This is a lightly edited version of the summary I used last Fall for the 2-3 classes on this topic I taught in my undergraduate intro class at MIT.

As such, it contains lots of material that we did not cover in the two hours we devoted to this topic, but I thought you might like to have the extra material available. The material that we did not cover is in blue.

I have tried to edit the summary so it does not have irrelevant remarks relevant only to last Fall’s version — forgive me if I missed any (“as we saw on Thursday...”)

Also the order of presentation is a bit different from what I did in the last LSA class — Dinka comes much later, for example — but the content is all there.

1. Wh-movement in wh-questions

A wh-question is a sentence that crucially contains somewhere in it a wh-word. The term wh-word needs a proper semantic definition, which this summary will not offer. Words that are informally identifiable as wh-words are found across the languages of the world — but the semantics of these elements is a complex and controversial topic.

Informally, when speakers ask a wh-question like What did Bill read? they presuppose that Bill read something, and a felicitous response to the question states the identity of the thing read. The element whose identity the speaker is trying to learn is given by the wh-word.

In English, we can recognize a wh-word by the fact that it helps trigger wh-movement (yes I know that’s circular) and, in general, by the presence of the wh-morpheme /hW/ (English). The term wh-phrase is generally used even when discussing languages in which the relevant morpheme has an entirely different shape (or even no constant form whatsoever).

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1 For many speakers, the initial /h/ drops, except when the syllable nucleus contains /u/ or its glide counterpart /w/, in which case — for all speakers — the /w/ drops. This accounts for the pronunciation of what, where, when, why, which vs. who and how (underlyingly /hWaw/, it should be spelled whoow!)

Class 8 summary: wh-movement

In many languages — English being one of them — a wh-question typically involves movement. Movement applies to a phrase that contains the wh-word (sometimes a phrase consisting of the wh-word alone; more on this topic below).

We can tell that wh-questions involve movement in several ways:

- It leaves a gap filled by an expression containing a wh-word (Recall that the verbs put and devour require an NP object.)
  
  1. a. What did Sue put __ on the table?
     b. Who did the monster devour __ today?

- The position before movement counts for Binding Theory. (This phenomenon is often called reconstruction:)
  
  2. [How much criticism of herself] can Mary tolerate __ ?________ Principle (A)

Crucially, the anaphor herself really behaves as though the phrase that contains it is in the direct object position. For example, if Mary does not c-command herself before movement, the result is bad, as seen in (3):

  3. *[How much criticism of herself] can [Mary’s brother] tolerate __ ?

Where does the wh-phrase move to?

This question is related to another question. In main clauses, in Standard English, wh-movement regularly co-occurs with movement of the highest auxiliary verb (did in (1a-b), for example). We also need to ask where the auxiliary verb is moving to.

What we observe is that the wh-phrase moves to a left-peripheral position in CP. Only one phrase moves in this manner. When a question contains two wh-phrases, for example, only one moves:

  4. a. [What] did Mary put __ on [which table]?
     b. *[What] [which table] did Mary put __ on __ ?

A good guess as to the identity of a unique position left-peripheral in CP that can receive a wh-phrase is Specifier of CP. And a good guess as to the landing site for the auxiliary verb is C itself (but we already knew that from earlier classes and from 24.900).

What’s the mechanism by which wh-phrases move to specifier of CP?

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<sup>1</sup>
- 2 -

• A feature of C (call it C's +wh feature) requires interrogative C to take a wh-specifier.

  We may think of this as an EPP-type property, an issue to which I return below.

What's the mechanism by which T moves to C in matrix (i.e., main-clause) questions?

• The C of main-clause questions has another property (we might call it a [+T] feature) which requires T to move to it as well.

• C of embedded questions does not have this feature in standard English, but does in many dialects, and is common in conversational "standard" English as well:

(5) % Mary wanted to know [what did Bill say about her]?

In (5), the presence of her in the embedded clause, if coreferent with Mary, indicates that we are dealing with a true embedded clause — not with a quote, which would have to look like (6):

(6) Mary wanted to know, "What did Bill say about me?"

• Also in Indian English, matrix interrogative C does not necessarily have the [+T] feature.

(7) Indian English main-clause questions

  a. What this is made from?
  b. Who you have come to see?


2 Trudgill and Hannah seem to imply that the facts of Indian English are simply reversed from the US/UK standard — that inversion is obligatory in embedded clauses and impossible in main clauses. I'm not sure if that is what they are saying, nor am I sure that it's true.

2. The +wh feature on C: feature-driven movement

Why does wh-movement obligatorily take place in the complements of certain verbs like wonder?

That is, wonder does not allow a declarative that-clause as its complement (except, perhaps, with the meaning "marvel at", in archaic English, irrelevant to us here):

(8) *Bill wondered [that Mary had eaten fish for dinner].

Just as wonder requires wh-movement in its CP complement, so a verb like believe forbids it:

(9) *Bill believed [what Mary had eaten __ for dinner].³

— and know allows both options:

(10) a. Bill knew [that Mary had eaten fish for dinner].
    b. Bill wondered [what Mary had eaten __ for dinner].

This looks like subcategorization by wonder for the +Wh feature on the head of its CP complement and subcategorization by believe for a C without this feature (or with a negative value for the feature) — with know showing both options:

(11) Subcategorization properties of wonder, believe and know

  wonder:    [+ __ [C, +Wh] ]
  believe:   [+ __ [C, -Wh] ]
  know:      [+ __ [C, ±Wh] ]

If this view is correct, a verb like wonder does not directly wh-movement in its complement (which would not be subcategorization as we know it). Instead, the requirement arises indirectly as follows:

• A verb like wonder subcategorizes for an interrogative C with a +Wh feature.
• C with this feature attracts a wh-phrase to it.
• If one tried to merge wonder with a CP in which wh-movement had not occurred (as is the case in (8), the derivation would be violating either the subcategorization property of wonder or the requirements of this +Wh feature.

³ The idiom can't believe does allow a CP complement with wh-movement (Bill can't believe what Mary ate for dinner) — interpreted as an exclamation, though, not a question. We put these cases aside.
3. The Doubly-Filled Comp filter

Why is C null with embedded wh-movement? Why can't it be pronounced?

- This seems to be a language-specific phenomenon. In modern Standard English, C  must be null whenever its specifier is non-null. But in other languages and some dialects of English, including older stages of the language, this restriction does not hold:

(12) a. Ik weet niet wie of Jan gezien heeft. 
    I know not who if John seen has  
    [Dutch]

b. men shal wel knowe who that I am

    [Middle English]

c. Je me demande quand que Pierre est parti.
    I wonder when that Pierre has left

    [colloquial French]

- The language-specific restriction is called the Doubly-Filled COMP Filter.

(13) Doubly-Filled COMP Filter [language-specific]
    The phonologically null variant of C is obligatory unless the specifier of CP is phonologically null.

Note that an auxiliary verb in C does not count as a "variant of C".

4. Pied-piping

What's a "wh-phrase"?

That is, what besides the wh-word may undergo movement to an interrogative C?

- Sometimes other material must accompany the wh-word. For example, in English the D which cannot move on its own. It must take the NP (N') with it:

(14) English is strict: NP (N') must accompany D
    a. [NP Which book] did Mary buy ___?
    b. *Which did Mary buy [DP ___ book]?

There is cross-language variation on this matter. For example, Russian is more permissive than English with respect to the phenomenon in (14). Russian does not require pied-piping of NP (N') along with the D which. Both examples in (15) are fine:

(15) a. Kakuju knigu Marija kupila?
    which book Mary bought

b. Kakuju Marija kupila ___ knigu?

In other cases, English is the more permissive language. For example, English allows stranding of a preposition when its object undergoes wh-movement — but Russian does not:

(16) English is permissive: P need not accompany its complement
    a. [PP To [DP whom]] did Mary speak?
    b. [DP Who] did Mary speak to [PP to ___]?

(17) Russian is strict: P must accompany its complement
    a. [PP S [DP kem]] Marija razgovarivala ___?
    with whom Mary spoke

    b. *[DP Kem] Marija razgovarivala [PP s [DP ___]]

The phenomenon in which a phrase bigger than the wh-word undergoes wh-movement is called pied-piping, a fanciful term due to J.R. Ross's famous 1967 MIT dissertation Constraints on Variables in Syntax. The reference is to the German folk-tale about the piper whose pipe could call all the rats of the city — and, alas, ultimately all the children of the city — after it:

He advanced to the council-table:
And, "Please your honours," said he, "I'm able,
"By means of a secret charm, to draw
"All creatures living beneath the sun,
"That creep or swim or fly or run,
"After me so as you never saw!
"And I chiefly use my charm
"On creatures that do people harm,
"The mole and toad and newt and viper;
"And people call me the Pied Piper."
from "The Pied Piper of Hamelin" by Robert Browning

The absence of pied-piping seen in (16b) is called preposition stranding.

French, Gbadi, and Vata (with postpositions only) — so few non-Germanic languages seem to have it. I am quoting here from a paper by Juliet Stanton, who in turn is citing a University of Connecticut dissertation by Klaus Abels on preposition stranding.
There are significant restrictions on pied-piping in English that we spent some time examining in class. For example, though virtually any phrase whose left-most member is a wh-word can be pied-piped, no matter how deeply embedded that word is, as seen in (18):

(18) I wonder ...
   a. who Mary should invite __.
   b. whose friend Mary should invite __.
   c. whose friend’s brother Mary should invite __.
   d. whose friend’s brother’s teacher Mary should invite?
   
   e. how many people Mary should invite __.
   f. how many people’s friends Mary should invite __.
   
   etc.

g. which people Mary should invite __.

h. which people’s friends Mary should invite __

— pied-piping of a phrase in which the wh-word is not leftmost is not possible (in an embedded question, at least):

(19) I wonder...
   a. who Mary will read a book about __.
   b. *a book about whom Mary will read.
   c. *a book about whose friend Mary will read.
   
   etc.

d. *a rumor that Mary visited whom Mary has heard.

   etc.

— with one salient exception: a phrase that begins with a preposition acts as if the preposition were not there. So long as the complement of P has a wh-word at its left edge, the result can be pied-piped:

(20) I wonder...
   a. with whom Mary should talk __.
   b. with whose friend Mary should talk __.
   c. with whose friend’s brother Mary should talk __.
   d. with whose friend’s brother’s teacher Mary should talk __.

   etc.

e. at how many people Mary should look ___ (before deciding who to photograph).

   etc.

f. at how many people’s friends Mary should look ___.

   etc.

g. for which people we should undertake this task __.

   etc.

In class, we did not try to figure out any particularly interesting explanation for these facts (though Justin did make an interesting proposal that relied on c-command by D rather than being leftmost). We merely observed the facts, so you would be aware that there are laws governing pied-piping. We did not try to explain them. But this is a very interesting topic, and if we had more time, I would have definitely told you more! (Google “Seth Cable pied-piping”, for example, to get a sense of one of the more important recent ideas.)

5. Relative clauses

• A relative clause is a CP that functions as an NP or DP modifier, and is a sister of N’ or D’ — like any of the adjectives or PP modifiers that we examined earlier in the semester:

(21) [DP The person [CP who I invited __] liked [DP the food [CP which I cooked __]].

   relative clause    relative clause

• Inside the relative clause, we find something like wh-movement (including pied-piping) — but with a slightly different set of wh-words. In particular, what and how are excluded (in Standard English, at least):

(22) a. *the book what I was reading
   b. *the way how I solved the problem

• We can assume that a variant of the +Wh feature seen in questions — we can call it +Rel — triggers wh-movement here, seeking out a wh-word of the sort that may occur in a relative clause. Note that relative clauses, being modifiers, are not subcategorized for, and are optional.

• There are three types of (restrictive) relative clauses in English:

(23) a. the person who I invited...
   b. the person that I invited...
   c. the person I invited...

• These all probably involve some kind of wh-movement, since they all have gaps in them:

(24) a. the book which I put __ on the table
   b. the book that I put __ on the table
   c. the book I put __ on the table
• The wh-phrase may not co-occur with an overt C:

(25) *the book which that I put __ on the table

Ingredients of an analysis:
1. C is either phonologically overt that or phonologically null C (O_C) in a finite relative clause. The idea of this alternation was not just cooked up for relative clauses, of course. We have both possibilities even in complement CPs (Mary believes that/O_C the world is round).]

2. The Doubly Filled COMP Filter holds in relative clauses, just as it does in questions.

3. English has phonologically null versions of who and what, which we can call O_REL.

How it works:
→ Pick that as C, and the wh-phrase must be null, to avoid violating the Doubly Filled COMP filter. This yields (23b) and (24b).

→ Pick φ as C, and the wh-phrase can be null or pronounced — since there's no possibility of violating the Doubly Filled COMP filter.

With pronounced wh-phrase, this yields (23a) and (24a).

With null who or what, this yields (23c) and (24c).

And it works splendidly!

(26) The three options (relativizing the object)
   a. the person who O_C I invited __...
   b. the person O_REL that I invited __...5
   c. the person O_REL φ I invited __...
   d. *the person who that I invited __... [∗ by Doubly Filled Comp Filter]

Well, almost... There's no null O_REL counterpart to pied-piped PP, which we have just stipulated:

(27) One option only (pied-piping of PP):
   a. the chair [in which] O_C I was sitting __...

   => b. *the chair O_REL that I was sitting __...

   => c. *the chair O_REL φ I was sitting __...

   d. *the chair [in which] that I was sitting __... [∗ by Doubly Filled Comp Filter]

Thus, there is only one type of relative clause when pied piping has taking place, rather than three.6 Compare the counterpart in which the preposition is stranded, which behaves just like (26):

(28) The three options once more (P-stranding)
   a. the chair which O_C I was sitting in __...
   b. the chair O_REL that I was sitting in __...
   c. the chair O_REL φ I was sitting in __...
   d. *the chair which that I was sitting in __... [∗ by Doubly Filled Comp Filter]

6. Restrictive vs. non-restrictive relative clauses

Here too we did not spend much time trying to figure out deep explanations, but I wanted you to be aware of the following facts.

English relative clauses come in two general flavors, restrictive and non-restrictive (also called appositive):

(29) a. The kids who John invited got lollipops. [restrictive]
    b. The kids, who John invited, got lollipops. [non-restrictive]

Two properties of non-restrictive relative clauses that distinguish them from restrictive relative clauses:

1. They are separated by a pause ("comma intonation") from the rest of the sentence.7
2. They provide "extra information" about the phrase they modify, and are not strictly necessary to determining the referent of the DP as a whole

(30) How to force a restrictive relative clause reading (in case you ever have to):
   a. Attach the relative clause to a proper name
      Mary,. who John invited to the movies...

   b. Add phrases like "by the way"
      these kids, who, by the way, John invited to the movies...

6 Note that the word that here is not a "relative pronoun" here. It is a complementizer, no matter what you might have heard elsewhere. As we saw in class, for example, there is nothing like pied-piping with that-relatives. The "relative pronoun" (i.e. the relative wh-word) is null. (Tom's South Dakota judgments, however, suggest that for him, that might have an alternative life as a relative pronoun.)

7 Interestingly, this is apparently not true in all languages. For example, Japanese, though it has non-restrictive relative clauses, is said not to distinguish them intonationally from restrictive relatives.

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7 Interestingly, this is apparently not true in all languages. For example, Japanese, though it has non-restrictive relative clauses, is said not to distinguish them intonationally from restrictive relatives.
Something I forgot to tell you in class:

(31) **Restrictive relatives follow all non-restrictive relatives...**
    a. the kids that Mary described in her newspaper article, who -- by the way -- John invited to the movies...
    b. *the kids, who -- by the way -- John invited to the movies, that Mary described in her newspaper article...

... a fact that can be understood if non-restrictive relatives are DP-level modifiers (sisters of D'), and restrictive relatives are NP-level modifiers (sisters of N').

And something that I mentioned only briefly in class, but this is the reason I brought the topic up in the first place:

For most speakers, Ø_C is unavailable in non-restrictive relatives. In this respect, they act like the relative clauses with pied-piping seen in (27):

(32) **One option only (non-restrictive relative):**
    a. Mary [who] Ø_C John invited __...  
    b. *Mary Ø_REL that John invited __...
    c. *Mary Ø_REL Ø_C John invited __...  
    d. *Mary [who] that John invited __...  [*by Doubly Filled Comp Filter]

We now leave relative clauses for a while. An obvious missing piece in our story is why Ø_REL is unavailable in various environments (including relative clauses built on the subject, even when restrictive: *The person met you is my friend). The plot thickens if we extend our gaze to other languages, but alas, not in this class...

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7. Multiple Questions: more evidence for feature-driven movement

**What is a multiple question?**

A **multiple question** is a question that contains more than one wh-word. Typically, the answer to a multiple question is a set of sentences in which each of the wh-words is replaced by an appropriate non-wh expression that makes the answer true.

Example:

(33) a. **Question:** Who bought what?
    **Answer:** Mary bought the book, John bought the calculator, Sue bought the computer, etc.

    b. **Question:** Who did you persuade to read what?
    **Answer:** I persuaded Mary to read War and Peace, I persuaded John to read Anna Karenina, and I persuaded Sue to read Crime and Punishment, etc.  

**Terminology: "wh-in-situ"**

A wh-phrase that does not undergo wh-movement is said to remain in situ, and is sometimes referred to as **wh-in-situ**.

In a multiple question in English, as we saw above, one wh-phrase undergoes wh-movement. Other wh-phrases remain in situ.

This means that before wh-movement takes place in a multiple question, there is more than one wh-phrase that potentially could undergo wh-movement. One might think there would be freedom in choosing which one. In fact, there is normally no such freedom.

(34) **The "Superiority effect"**

When IP contains two wh-phrases, and one c-commands the other, the one that undergoes wh-movement is the one closest to the interrogative C.

Here are some examples:

(35) **Superiority effect: subject vs. object**
    a. Who __ bought what?
    b. *What did who buy __?

(36) **Superiority effect: higher object vs. lower object**
    a. Who did you persuade __ to read what?
    b. *What did you persuade whom to read __?

The existence of the Superiority effect suggests that it is a feature on C that picks what wh-moves to it. We can view the feature acting as a probe, hunting down the tree and picking the first wh-phrase it finds (the goal) as the one that will be its specifier via movement. We call this the "Attract Closest" property of movement:

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8 Russian novels. I recommend them.

9 There are exceptions that have been studied. For example, when instead of who and what we have such phrases as which person and which book, many speakers find that the Superiority effect disappears or at least weakens.
Attract Closest
When a head attracts a phrase with a particular property to its specifier, it picks the closest phrase with that property.

If we had more time...
...I would develop the important observation we discussed briefly: that the "Attract Closest" property actually holds of every instance of movement that we have discussed. For example:

- When T attracts a DP from the specifier of VP, it always attracts the highest one: the external argument if that exists, or the highest internal argument.
- Likewise for all the instances of head movement that we discussed: V-to-T (always moves the highest of a bunch of auxiliary verbs if there are any, and only moves the main verb if there's no auxiliary and T-to-C.

And if we had even more time...
...I would have told you that the model I am sketching here is associated with research in the so-called Minimalist Program. The name comes from a 1993 paper (and 1995 book) by Noam Chomsky, and reflects work done by a number of researchers over the past two decades or so. There are other approaches that differ to varying degrees from Minimalism.

- A lexical item (a head) is made of features (properties).
- Some of these features -- called uninterpretable features (notated with a little u) -- are "active". What this means is explained in the next bullet.
- An uninterpretable feature acts as a probe (as just described), looking down the tree for the closest matching instance of the same feature -- called a goal. (The relationship between probe and goal is called agreement, and sometimes expresses itself as morphological agreement.)
- If the probe also has a [generalized version of the] EPP property, some constituent that contains the goal will move to the probe, forming a specifier of the probe.
- In wh-movement, the probe is the uninterpretable Q-feature (or R-feature) of C.

In a nutshell:
Step 1: If the head has an uninterpretable feature uF, it acts as a probe, looks down the tree for a goal. If probe is successful --> agree.

Step 2: If uF is also +EPP --> movement.

Wait a minute! (I hear you saying.) We don't see morphological agreement between C and wh in English. True, but we do in Kinande and some other languages:

Wh-C agreement in Kinande (Bantu, NE Congo)

- a. IyondI yO kambale alangIra. who (cl.1) that (cl.1)Kambale saw
- b. aBahI Bo kambale alangIra. who (cl.2) that (cl.2) Kambale saw
- c. EkIhI kyO kambale alangIra. what (cl.7) that (cl.7) Kambale saw
(Schneider-Zioga 1987; quoted in Rizzi 1990)

8. Multiple Specifiers

Sometimes, an uninterpretable feature keeps probing for new goals, even after Agree has already taken place with the closest goal. If the feature is also EPP, we find multiple movement, forming multiple specifiers.

This is what we find in multiple questions in Slavic and other East European languages (including the non-Slavic languages Yiddish and Romanian, as well as Hungarian on some analyses).

What's interesting is how the wh phrases are ordered. The closest wh to C moves first. The next-closest "tucks in" under it. In class, I gave you examples from Russian. Here are very similar examples from Bulgarian, just for a bit of variety:

Bulgarian

(39)a. Koj kogo vižda? who whom sees ‘Who sees whom?’

b.*Kogo koj vižda? [on multiple pair reading] whom who sees

(40)a.Koj kode ___ udari Ivan ___? who where hit Ivan ___ [NB: Ivan is the subject. The verb is in C]

b.*Kade koz ___ udari Ivan ___? [on multiple pair reading] where who hit Ivan
In West Ulster English, unlike other dialects, expressions like what all, who all etc. can undergo wh-movement and strand all in the trace position.\(^{11}\) This is very much like the Japanese numeral quantifier stranding discussed earlier in the class.

- **(41)** a. Kjede udari Ivan
  who where hit Ivan
  cf. Who hit Ivan where?

- **(42)** \[CP What do you think [CP (that) he’ll say [CP (that) we should buy __ ]]\]

- **Answer:** yes! This is called the "successive cyclic" property of wh-movement.\(^{10}\)

- **As so often** in this course, there is "stranding" evidence for successive cyclic wh-movement. The evidence comes from West Ulster English (N. Ireland), studied by James McCloskey (discreever of the fuck-all data from the unaccusativity problem set).

- The evidence concerns phrases like what all and who all, which are possible in many dialects of colloquial English. What all and who all seem to mean the same as what and who, except that the answer is expected to be a plurality. Those of two who you know Spanish are familiar with this from the quién/quiénes ‘who.SG/who-PL’ distinction.

- **But now to what makes West Ulster English special:**

- **In West Ulster English, unlike other dialects, expressions like what all, who all etc. can undergo wh-movement and strand all in the trace position.\(^{11}\) This is very much like the Japanese numeral quantifier stranding discussed earlier in the class.

- \[^{10}\] Like many terms in syntax, this one is a holdover from an earlier model of syntax, that included a notion called the "cycle". I won't burden you with the explanation here, but I also didn't want you to be scratching your head over the term.

- \[^{11}\] What all etc. seem to mean the same as what etc. except that the answer is expected to be a plurality. What all is not literary English, but is common in many dialects of the US, as well as in Ireland. (I'm not sure about other dialects.) The phenomenon in the (b) sentences, however, is not (as far as I know) found in the US. If you know otherwise, tell me!

> **West Ulster English**

- **(43)** a. What-all did you give __ to the kids?
  b. What- did you give __-all to the kids?

- **(44)** a. Who-all did you send __ to the shops?
  b. Who- did you send __-all to the shops?

- **(45)** a. Tell me what-all you got __ for Christmas.
  b. Tell me what- you got __-all for Christmas.

- As with Japanese numeral quantifier stranding, it is important to make sure that the all is not simply free to occur anywhere. It really does seem to stand next to the trace of the wh-word. It cannot occur in random places:

- **(46)** *Who- did he tell __ he was going to resign -all.*

- **(47)** a. What- did you do __all after school the day?
  b. *What- did you do __ after school the day -all?*
  c. *What- did you do __ after school -all the day.*

- **And now to what makes West Ulster English not only special, but truly exciting:**

- **All** may also be stranded in any Spec,CP that lies between the original position of the wh-phrase and its final position.
(49)  **W. Ulster -** all stranding in specifier of declarative CP (with complementizer φ)
   a. What-**all** did he say [CP __ φ [TP he wanted__]]?
   b. What- did he say [CP __ φ [TP he wanted __-**all**]]?
   c. What- did he say [CP __-**all** φ [TP he wanted __]]?

(50)  **W. Ulster -** all stranding in specifier of declarative infinitive with complementizer φ
   What- were you trying [CP __-**all** φ [TP PRO to say __]]?

(51)  **W. Ulster -** all stranding in specifier of declarative infinitive with complementizer for
   Who- did you arrange [CP __-**all** for [TP your mother to meet at the party]]?

(52)  **W. Ulster -** all stranding in specifier of declarative CP with complementizer that: two levels of embedding!
   a. What-**all** do you think [CP that he’ll say [CP that we should buy __]]?
   b. What- do you think [CP ―-**all** that he’ll say [CP that we should buy __]]?
   c. What- do you think [CP that he’ll say [CP __-**all** that we should buy __]]?
   d. What- do you think [CP that he’ll say that we should buy __-**all**]?

(McCloskey, James (2002) "Quantifier Float and Wh-Movement in an Irish English". Linguistic Inquiry 31:57-84.)

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**Binding evidence**

Principle A also provides evidence for successive cyclic wh-movement through intermediate specifiers of CP.

(53)  **Binding evidence for successive cyclicity**
   a. **Principle A applies in highest Spec,CP**
      [1 Tom asked [2 [which picture of himself] Mary thought [3 __ that the kids liked __]]]
   b. **Principle A applies in intermediate Spec,CP**
      [1 Tom asked [2 [which picture of herself] Mary thought [3 __ that the kids liked __]]]
   c. **Principle A applies in the lowest position**
      [1 Tom asked [2 [which picture of themselves] Mary thought [3 __ that the kids liked __]]]

We can check that Principle A is otherwise acting normally (nothing wild is going on) by noticing that the antecedent still must c-command the reflexive in the relevant position:

(54)  **Binding Principle A is observed in this construction:**
   a. *1Tom's sister asked [2 [which picture of himself] Mary thought [3 ___ that the kids liked ___]]
   b. *1Tom asked [2 [which picture of herself] Mary's brother thought [3 ___ that the kids liked ___]]
   c. *1Tom asked [2 [which picture of themselves] Mary thought [3 ___ that the kids's teacher liked ___]]

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10. The necessity of successive-cyclic wh-movement: evidence from Dinka

(In class, we discussed this before West Ulster English and before the Binding Evidence given above, but as I realized, it logically comes after that discussion — so that's how I've arranged things here.)

Dinka is a Nilotic language spoken in Southern Sudan. The date below come from work of Coppe van Urk (including a paper co-authored with Norvn Richards).

- **Fact 1:** Dinka is a verb-second language.

(55)  **V2 property of Dinka: main clauses**
   a. Cán acím kwën.
      Can eats food
      'Can [a proper name] is eating food.'
   b. Ból aci wøj kwål rɔk.
      Ból has cow stolen town
      'Ból [another proper name] has stolen a cow in the town.'
   c. Kwën acím Cán.
      food eats Can
      'Food, Can is eating.'
   d. Wọj aci Ból kwål
      cow has Ból stolen
      'A cow, Ból has stolen.'
   e. Rɔk aci Ból wøj kwål.
      town has Ból cow stolen
      'In the town, Ból has stolen a cow.'
some ungrammatical examples:

f. *Cán ĉan kwễn.
   eats Can food
   'Can is eating food.'

g. *Ból wáŋ kwáŋ riñk.
   has Bol cow stolen town
   'Bol has stolen a cow in the town.'

h. *any other non-V2 order

- **Fact 2:** Unlike German, V2 in Dinka is also found in embedded clauses.

(56) **V2 property of Dinka: embedded clauses**

a. Ból ací luéel, [Cán ací kitáp yɔ̀ɔc].
   Bol has said Can has book bought
   'Bol has said that Can bought a book.'

b. Ból ací luéel, [kitáp acíi Cán ɔ́ɔc].
   Bol has said book has Can bought
   'Bol has said that Can bought a book.'

c. *Ból ací luéel, [ací Cán kitáp ɔ́ɔc].
   Bol has said has Can book bought
   'Bol has said that Can bought a book.'

d. *any other non-V2 order

- **Analysis:** Let us assume the same analysis we have given to V2 in German:
  movement from T to C of the finite verb, and movement of some other phrase to form
  the specifier of CP.

  (There is more to figure out about this than the data presented below lets on, but let's
  stick with a simplified story for present purposes.)

- **Fact 3:** Wh-questions involve movement of a wh-phrase to the specifier of CP, much
  as in English — and also T-to-C movement, resulting in a V2 configuration for
  questions as well as declaratives (again just as in German).

(57) **V2 property of Dinka questions: main clauses**

a. Yétnо čií Ból luéel, [kitáp ɔ́ɔc]?
   Where has Bol say we bought
   'Where did Bol say [that we bought a book__]?'

b. Yétnо čií Ból luéel, [kitáp ɔ́ɔc]?
   Where has Bol say book have we bought
   'Where did Bol say [that we bought a book__]?'

This fact can be explained straightforwardly if wh-movement can only exit a CP via
its specifier position — i.e. if wh-movement is obligatorily successive-cyclic,
**stopping off at SpecCP.** The embedded clause sounds like a V1 clause because its
specifier was filled by a moving wh-phrase that later moves on:

(59) [I_C]P Where has Bol__ said [CP _ have we _ book bought __] (= (58c))

- This in turn means that a semantically inert +wh feature must be available for
declarative C that has the same attracting EPP-ish power as its semantically
interpretable counterpart in interrogative C. Various questions arose about this in
class, which I need to leave for some other semester…

- **Now the key facts!** When wh-movement takes place from a subordinate clause (as in
  English 'Who did you say bought a book, the verb must come first in that
  subordinate clause:

(58) **V1 property of Dinka embedded clauses from which wh-movement has take
place**

a. Yétnо čií Ból luéel, [kitáp ɔ́ɔc]?
   who has Bol said has book bought
   'Who did Bol say [__ bought a book]?'

b. *Yétnо čií Ból luéel, [kitáp acíi ɔ́ɔc]?
   who has Bol said book has bought
   'Who did Bol say [__ bought a book]?'

c. Yétnо čií Ból luéel, [c̃i ɔ́ɔk ɔ́ɔc]?
   Where has Bol say have we book bought
   'Where did Bol say [that we bought a book__]?' (asking about the location of
   book buying)

d. *Yétnо čií Ból luéel, [c̃i ɔ́ɔk ɔ́ɔc]?
   Where has Bol say book have we bought
   'Where did Bol say [that we bought a book__]?'
11. The necessity of "successive-cyclic" wh-movement: wh-islands and relative-clause islands

Even without a general V2 property that makes it blindingly obvious that long-distance wh-movement must stop off at the specifier of CP, languages like English provide evidence for the successive-cyclicity of wh-movement — from certain island effects that arise when wh-movement tries to take place out of a clause where the specifier of CP is already occupied.

Wh-islands

This phenomenon is found when one tries to extract a wh-phrase from a declarative clause contained in an embedded question. The effect is called the wh-island constraint:

(60) The "Wh-island constraint" (*crossing a that-clause and then an interrogative)\(^{12}\)

\[\begin{array}{c}
\uparrow \\
\downarrow
\end{array} \quad \begin{array}{c}
\Rightarrow \quad \leftarrow \\
\n\n\end{array}
\]

*What did Mary meet [NP a girl [CP who [___ said [CP1 that Bill had bought ___]]]]?

In example (60), even though what may move to Spec,CP1, it may not move to Spec,CP2 - since that specifier is occupied by who.\(^{13}\) Consequently, the second step of wh-movement must cross two CPs. It has been suggested that this is not allowed.

Complex NPs

In fact, not only can wh-movement not cross more than one CP at a time -- it apparently cannot cross a DP and a CP in the same step. This phenomenon is called the Complex NP Constraint (where "complex NP" means an NP -- a.k.a. DP -- containing a CP). There are two situations to consider: CP complements to N and relative clause modifiers of N' (and D'):

Constraints on extraction out of particular domains are called island conditions. Domains out of which extraction is forbidden are called islands.

\(^{12}\) Actually, simpler examples in which a wh-phrase just moves out of an interrogative clause (without any further embedding) are also bad, though not as bad as (60):

*What did Mary ask [who bought ___]?

— and in fact it's simpler examples like these that are most commonly cited as instances of the Wh-island constraint. As you can calculate for yourself, the Subjacency Condition as stated below does not rule these examples out — but can be tweaked to do so. I will leave this tweaking for a future syntax class, however.

\(^{13}\) Notice that who must move first to Spec,CP2 by Attract Closest. One might wonder whether examples like (60) are also ruled out by Attract Closest, since after who has moved to Spec,CP2, it is closer to the highest C than what is. This is a reasonable question -- one that might undermine the arguments for the necessity of an independent Subjacency Condition. But there is more to it than this, a topic I won't develop here.

(61) The "Complex NP Constraint"

a. CP complement to N is an island

*Who did Mary resent [DP our claim [CP that Bill had invited ___]]?

b. A relative clause (CP modifier of N') is an island

*What did Mary want to meet [DP the man [CP who had said ___]]?

*Who did Mary meet [NP a friend [CP who [___ bought ___]]]?

If you had voted for another class on wh-movement, we would have covered the following topic. We didn't, but you might like to know anyway:

We can understand the complement case of the Complex NP Constraint as a prohibition against crossing not merely two CPs, but also a CP and a DP. This is called the Subjacency Condition. The nodes that the subjacency condition cares about are called Bounding nodes (also known as barriers):

(62) The Subjacency Condition

Movement may cross at most one bounding node at a time.

(63) Bounding nodes: CP, DP.

Important: To understand the Complex NP Constraint as a case of Subjacency, we must suppose that D, unlike C, cannot bear an uninterpretable wh feature. Thus, successive cyclic movement of wh is not allowed through Spec,DP. In this sense, DPs are just like CPs whose specifier is otherwise occupied.

(64) *Who did Mary resent [DP our claim [CP that Bill had invited ___]]?

12. Another island condition: the Condition on Extraction Domains (CED)

The statement in (65) also appears to be true:

constraint. As you can calculate for yourself, the Subjacency Condition as stated below does not rule these examples out — but can be tweaked to do so. I will leave this tweaking for a future syntax class, however.
(65) **Condition on Extraction Domains**
Wh-movement is forbidden from non-complements.

For example, extraction from subjects is forbidden:

(66)  *Who are [pictures of ___] on sale at the Coop?

(67)  *Who would [for Mary to talk to ___] annoy Peter?

And extraction from adjuncts:

(68)  a.  ??Who will Bill be unhappy [unless I invite ___]?
  b.  *To whom did Sue leave the room [because she had spoken ___]?
  c.  *What will Mary get mad [since I didn’t finish ___]?

Note: Extraction out of a relative clause is forbidden both by Subjacency and by the CED. Is this overkill? Or does it perhaps explain why the island effects are particularly strong with relative clauses? You decide!

Note: Head movement also obeys CED!

13. **The Coordinate Structure Constraint (CSC)**

Finally, another island constraint:

(69) **Coordinate Structure Constraint**
You submitted an order in the amount of $29.47 USD to Jarden Consumer Solutions
1. A conjunct in a coordinate structure may not be moved out of that coordinate structure [strong effect]; and
2. Extraction out of a conjunct is also forbidden [weak effect]

(70) **CSC clause 1**
   a.  *Which book did you read *Harry Potter and ___?*
   b.  *Which book did you read ___ and *Harry Potter?*

(71) **CSC clause 2**
   a.  [*] How many languages does [Mary speak ___ fluently] and [has a translator’s certificate from the UN]?
   b.  [*] What kind of chocolates did John open [a jar of jelly-beans] and [a box of ___]
   but:
   c.  What kind of chocolates did John [go to the store] and [buy ___]

Interestingly, it appears possible to simultaneously extract a single wh-phrase from two or more conjuncts at once -- a possibility we will not explore further here. This is called "Across the Board" (ATB) movement, and appears to by-pass the CSC:

(72) a.  How many languages does [Mary speak ___ fluently] and [John write poetry in ___]
    b.  What kind of chocolates did John eat a [bag of ___] and [a box of ___]?

ATB movement can be analyzed as a situation in which the element shared by the two conjuncts simultaneously externally merged in both of them — and then moved to the specifier of a shared CP:

(73)

14. **Covert Movement**

We have developed the following proposal throughout the class:

- **Movement is "Internal Merge"**, i.e.
  (i) make a copy of a constituent inside the current tree; and
  (ii) merge the copy, forming a specifier (or adjoined position)

In this section, it will convenient to assume the following terminology:

- **The copies formed by movement are coindexed and form an object called a chain.**
- **Lower copies in a chain are called traces.**
How does the phonological component of the grammar talk to the syntax? So far, it looks like (75) is the operative principle:

(75) **Pronunciation Principle:**

Pronounce the top member of the chain.

In this summary, however, we see some evidence that suggests that (75) is not always correct, at least not on the surface of things...

At first sight, it looks as though Japanese has the interesting property of lacking *wh*-movement entirely:

(76) **Japanese: matrix questions**

a. John-ga\(^{14}\) Mary-ni \(\text{\textit{nani}-o} \) ageta no?

John-NOM Mary-DAT - what-ACC gave Q\(^{15}\)

'What did John give to Mary?'

b. John-ga \(\text{\textit{naze}} \) kubi-ni natta no?

John-NOM why was fired Q

'Why was John fired?'

Japanese, in essence, has "John gave what to Mary" and "John was fired why" where English has comparable examples with *wh*-movement. Of course, so does English, in particular contexts (e.g. "remind me" questions, echo questions, etc.). But Japanese really goes whole hog and leaves *wh* phrases in situ even in embedded questions, where this is impossible in English [I'm slightly reordering the presentation in the handout]:

(77) **Embedded questions also show *wh*-in-situ**

Mary-ga \([\text{\textit{DP}} \text{\textit{NP}}] \) John-ga \(\text{\textit{nani}-o} \) katta-ka

Mary-NOM John-NOM what-ACC bought-Q know

'I know what John bought' [lit. 'I know John bought what']

- The question is: Is the relation between (I) the position in which we hear a Japanese *wh*-phrase and (II) the position to which it would move in a language like English sensitive to islands? Can an island boundary intervene between these two positions? If so, we have evidence that Japanese has *wh*-movement after all, and we just don't hear it.

- It turns out that if the *wh*-phrase is modified by *ittai* (lit. "one body"), which has something of the flavor of "on earth" or "the hell" in *what on earth* or *what the hell*, it can be embedded in a simple that-clause, but not in a relative clause or in an adjunct:

(78) **Baseline:**

Mary-ga John-ni [ittai \(\text{\textit{nani}-o} \) ] ageta-no?

Mary-NOM John-DAT on-earth what-ACC gave - Q

'What on earth did Mary give to John?'

(79) **Simple embedding:**

Mary-ga [\(\text{\textit{CP}} \) John-ga [ittai \(\text{\textit{nani}-o} \)] yonda] itta-no?

Mary-NOM John-NOM on-earth what-ACC read that said-Q

'What on earth did Mary say that John read?'

(80) **Complex NP Constraint:**

??Mary-ga \([\text{\textit{DP}}] \) [\(\text{\textit{CP}} \) ] John-ga [ittai \(\text{\textit{nani}-o} \) ] yonda\(\text{-koto-o}\)]

Mary-NOM John-NOM on-earth what-ACC read fact-ACC

wasureteiru-no?

 remembered\(\text{-Q}\)

'What on earth did Mary remember [the fact [that John read __]]'

(81) **a. Complex NP Constraint\(^{16}\)**

*Mary-ga \([\text{\textit{DP}}] \) [\(\text{\textit{CP}} \) John-ni ittai \(\text{\textit{nani}-o} \) ageta] hito-ni] atta-no?

Mary-NOM John-DAT on-earth what-ACC gave man-DAT met - Q

'What on earth did Mary meet [the man [who gave _ to John]]?'

b. CED effect

*Mary-ga \([\text{\textit{NP}}] \) [ittai \(\text{\textit{nani}-o} \) ] yomu mae-ni] dekaketa-no?

Mary-NOM John-NOM on-earth what-ACC read before left - Q

'What on earth did Mary leave [before John read __]?

- If *ittai* is omitted, the sentences are not so bad for most speakers, which is a mystery that I will leave unsolved for now.

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\(^{14}\) To a Japanese speaker, this sentence, and others like it, sounds much more natural if the nominative marker -*ga* is replaced with the topic marker -*wa*. Our examples ignore this fact, in the interests of clarity.

\(^{15}\) "Q" is a gloss for the interrogative complementizer.

\(^{16}\) As you can see, relative clauses precede their N’ in Japanese.
Actually, there is an exception to the mystery:

Adjuncts like *naze 'why' obey islands even without *ittai:

(82) a. Complex NP Constraint (Subjacency) with *naze 'why'
   *Mary-ga [dp [cp John-ni *naze hon-o ageta] hito-ni] atta-no?

   'What is the reason x such that Mary met [a man who gave John a book for reason x]?

   b. Adjunct island effect (CED) with *naze 'why'
   *Mary-ga [John-ga *naze hon-o yomu mae-ni] dekaketa-no?

   Mary-NOM John-NOM why book-ACC read before left - Q
   'What is the reason x such that Mary left [before John read a book for reason x].'

This parallels English, where island effects are often squishy with extraction of DPs but quite robust with extraction of adjuncts.

(83) a. ??What did Mary resent [the fact that they had fixed__ with a wrench]?  
    b. *How did Mary resent [the fact that they had fixed the car __]?  
    c. *Why did Mary resent [the fact that they had fixed the car __]?  

   (on the readings indicated by the bracketing)

The point:
Japanese *wh*-phrases (ignoring the mystery mentioned above) act just as if they had moved to Spec,CP — obeying island conditions! The only difference is that the movement is covert. It doesn't change the phonology. We don't hear the effects of movement.

15. Tentative conclusion: the model

In Japanese, when a verb selects a +wh complementizer, the requirement of wh-movement to specifier of CP is met by "covert movement" in the embedded clause.

How this fits in the model:

(84) Possibility #1 (the "Y" model)
Wh-movement may happen before or after Spellout -- the point at which the syntactic derivation makes contact with phonology. Movement after Spellout is covert, since it does not feed the phonology. The Pronunciation Principle in (75) is correct.

Possibility #2 (the "single output" model)
Wh-movement always happens the same way. The Pronunciation Principle is wrong. The EPP property of certain heads dictates that you pronounce the new top of the chain formed by movement. The EPP property of other heads dictates that you pronounce the old top of the chain formed by movement.

Which is right? Take another syntax class for more discussion!