Context updates in head-final languages: linear order or hierarchy?

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Introduction   Schlenker (2009, 2010) proposes a parsing-based approach to presupposition projection. The analysis derives the order in which operators update the context, based on their classical semantics. Instead of hard-coding such information in the lexicon, Schlenker defines local context (LC) as follows:

(1)   Local context (Schlenker 2010)

The local context of an expression *d* of propositional or predicative type which occurs in a syntactic environment *a _ b* in a context *C* is the strongest proposition or property *x* which guarantees that for any expression *d'* of the same type as *d*, for all strings *b'* for which *a d' b'* is a well-formed sentence,

$$C \models^{c' \to x} a \ (c' \text{ and } d') \ b' \leftrightarrow a \ d' \ b'$$

Informally speaking, the LC of an expression E within S is the smallest domain the interpreter has to consider in interpreting E, without jeopardizing the truth condition of S. The interpreter traverses the string of expressions from left to right, thus upon encountering E, it only has access to the expressions that linearly precede E. Given those expressions, the interpreter calculates the strongest but innocuous restriction. Schlenker shows that the suggested model nearly replicates the prediction of Heim (1983).

Issues in linear order-based approach   Strictly relying on linear order fails to account for the presupposition projection behavior in head-final languages. In the following Korean example, the attitude verb *mit* 'believe' follows the embedded clause. Since Schlenker's theory calculates the LC of the embedded clause based on the expressions that linearly precede it, the interpreter does not have access to the matrix verb. The consequence for the theory is that the LC of the embedded clause cannot be restricted to Johns doxastic worlds. However, the example does presuppose that John believes that Mary used to smoke.

(2)   John-un [Mary-ka   keysokhayse tambay-lul   pi-n-tako]   **mit**-nun-ta.

John-TOP [Mary-NOM continuously cigarette-ACC smoke-PRES-COMP] **believe**-PRES-DECL

'John believes that Mary continues to smoke.'   (embedded clause > believe)

Ingason (2016) also points out that strictly relying on linear order is problematic. The Japanese examples in (3) show that the context is first updated with respect to a head noun, then with respect to its relative clause: (3a) is felicitous because the head noun *zyosei* 'woman', which is less restrictive than its relative clause *yamome-dearu* 'who is a widow', updates the context first. In contrast, (3b) triggers the redundancy effect because the head noun *yamome* 'widow' is more restrictive than the relative clause *zyosei-dearu* 'who is a woman'. Ingason suggests that this is evidence that the order of context update mirrors syntactic hierarchy, but not linear order.

(3)   a. Taro-ga   [[**yamome**-dearu] **zyosei**-ni]   atta.

Taro-NOM [[**widow**-COP]   **woman**-DAT] met

'Taro met a woman who is a widow.'   (widow > woman)

b. # Taro-ga   [[**zyosei**-dearu] **yamome**-ni] atta.

Taro-NOM [[**woman**-COP] **widow**-DAT] met

'Taro met a widow who is a woman.'   (woman > widow)

Hierarchy-based account   Romoli and Mandelkern (2017) reform Schlenker's original formulation in a way that the LC is calculated on LF: when calculating the LC of *E* within a full clause *S*, the interpreter considers *only the expressions that c-command S at LF*, instead of considering the expressions that linearly precede it. The net effect is that the expressions that are higher in the structure update the context first. This hierarchy-based account correctly predicts that the redundancy effect arises in (3b). In calculating the LC of the relative clause, only the expressions that c-command it are taken into account, hence *Taro*, *met*, and *widow*. Accordingly, the LC is restricted to the individuals *x* such that **widow**

x and *met **Taro** x* is true. Further updating this LC with respect to *woman* is redundant, therefore is infelicitous. The hierarchy-based account also makes the right prediction for (2): *John* and *believe* c-command the embedded clause, thus they are both considered in calculating the LC of the embedded clause. Therefore, the LC can be restricted to John's doxastic worlds.

Issue in hierarchy-based approach The hierarchy-based account cannot explain why the context is invariably updated left-to-right in a coordinated structure, despite the cross-linguistic variation in constituency. The issue arises in Korean, where the left conjunct and the conjunction operator form a constituent as in (4). In this set-up, the hierarchy-based account predicts that the right conjunct is updated before the left conjunct because the former c-commands the latter. This is not borne out; just as in English, the left conjunct first updates the context, so the entire sentence presupposes that 'if John is over thirty, he cannot apply'.

(4) a. John-un selun-i nem-ess-ko caki-ka ciwenha-ci mosha-n-ta-nun
John-TOP thirty-NOM over-perf-and self-NOM apply-CI cannot-PRES-DECL-REL
kes-ul al-n-ta.
thing-ACC know-PRES-DECL
'John is over thirty and he knows he cannot apply.'

b.

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                          CP
                 ┌─────────┴─────────┐
                CP        and        CP
            ┌────┴────┐          ┌────┴────┐
       John is over thirty   he knows he cannot apply
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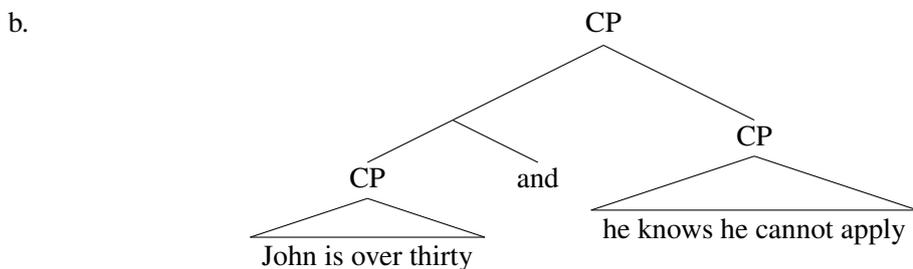
Proposal Based on the consideration of the syntax-semantics interface, we make the following two adjustments to Schlenker's theory: First, the interpreter parses a sentence from left to right, but the LC of an expression (either propositional or predicative) can be calculated only at points where the interpreter has access to the semantic value of the parsed expressions. The reasoning is that the mutual entailment which Schlenker posits in (1) should be an entailment on semantic values, not on strings. Then our adjustment receives support from the theories that limit access to semantic values of an expression to certain points in the derivation (Barker and Shan 2014, Chomsky 2008). Among them, we adopt Barker and Shan's view that semantic values can only be retrieved from a clause. The net effect is that calculation of LC needs to be *delayed* if the parsed expressions altogether do not constitute a clause.

The second adjustment concerns what can be a target of LC computation. We suggest that only maximal projections (NP, VP, CP), but not heads or bar-levels (N, N̄, V, V̄, C, C̄), can be such targets.

Case study: Ex (2) Delaying the LC computation is crucial in explaining (2). The bullet points in (5) mark the positions of our interest, at which the interpreter attempts to calculate the LC of the embedded clause. Only $\bullet_3$ is a possible position for calculating the LC, whereas doing so in $\bullet_1$ and $\bullet_2$ is blocked. As for $\bullet_1$, the interpreter has only parsed *John*, which is not a full clause. Similarly, by the time the interpreter reaches $\bullet_2$, it has encountered *John that Mary continues to smoke*. But again, the expressions do not form a clause. Thus, the calculation of LC is delayed until $\bullet_3$, the point at which the interpreter has access to the sentence-final *believes*.

(5) John $\bullet_1$ [that Mary continues to smoke] $\bullet_2$ believes $\bullet_3$

Case study: Ex (4) As for the Korean coordinated structure, the interpreter first parses the left conjunct. Upon completion of the left conjunct, the interpreter can calculate its LC because *John is over thirty* is a full clause. The general prediction is that cross-linguistic variation in coordinated structure is irrelevant to the order of context update; the left expression always updates the context before the right one.

(6) [[$_{CP}$ John is over thirty] • and] [$_{CP}$ he knows that he cannot apply]

Case study: Ex (3) The redundancy effect in (3b) is also accounted for. First, only •$_3$, but not •$_1$ or •$_2$, is a possible point of LC computation; neither *John that is woman* nor *John that is woman widow* is a full clause in (7). In calculating the LC of the NP as in (7a), all of the parsed expressions except the NP (because its LC is being computed) will be taken into account; *John* and *met* are considered, but not *that is woman* because it is part of the NP. Consequently, the LC of the NP is the set of individuals that John met. In contrast, when computing the LC of the relative clause as in (7b), *John*, *widow*, and *met* are considered. Therefore, the LC is the set of individuals x such that **widow** x and **met** x John is true. As in the hierarchy-based account, updating this LC with *that is woman* is redundant.

(7) a. LC of NP: John [$_{NP}$ [$_{\text{RelP}}$ ~~that is **woman**~~] •$_1$ **widow**] •$_2$ met •$_3$

   b. LC of RelP: John [$_{NP}$ [$_{\text{RelP}}$ ~~that is **woman**~~] •$_1$ **widow**] •$_2$ met •$_3$

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