that $\cap A(w) \subseteq q$). I assume that, the presupposition on the modal base $(\cap A(w) \subseteq q)$ suspended, a *because*-sentence is true only when all the 'best'-worlds $(\text{Max}(\cap A(w))(R(w)))$ are *q-and-p*-worlds and $\neg q$ -and- $\neg p$ -worlds (see (17)). With respect to the same ordering source $R(w)$ and modal base $\cap A(w)$, it follows that all the worlds in $\text{Max}(\cap A(w))(R(w)) \cap \neg p$ are $\neg q$ -worlds. Hence, the counterfactual-conditional inference arises.

- (17) $\llbracket \text{because} \rrbracket^{\text{A,R}}(p)(q)(w)$ is defined only if $w \in q$ and $w \in \text{Max}(\cap A(w))(R(w))$;
 when defined, $\llbracket \text{because} \rrbracket^{\text{A,R}}(p)(q)(w) = 1$ iff for all $w' \in \text{Max}(\cap A(w))(R(w))$: $w' \in (q \cap p)$ or $w' \in (\neg q \cap \neg p)$

(where $\cap A(w)$ is the set of accessible worlds from w and $\text{Max}(\cap A(w))(R(w))$ is the set of the 'best'-worlds in $\cap A(w)$ relative to the ordering source $R(w)$)

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