On NPI-Licensing and the Semantics of Causal Sentences

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Synopsis: This paper aims to account for the licensing of minimizers and weak NPI-*any* in *because*-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 *because*-sentences under negation or in *yes-no* questions. 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: In the literature, only (1) is discussed: the NPI-*any* in (1a) is licensed by the rise of the negative implicature on the reasoning adverbial clause (see Linebarger (1987)) or the cancellation of the relevant factivity presupposition via metalinguistic negation (see Kadmon and Landman (1993)). However, neither of these analyses accounts for (1b). Moreover, Kadmon and Landman's (1993) analysis conflicts with Horn's (1985) observation that metalinguistic negation does not license NPIs.

Proposal: I propose that the key to the account for (1)-(3) lies in an adequate semantics of *because*.
   The inadequacy of the Lewis-style semantics: Following Lewis (1973), Dowty (1979), a.o., it is widely assumed that *because* carries a factivity presupposition on both of its arguments. Moreover, the truth condition of a *because*-sentence is paralleled with that of a corresponding counterfactual conditional (see (4)). According to (4), the main clause (*q*) of a *because*-sentence is a S(trawson-)D(ownward-)E(ntailing) context. This semantics is problematic in that: (i) it is not clear that the entailment relation of causal sentences goes this way, and (ii) following von Fintel (1999) and Heim (1984), this semantics incorrectly predicts that *any* could be licensed in the main clause of a causal sentence (see (5)).

(4) $[\![because]\!](p)(q)=1$ if p is true and q is true and $\neg p\,\square\!\!\rightarrow\neg q$ is true, and $[\![because]\!](p)(q)=0$ 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).

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

   On the semantics of because: The semantics of *because* I propose to account for (1)-(3) is in (6). According to (6), 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* is still an UE context due to the presence of the factivity presupposition.

(6) $[\![because]\!]^{A,R}(p)(q)(w)=1$ if $w\in q$ and $\cap A(w)\subseteq q$ and for all $w'\in Max(\cap A(w))(R(w)):w'\in q\cap p$
   $[\![because]\!]^{A,R}(p)(q)(w)=0$ if $w\in q$ and $\cap A(w)\subseteq q$ and for some $w'\in Max(\cap A(w))(R(w)):w'\notin q\cap p$
   Otherwise, it is undefined; ((where $\cap A(w)$ is the set of accessible worlds from w and $Max(\cap A(w)(R(w))$ 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 form the semantics of *because* in (6). 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.

   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 (7)). The set of alternatives C is strictly determined by the focus and scope of *even* at LF (see Wilkinson (1996), a.o.).

(7) ⟦even⟧(C)(p)(w) is defined only if ∀q[q∈C & q≠p→q>$_{likely}$ p] (Scalar Presupposition (ScalarP))

    If defined, ⟦even⟧(C)(p)(w)=1 iff p(w)=1

    For any two propositions p and q and p≠q, q>$_{likely}$ p if p entails q ({w:p(w)=1}⊆{w:q(w)=1}).

Moreover, the contrast in (8) shows that, although *even* can move across *because* at LF, it cannot scope over *not…because* via LF-movement.

(8) 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 (9a-b) and (10a-b) respectively). Since the reasoning adverbial clause is an UE context, ScalarP can be satisfied in neither of (9a-b). Hence, (2a) is ungrammatical. Likewise, given that the main clause of a *because*-sentence is an UE context, ScalarP fails in both (10a) and (10b). Therefore, (2b) is ungrammatical as well.

(9) a. [¬[[because [***even***[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]]]]

(10) a. [¬[[because John married Sue][***even***[John helped Mary to the **[minimal]$_F$** degree]]]]

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

    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 (8), *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 (11a-b) and (12a-b) respectively. Since the reasoning adverbial clause is an UE-context, ScalarP fails in all the possible answers generated via the LFs (11a) and (11b) (see (11a′) and (11b′)). Given that there is no felicitous answer to (3a), (3a) is ungrammatical.

(11) 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 (12a) and (12b). Since there is no felicitous answer to (3b), (3b) is ungrammatical.

(12) a. [Whether$_i$ [t$_i$ [[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]]]]]

    Further Predictions: The analysis above correctly predicts that minimizers are licensed in the reasoning adverbial clause if *even* scopes over negation through base-generation rather than LF-movement, as (13a) shows. Moreover, it correctly predicts that the *y-n* question in (14b) is grammatical and negatively biased. As in (13b) and (14b), since the reasoning adverbial clause is a DE context under negation, ScalarP is satisfied in (11a) and the negative answer to (12a).

(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]]]]

(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]]]]]

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 causal 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 (∩A(w)) in (4) (namely, that ∩A(w)⊆q). I assume that, the presupposition on the modal base (∩A(w)⊆q) suspended, a *because*-sentence is true only when all the 'best'-worlds (Max(∩A(w)(R(w))) are *q-and-p*-worlds and *¬q-and-¬p*-worlds (see (14)). With respect to the same ordering source R(w) and modal base ∩A(w), it follows that all the worlds in Max(∩A(w)(R(w)))∩¬p are *¬q*-worlds. Hence, the counterfactual-conditional inference arises.

(15) ⟦because⟧^{A,R}(*p*)(*q*)(w)=1 if w∈q and for all w′∈Max(∩A(w))(R(w)):w′∈(q∩p) or w′∈(¬q∩¬p)

    ⟦because⟧^{A,R}(*p*)(*q*)(w)=0 if w∈q and for some w′∈Max(∩A(w))(R(w)):w′∈(q∩¬p) or w′∈(¬q∩p)

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