CISCL
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COVERT MOVEMENT FROM A TOP-DOWN PERSPECTIVE: QUANTIFIER RAISING

1. What's Q(uantifier)R(aising)?

(1) Semantic partition: quantifier, restrictive clause and nuclear scope (Kamp 1981, Heim 1982, Diesing 1992:7)
   a. Every llama ate a banana
   b. Every$_x$ | x is a llama | $\exists_y$ y is a banana $\wedge$ x ate y
      Quantifier | restrictive clause | nuclear scope

(2) Covert movement operation (it affects LF) creating an operator-variable configuration fixing the operator/nuclear scope

(3) Scope of α = set of nodes c-commanded by α

(4) Variable = non-overt A'-bound category

(5) Varieties of scope judgments (Beghelli & Stowell 1997:86):
   a. existential commitment (e.g. John wants to marry a canadian princess)
   b. interaction of QPs ($\forall$,$\exists$) with negation (e.g. John didn't read a book)
   c. distributive readings (e.g. every boy read two books)

(6) Every man loves some woman
   a. For every man x, there is a woman y, such that x loves y (surface scope)
   a'. [$_{IP}$ Every man$_i$ [$_{IP}$ some woman$_j$ [$_{IP}$ x_i loves y_j]]]
   b. There is a woman y, for every man x, such that x loves y (inverse scope, wide scope of the existential quantifier)
   b'. [$_{IP}$ Some woman$_j$ [$_{IP}$ every man$_i$ [$_{IP}$ x_i loves y_j]]]

2. QR ≅ Movement ?

(7) QR is another instance of Move
   a. Mary saw *who* → *Who* did Mary see *t*?
   b. Mary saw *nobody* → *Nobody* Mary saw *t*.

(8) Similar locality constraints (Cecchetto 2004):
   a. **What* will a technician complain [if you damage *t*]? (*if*-clause islandhood)
   b. *A technician* will complain [if you damage *every plane*]. ($\exists>\forall$, *$\forall>\exists$)

   a'. *Which movie* did you see *t*? (coordinate-structure constraint)
   a". **Which movie* did you see *t* and appreciate "The House of Mirth"?
   b'. *A (different) student* likes *every professor*. ($\exists>\forall$, $\forall>\exists$)
   b". *A (#different) student* likes *every professor* and hates the dean. ($\exists>\forall$, *$\forall>\exists$)

(9) Similar weak crossover (WCO) effects (Chomsky 1976, Anoun & Li 1994:2-3)
   a. who$_i$ did his$_i$ mother see x_i
   b. his$_i$ mother saw everyone$_i$
   b'. everyone$_i$ his$_i$ mother saw x_i

(10) One main difference: QR is not cyclic
   Someone expected [$_{CP}$ that *every Republican* would win]. ($\exists>\forall$; *$\forall>\exists$)

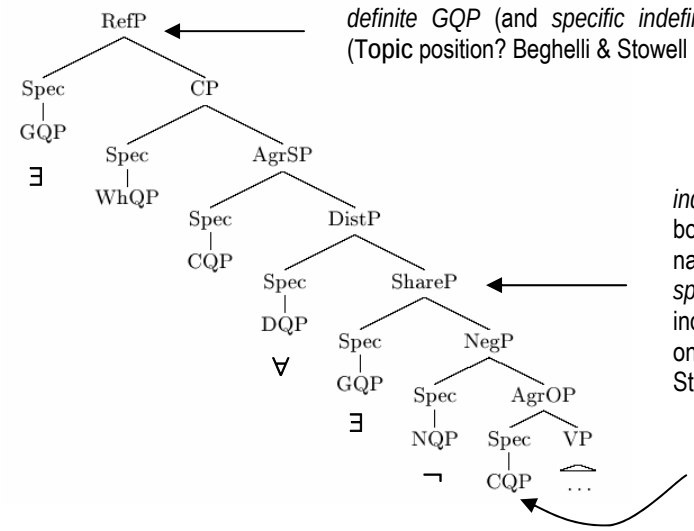
(11)

	Movement	QR	
1. Feature-driven	✓	×	(but see Hornstein 95, Beghelli & Stowell 97, Longobardi 91, Kayne 81)
2. Successive cyclic	✓	×	(but see Cecchetto 04; Reinhart 97)
3. Overt (leftward)	✓	×	(but see Szabolsci 97, Kayne 98, Fox & Nissenbaum 99, Fox 02)

3. What & where

(12) "Cartography" of the quantificational positions (Beghelli & Stowell 1997):
- a. WhQPs (*what*, *which man*...) (IT: *cosa*, *quale uomo*)) +wh (encoding interrogative force)
- b. NegQPs (*nobody*, *no man*, negative words (IT: *nessuno*, FR: *personne*)) +neg (encoding negative force)
- c. D(istributive-Universal)QPs: *every*, *each* (IT: *ogni*, *ciascuno*) ±dist ±univ
- d. C(ounting)QPs (*few*, *fewer than three*, *at most three*...) very local scope (in situ quantification)
- e. G(roup-denoting)QPs (*a*, *some*, *several*, bare numerals such as *one student*, definite QPs...) they introduce group referents (wide scope or very local scope as CQPs)

(13)



definite GQP (and *specific indefinites*): logical subject of predication (Topic position? Beghelli & Stowell 1996:76, no downward entailing QPs)

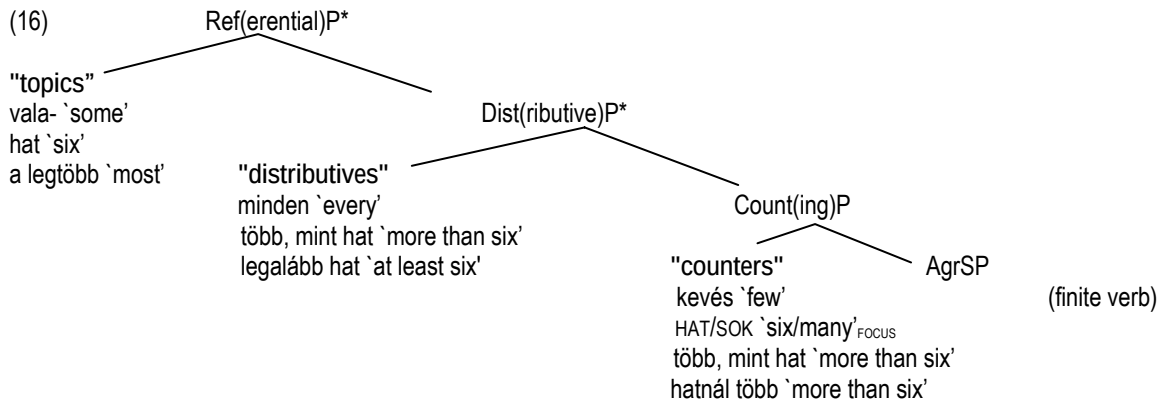
indefinites, *bare numerals*, QP with externally bound variable (Diesing's position for scrambled narrow scope presuppositional QPs, *dependent specific reference,* Diesing 1992, i.e. ranging over individuals whose existence is presupposed; but only accessible for existential QPs Beghelli & Stowell 1996:77)

indefinites and *bare plurals GQP* take scope in their case position (interpreted non-specifically like CQPs)

(14) Overt scope-taking in Hungarian (Szabolcsi 1997, Brody & Szabolcsi 2003):
- a. Minden ember kevés filmet nézett meg.
  every man-nom few film-acc viewed prt
  `Every man viewed few films,
  viz. every$_{Subject}$ > few$_{Object}$'
- b. Minden filmet kevés ember nézett meg.
  every film-acc few man-nom viewed prt
  `Few men viewed every film,
  viz. every$_{Object}$ > few$_{Subject}$'
- c. *Kevés ember minden filmet megnézett / nézett meg.
  few men-nom every film-acc prt-viewed / viewed-prt
- d. *Kevés filmet minden ember megnézett / nézett meg.
  few film-acc every man-nom prt-viewed / viewed prt

(15) Special status of post-verbal QPs in Hungarian (Brody & Szabolcsi 2003)
- a. Kevés filmet látott minden ember.
  few film-acc saw every man-nom
  `few > every' (direct scope)
- b. Kevés filmet látott minden ember.
  few film-acc saw every man-nom
  `every > few' (inverse scope)

(16)



(17) Other overt scope-marked languages:
- a. KiLega, Bantu language (Kynialolo 1990): Selective overt movement of *each/every*, but not *all*!
- b. Palestinian Arabic (Kahalaily 1995): DQP must undergo overt leftward movement
- c. Germanic languages (Kratzer 1988, Diesing 1990) ShareP could be the landing site for indefinites scrambling

4. Preferences & constraints

(18) Surface scope is often preferred:

a. Every student read two books	(every > two;	two > every)
b. Two students read every book	two > every;	every > two)

(19) GQP - negation interaction:

a. The students didn't read two/some books	(∃ > ¬; ¬ > ∃)	subject/object asymmetry of GQP w.r.t. neg. (a-d)
b. No student read two/some books	(∃ > ¬; ¬ > ∃)	
c. Two/some students didn't read this book	(∃ > ¬; *¬ > ∃)	
d. Two/some students read no books	(∃ > ¬; *¬ > ∃))	
e. a student didn't write this book	(∃ > ¬; ¬ > ∃)	
f. students didn't write this book	(∃ > ¬; ¬ > ∃)	

(20) DQP - negation interaction (negation precludes the existential event-QP):

a. ??Every boy didn't leave	
a'. ??Each boy didn't leave	
b. John didn't read every book	(¬ > ∃; *∀ > ¬ , possible only with focussed ∀)
b'. ??John didn't read each book	(*each* favors wide scope, Fodor & Sag 1982)
c. All the boys didn't leave	(like GQP in (19))
c'. John didn't read all the books	
e. Every/each boy didn't read one book	(existential moves to spec of ShareP: For every boy, there is one book that he didn't read)
e'. One boy didn't read every book	*∀ > ∃ > ¬
e". One boy didn't read each book	∀ > ∃ > ¬

(21) *Each* Vs. *every* (*each* [+definite], contextually determined quantification Vs. every, free quantification; Gil 1992)

a. One boy ate almost twenty/all the apples	(*almost* marks the end point of a scale)
b. One boy ate almost every apple	
b'. *One boy ate almost each apple	
c. Every dog has a tail	(generic reading)
c'. Each dog has a tail	(*generic reading)

(22) D/GQP – CQP interaction:

a. Some/one of the student visited more than two girls	(∃ > C; *C > ∃)
a'. Some/one of the student visited few(er than three) girls	(∃ > C; *C > ∃)
b. Every student visited more/fewer than two girls	(∀ > C; *C > ∀)

(23) Collective/distributive reading: all Vs. every/each over events
a. The Pope looked at all the members of his flock (collective reading: single looking event)
b. The Pope looked at every/each member of his flock (*collective reading)
a'. All the boys surrounded the fort (collective reading: plural subject/group)
b'. #Every/each boy surrounded the fort (*collective reading)

(24) Apparent distributive reading over indefinite GQP: uniform behaviour of G/DQP (Vs. (23))
a. Tom, Dick, and Harry read two books about India (GQP objects could be in spec of AgrO-P)
b. Three boys read two books about India
c. All the boys read two books about India
d. Every/each boy read two books about India

(25) Only DQPs truly distribute over GQPs (as in (23))
a. Every boy read a different book (*different* forces a distributed share reading,
b. Each of the boys read a different book counting interpretation of GQPs in (24))
c. *All the boys read a different book
d. *The boys read a different book
e. *Five boys read a different book

(26) Distributive reading (inverse scope construal) only with DQPs in object position:
a. A different boy read every book
b. A different boy read each book
c *A different boy read all the books
d.*A different boy read Ulysses and Dubliners
e. *A different boy read two books

(27) Simple indefinites and bare plurals can lead to an inverse distributive reading (Reinhart 1995, Hirschbuehler 1982):
a. An American flag was hanging in front of two buildings (reconstruction in their thematic VP position)
b. blossoms sprang out of two rosebushes.

c. Five guards stood in front of two buildings (changing QPs blocks distributive reading)
d. Three blossoms sprang out of two rosebushes

5. Boundaries

(28) Right Roof Constraint (RRC): an element cannot be QR-ed out of the clause in which it originates (Ross 1967)
(10) *Someone* expected [CP that *every Republican* would win]. (∃>∀; *∀>∃)

(29) Apparent counterexamples come from quantificational subjects of ECM structures (a), raisings contexts (b) and restructuring (c) sentences (cfr. Cecchetto 2004):

a. [ECM] Some student expected every professor to leave (?∀∃) (not the preferred reading though)
a'. [no ECM] Some student expected every professor would leave (*∀∃)

b. [raising] Someone seems to attend every class (✓∀∃)
b. [no raising] Someone persuaded John to attend every class (*∀∃)

c. [restruct.] Uno studente ha cominciato ad apprezzare ogni professore (✓∀∃)
A student has begun to appreciate every professor
c'. [no restruct.] Un poliziotto ha ammesso di sorvegliare ogni uscita (*∀∃)
A policeman has admitted to controll(ing) every exit

6.1 Analysis 1: free adjunction (May 1977, 1985)

(30) Uniformity of Quantifier Scope assignment (Scope Uniformity)
Quantifier Raising (QR) applies uniformly to all QPs. Neither QR nor any particular QP is landing-site selective; in principle, any QP can be adjoined to any (non-argument) XP.

(31) Problems:
a. QPs behaves differently depending on their type
b. Stipulative nature of the other features (covertness, non-cyclicity)

6.2 Analysis 2: reconstruction effects (Hornstein 1995)

(32) No QR: QR effects are due to reconstruction (A-movement + copy theory of traces)

(33) A technician inspected every plane
a. [$_{AGRsP}$ A technician AGRs° [$_{TP}$ T° [$_{AGRoP}$ every plane AGRo° [$_{VP}$ a technician V° every plane]]]]
b. [$_{AGRsP}$ A technician AGRs° [$_{TP}$ T° [$_{AGRoP}$ every plane AGRo° [$_{VP}$ ~~a technician~~ V° ~~every plane~~]]]] (∃ > ∀)
c. [$_{AGRsP}$ ~~A technician~~ AGRs° [$_{TP}$ T° [$_{AGRoP}$ every plane AGRo° [$_{VP}$ a technician V° ~~every plane~~]]]] (∀ > ∃)

(34) Problems:
a. AGRo does not have any clear status in the current (minimalist) framework
b. ACD problems (Kennedy 1997):
i. Beck [VP1 read a report on every suspect Kollberg did [VP2 ~~read a report on every suspect Kollberg did VP1~~]]
ii. Beck read a report on every suspect Kollberg read a report on.
ii'. [IP every suspect Kollberg did [VP1 ~~read a report on *t*~~] [IP Beck [VP1 read a report on *t*]

6.3 Analysis 3: Checking theory of scope assignment (Beghelli e Stowell 1990, 97)

(35) "Evident" morphological encoding of the relevant Q-feature in QP/DP (*e*-morphology: logico-semantic features) that requires checking by spec-head agreement with an operator in the dedicated head;
es. [$_{+DIST}$ Every ...] →$_{LF}$ [$_{DistP}$ [$_{+DIST}$ Every ...] ∀-op.] (+DIST = ∀)
[$_{+GROUP\ REF}$ Some ...] →$_{LF}$ [$_{ShareP}$ [$_{+GROUP\ REF}$ Some ...] ∃-op.] (+GROUP REF = ∃)
[$_{+GROUP\ REF\ +logical\ subj.}$ Some ...] →$_{LF}$ [$_{RefP}$ [$_{+GROUP\ REF\ +logical\ subj.}$ Some ...] ∃-op.]

(36) Scope is simply the by-product of agreement processes (Beghelli e Stowell 1997:78) → scopal ambiguity is much more restricted than what's considered in literature

(37) empirically interesting because it explains many data that are not scopally ambiguous

(38) Predictions:
a. A WhQP should always take wide scope with respect to any other QP in their clause other than GQPs when these are as signed scope in Spec of RefP
b. A GQP should be scopally ambiguous with respect to a clause mate DQP depending on whether the GQP moves to Spec of RefP or to Spec of ShareP
c. A GQP object should be scopally higher than clausal negation owing to the fact that it takes scope in Spec of ShareP or Spec of RefP (exception: when an indefinite or bare numeral GQP remains in its Case position Spec of AgrO-P and receives a counting interpretation) (19.a-b)
A GQP subject should always take wide scope w.r.t clausal negation and/or a clausemate NQP (19.c-d) (indefinites must be restricted variables (19.e-f) unselectively bound by a variety of external Q (19.e-f))
d. A CQP in object position should never be able to take inverse scope over a GQP or DQP occurring in subject position (22.a-b).

(18) b. [$_{RefP}$ [Two students]$_1$ [$_{AgrP}$ t_1 read$_2$ [$_{DistP}$ [every/each book]$_3$ [$_{ShareP}$ t_1 ... [$_{AgrO\text{-}P}$ t_3 [t_1 [$_{VP}$ t_2 t_3]]] ...]]] (∃>∀)
b'. [$_{AgrP}$ [~~Two students~~]$_1$ read$_2$ [$_{DistP}$ [every/each book]$_3$ [$_{ShareP}$ <two students>$_1$ ... [$_{AgrO\text{-}P}$ t_3 [t_1 [$_{VP}$ t_2 t_3]]] ...]] (∀>∃)
(notice that *ShareP* is not a θ-positon!)

(39) Strong Distributivity
a. DQPs headed by each/every are Strong Distributors
b. Strong Distributivity is obligatory
c. Strong Distributivity can arise under an inverse scope construal e.g. where the distributee is in Spec of AgrS-P and the distributor is in Spec of AgrO-P.

(40) Pseudo Distributivity (Weak Distributivity)
a. Plural definite and indefinite GQPs including QPs headed by all are Pseudo-distributors
b. Pseudo-distributivity is optional
c. Pseudo-distributivity cannot arise under an inverse scope construal e.g. where the distributee is in Spec of AgrSP and the distributor is in Spec of AgrOP

(41) Problems:
why QR is covert and not cyclic?

6.4 Analysis 4: Cyclic QR (Cecchetto 2004)

(42) Scope economy: QR is cyclic but only if at any step it makes a semantic difference

(43) Object control
a. Un professore ha convinto almeno uno studente a frequentare ogni corso
b. Un professore ha convinto Gianni a frequentare ogni corso

(44) Subject control
a. Gianni ha promesso ad almeno un professore di frequentare ogni corso
b. Uno studente ha promesso ad almeno un professore di frequentare ogni corso
c. Uno studente ha detto ad almeno un professore di frequentare ogni corso
(see Cecchetto 2004 for a discussion, and Sauerland 2004 for an alternative analysis in terms of relativized minimality effects).

(45) Problems:
feature driven inconsistency: syntactic and semantic phases are not parallel (from a semantic point of view syntactic phases have to be "open" to calculate the nuclear scope of the QP) then how a semantic evaluation can precede the syntactic phase closure?

6.5 Analysis 5: a top-down perspective (Chesi 2004, Bianchi & Chesi 2006, Bianchi 2007)

(46) In a nutshell:
a. remove the QP since not LF-interpretable
b. re-merge it in a position when it can take an adequate argument/nuclear scope

(47) Linearization axiom:
a. <A, B> if A (is a lexical head and) selects B as an argument
b. <B, A> is B is a functional specification of A.

(48) Nested phases (Chesi 2004, Bianchi & Chesi 2006)
i. unselected phases (true adjuncts, preverbal arguments, relatives) are islands for "extraction", that is, unselected constituents cannot be discharged within an unselected phase.
ii. phases are DPs and CPs; the head of the DP phase is N, the head of the VP phase is V
iii. linear order is determined by a linearization principle: functional elements are on the left of the phase head, selected complements are on the right.
iv. "heavy" licensors project on the right (nested phases).

(49) QR is always on the right (Bianchi & Chesi, in progress):
i. storage of a QP in a dedicated memory buffer of the current phase (Schlenker 2005);
ii. integration of a coindexed variable in the corresponding argument position;
iii. when the top-down computation of the current phase is concluded, the QP function is retrieved from the Q-buffer and takes scope over the structure (elements retrieved from memory buffers are (typically) not spelled out)

(50) Phase projection (Top-down expectation):
i. the phase-head projects the minimal set of dominance relations so as to satisfy its selectional requirements
ii. selectional requirements have to be satisfied within the superordinate phase

(51) Overt movement: the system first computes the displaced occurrence in a functionally licensed (criterial) position, stores the element in a M(ove)-memory buffer, and then looks for a selected position where the element can be re-merged.

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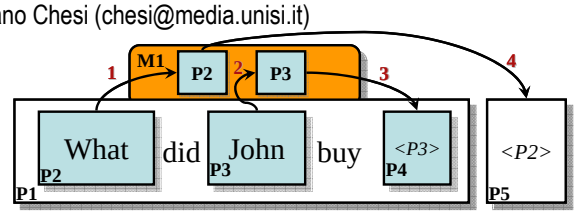
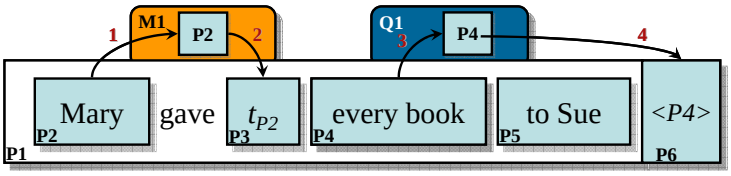
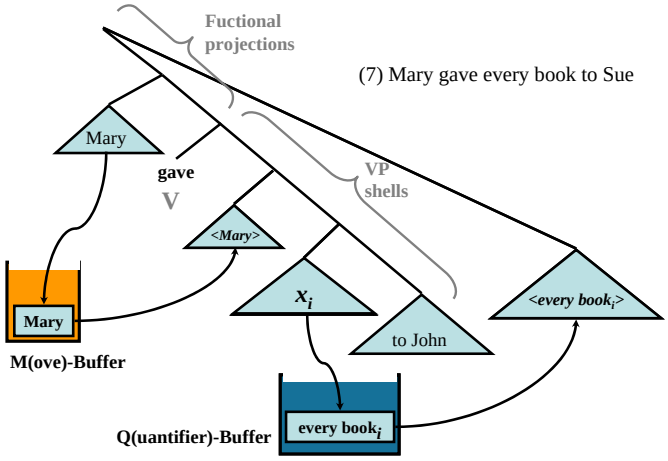


(52) Quantifier Raising: the system computes the QP in an argument position which is PF-interpretable but not LF-interpretable, stores the QP in a Q(uantifier)-memory buffer, and re-merges it at the point where it can be properly interpreted (i.e., at the end of the phase).



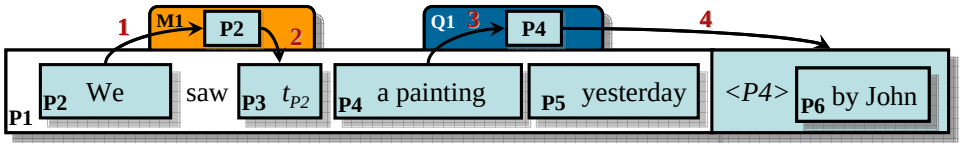
(53) An implementation of QR:
a.Compute a QP and spell it out in the selected (or functionally licensed) position within phase *n*.
b. Insert the QP in the Q-buffer of phase *n* with index *i* (QPi)
c. Insert a variable with index *i* in the selected position.
d. At the end of the computation of phase *n*, retrieve QPi from the Q-buffer of *n* and attach it to the structure built in phase *n*.
e. Success Condition: at the end of any phase *n*, the Q-buffer of *n* must be empty.

(54)



(55) Advantages:
a. The re-merge position is (as usually) covert
b. The re-merge position of QR follows the computation of the selected position: "rightward" movement.
c. The clause-boundedness of QR is a "right roof" effect, corresponding to a final phase boundary.

(56) Covertness
a. The position computed first is "PF-interpretable" (criterial or argumental position) and the QP phase is spelled out there, before storage in the Q-buffer
b. Remerge positions are generally unpronounced (Chesi 2004)
c. It is possible to implement Late Merge à la Fox & Nissenbaum (1999)



(57) Rightward orientation:
a. The first position of the QP dependency is selected or functionally licensed.
b. "Rightward" movement: the re-merge position of QR follows the computation of the selected position.
c. The remerge position implements inverse selection: the structure previously computed in the current phase is the argument of the QP function.

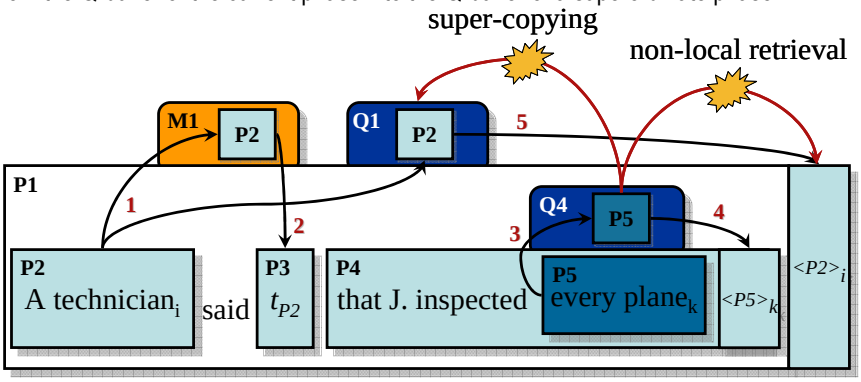
(58) Clause-boundedness:

a. The clause-boundedness of QR is a right roof effect.

b. The QP is stored in the Q-buffer of the current phase *n*:

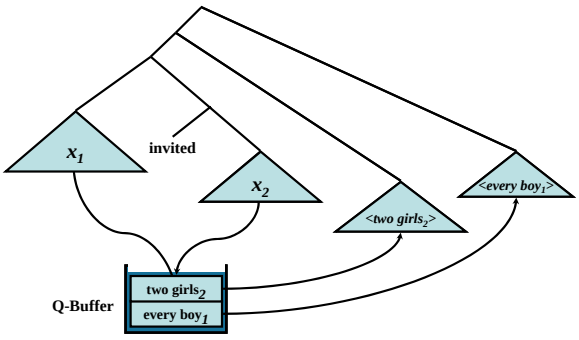
i. It takes scope over all the phases nested in *n*, by rightward attachment;

ii. It cannot take scope over any superordinate phase, because this would require either non-local retrieval, or super- copying from the Q-buffer of the current phase into the Q-buffer of a superordinate phase.



(59) Scope ambiguities → Surface Scope Preference

a.



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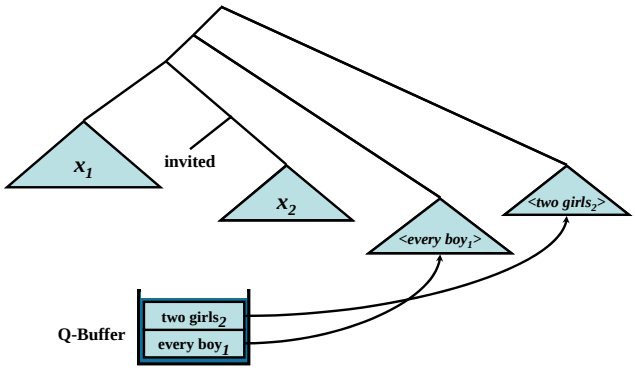

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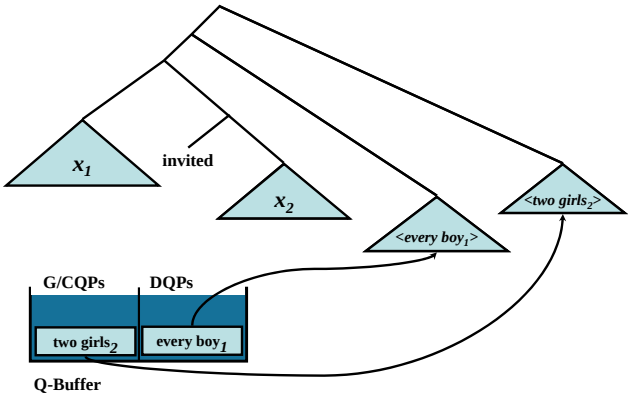


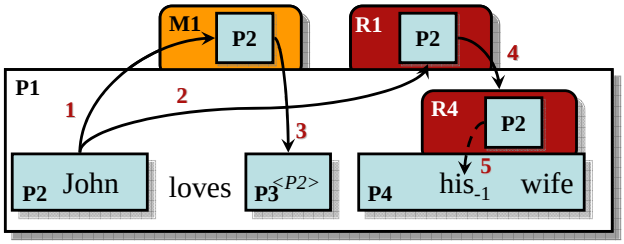
(60) Pronominal Binding → Leftness Condition (Chomsky 1976, Higginbotham 1980, Bianchi 2001):
A variable cannot be the antecedent of a pronoun on its left

Implementation of A-binding (Bianchi 2007a, based on Schlenker 2005):

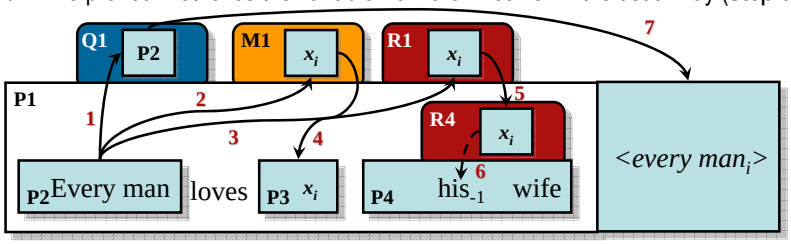
a. When an R-expression is processed, its referent is stored (step 2) in a phase-local R(eferential)-buffer (≠ M-buffer & Q-buffer: no discharge/remerge);

b. Nested and selected phases inherit the R-buffer of the containing phase (step 4)

c. The bound pronoun retrieves the referent (via a negative index) from within the R-buffer (step 5, and moves it to the last position of the R-buffer, where it is used to evaluate the truth conditions)



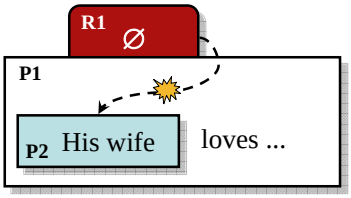
(61) When the pronoun is bound by a QP:
a. After QR (step 1), the bound variable is stored in the local R-buffer (step 3);
b. The pronoun retrieves the variable from the R-buffer in the usual way (step 6)



(62) This mechanism immediately derives the Leftness Condition:

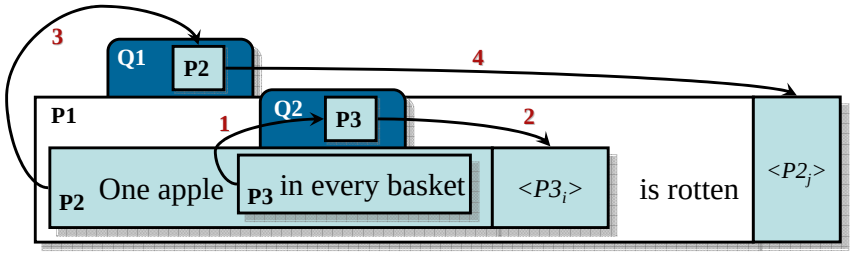
His wife loves *every man*.

a. The pronoun can retrieve the Q-bound variable from the R-buffer only after the QP has been processed and the variable has been inserted by the QR operation.
b. Therefore, the processing of the QP must precede the processing of the bound pronoun. (Cf. Schlenker 2005, Shan & Barker 2006).



(63) Inverse linking:
[cQP *One apple* in [iQP *every basket*]] is rotten

How to obtain wide scope of the i(nternal)QP over the c(ontaining)QP?
a. Extraction of iQP from cQP (cf. Sauerland 2005)
b. Adjunction of iQP to cQP (cf. Büring 2004)



(64) A pronoun in the matrix phase apparently bound by the iQP must be an E-type pronoun, à la Büring (2004):
[cQP *Somebody* from [iQP *every city*]k]i hates itsk climate
Somebody from *every city* hates [the city they are from]'s climate

Problem: how to obtain internal scope of the iQP? (Cf. Heim & Kratzer 1998, 221 ff.) This may follow if the PP can be an independent phase with its own Q-buffer (i.e., akin to a reduced relative).

(65) VP-scope (our top-down system doesn't have a *vP* phase with a Q-buffer lying in the scope of negation (cp. Fox's *vP* scope). The matrix phase Q-buffer will have scope over negation):

Al ***didn't*** attend ***more than two meetings*** (Heim & Kratzer 1998:218) $(\neg > QP) \neq (QP > \neg)$:

a. $(\neg > QP)$ the maximum number of meetings that Al attended is two
b. $(QP > \neg)$ There are more that two meetings such that Al did not attend them

Assume that negation too is stored in the Q-buffer, so that it can take either relative scope w.r.t. the QP. This assumption is also required to account for Quantifier Lowering of a subject QP into the scope of negation (cp. Fox's lowering to the *vP*-trace position):
Every arrow didn't hit the target

(66) a. ***A boy*** admires ***every teacher***. $(\forall>\exists)$, $(\exists>\forall)$
b. ***A boy*** admires ***every teacher***. Mary does, too. $(*\ \forall>\exists)$, $(\exists>\forall)$

- In order to have scope reversal in the first conjunct of (b), the QPs in the Q-buffer must be rearranged
- No rearrangement of the Q-buffer is required in the second conjunct, because the subject is non-quantificational
- therefore, the two conjuncts are not semantically parallel.

Does the linear position of the scopally uninformative conjunct matter? Probably not:
c. Yesterday, ***a guard*** stood in front of ***this church***, and ***a policeman*** did, in front of ***every mosque***. $(\#\exists>\forall),(*\forall>\exists)$

Conclusions: advantages of a top-down derivation

- Covertness and rightward orientation of QR
- Rightward attachment as inverse selection
- Right roof constraint (i.e., limitation to the immediately containing phase)
- Preference for surface scope (last in, first out retrieval strategy)
- Leftness Condition on Q-binding of pronouns
- Inverse linking
- *vP* scope (lower than negation) without *vP* phases

What remains of the initial assimilation of QR to overt instances of Move?
- Storage mechanism, with phase-local stores (but Q-buffer instead of M-buffer)
- Emptiness condition (the stored elements must be "discharged" from the store by the end of the phase computation)

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