RIGHTWARD “MOVEMENTS” FROM A TOP-DOWN PERSPECTIVE:
EXTRAPOSITION AND HEAVY NP-SHIFT

1. Some cases of “rightward movement”

(1) “Rightward-moved” objects: constituents (extraposed elements) which are on the right of the host they modify, and which are separated from it by an intervening (overt) element

(2) a. [That John is a fool] is obvious
   b. It is obvious that John is a fool  (Extraposition, Rosenbaum 1967)

(3) a. [A book which was written by Chomsky] appeared
   b. [A book __] appeared which was written by Chomsky  (Relative extraposition)

   b. [A review __] appeared of Chomsky’s book  (PP extraposition)

(5) a. I [gave everything I had] to John
   b. I [gave __] to John everything I had  (Heavy NP-shift)

2. What

(6) Which PPs can be extraposed:

   Vs.  moved:       (Fox & Nissenbaum 1999)

   a. We saw [a painting __] yesterday of John  (arguments)
   d. How [fond of Sally] are you?
   d’. How [fond __] are you of Sally?  (PP complements of adjectives, Baltin 2006)

   b. We saw [a painting __] yesterday from the museum  (adjuncts)
   e. How [certain that the Mets will win] are you?
   e’. How [certain __] are you that the Mets will win?  (clausal complements of adjectives)

   c. We saw [a painting __] yesterday by John
   f. [Talk to Sally about Martha] though I may, it won’t matter.
   f’. [Talk to Sally __] though I may about Martha, it won’t matter.  (PP complements of verbs)

   g. [Believe that Fred is crazy] though I may, it doesn’t matter.
   g’. [Believe __] though I may that Fred is crazy, it doesn’t matter.  (clausal complements of adjectives)

(7) Which RCs can be extraposed:

   a. [Some men __] appeared at the door that Mary had been insulting.  (De Vries 2006)
   *Appositive relatives, unlike restrictive relatives, do not undergo what is generally thought of as “Extraposition from NP” (Emonds 1979:234, Vergnaud 1974:181)

   b. *These men appeared at the door, who Mary had been insulting.
   b’. These men, who Mary had been insulting, appeared at the door.
   (appositive)

   c. I have seen [Ann __] yesterday, who is our director.
   (appositive, Citko 2006)

   d. I met [John __] yesterday, who I like a lot.

   e. Marie est là, qui pleure comme une Madeleine.
   Marie is there, who cries like a fountain
   ‘Marie is there, and she is crying her heart out.’
   (French, appositive, pseudo-relatives

   f. Ik heb [Joop __] gezien, die twee zusters heeft.
   I have Joop seen who two sisters has
   ‘I saw Joop, who has two sisters.’
   (Dutch, appositive, De Vries 2006)
g. Gisteren heb ik [mijn zuster _ ] bezocht, die blond haar heeft (zoals je weet).
yesterday have I my sister visited who blond hair has (as you know)
‘Yesterday I visited my sister, who has blond hair (as you know),’
h. [Ritzen _ ] kwam op bezoek, van wie laatst een schaamteloos boek over ministerschap is verschenen.
Ritzen came on visit by whom lately a shameless book on ministership has appeared
‘Ritzen came to visit, by whom a shameless book on ministership was published recently.’

(7) Which structure for RCs?
a. [[the book [book i that John read ti]]] (matching structure)
b. [D the [CP booki [that John read ti]]] (raising structure, Kayne 1994, Bianchi 2000)

(8) What can be shifted:
a. I gave [the books which my uncle left to me as part of his inheritance] to Bill
b. I gave _ to Bill [the books which my uncle left to me as part of his inheritance] (arguments, complex NP-shift)
c. I talk _ all the time [to my uncle who left me an enormous inheritance] (prep. objects)

(9) There are 119 possible variation of the following example... (Pinker 1994:131):
a. In my laboratory we use it as an easily studied instance of mental grammar, allowing us to document
   in great detail
   the psychology of linguistic rules
   from infancy to old age
   in both normal and neurologically impaired people,
   in much the same way that biologists focus on the fruit fly Drosophila to study the machinery of the genes.
b. In my laboratory we use it as an easily studied instance of mental grammar, allowing us to document
   the psychology of linguistic rules
   in great detail
   in both normal and neurologically impaired people,
   from infancy to old age
   in much the same way that biologists focus on the fruit fly Drosophila to study the machinery of the genes.

3. (From) where

(10) Structural position of the host:
a. See (3) (subjects)
b. I called [somebody _] yesterday who I couldn’t stand (objects)
c. I talked [to somebody _] about that who was quite knowledgeable (prepositional objects)
d. I saw it [in a magazine _] yesterday which was lying on the table (adjuncts)
d'. *[In which magazine _] did you see it in t which was lying on the table? (*fronted PP)
d''. ?*[Which magazine _] did you see it in t which was lying on the table? (*NP fronting with preposition stranding)
e. [Who _] did you visit who was unhappy about the visit? (moved wh-phrases, Culicover & Rochemont 1990)
f. *A review of [a book _] appeared by three authors (*embedded DPs, English)
g. Ik heb [de papieren [van de man _]] gecontroleerd die een rode koffer droeg (embedded DPs, Dutch, De Vries 1999)
   I have [the papers [of the man _]] checked who a red suitcase carried

(11) Symmetries between extraposition and movements in double objects constructions (Culicover & Rochemont 1997:15):
a. Bill [gave [John _] yesterday the book that he was looking for
b. What did Bill [gave [John _] t] yesterday
c. *Bill [gave _] the book yesterday anyone who wanted it
   c. *Who did Bill [give _] the book yesterday

(12) Split antecedence (Perlmutter & Ross 1970):
a. A man entered the room and a woman left who were similar.
b. *A man visited a woman (yesterday) who were similar. (only across conjuncts...)
c. A man entered the room and l saw a woman who were similar (... in the same structural position)

(13) A'-chain heads are related to the extraposed element:
a. *Hei [ invited [ several girls _] to the party] that John, dated in high school. (Culicover & Rochemont 1997)
b. [How many girls _] did [he invite _] to the party that John, dated in high school?
(14) Scope diagnostics: **principle C effects**: an extraposed element is not c-commanded by its host (Culicover and Rochemont 1997; the pronominal object C-commands the second object, Larson 1988):

- a. I sent her [many gifts _ ] last year that Mary didn’t like.
- b. *I sent her [many gifts that Mary didn’t like ] last year.


- a. ??/*[Which book about John’s library] did he read _ ?
- a’. [Which book from John’s library] did he read _ ?

(16) Scope diagnostics: ‘Free choice’ any is licensed in the scope of the verb look for. (Fox & Nissenbaum 1999)

- a. I looked very intensely for [anything that would help me with my thesis].
- b. *I looked for [anything _ ] very intensely that will/would help me with my thesis.
- c. I looked for [something _ ] very intensely that will (likely) help me with my thesis. (wide scope forced)
- d. I would buy [anything _ ] without making a fuss that will/would help me with my thesis. (under the scope of would)

(17) Constituents extraposed from **subjects** attach to IP, while constituents extraposed from **objects** attach to VP:

An extraposed phrase is adjoined to the first maximal projection that dominates the phrase in which it originates (Baltin 1981, 2006)

- a. Although [IP not [many people _ ] would [VP ride with Fred] who knew just him ], some [IP would [VP _ ] who knew his brother ].
- c. *Although he didn’t [VP call [people _ ] up who are from Boston ], he [VP _ ] who are from New York .
- d. *Although he didn’t [VP call [people _ ] up from Boston ], he [VP _ ] from New York .

(18) **Williams’ generalization** (Williams 1974):

When an adjunct β is extraposed from a “source NP” α, the scope of α is at least as high as the attachment site of β (the extraposition site)

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4. Optionality and heaviness

(19) Extraposition is **optional**:

- a. I saw it [in a magazine which was lying on the table] yesterday
- a’. I saw it [in a magazine _ ] yesterday which was lying on the table
- b. We saw [a painting of John] yesterday
- b’. We saw [a painting _ ] yesterday of John

(20) Heavy NP-shift is **optional** but sometimes **impossible** (a) sometimes **highly recommended** (b):

- a. I gave the books to Bill
- a’. *I gave to Bill the books (**“light” NP-shift**)
- b. *I gave [the books that John bought yesterday at the second-hand market after he came back from school] to Mary
- b. I gave to Mary [the books that John bought yesterday at the second-hand market after he came back from school]
In Dutch, **complement clauses** (a) and **finite clausal complements** (b) undergo extraposition obligatorily (De Vries 1999):

a. *Kees heeft [ de prijs aan te nemen geweigerd ]
   Kees has the prize prt to accept refused

b. *Kees heeft [ dat hij de prijs zal weigeren besloten ]
   Kees has that he the prize will refuse decided

(22) **Right Roof Constraint (RRC):** an element cannot move rightward out of the clause in which it originates (Ross 1967)

a. *[John was believed [ to be certain _ ] by everybody ] that the Mets would lose.
   (Baltin 2006)

b. *A review of [ a book _ ] appeared by three authors
   (10.f)

b'. [A review [of a book] _ ] appeared by three authors
   (Akmajian 1975)

c. The fact that John [ gave to Bill the books which my uncle left to me ] is of no consequence
   (Ross 1967)

c'. *The fact that John [ gave to Bill _ ] is of no consequence the books which my uncle left to me

(23) **Subjacency condition** (Chomsky 1973):
   In the configuration X ... [α ... [β ... Y ... ] ... X' ... ] ... X', no element Y can be moved to position X or X', if α and β are both cyclic nodes.

a. as for (10.d-d') PP should be a “cyclic node”   (Baltin 1978)

b. but this sentence would be ruled out (Chomsky 1986):
   Who did you announce [cp ... [np plans [cp to visit ti]]]?

(24) **Barriers** (Chomsky 1986):
   Maximal projection non L-marked (i.e. L-marking means being a complement to a lexical category and being theta-marked by that lexical category)

(25) A “problem” with **directionality**: extraposition is possible rightward but **not (always) leftward**:

a. *That John read [ the book _ ] last week (neither topicalization nor focalization)

b. for PPs see paradigm in (6).

(26) **Generalized Subjacency** (Baltin 1981):
   In the configuration A ... [α ... [β ... B ... ] ... ] ... A',
   i. A' cannot be related to B where α and β are maximal projections of any major categories;
   ii. A cannot be related to B where α and β are drawn from the following list of phrasal categories; (a) PP; (b) NP; (c) S or S' or both, depending on the specific language.

a. Become [fond of Sally] though he may, it won't matter.

b. *Become [fond _ ] though he may of Sally, it won't matter. (crossing AP, VP)

(27) Why successive cyclic movement to escape “subjacency” doesn’t work (Akmajian 1975)?
Derivation by phase (Chomsky 2001):
extraposition is not a feature driven movement (feature checking, last-resort): afterthought.

Constraints on the “hosting” determiners: **Definite DP islandhood** (Fiengo and Higginbotham 1980, Diesing 1992)

- **a.** Who did Mary see [a (good) picture of t]?
- **b.** ?Who did Mary see [the (best) picture of t]?

Extraposition is subject to the **Definiteness Constraint** (Diesing 1992):

- **a.** The man showed up that hated Chomsky (Guéron and May 1984)
- **b.** *I read that book during the vacation that was written by Chomsky.
- **c.** Those students will pass this course who complete all of their assignments on time (Baltin 2006)

Adjunct/Argument asymmetry (Fox & Nissenbaum 1999):

- **a.** I saw the (best) picture yesterday from the museum.
- **a’.** *I saw the (best) picture yesterday of the museum.
- **a”.* I saw a (very good) picture yesterday of the museum.

b. I heard the same rumor yesterday that you were spreading.

b’. *I heard the same rumor yesterday that you were quitting.

b”. I heard a similar rumor yesterday that you were quitting.

Constraints on moved constituents

Extraposed constituents are **islands for extraction** (Lasnik & Saito 1992):

- **a.** [a man _] walked in who was from California
- **b.** *[what state] did [a man _] walk in [who was from ti ]
- **c.** *Who did you hear [the rumour [that Mary kissed ti ]]

Frozen Structure Constraint (Ross 1967:295): If a clause [or a prepositional phrase] has been extraposed from a noun phrase whose head noun is lexical, this noun phrase may not be moved, nor may any element of the clause be moved out of that clause.

Complex NP-Constraint (Ross 1967:70):
No element contained in a sentence dominated by a noun phrase with a lexical head noun may be moved out of the noun phrase by a transformation;

Ditransitive verbs: a shifted direct object prevents extraction of the indirect object via wh-movement

Condition on Extraction Domains (Huang 1982): extraction is only possible out of phrases which are ‘properly governed’, where a node A is taken to properly govern a node B iff

- A c-commands B and no major category boundary intervenes between A and B,
- B is contained within a maximal projection of A, and
- B is assigned its thematic role by A.
7.1 Analysis 1: rightward movement

(38) Extraposition transformation (Rosenbaum 1967:11):

\[
\begin{array}{c}
X \quad N \quad S \quad Y \\
\text{+ PRO} \quad \text{NOT} \quad + D \quad + E \\
1 \quad 2 \quad 3 \quad 4 \quad \rightarrow \quad 1, 2, \emptyset, 4+3
\end{array}
\]

(39) Two other fundamental rules:
PS Rule 1: VP \rightarrow V (NP) (PP) (S/PP)
PS Rule 2: NP \rightarrow DET N (S)

(40) Underlying structure of (2): [NP [DET ] [N it] [S that John is a fool] ] [VP is obvious]
(2.a) "That John is a fool is obvious" is derived by Pronoun Deletion transformation (Rosenbaum 1967:22 fn.4)
(2.b) "It is obvious that John is a fool" is derived by Extraposition transformation (38).

(41) Extraposition from NP (Ross 1967:4):

\[
\begin{array}{c}
X \quad [NP - ] S \quad Y \\
1 \quad 2 \quad 3 \quad \rightarrow \quad 1, \emptyset, 3+2
\end{array}
\]

(42) Underlying structure of (3) is (3.a): [A book which was written by Chomsky] appeared
(3.b) [A book _] appeared which was written by Chomsky" is derived by Extraposition from NP (41)

(43) a. [s [VP [That a gun [s which I had cleaned] ] [VP went off] ] [VP surprised no one] ]
   b. [s [VP [That a gun _] ] [VP went off] ] [VP surprised no one] [s which I had cleaned]
   (by (41) it should be ✓, so we need something like (22))

(44) Problems:
   a. why movement is much more constrained on the right than on the left?
   b. what triggers extraposition?
   c. is there any way to account for the last-cyclic nature of the rule?
   d. how do account for split antecedence (ex. (12)).

7.2 Analysis 2: base generation (Culicover Rochemont 1990, 97)

(45) An extraposed constituent seems to be subject (at LF, after QR) to the Complement Principle (Guéron & May 1984):
   In a sequence of categories \( \alpha, \beta_1, \ldots, \beta_n \) in a structure \( \Sigma, \beta_1, \ldots, \beta_n \) are complements to \( \alpha \) only if \( \alpha \) governs \( \beta_i \) (by (41) it should be ✓, so we need something like (22))
   (\( \alpha \) governs \( \beta \) if \( \alpha \) and \( \beta \) are dominated by all the same maximal projections, and there are no maximal projection boundaries between \( \alpha \) and \( \beta \))

(46) Full Interpretation Vs. (Generalized) Subjacency violation

(47) No distinction between complements and adjuncts
   a. [A review _] appeared of Chomsky's book. (4.b)
   b. [A man _] showed up who was quite convincing.

(48) Problems:
   a. Generalized Subjacency = Complement Principle: without reanalysis (13.a), repeted below, would violate (45):
      I saw it [in a magazine _] yesterday which was lying on the table
   b. it obscures the productive distinction between arguments and adjuncts
c. does Complement Principle applies at LF (*definite articles Vs. quantifiers)? But what about *demonstratives*?
   i. *[The man _] showed up that hated Chomsky. (ex. (30))
   ii. *[Those students _] will pass this course who complete all of their assignments on time.

### 7.3 Analysis 3: modification based account (Kayne 1994)

(49) LCA maps linear precedence onto asymmetric C-command

(50) Under (49) rightward adjunction is not possible (if A asymmetric C-commands B, then terminals dominated by B could not precede terminals dominated by A: rightward adjunction could not be linearized)

(51) Stranding analysis:
   i. arguments are generated in the domain of their heads;
   ii. movement to non-c-commanding positions is impossible.

(52) Natural account for the *Definiteness Constraint* in (30): non-constituents cannot be moved
   a. \[ [[CP [[NP [D the] [CP [NP book] [C[C that]] [TP I \ ![v\!read][NP t]]]]]] \]
   b. \[ [[CP [[NP two/a/those book(s)]] [C[C that]] [TP I \ ![v\!read][NP t]]]] \]

(53) DPs allowing *post-nominal genitives allow extraposition*:
   a. *the book of John’s ...
   b. the books of John’s that we like
   c. \{ two / those / a \} book(s) of John’s ...

   (e.g. *the and those are equally definite)

   c’. [CP [o of][NP John’s [NP two pictures]]
   c’’. [CP [NP two pictures] [o of][NP John’s t]]

   a’. the head [D the] cannot take a DP as a complement

(54) Guéron and May (1984): extraposed constituents have to be quantified (in (52.a) the head of the relative is not quantified)... but this quantification-based account does not tease apart the from those.

(55) The *Right-Roof Constraint*, (22), is replaced by *theta-role requirements* and/or by (51.ii):
   *The fact that [somebody] walked into the room is irrelevant [ t who I knew]. (Kayne 1994:118)

(56) Reminiscent of Sportiche 1988 account for floating quantifiers (Kayne 1994:118 fn) they differ in terms of intermediate positions:
   a. The men were all injured in the accident
   b. *A man was who has no relatives injured in the accident

(57) “A relative clause can be stranded by A-movement only in a non-Case position” (Kayne 1994:121)
   i. *Someone just walked [t who we don’t know] into the room. (constraint on complex-specifiers? Kayne (35)-(55) ch.8)
   ii. John ushered [someone who we don’t know] into the room.

(58) Problems:
   a. extraposed constituents seem not to be c-commanded by their host:
      i. *I sent heri [many gifts that Mary didn’t like] last year.
      ii. I sent her [many gifts ] last year that Mary didn’t like.
   b. (51.i) is unable to account for this contrast (Baltin 2006):
      i. It was [ believed _ ] to be certain ] by everybody that Fred would win. (expletive A-movement)
      ii. *John was [ believed _ ] to be certain ] by everybody that the Mets would lose.
   c. problems with stranding elements in a non Case-marked position:
      *Someone; was given [t who liked Steinbeck] an interesting book
   d. (10.c) is unexplained:
      “I talked [to somebody _] about that who was quite knowledgeable” (IP NP) was not considered a constituent: 
7.4 Analysis 4: mixed account (Fox & Nissenbaum 1999)

(59) “Overt” movement Vs. “Covert” Movement
pronunciation of the head of the chain
Vs. pronunciation of the tail of the chain

(60) Covert operations can precede overt ones: evidence from extraposition → no movement, but QR, then merge of the adjunct

(61) (PP, clausal) complements → rightward movement

(62) adjuncts, RC → late merged after QR:

[CP John [VP [VP [VP [DP a book] up] [DP a book]] [CP which he really enjoyed]]

i. [CP John [VP [VP [VP [DP a book] up] [DP a book]] [CP which he really enjoyed]]]
ii. QR (as in Guéron & May extraposition of relatives is tied to QR!)
iii. Late merge of the relative clause:
[CP John [VP [VP [VP [DP a book] up] [DP a book]] [CP which he really enjoyed]]]
iv. PF deletion of the head of the QRred nominal chain:
[CP John [VP [VP [VP [DP a book] up] [DP [DP [DP a book]] [CP which he really enjoyed]]]]

(63) Extraposed RCs do not reconstruct (Wilder 1995):
   a. “We talked [about her claim _] yesterday that Mary will hire Peter.
   b. I gave him [an argument _] yesterday that supports John’s theory

(64) QR across the board to deal with (12a):
   i. [[a man entered the room] and [a woman left]]
   ii. QR from both conjuncts:
       [[a man] entered the room] and [[a woman] left] [DP[a man] and [a woman]]
   iii. merger of the relative clause to the conjoined DP:
       [[DP a man] entered the room] and [DP a woman] left][DP[DP a man] and [DP a woman][CP who were similar]]

(65) Problems:
   a. why QR is on the right?
   b. what about A’-head relatedness expressed in (13)? (QR to the right before Wh- movement to the left?)
   c. why only CP/PPs are late-merged?


(66) 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.

(67) 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).

(68) 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)
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

Selected (sequential) Vs. unselected phases (nested)

a. (“from the museum” is late-attached)
b. (“painting” phase is kept open since “yesterday” didn’t satisfy sel. req.)

Asymmetries in bleeding condition C ((30) and (31)) is captured adapting Bianchi 2007 account:
selected complements receive the evaluation sequence from the superordinate phase, adjuncts late-attached to QR-ed does not.

Asymmetries between IP and VP (and Wh-moved P) attachment are related to the hosting-phase surface position. Scope properties (14) (17) (18) should be captured combining this assumption with (72).

The Right Roof Constraint (22) (and Akmajian’s restriction) is captured by means of (69.ii).

Split antecedence (es. (12)) could be captured if we assume that identical phase projections do overlap (then expecting an unique argument, instead of projecting distinct ones)

Problems:

a. it doesn’t capture the Definiteness Constraint asymmetry between adjuncts and arguments reported in (31) (but F&N do not explain how an extrapolposed adjunct can be related to a non-QR-ed DP!!!).
b. no those/the difference.

Thing to do:

a. better specify the notion of heaviness.
b. try to relate extraposition productivity to OV, V2 parameters.
Selected references


Huck, Na 1990. *Extraposition and Focus*. Language


Williams, E. S. 1974. Rule Ordering in Syntax: MIT.