Preliminary tree to remind ourselves: They will bake a cake.

1. CP
   C'
   [–Q] TP
   T
   T' VP
   DP
   V' V
   D' V
   D cake

   • Verb bake needs to assign two θ-roles.
   • Finite T needs to assign NOM Case
   • Finite T needs its specifier to be filled (EPP)
   • DP they needs NOM Case
   • DP a cake needs ACC Case

Wh-movement

Wh-questions in English (who(m), what, where, why, when …) involve:
- Inversion ([+Q] C forces T to move to C).
- Movement of a wh-word to SpecCP.

(2) What will they bake?
   Object wh-question
   • Question (so C is [+Q]).
   • Wh-question (so C is [+WH]).
   • bake still has 2 θ-roles to assign.
   • what is a DP, distinguished by [+wh] (is a wh-word).
   • DPs need case, arguments need θ-roles.

(4)

Since T does not move to [+Q] C in embedded questions, why not:

(9) a. * I know [CP what that you will do next summer].
   b. * I wonder [CP what that they baked].

Doubly-filled COMP filter:

* [CP wh-phrase that I if I whether … ]

Wh-movement. Where C is [+WH], a [+WH] phrase must move to SpecCP.

(10) CP
    C'
    [–Q] TP
    T
    T' VP
    V'
    V
    DP
    be
    baked
    D' V
    D what
    [–WH]
Wh-movement applies to wh-phrases which already have Case.

- We can’t move a DP for Case after it’s already got Case.
- We can move a [+wh] DP in wh-movement after it’s got Case.
- In fact, we have to—DPs need Case.

Terminology:

- Movement for Case/EPP is A-movement (“Argument” movement—things which got θ-roles)
- Movement not for Case is A′′′-movement (A-bar movement) (e.g., for [+WH] feature of C).

You cannot move a wh-word out of a CP contained within a DP.

The DP is a “complex noun phrase” island...

If a wh-word is in an island at DS, it cannot be moved off the island to an external SpecCP.

“Wh-movement must not cross more than one bounding node (but it may cross one)

Subjacency condition:

Wh-movement may not cross more than one bounding node (but it may cross one)

Bounding nodes: DP, TP.

That’s the answer, let’s see how it works...

They heard the claim that Bill baked a cake.

Note: This differs from the book a little bit. The structure shown here is right.

Now, let’s try *What did they hear the claim that Bill baked?
How about *What do you think that Mary baked?* then—?

(33) What do [TP you think that [TP Mary baked *t* ]]?

Why isn’t this out?

**Successive-cyclic wh-movement:**
When moving a wh-word out of a CP, it will move first to SpecCP and then out of the CP, in order to satisfy Subjacency.


(34) What all did you get *t* for Christmas?
(35) What did you get all for Christmas? (West Ulster)

(36) All the students have left.
(37) The students have all left.

(38) I don’t remember [CP what I said all ].

(39) What all did he say (that) he wanted ?
(40) What did he say (that) he wanted all ?
(41) What did he say all (that) he wanted ?
Subject wh-questions: Who moved my cheese?  Who will eat this sandwich?

- Because the subject is the wh-word, no inversion is detectible.
- Nor is there any do support (*Who did move my cheese?)

Nevertheless, in the interest of simplicity and theory-internal consistency, we assume nothing is really different...

(48) CP
  C'  [±Q] TP
  [±wh] T

[+Q] C

[T [PAST] -ed

Wait!—what is going on with affix hopping and do-support here?

Movement before SS is always upwards, to a c-commanding pos’n. “Movement” on the PF branch doesn’t really act like movement.
Argument *wh*-questions vs. adjunct *wh*-questions...

Argument *wh*-questions are subject *wh*-questions, object *wh*-questions.

Who bought the book? What did Bill buy? What was eaten?

Adjunct *wh*-questions are those which question constituents which in a declarative would be adjuncts.

Who bought the book? What did Bill buy? What was eaten?

Adjunct *wh*-questions are more delicate than argument *wh*-questions.

(51) I fixed the car with a wrench.

(52) CP
   
   C
   
   TP
   
   [–Q]
   
   DP_i T
   
   [PAST]
   
   VP
   
   V'
   
   PP
   
   V
   
   fix the car
   
   P
   
   DP
   
   CP
   
   C'
   
   [ C+T_j]
   
   TP
   
   DP_i T
   
   [–Q]
   
   I
   
   T'
   
   VP
   
   V'
   
   PP
   
   V
   
   fix the car
   
   P
   
   DP
   
   (53) How_i did you fix the car t_i?

Nailing down the precise formulation of this restriction is very complicated... (see Chomsky 1986, Rizzi 1990)

Here is a close approximation:

**Empty Category Principle (ECP)**

Lexical: N, V, A, P

Functional: C, T, D

**Proper Government**

α properly governs β iff

(i) α governs β and α is a lexical head
    or

(ii) α antecedent-governs β.

Idea:

(i) accounts for *What_i did you say knew how Bill fixed t_i?*
    or

(ii) allows for *How_i did you fix the car t_i?*

"antecedent governs" means How and its trace are close.

**Antecedent Government (first attempt)**

α, a moved category, antecedent-governs β iff

i) α binds β (c-commands & co-indexed)

ii) no more than one bounding node dominates β but not α.

‘...if moving from β to α would not violate Subjacency’

(54) CP
   
   PP_k
   
   C'
   
   [ C+T_j]
   
   TP
   
   DP_i T
   
   [–Q]
   
   I
   
   T'
   
   VP
   
   V'
   
   PP
   
   V
   
   fix the car
   
   P
   
   DP

(55) ?Whose car_i were you wondering how to fix t_i?
    (Ed’s car...I was wondering how to fix Ed’s car.)

(56) *How_i were you wondering whose car to fix t_i?
    (With a wrench... I was wondering whose car to fix with a wrench.)

What makes these different?

It appears that adjuncts are hyper-sensitive to Subjacency violations, but it possible to move an adjunct *wh*-word as long as it doesn’t go too far.

Interestingly, subjects generally act like adjuncts—

(57) *How_i were [TP you wondering [CP whose car [TP to fix t_i]]]?
    (With... I was wondering whose car to fix with a wrench.)

(58) How_i did [TP you fix the car t_i]?

(59) How_i did [TP Bill say [CP t_i] that [TP you fixed the car t_i]]?

It appears that adjuncts are hyper-sensitive to Subjacency violations, but it possible to move an adjunct *wh*-word as long as it doesn’t go too far.

It kind of looks like “traces which get accusative Case” are safe.

(60) *How_i did you know [CP which car t_i fixed (with a hammer)]?

(61) ?[Which car_i do you know [CP how Bill fixed t_i]?

(62) *How_i do you know [CP which car Bill fixed t_i]?

(63) *Who_i do you know [CP which car t_i fixed (with a hammer)]?

(64) *Who_i do you know [CP how t_i fixed (the Pacer)]?

Usually...

(65) [Which chair_i do you find [ t_i will roll most smoothly]?

(66) [Which taxi service_i do you consider [ t_i most reliable]?

It kind of looks like “traces which get accusative Case” are safe.

Nailing down the precise formulation of this restriction is very complicated... (see Chomsky 1986, Rizzi 1990)

Here is a close approximation:

**Empty Category Principle (ECP)**

Lexical: N, V, A, P

Functional: C, T, D

**Proper Government**

α properly governs β iff

(i) α governs β and α is a lexical head
    or

(ii) α antecedent-governs β.

Idea:

(i) accounts for *What_i did you say knew how Bill fixed t_i?*
    or

(ii) allows for *How_i did you fix the car t_i?*

"antecedent governs" means How and its trace are close.

**Antecedent Government (first attempt)**

α, a moved category, antecedent-governs β iff

i) α binds β (c-commands & co-indexed)

ii) no more than one bounding node dominates β but not α.

‘...if moving from β to α would not violate Subjacency’

(57) *How_i were [TP you wondering [CP whose car [TP to fix t_i]]]?

(58) How_i did [TP you fix the car t_i]?

(59) How_i did [TP Bill say [CP t_i] that [TP you fixed the car t_i]]?

(60) *How_i did you know [CP which car t_i fixed (with a hammer)]?

(61) ?[Which car_i do you know [CP how Bill fixed t_i]?

(62) *How_i do you know [CP which car Bill fixed t_i]?

(63) *Who_i do you know [CP which car t_i fixed (with a hammer)]?

(64) *Who_i do you know [CP how t_i fixed (the Pacer)]?

Usually...

(65) [Which chair_i do you find [ t_i will roll most smoothly]?

(66) [Which taxi service_i do you consider [ t_i most reliable]?

It kind of looks like “traces which get accusative Case” are safe.
(69) ? Which car do you know how to fix \( t \)?

(70) * Whq\( q \) do you know how \( t \) will fix the car?

(71) Which band did you consider \( t \) to be the best?

That-trace effect

(72) What did you say (that) Bill would fix \( t \)?

(73) * Who did you say (*that) \( t \) would fix the car?

This differentiates subjects and objects—it looks like a job for the ECP. When the trace must rely on antecedent government, that blocks it.

Empty Category Principle (ECP)

Traces must be properly governed

\[ \alpha \text{ properly governs } \beta \text{ iff } \]

(i) \( \alpha \) governs \( \beta \) and \( \alpha \) is a lexical head

or

(ii) \( \alpha \) antecedent-governs \( \beta \).

\[ \alpha \text{ antecedent-governs } \beta \text{ iff } \]

(i) \( \alpha \) binds \( \beta \)

(ii) no more than one bounding node dominates \( \beta \) but not \( \alpha \).

(iii) there is no filled C governing \( \beta \).

(74) * \( C' \)

\[ C \]

TP \( t_1 \) T

(75) Didn't you say that Bill would fix your car?

(76) * CP

\[ chi_i \]

\[ C' \]

\[ hai \]

\[ CP \]

\( t_1' \)

\[ C \]

TP

\( che \)

not gov’d by a lexical head

not antecedent gov’d by \( t_1' \):

* \( t_1' \) binds \( t_1 \)

• no bounding nodes intervene

but

• there is a filled C (che) governing \( t_1' \).

(77) Hanno telefonato molti studenti

have.3pl phoned many students

‘Many students have phoned.’

(78) Vinceremo noi will-win.1pl we

‘We will win.’

(79) TP

\[ pro \]

Vinceremo noi will-win.1pl we

‘We will win.’

(80) How did you say (that) he will fix your car \( t \)?

(81) ...

(82) Italian

Chi hai detto che ha scritto questo libro?

who have-you said that has written this book

‘Who did you say wrote this book?’

(83) [CP Chi_1 [tp pro hai detto [CP \( t_1' \) che [tp pro ha

[vp scritto question libro] \( t_1' \)]]]

(84) CP

\[ chi_i \]

\[ C' \]

\[ hai \]

\[ CP \]

\( t_1' \)

\[ C \]

TP

\( che \)

proj

\[ T \]

V

\( T' \)

\[ V' \]

\[ CP \]

\( t_j \)

\[ V' \]

\[ t_i \]

\( \text{scritto question libro} \)
(85) Mario E parla Florentine It.
Mario SCL speaks
‘Mario speaks.’

(86) E parla SCL speaks
‘He speaks’

(87) * Parla

(88) gl ha telefonato della ragazze SCL( M .SG ) has phoned some girls( F .PL )
‘Some girls telephoned.’

(89) Quante ragazze tu credi che gli abbia parlato?
how many girls do you think have spoken?

(90) * Quante ragazze tu credi che le abbiano parlato?
how many girls do you think have spoken?

The category of wh-words:

(91) \[ \text{DP} \langle \text{wh} \rangle \] \[ \text{DP} \langle \text{wh} \rangle \] \[ \text{DP} \langle \text{wh} \rangle \]
\[ D' \] \[ D' \] \[ D' \]
\[ \text{what} \] \[ \text{who} \] \[ \text{which} \]
\[ \text{NP} \]
\[ \text{N} \]
\[ \text{book} \]

(92) \[ \text{AdvP} \langle \text{wh} \rangle \] \[ \text{AdvP} \langle \text{wh} \rangle \] \[ \text{AdvP} \langle \text{wh} \rangle \] \[ \text{AdvP} \langle \text{wh} \rangle \]
\[ \text{Adv} \]
\[ \text{Adv} \] \[ \text{Adv} \] \[ \text{Adv} \]
\[ \text{how} \] \[ \text{why} \] \[ \text{when} \] \[ \text{where} \]

(93) \[ \text{DP} \langle \text{wh} \rangle \] \[ \text{PP} \langle \text{wh} \rangle \]
\[ \text{DP} \langle \text{wh} \rangle \]
\[ \text{D} \]
\[ \text{D} \]
\[ \text{NP} \]
\[ \text{P} \]
\[ \text{DP} \langle \text{wh} \rangle \]
\[ \text{D} \]
\[ \text{D} \]
\[ \text{NP} \]
\[ \text{P} \]
\[ \text{DP} \langle \text{wh} \rangle \]
\[ \text{D} \]
\[ \text{D} \]
\[ \text{NP} \]
\[ \text{P} \]
\[ \text{DP} \langle \text{wh} \rangle \]
\[ \text{D} \]
\[ \text{D} \]
\[ \text{NP} \]
\[ \text{P} \]
\[ \text{DP} \langle \text{wh} \rangle \]
\[ \text{D} \]
\[ \text{D} \]
\[ \text{NP} \]
\[ \text{P} \]
\[ \text{DP} \langle \text{wh} \rangle \]
\[ \text{D} \]
\[ \text{D} \]
\[ \text{NP} \]
\[ \text{P} \]
\[ \text{DP} \langle \text{wh} \rangle \]
\[ \text{D} \]
\[ \text{D} \]
\[ \text{NP} \]
\[ \text{P} \]
\[ \text{DP} \langle \text{wh} \rangle \]
\[ \text{D} \]
\[ \text{D} \]
\[ \text{NP} \]
\[ \text{P} \]
\[ \text{DP} \langle \text{wh} \rangle \]
\[ \text{D} \]
\[ \text{D} \]
\[ \text{NP} \]
\[ \text{P} \]
\[ \text{DP} \langle \text{wh} \rangle \]

(94) Bill heard [ DP the speech \[ \text{CP} \] \[ \text{TP Mary made } t_1 \]].

Restrictive relatives restrict the reference of the head noun. Semantically, we refer to something which is both:

• a speech

and

• (something) which Mary made.

Appositive relatives don’t restrict the reference, but provide additional information.

(95) a. Mary, who you met yesterday, just bought a house.

b. Mary, [ CP who [ CP you met } t_1 yesterday ] ]...

Free relatives involve -ever and don’t modify a head noun.

(96) a. I will buy [whatever] you sell } t_1 ].

b. Whoever just arrived unplugged my lamp.

Pied-piping: [For whom] i did you buy that bagel } t_1 ?

P-stranding: Who(m) i did you buy that bagel for } t_1 ?

So: • If relative clauses allow an Op, why can’t wh-questions?

• Why can you have that with Op but not with which?

* I heard the speech which } t_1 that Mary made.

Recoverability Condition
The content of a null category must be recoverable (from a co-indexed overt category in the sentence).

(97) a. Bill heard the speech [ which Mary made ].

b. Bill heard the speech [ that Mary made ].

c. Bill heard the speech [ Mary made ].

(98) Bill heard [ DP the speech \[ CP Op_1 (that) \[ TP Mary made } t_1 ]]].

Is it really wh-movement? What do we know about wh-movement?

(99) \[ \text{CP} \]
\[ \text{Op}_1 \]
\[ \text{C}' \]
\[ \text{CP} \]
\[ \text{Op}_1 \]
\[ \text{C}' \]
\[ \text{CP} \]
\[ \text{Which}_1 \]
\[ \text{C}' \]
\[ \text{C} \]

(100) a. When did Mary buy the book?

b. Where did Mary buy the book?

c. How did Mary buy the book?

(101) a. I know the way which John wonders [ wh-island why Bill went } t_1 ].

b. I know the way which John made [ CNP the claim that Bill went } t_1 ].

(102) * I know the way Op_1 (that) John wonders [ wh-island why Bill went } t_1 ].

(103) * I know the way Op_1 that John made [ CNP the claim that Bill went } t_1 ].

Recoverability Condition
The content of a null category must be recoverable (from a co-indexed overt category in the sentence).

(104) a. When did Mary buy the book?

b. Where did Mary buy the book?

c. How did Mary buy the book?

d. * Op_1 did Mary buy the book?
(105)  a.  *Op$_i$ did Mary buy $t_i$?
   b.  *Op$_i$ did Mary give a book $t_i$?

(106)  Bill heard the speech$_i$ [CP Op$_i$ that [TP Mary made $t_i$]].

**Doubly Filled Comp Filter**

*{CP wh-XP that / if / whether…}, if wh-XP is overt (non-null).

(107)  Sample relative clause:

* \[ \text{The student Bill will meet}. \]

```
D'                  
D                  
    NP
      N'         
        CP     
          N  
            Op$_i$ 
              C
                TP
                  [+Q]
                    DP$_j$ 
                      T'
                        T
                          V'
                            V
                                $t_i$

student
```

Bill

will

meet