Processing Evidence for Quantifier Raising:
The Case of Antecedent Contained Ellipsis

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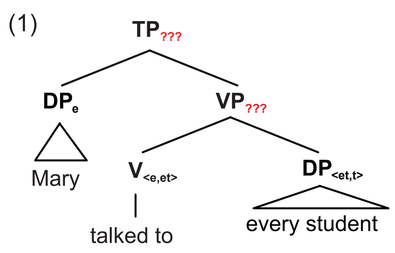
Summary

Quantifiers do not refer and therefore require a richer mode of syntactic or semantic composition than referring expressions when they appear in object position (cf. Heim&Kratzer 1998). In a recent self-paced reading study we have shown that first pass parsing is sensitive to the quantificational vs. referring status of a DP in such positions (Varvoutis&Hackl 2006). The current study extends this research to cases of Antecedent Contained Ellipsis and provides online evidence for the existence of Quantifier Raising, a covert syntactic mechanism that has been proposed to resolve the problem of quantifiers in object position (e.g. May 1977).

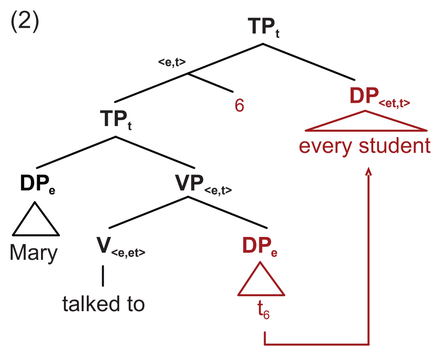
Quantifier Raising (QR)

QR is a covert syntactic movement operation that resolves the problem of quantifiers in object position (cf. May 1977). The problem of quantifiers in object position (QOb) arises when quantifiers, which do not refer, appear in internal argument positions, which can only host referring expressions. Using familiar type theory (cf. Montague 1973) the problem (1) and its resolution via QR (2) can be described as below:

(1)



(2)



Since definite DPs can be analyzed as referring expressions, there is no type-mismatch with definite DPs in object position to trigger QR.

Antecedent Contained Ellipsis (ACE)

ACE refers to ellipsis that is properly contained within the expression that serves as the antecedent for ellipsis resolution, (3). The existence of ACE is puzzling given that ellipsis resolution is subject to an identity constraint between the elided constituent and its antecedent.

(3) John talked to every / the student Mary did ⌓.

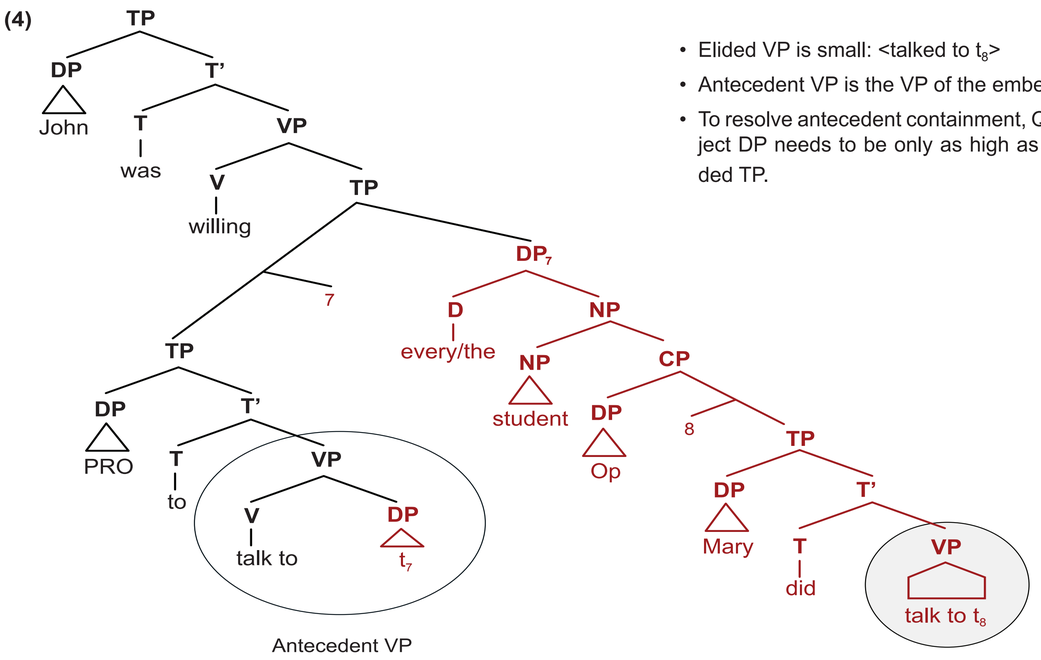
Because of antecedent containment in ACE, it should be impossible for the antecedent VP to be identical to the elided VP.

A solution to this paradox is to QR the object DP to a position outside of the antecedent VP, undoing antecedent containment. In ACE, QR targets quantificational and referential DPs alike.

Sag-Williams Generalization (Sag 1976, Williams 1974)

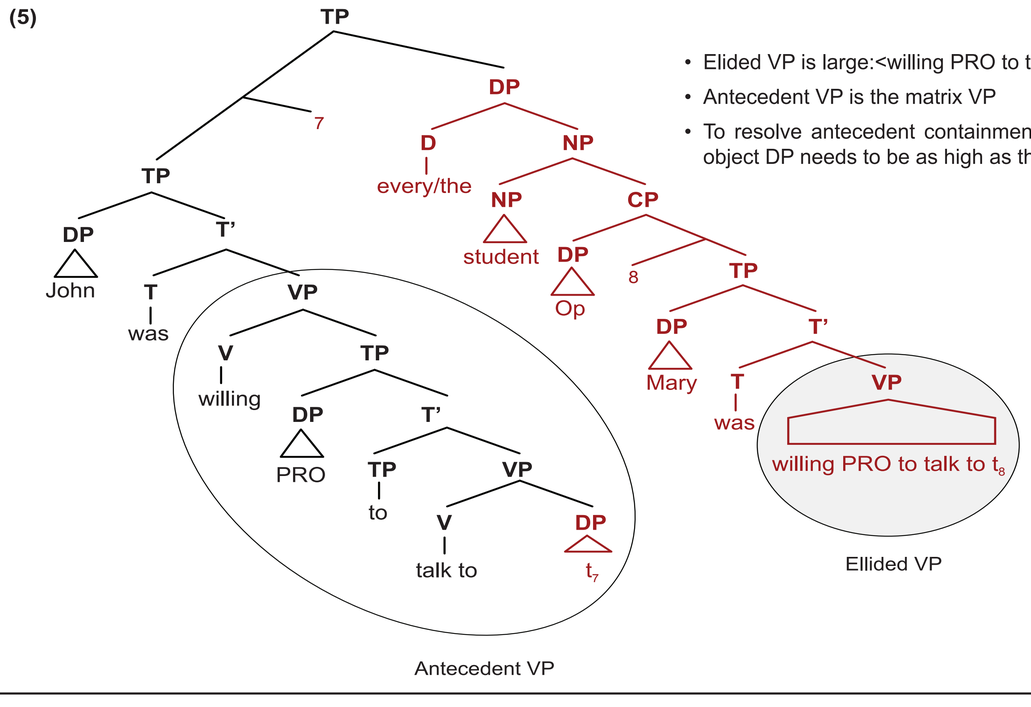
The size of the ellipsis determines the lowest possible scope of the object DP.

(4)



- Elided VP is small: <talked to t_8>
- Antecedent VP is the VP of the embedded TP
- To resolve antecedent containment, QR of the object DP needs to be only as high as the embedded TP.

(5)



- Elided VP is large:<willing PRO to talked to t_8>
- Antecedent VP is the matrix VP
- To resolve antecedent containment, QR of the object DP needs to be as high as the matrix TP.

A Self-Paced Reading (SPR) Study of ACE

SPR's sensitivity to linear order provides a way to differentiate between these two triggers of QR (QOb and ACE). Because of QOb in ACE sentences with quantificational DPs, QR is triggered earlier (at the determiner) than in ACE sentences with definite DPs. In sentences with definite DPs, QR is not triggered until the ellipsis site.

Design

This study compares definite and quantificational DPs in object position across three conditions, (6). In condition A there is no ellipsis (the gap is simply a trace). Condition B contains a "small" ellipsis site (4) and condition C a "large" ellipsis site (5). When the parser reaches the ellipsis site (conditions B and C), object DPs must be QR-ed to resolve antecedent containment. However, quantificational DPs will have already been QR-ed because of QOb. Assuming that QR is, by default, local, quantifiers raise above only the embedded VP. This obviates the problem of antecedent containment in condition B but not in condition C, leading us to expect an interaction in the region following the ellipsis site.

(6) The secretary was trained to manage…

A - the/every program that the intelligent young professional designed
B - the/every program that the intelligent young professional did
C - the/every program that the intelligent young professional was

…during her four years at college.

Predictions

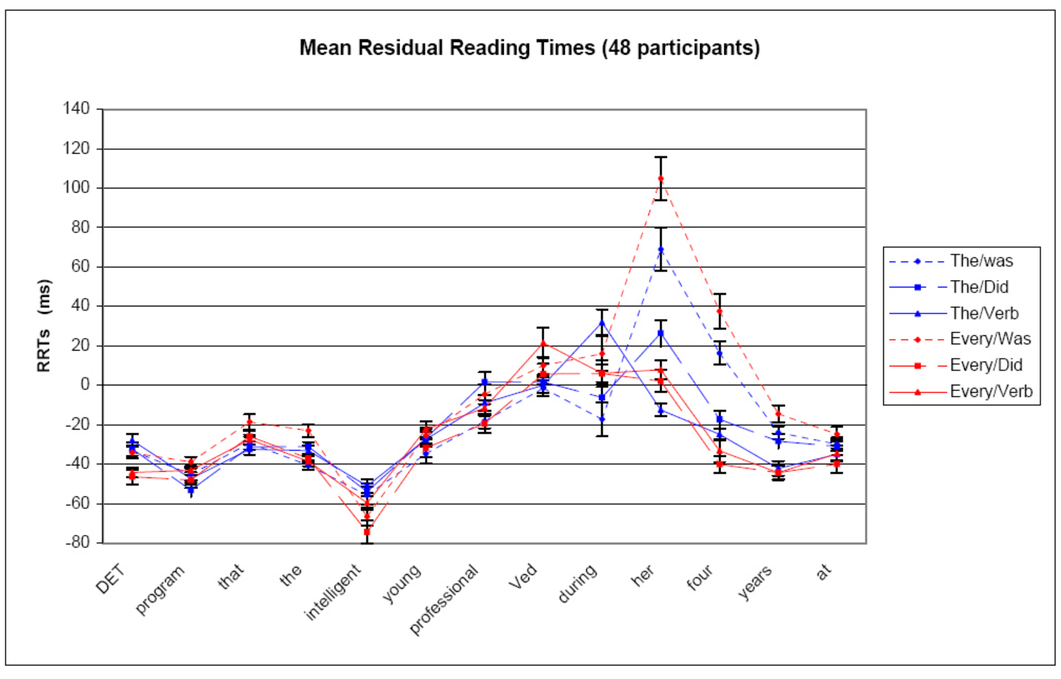
- Main effect (Det) directly following the determiner: 'every' > 'the' (Varvoutis & Hackl 06)
- Interaction (Det*Ell) after the gap:
  - Definite DPs: condition B and condition C will be longer than condition A
  - Quantificational DPs: no significant difference between condition A and condition B
    increased RTs for condition C

Methods

- 48 undergraduates of the Claremont Colleges
- 60 target items and 120 fillers in a moving window self-paced reading task.
- 2 factors: Determiner (the/every) by Ellipsis Size (was/did/designed)

Results

Residual reading times from 48 subjects show a main effect (Det: $F(2,46) = 4.591$; $p = 0.037$) on the two words after the determiner, and a significant interaction (Det*Ell: $F(2,46) = 4.363$; $p = 0.018$) on the second word after the gap, which supports the above predictions.

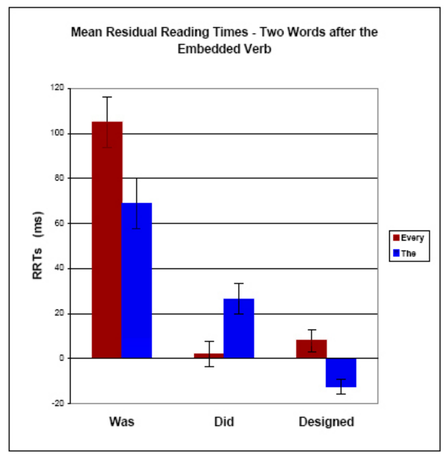


Discussion and Conclusion

We observe that RTs for "the-A" are lowest and that RTs for "the-B" are higher than RTs for "every-A" and "every-B." We also observe increased RTs for "the-C" and "every-C."

These results support the following hypotheses:

- Quantificational DPs in object position always trigger QR
- Definite DPs only undergo QR when there is an independent trigger (e.g. ACE)
- QR is, by default, local.



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