MM3 Syntax-Semantic Interface
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Quantifier Raising: May (1977, 1985)

1. The Problem: Inverse Scope Phenomena

Standard compositional procedures should allow for the correct interpretation of the surface readings of sentences with more than one quantified expressions, cf. (1):

(1) Every student wrote more than one summary $\forall >> |>1|$
= ‚For every student x, there is more than one summary such that x wrote it.'

BUT: Sentences like those in (2) and (3) display scope ambiguity in the absence of overt movement

(2) *inverse scope in transitive clauses:*

[$_S$ Some man [$_{VP}$ loves every woman]].

i. *surface reading*: $\exists >> \forall$: There is a man that loves every woman.
ii. *inverse reading*: $\forall >> \exists$: For every woman y there is a man that loves y.

(3) *inverse scope from within complex DPs:*

a. One apple in every basket is rotten.
only sensible interpretation: $\forall >> |1|$

b. Ein Apfel in jedem Korb war faul.

Questions: i. How can we account for the existence of inverse readings, and thus of scope ambiguity in (1) – (3)?
ii. Semantic or Syntactic (= structural) ambiguity?

2. May (1977) *The grammar of quantification*: Structural Ambiguity

→ **see also *Handout of Presentation in class* (Kotek) !!!**

- *Basic Claim:*

The principles of UG, which determine our universal knowledge of linguistic structures, not only define the set of possible syntactic expressions of a language (= surface structures), *but also the set of possible logical forms*.

→ ambiguity of (1) – (3) is syntactically determined

→ the different interpretation result from different syntactic configutations as the representational level of LF:

(4) *LF (Logical Form):*

That level of structural representation that links the theories of linguistic form (= syntax) and interpretation. LF represents those syntactic aspects that are relevant for semantic interpretation, or those parts of semantic structure that are syntactically encoded.

- *Three further assumptions:*

(5) i. Representations of logical form are phrase markers, i.e. *syntactic objects*.

ii. The syntactic rules mapping surface structures to LF-structure are identical to those rules that generate surface structures → *move α*

iii. The result of applying these rules is subject to general conditions of well-formedness, such as the ECP (Empty Category Principle) or the PCC (Path Containment Condition) . *These conditions depend on the respective syntactic framework* 💣

(6) D-structure → S-Structure → LF → LF''

SYNTAX SEMANTIK

→ Mapping from surface structure to LF comes in form of covert movement , or: QR

(7) *Quantifier Raising (QR):*

At LF, adjoin all quantifiers to S (or: IP) [leaving behind a trace = a variable]
This movement is triggered by the special semantic type of quantifiers: <et,t>

→ Application of QR generates Montegovian quantificational structures in the syntax!

(8) a. $[_S$ some man$_1$ $[_S$ every woman$_2$ $[_S$ t_1 loves $t_2]]]$
→ surface reading

b. $[_S$ every woman$_2$ $[_S$ some man$_1$ $[_S$ t_1 loves $t_2]]]$
→ inverse reading

→ *Strict disambiguation at LF:*

1:1-correspondence between syntactic form and semantic interpretation

- *Strong Evidence for the existence of LF and QR:*

Variable binding with inverse linking constructions (May 1977, 1985)

The QP *every city* in (9) appears to bind the VP-internal pronoun *it*, although the QP does not c-command the pronoun at surface structure:

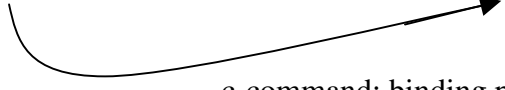
(9) a. $[_{DP}$ Someone from **every city$_1$**] $[_{VP}$ despises **it$_1$**].
'In jeder Stadt gibt es jemanden, der diese verabscheut.'

b. Mindestens eine Person aus jeder Stadt hasst sie/diese.

→ *LF-based solution (May 1977, 1985):*

Every city QRs at LF to a position from which it can-command and hence bind the pronoun → adjunction to S/IP (or at least DP):

(10) [**every city$_1$**] $[_{DP}$ somebody from **t$_1$**] $[_{VP}$ despises **it$_1$**]



c-command: binding possible

→ Apart from these binding cases, there are a number of additional and *independent* semantic and syntactic arguments in favour of LF & QR !

3. Additional (independent) arguments for QR (cf. Hornstein 1995: chs. 1 & 2):

3.1 Parallelism to overt A-bar movement (see *Presentation in Class*)

- The scope-taking behaviour of quantifiers is governed by standard restrictions on overt A-bar movement:

→ QR does not show island variations, cf. Ruys (1993):

(11) *Coordinate Structure Constraint* (Ross 1967):

a. *$\mathbf{Who_1}$ did some professor [$_{VP}$ [admire $\mathbf{t_1}$] und [despise the dean]]?

b. **Some professor** [$_{VP}$ [admired **every student**] and [despised the dean]].
NOT: ‚Für jeden Studenten gibt es einen (anderen) Professor, der ihn bewunderte und den Dekan verachtete.'

b'. **every student$_1$** [**some professor** [$_{VP}$ [admired $\mathbf{t_1}$] and [despised the dean]]].

(12) *Complex Noun Phrase Constraint* (Ross 1967):

a. *$\mathbf{Who_1}$ did Peter regret [NP the fact that Bill had met $\mathbf{t_1}$]?

b. **Some man** regretted the fact that Bill had met **every cheer-leader**.
NOT: 'Für jeden Cheer-Leader gibt es einen (anderen) Mann, der bedauerte das Bill sie getroffen hatte.'

b'. ***every cheer-leader$_1$** [**some man** regretted the fact that Bill had met $\mathbf{t_1}$] .

BUT: Surprisingly, QR out of finite clauses appears to be blocked (13b), contrary to what we find with overt A-bar movement (13a):

(13) a. **Whom$_1$** does Peter believe that Mary is dating $\mathbf{t_1}$?

b. **Someone** believes that Mary is dating **every student**.
NOT: Für jeden Studenten gibt es jemand (anderen), der glaubt, dass Mary mit ihm zusammen ist.

→ QR does not seem to occur across finite sentence boundaries, cf. also Reinhart (1997).

- *Conclusion:*

If QR is an instance of syntactic A-bar movement, then there are differences between overt and covert instantiations of this movement operation.

→ weakening of the argument, but see Fox (2000) for a claim that QR is can occur across finite sentential boundaries.

3.2 Antecedent-Contained Deletion (ACD) (Hornstein 1995, H&K 1998)

- In English and German, the content of a VP can be deleted under identity with an antecedent VP:

(14) a. Peter read a book and Bill did too.
b. Peter [$_{VP1}$ **read a book**] and Bill [$_{VP1}$ **read a book**] too.

→ VP2 in (14a) can be interpreted after copying of the content of VP1 into VP2, cf. (14b).

- In the presence of a quantified NPs, it is also possible to delete a VP that is embedded inside the antecedent VP (antecedent-contained deletion):

(15) a. Peter [$_{VP1}$ read [$_{QP}$ every book that Bill [**$_{VP2}$ did**]]].
= Every book that Bill read, Peter read.

b. *Peter read the book that Bill did.

→ *Problem:*

Copying of VP1 into VP2 leads to infinite regress in the ACD-case in (15a):

(16) Peter [$_{VP1}$ read [$_{QP}$ every book that Bill [**$_{VP2}$ read [$_{QP}$ every book that Bill [$_{VP2}$ did**]]]]].

→ *A Solution:*

The object QP QRs aand adjoins to S/IP:

(17) a. [$_{IP}$ [$_{QP}$ every book that Bill [**$_{VP2}$ did**]]**$_1$** [$_{IP}$ Peter [**$_{VP1}$ read t$_1$**]]]

b. [$_{IP}$ [$_{QP}$ every book that$_1$ Bill [**$_{VP2}$ read t$_1$**]]$_1$ [$_{IP}$ Peter [**$_{VP1}$ read t$_1$**]]]

→ VP1 in (17) no longer contains VP2, which makes copying without infinite regress possible

3.3 wh-in-situ languages (Huang 1982)

- *Assumption:*

The scope of a question is indicated by the position of the wh-element:

(18) a. **Wer** ist gekommen? → direkte Fragen
b. Peter fragt sich, **wer** gekommen ist. → indirekte Fragen

→ Without the existence of LF-movement, this assumption is problematic for wh-in situ languages like Chinese and French, where wh-elements in embedded clasuses can take scope over the matrix clause and form a direct question:

(19) Zhangsan zhidao [CP [IP Lisi mai-le sheme]] [Chinesisch]
Z. weiss Lisi kauft-Asp was

i. Zhangsan weiss **was** Lisi gekauft hat. (vgl. 18b)
ii. **Was** weiss Zhangsan, dass Lisi gekauft hat?

→ The assumption of LF-movement accounts for the existence of the direct question interpretation in (19ii):

The wh-element cannot take matrix scope from its surface position, hence it must be raised at LF (but see Lisa Cheng 1993, 1997, for a different approach to wh insitu)

- *Subject/object asymmetries:*

Wh-in situ languages display subject-object asymmetries, which suggests that structural factors play a role: object extraction is easier than subject extraction:

(20) a. Pierre a dit que Jean a vu **qui** ? OBJ-matrix question
P. hat gesagt dass Jean hat gesehen wen
‚Wen hat Pierre gesagt, dass Jean gesehen hat?'

b. *Pierre a dit que **qui** a vu Jean ?
P. hat gesagt dass wer hat gesehen Jean

→ QR of the embedded wh-subject is blockewd in (20b), as the subject trace would not be properly governed in the resulting LF-configuration (due to the workings of the ECP).

(21) *Qui$_1$ Pierre a /a Pierre dit t_1 que t_1 a vu Jean ?

3.4 Multiple Questions

- Comparable subject/object asymmetries are found with embedded multiple questions in German and English:

(22) a. Who believes that Bill bought **what**.
LF: **what$_1$** who [believes that Bill bought **t_1**]
→ LF-movement of embedded object OK

b. *Who believes (that) **what** happened?
* **what$_1$** who [believes (that) **t_1** happened]?
→ LF-movement of embedded subject blocked

(23) a. Wer hat wen gesehen? LF: [wen$_2$ [wer]$_1$] t_1 hat t_2 gesehen?
A: Moritz hat Frauke gesehen, Torben hat Ina gesehen, etc.

b. *?Wen hat wer t gesehen?

→ LF-movement of wh-subject and adjunction to *wen* blocked by ECP.

→ The assumption of LF-movement accounts for the contrast observed in (22) and (23). A purely semantic account (without additional stipulations) would fail to do so.

- *Languages with multiple overt wh-movement:*

In some languages, the proposed covert movement operations of wh-elements in mltiple questions apply overtly: E.g., in Romanian and Bulgarian, all *wh*-elements must move *overtly* to the left periphery in order to take scope over the sentence.

(24) a. **Cine ce** cumpara? [Rumänsich]
wer was kauft
‚Wer hat was gekauft?'

b. **Koj kogo** e vidjal? [Bulgarisch]
wer wen ist gesehen
‚Wer hat wen gesehen?'

Question: Do we find languages with overt Quantifier Raising?

→ YES!!! → Hungarian, cf. next session

4. Modifications in May (1985): Semantic Ambiguity

- *A first problem for May (1977)*

LF-structures must obey the general syntactic principles of well-formedness, but the structure in Die syntaktische Struktur in (8a) violates the *Empty Category Principle*:

→ subject traces (and adjunct traces) must be locally bound

(8) a. [$_S$ some man$_1$ [$_S$ every woman$_2$ [$_S$ t_1 loves t_2]]] *surface reading* ∃>>∀

→ The ECP applies with instances of overt wh-movement...

(25) a. **Who$_1$** do you think [$_{CP}$ **t_1**, [$_{IP}$ **t_1** saw Mary]]? → t_1 locally bound by t_1,

b.*Who$_1$ do you think [$_{CP}$ **t_1**, that **t_1** saw Mary?] → t_1 not locally bound (*that* intervenes)

... and also with instances of covert wh-movement

(26) a. Who admired what?
a'. [$_{CP}$ **Who** [$_{IP}$ **t_1** admired what]]?

b. * What did who admire?
b'. * [$_{CP}$ **who$_2$** [$_{CP}$ what$_1$ [did **t_2** admire t_1]]] (*what* intervenes)

→ The LF-structure of the ungrammatical (26b) in (26b') is structurally parallel to (8a)!!!

- *May's solution:*

  There is no strict disambiguation at LF, i.e. (2) has only one LF-structure. This LF-structure determines the range of possible readings via the *scope principle*, cf. (27):

(27) *Scope Principle:*

Two quantifiers (more generally: 'operators', which are phrases in an A-bar position at LF) that mutually govern each other (i.e., which c-command each other and are not separated by an intervening *maximal* projection) can take arbitrary relative scope.

(28) *The sole LF-structure of (2) is (8b):*

[$_S$ **every woman$_2$** [$_S$ **some man$_1$** [$_S$ t_1 loves t_2]]]

→ Restricted LF-movement plus the scope principle help to explain the contrast in (29ab):

(29) a. What$_1$ did everyone buy t_1? → *ambiguous*

i. What is the thing such that everyone bought it? → *single answer*
ii. For every person x, what did x buy? → *pair-list answer*

b. Who$_1$ bought t_1 everything? → *unambiguous*

Who is the person that bought everything?

(30) a. LF (29a): [$_S$, what$_1$ [$_S$ everone$_2$ [$_S$ t_2 bought t_1]]]

b. LF (29b): * [$_S$, who$_1$ [$_S$ everything$_2$ [$_S$ t_1 bought t_2]]] → *see problem 2!*

- *A new problem for May (1985)*

  The LF-structure of (29b) in (30b) is not well-formed at all and does not allow for the generation of even a single reading → (29b) should be ungrammatical, contrary to fact!

→ *May's (ad hoc) solution:*

Quantifiers can also adjoin to VP

(31) LF (29b): [$_S$, who$_1$ [$_S$ t_1 [$_{VP}$ **everything$_2$** [$_{VP}$ bought **t_2**]]]]

5. Open Questions

i. How is the VP-adjunction structure in (31) interpreted?

(31') [[VP]] = [[everything]] ([[2 bought t_2]])

= [λP. for all z, z is a thing, P(z)] (λx.λy. y bought x)

= ???

→ Notice that Fox (2000) also assumes VP-adjunction to be an option for VPs, but in Fox's framework VPs are proposition-denoting and hence of a different semantic type!

ii. If adjunction of QPs to VP is an option in (29b), why can't we derive the surface reading of (2) in the same manner?

(32) [$_S$ some man$_1$ [$_S$ t_1 [$_{VP}$ every woman$_2$ [$_{VP}$ loves t_2]]]]

→ this would only leave the ambiguous (29a) as evidence for the scope principle

iii. Do all languages allow for QR to the same extent as English, or is there parametric variation with respect to the availability of covert QR?

→ *next week's session !*

iv. To what extent ARE inverse readings available in English: How general a process is QR?

→ *session after next week !*