A plea for optional QR

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Assumptions

- The following two assumptions are commonly made:
  1. The Copy Theory of Movement: Moved elements leave behind full copies of themselves rather than traces. PF and LF then pronounce/interpret one copy and delete the other
  2. Movement for type reasons: When a quantifier occurs in object position, its type clash is resolved by moving it to a position where it is interpretable

Consequence: Free inverse scope

- If we make these two assumptions, a sentence like (1) has the structure in (2): *every boy* is first merged as the object of the verb and *a girl* is merged in its vP-internal position. *Every boy* has to move up for type reasons. The first node of type *t* it comes across is the vP node above *a girl*, so this is where it attaches. *A girl* moves to its final position in TP.

(1) A girl loves every boy.

(2) $[_{TP}$ a girl $[_{vP}$ every boy $[_{vP}$ a girl $[_{VP}$ loves every boy]]]]

- When the semantics interprets this structure, it can choose to interpret the higher copy of *every boy* and either the higher or the lower copy of *a girl* (Hornstein, 1995; Johnson & Tomioka, 1997). Crucially, no extra movement operation is necessary for *every boy* to to take scope over *a girl*; the same syntactic structure leads to both scope configurations, so you get inverse scope 'for free'.

Claim

- The fact that no extra movement step is necessary to yield an inverse scope configuration is problematic. We need a system where QR is truly optional.

Argument 1: Scope Economy

- Scope Economy (Fox, 2000): A scope shifting operation cannot be semantically vacuous
- *Mary* and *every teacher* are scopally commutative. Therefore, *every teacher* cannot move over *Mary* in the ellipsis sentence in (3). In ellipsis constructions, the antecedent and ellipsis sentence have to have parallel LFs (the Parallelism condition). Therefore, *every teacher* cannot move over *a boy* in the antecedent sentence, either. This is why we do not get inverse scope in (3), while we do get inverse scope in (4).

(3) A boy admires every teacher. Mary does, too. $\exists > \forall$; $*\forall > \exists$

(4) A boy admires every teacher. A girl does, too. $\exists > \forall$; $\forall > \exists$

- The problem: If you make the two assumptions listed above, **there is no way to prevent inverse scope in (3)**. As shown in (5), *every teacher* moves over the lower copy of *Mary* for type reasons. Type-driven movement is exempt from Scope Economy. *Mary* overtly moves up for EPP reasons. The semantic component then receives a structure with two copies of *Mary* that have been generated in the syntax: one is higher than *every teacher* and the other is lower. Inverse scope can be attained simply by deleting the higher copy and interpreting the lower copy of *Mary*. No movement is required for this, so there is no movement operation that can be blocked by Scope Economy. Thus, the prediction is that inverse scope is possible in (3).

(5) $[_{TP}$ Mary $[_{vP}$ every teacher $[_{vP}$ Mary $[_{VP}$ admires every teacher]]]]

Argument 2: Processing

- In a series of experiments, Anderson (2004) shows that inverse scope configurations are more difficult to process than surface scope configurations: people find them more difficult to get even when the context is biased towards inverse scope and self-paced reading experiments show that people read inverse scope configurations more slowly.
- If we want our theory of language to be compatible with processing data, we need a theory where surface scope is the baseline, and inverse scope requires some additional operation, which leads to more complexity.
- The problem: In the derivation in (2), **inverse scope is no more complex than surface scope**. Our theory fails to predict that the inverse scope configuration in (6) incurs a higher processing cost than the surface scope configuration in (7). There is no reason why interpreting the lower copy and deleting the higher one should be more complex than interpreting the higher copy and deleting the lower one.

(6) $[_{TP}$ ~~a girl~~ $[_{vP}$ every boy $[_{vP}$ a girl $[_{VP}$ loves every ~~boy~~]]]]

(7) $[_{TP}$ a girl $[_{vP}$ every boy $[_{vP}$ ~~a girl~~ $[_{VP}$ loves every ~~boy~~]]]]

Figure 1: Illustration of the problem

Argument 3: Missing readings

- QR is known not to be freely available (e.g. Beghelli & Stowell, 1997). Some examples where only a surface scope reading is possible are given in (8).

(8) a. Some students read exactly two books.
b. A girl met all professors.
c. No music critic listened to exactly two albums.
d. Every child went to exactly two amusement parks.
e. Every student went to no parties.
f. No child found an Easter egg.
g. No boy read every book.

- When the same pairs of quantifiers as in (8) are base-generated in the opposite order, no problem arises. Compare e.g. (8-a) to (9-a) and (8-b) to (9-b). This means that inverse scope is impossible in (8) not because this would lead to uninterpretability but because of constraints on movement.

(9) a. Exactly two students read some books.
b. All professors met a girl.

- The problem: It is clear that we need to be able to formulate constraints on QR, whatever they may be. If you make the two assumptions given above, **it is impossible to formulate such constraints**. In the derivation of (8-a), *exactly two books* moves up for type reasons. This movement operation is necessary to avoid a type clash, and can therefore not be constrained. Then the semantics can interpret the higher or the lower copy of *some students*, and we get inverse scope.

(10) $[_{TP}$ some students $[_{vP}$ exactly two books $[_{vP}$ some students $[_{VP}$ read exactly two books]]]]

Solution: Only optional QR

- I propose to solve the problem by allowing object quantifiers to be interpreted *in situ*. This way, an object quantifier only moves for scope reasons.
- It is a convention to account for object quantifier type clashes and scope ambiguities in the same manner (syntactic movement), but as far as I know there is no reason why this should be so.
- Concrete proposal: a hybrid movement/flexible types account. Object quantifiers are ambiguous à la Montague (1973); Partee and Rooth (1983); Hendriks (1993) and can be interpreted in the position where they are base generated:

(11) a. $[\![every]\!] = \lambda P_{\langle e,t\rangle}\lambda Q_{\langle e,t\rangle}.\forall x : P(x) \rightarrow Q(x)$
b. $[\![every]\!] = \lambda P_{\langle e,t\rangle}\lambda R_{\langle e,\langle e,t\rangle\rangle}\lambda y.\forall x : P(x) \rightarrow Q(x)(y)$

- Scope, on the other hand, is regulated by movement, as usual. The structure of a sentence like (12) then looks as in (13), with movement only taking place in the inverse scope configuration.

(12) A girl loves every boy.

(13) a. Surface scope: $[_{TP}$ a girl $[_{vP}$ a girl $[_{VP}$ loves every boy]]]
b. Inverse scope: $[_{TP}$ a girl $[_{vP}$ every boy $[_{vP}$ a girl $[_{VP}$ loves every boy]]]]

- This solves the issues described above in the following way:
  - Scope Economy can restrict QR because it does not happen automatically (argument 1)
  - Inverse scope requires an extra movement step and involves a more complex structure, in line with processing data (argument 2)
  - As QR does not take place obligatorily, we can formulate constraints on it (argument 3)

QR vs. Reconstruction

- This account ensures that QR is an optional movement step, but Reconstruction still merely involves interpreting the lower copy of the subject rather than the higher one.
- We thus expect an asymmetry between QR and Reconstruction: whenever Reconstruction is not possible, this cannot be due to a constraint on movement. The most obvious alternative is a constraint on interpretability: this means that whenever two operators *a* and *b* occur in a sentence and *a* cannot reconstruct to a position below *b*, this must be because the scope configuration $b > a$ is, for some reason, uninterpretable. This is difficult to test, but the data in (14) and (15) seem to indicate that this idea is on the right track.

(14) a. More than half of the students are allowed to attend the seminar. *mth* > ◊ ; *◊ > *mth*
b. At most five people can fit in this car. *at most*> ◊ ; *◊ >*at most*

(15) a. John is allowed to invite more than half of the students. *mth* > ◊ ; *◊ > *mth*
b. Mary can fit at most five suitcases in her car. *at most*> ◊ ; *◊ >*at most*

References

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