Semantic construction for restrictive and non-restrictive relative clauses

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As noted in Partee (1975), surface-oriented syntactic frameworks must assume that in DPs like (1) the noun is modified by the relative clause, and the resulting constituent is then the syntactic sister of the determiner:

(1) every girl that I love

Otherwise, one could not combine the semantic contributions of the DP constituents ($\langle\langle e,t\rangle,\langle\langle e,t\rangle,t\rangle\rangle$ for determiners, $\langle e,t\rangle$ for nouns, $\langle\langle e,t\rangle,\langle e,t\rangle\rangle$ for nominal modifiers like relative clauses) into a semantic representation of type $\langle\langle e,t\rangle,t\rangle$ by functional application.

For surface-oriented syntactic frameworks like HPSG, which do not rearrange constituents on some syntactic level (e.g., by 'move-α'), crosslinguistic semantic construction for relative clauses thus poses a challenge as soon as the following standard linguistic tenets are accepted:

(a) the only operation of semantic construction is functional application

(b) functional application presupposes that the involved constituents are syntactic sisters in the underlying (binary branching) syntactic structure

(c) semantic contributions of DP constituents have fixed types, within and across languages

Consequently, noun and modifier semantics must be combined first, the result is then combined with the determiner semantics. An alternative analysis of a DP such as (1), where determiner and noun form a constituent first before the relative clause is integrated, is thus blocked.

In addition, these tenets predict that the determiner must appear peripherally; the ordering Mod- Det-N or N-Det-Mod should be ruled out. While this prediction agrees with English DPs as (1), it does not hold good for its Turkish analogue (2), where the relative clause equivalent (*sevdiğim*, literally, 'of my loving') frequently precedes the determiner, and the noun follows it:

(2)

sev-	diğ-	-im	her	kız
love	*nominalization*	*my*	*every*	*girl*

Similarly, modification of indefinite pronouns such as *everyone* or *something*, which arguably combines both a noun and a determiner lexically, is in conflict with the predictions of the tenets:

(3) everyone that I love

Abney (1987) proposes an analysis of (3) in terms of an incorporation of an enclitic noun *-one* with the determiner, which preserves compositionality - but only at the cost of stipulating an otherwise unmotivated reading of *one* (also with a much more specific interpretation 'person'). What is more, for languages whose indefinite pronouns are not morphologically transparent, the analysis loses much of its elegance (cp. e.g. German *jemand* or Dutch *iemand* 'someone').

We consider (2) and (3) instantiations of the same interface phenomenon, viz., modification of an intermediate D projection (consisting of D and NP complement for (2) and only an intransitive determiner for (3)). The emerging new D projection then projects to DP. However, this analysis entails that the modifier can pertain only to a *part* of the semantic contribution of the modified expression. In (2) and (3), this part is the restriction of the universal quantification in the modified element, which is underlined in (5) for the case of (2). (3) works analogously (after replacing the property $\mathbf{girl}'$ by $\mathbf{person}'$) in (5) and (6):

(4) relative clause semantics: $\lambda P\lambda x.P(x) \wedge \mathbf{love}'(\mathbf{speaker}', x)$

(5) modified D projection semantics: $\lambda Q \forall y.\underline{\mathbf{girl}'}(y) \rightarrow Q(y)$

(6) resulting DP semantics: $\lambda Q \forall y.(\mathbf{girl}'(y) \wedge \mathbf{love}'(\mathbf{speaker}', y)) \rightarrow Q(y)$

To model a syntax-semantics interface that can build (6) from (4) and (5) on the basis of a surface-oriented syntactic analysis, we will re-use already established techniques for semantic construction of underspecified representations of structural ambiguities (e.g., Underspecified DRT, Reyle 1993; Minimal Recursion Semantics, Copestake et al. 2005; or Constraint Language for Lambda Structures, Egg et al. 2001, to cite but a few).

For the construction of such underspecified representations, *structured meanings* are employed. Interface rules can address different distinguished parts of such a structured representation, which gives the necessary flexibility to handle cases like (2) and (3). Since these structured meanings and interface rules that explicitly mention parts of such meanings are necessary anyway to handle structural ambiguity, we can achieve flexible semantic construction at no additional cost. Egg (2004) shows that such a syntax-semantics interface can handle intricate cases of the mapping from syntax to semantics without having to assume a level of syntax like Logical Form at which constituents are rearranged in a way suggested by semantics.

In cases like (2) and (3), that part of the semantic contribution of a modified expression to which the modifier can pertain semantically (the restriction of the quantification) is distinguished and thus accessible to the interface rules that determine the integration of the semantic contributions of modifier and modified expression. Formally, this means that tenets (b) and (c) from the above list can be upheld, while tenet (a) is relinquished.

This analysis can then be applied to non-restrictive relative clauses as in (8) as opposed to (7):

(7) The train which leaves at 11:30am is waiting on platform 5 (i.e., there are others)

(8) The train, which leaves at 11:30am, is waiting on platform 5 (i.e., it's the only one)

The semantic difference between (7) and (8) will be derived following the intuition of Bartsch (1979) that non-restrictive relative clauses (as opposed to restrictive ones) are part of the *scope* of the respective quantifier. To this end, the specific intonation or the commas that indicate nonrestrictivity are interpreted in terms of an operator that makes the scope of a quantifier accessible in the semantic representation (while making the restriction inaccessible). Consequently, a modifier of a DP like *the train* in the case of (8) will pertain to the scope of the quantification and not to its restriction, which immediately yields the correct truth conditions: In (7), the relative clause co-determines the unique entity (the only train leaving at 11:30pm) because it is part of the restriction of the quantifier. In constrast, the identity of the unique object in (8) is determined by the noun *train* alone (nothing else is in the restriction of the quantifier), there are no other trains, and the unique train happens to leave at 11:30pm.

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