CAS LX 422 / GRS LX 722 Intermediate Syntax

Phases, relative clauses, and LF (ch. 10)

A word about interpretation

Let's think for a moment about what a *wh*-question means:

Who did Pat meet? $[_{CP} [_{DP} who]_i T_k + C [_{TP} Pat meet t_k]]$

Something like (a 'logical form'): Tell me (a person) x such that Pat met x is true.

Pronouncing & interpreting

There are two things we need to do with the lexical items we assemble on the workbench:

- Pronounce the sentence
- Interpret the sentence

We've mainly been concentrating on the pronunciation part (getting the words into the order we hear them), but the structure is also assumed to be the basis for interpreting the sentence as well.

Our model of grammar

Here is the little picture of our model of grammar. The structure we end up with is used both to express the logical relations between participants and to pronounce the structure.



A word about interpretation

- Who did Pat meet?
 [CP [DP who]_i T_k+C [TP Pat meet t_k]]

 Tell me (a person) x such that is Pat met x is true.
- If we need to get to a logical structure like Tell me (a person) x such that Pat met x is true, then it may well be that this is what wh-movement is for. The trace serves as the x variable, the moved wh-phrase sets the domain.
- Suppose that moving a *wh*-phrase (leaving a trace) is necessary for interpretation as a *wh*-question.

<u>Wh</u>-movement and interpretation

- Who bought what?
- Tell me a (person) x and tell me a (thing) y such that x bought y is true.
- Who gave what to whom?
- Tell me a (person) x and tell me a (thing) y and tell me a (person) z such that x gave y to z is true.
- How do we interpret those other wh-words?

The <u>wh</u>-typology

- English: One wh-word moves to the front.
- What did Bill give to whom?
- Japanese: No wh-words move to the front.
- Taroo-ga dare-ni nani-o ageta no? T-nom who-to what-acc gave Q 'What did Taroo give to whom?'
- Bulgarian: All wh-words move to the front.
 - Kakvo na kogo Ivan dade?
 what to whom Ivan gave
 'What did Ivan give to whom?'
- French: One wh-word or no wh-words move to the front.
 - Qui as-tu vu? Who have-you seen 'Who did you see?'
- Tu as vu qui? You have seen who
 - 'Who did you see?'

The <u>wh</u>-typology

- Yet in all of these languages, the meaning of What did Bill give to whom? is the same...
- Tell me a (thing) x and tell me a (person) y such that Bill gave x to y.
- So, if the 'tell me an x...such that...x...' meaning arises from wh-movement (and, in fact, we can see the wh-movement in Bulgarian), it stands to reason that even in English and Japanese there is whmovement for each wh-word—we just can't always hear it.

Phases again

Remember that what's supposed to be true of phases is when they are "committed," we have locked in the pronunciation and interpretation.

But what if we lock in the pronunciation first, move a little bit more, and then lock in the interpretation?

[_{CP} what_i T_k +C [_{TP} Pat t_k give t_i to whom]]?

- Lock in pronunciation
- [$_{CP}$ whom_m what_i T_k+C [$_{TP}$ Pat t_k give t_i to t_m]]?
- Lock in interpretation

This will sound like: What did Pat give to whom?

Phases again

Why would we lock in pronunciation first?

[$_{CP}$ what_i T_k+C [$_{TP}$ Pat t_k give t_i to whom]]?

Lock in pronunciation

[$_{CP}$ whom_m what_i T_k+C [$_{TP}$ Pat t_k give t_i to t_m]]?

• Lock in interpretation

We said before: Strong features (generally) require movement because the strong feature must be local to the feature that checks it.

Viewed in light of different "timing" for locking in pronunciation and interpretation, we could now say that strong features need to be checked *before locking in pronunciation*. But since the system is lazy, it will wait until after that to check any remaining (weak) features.

Pros, cons

If we imagine that there can be this type of "covert movement" we gain a strong benefit:

 All languages have basically the same structure for the purposes of *interpretation*. Even if they seem to differ in terms of what visibly moves.

But it raises a number of issues as well:

- We must assume that once you covertly move something, you've left the phonological features behind—any further movement will also have to be covert.
- We must assume that all wh-words accumulate in SpecCP (some covertly) but without losing the explanation of wh-island violations (there is only one SpecCP).
- Covert movement seems not to obey islands: Strong features can't see inside committed phases, but *others* seem to be able to. Non-strong features won't affect the pronunciation, though—it's ok when the pronunciation is locked.

LF movement

When syntacticians talk about this kind of "covert movement" at parties, they sometimes speak of it as **LF movement**.

That is, movement that happens in order to construct the **logical form** of the sentence but doesn't affect the pronunciation.

 We will not really seriously deal with LF movement in this class. We will not draw it in our trees. But it's worth having heard about it.

Wh-phrases binding pronouns

- There is an interesting property of the kind of operator-variable formation that we can see in whmovement.
 - Who likes his roommate?
 - Pick the x such that x likes x's roommate.
 - Who_i [_{TP} t_i likes his_i roommate]
- Notice that it is possible to have a pronoun bound by a wh-word.
 - And it is binding, like the binding we spoke of wrt Binding Theory. It's assignment of reference, both to the trace and to his, matching the reference of who.

WCO

But now consider this:

• Who does his roommate like?

Can this mean the same thing as Whose roommate likes him?

*Who_i does his_i roommate like t_i?

How is this different from

Who_i t_i likes his_i roommate?

[Whose roommate]_i t_i likes him_i?



Quantifiers

We interpret Bill saw everyone as

• For every person x, Bill saw x.

This is the meaning. This is the logical form of the sentence Bill saw everyone. In the notation of formal logic, this is written as $\forall x$. Bill saw x 'For all x (x a person), Bill saw x.'

Quantifiers

- Every boy hates his roommate.
- Notice that each boy hates a different roommate, the roommates are specific to each boy.
- For every boy x, x hates x's roommate.
- This means that every boy doesn't just mean the group of boys; rather it goes through the set of boys and says something about each of them individually.

Quantifiers

These phrases which don't refer to specific people/things in the world but rather seem to do things to sets of people/things (like state generalizations) are *quantifiers*. Examples:

- most students
- twelve angry men
- fewer than half of the members
- some custodian
- nobody in their right mind

QP

What is the category of a quantifier like most students?

DP D nP every student

Well, it goes basically in all the same places a DP goes. Like which student or what or who.

So, like what we said for *wh*-phrases, quantifier phrases are really DPs with an extra property (they're quantificational). Sometimes people write QP, but they mean 'a quantificational DP'.

Restrictions

To reiterate, quantifiers are used to say something about *individuals in a set*.

Most students like syntax.

The set (sometimes, restriction) is the set of students.

This says that, if you check *all* of the students individually to see if *each* likes syntax, you'll find that most (more than half) of the students you checked do.

• For each x in students, does x like syntax? Did we answer "yes" for most of the ones we checked?

Quantifiers

- To write the logical form (meaning) of a sentence with one of these, you put the quantifier first, and replace where it came from with a variable:
- Most students eat at Taco Bell.
 For most students x, x eats at Taco Bell
- No administrators eat at Taco Bell.
 For no administrator x, x eats at Taco Bell
- Mary likes every flavor of ice cream.
 For every flavor of ice cream x, Mary likes x

Binding

A quantifier is said to *bind* its variable. That is, the reference of the variable is assigned by the quantifier.

Bill read every book. For every book *x*, Bill read *x*

Is this true? Well, let's go through the books. Moby Dick. Did Bill read Moby Dick? Yes. Ok, War and Peace. Did Bill read War and Peace? Yes. Ok,

Scope

- A student read every book.
- When is this true?
 - Mary, it turns out, has read all of the books.
 - •Nobody has read everything, but Mary read half of the books and Bill read the other half. Every book was read by a student.
- There are two meanings here, the sentence is ambiguous between two logical forms.

Scope

A student read every book There is a student x such that for every book y, x read y

or

For every book y, there is a student x such that x read y

It matters which quantifier comes first in the logical form.

Scope

This is perfectly logical. A quantifier takes a set of individuals and checks to see if something is true of the individual members of the set.

A student read every book. (Namely, Mary)

In the set of students, we find that it is true that for at least one student x: x read every book.

In the set of students, we find that it is true that for at least one student x: In the set of books, we find that it is true that for each book y, x read y.

There is a student x such that for every book y, x read y.

 $\exists x \in students : \forall y \in books: x read y.$

Scope

A student read every book. (The books were all covered, though not necessarily by one student)

In the set of books, we find that it is true that for each book x: a student read x.

In the set of books, we find that it is true that for each book x: In the set of students, we find that it is true that for at least one student y, yread x.

For every book x, there is a student y such that y read x.

 $\exists x \in books: \forall y \in students: y read x.$

LF

We think about this kind of ambiguity in much the same way we think about Mary heard a dog bark in the house.

• (either Mary was in the house or the dog was)

This (above) is a *syntactic* ambiguity, depending on where the PP *in the house* is attached.

If there are two different interpretations, there are two different *structures*. Two different LFs.



Quantifiers and binding

Every girl aced her exams.
 [Every girl]_i [t_i aced her_i exams]

For every girl x, x aced x's exams

Not only the trace of QR, but also pronouns, can be bound by the quantifier, their referent determined by the quantifier.

Quantifiers and binding

[Every girl]_i [t_i aced her_i exams]

Binding (assigning reference) is subject to ccommand.A quantifier can only assign reference to a variable (its trace and possibly other pronouns) which it c-commands.

Her brother said that every girl aced her exams.

The things which a quantifier c-commands are said to be in its **scope**.

• Quantifiers can only bind variables in their scope.

WCO

Now, let's look at weak crossover again.

- Every girl likes her roommate.
- For every girl x, x likes x's roommate.
- Her roommate likes every girl.
- For every girl x, x's roommate likes x.

Why can't the second sentence have this meaning?

WCO

[Every girl]_i [$_{TP} t_i$ likes her_i roommate].

For every girl x, x likes x's roommate.



[Every girl]_i [_{TP} her_i roommate likes t_i].

For every girl x, x's roommate likes x.

Answer:WCO again. But WCO is about moving a quantifier over a variable—so if WCO rules out this meaning, there must have been movement. There must have been QR.A movement we couldn't see.

ACD

Here's another reason to believe in QR, *antecedent contained deletion*. This one's kind of complicated, so hang on tight.

First, we need to talk about VP ellipsis.

Mary bought a record, and Bill did too.

[TP Mary -ed [vP buy a record]] and
 [TP Bill -ed [vP buy a record]] too.

VP ellipsis

- Mary bought a record and Bill bought a tape.
 ≠ Mary bought a record and Bill did too.
- VP ellipsis is allowed when a preceding VP is identical.
- To interpret this, you need to use the content of the preceding VP.
- Mary bought a record and Bill did (buy a record) too.

VP ellipsis

- We will consider the process of VP ellipsis to be one of *deletion under identity*.
- Underlyingly: -ed [_{vP} Mary sleep] and -ed [_{vP} Bill sleep] too.
- Before deletion: Mary -ed [_{vP} t sleep] and Bill -ed [_{vP} t sleep] too
- Pronunciation: Mary -ed [_v t sleep] and Bill -ed (v t sleep) too Mary slept and Bill did too

VP ellipsis

- So, as long as two VPs in sequence look identical (where traces of movement look identical to one another—they sound the same), we are allowed to pronounce the second one very quietly.
- Like an extreme case of Mary bought a record and Bill bought a record too.

VP ellipsis

Note that identity is actually fairly abstract.

John slept and Mary will too.

John slept and Mary will sleep too.

Before deletion: John -ed [$_{vP}$ t sleep] and Mary will [$_{vP}$ t sleep] too

The inflectional features of v don't matter for identity; the verb doesn't *inherently* have a tense suffix.

VP ellipsis with relative clauses

- Now, consider a DP with a relative clause:
- the record $[Op_i$ that Mary bought t_i].
- Bill :[ikes [the record that Mary bought]. :
- Bill likes the record that Mary bought and Sue does too.
- Bill likes the record that Mary bought and Sue does (like the record that Mary bought) too.

ACD

Bill likes every book Mary does.

Bill [$_{vP}$ likes every book Op_i Mary [$_{vP}$ likes t_i]].

vP: likes [every book Op Mary likes t]

vP: likes t

Those aren't the same.VP ellipsis *shouldn't* work, but yet it does.

The deleted VP is contained in the antecedent VP (antecedent-contained deletion)

QR and ACD

- But now let's consider what QR would do.
- Every book that Mary likes is a quantifier.
- Quantifiers have to move up past the subject by LF.
- Bill likes every book Mary does.
- Pronunciation (before covert movement):
 Bill [_{vP} likes [every book Op_j Mary [_{vP} likes t_j]]].
- LF:
 - [every book Op_i Mary [$_{vP}$ likes t_i]] $_i$ Bill [$_{vP}$ likes t_i].
- But now the VPs are identical. So QR allows us to explain ACD in a natural way.

Where do quantifiers go?

• Every student left.

[Every student]_i [_{TP} t_i left]

We need a variable in subject position, so QR must be moving the quantifier out of TP, to somewhere higher then TP.

Believe me that it is also moving somewhere *lower* than CP.





Relative clauses

- Another place where we see *wh*-movement, besides in explicit questions (either in the main clause or embedded) is in *relative clauses*.
 - •The book which I read
 - •The woman who(m) I met
- These consist of a **head noun** (book, woman) and then what appears to be a *wh*-question that further specifies the referent of the head noun.

Relative clauses

Relative clauses serve to *modify* the head noun. Kind of like adjectives, or PP modifiers.

- The unhappy students.
- The students from Vancouver.
- The students who solved the problem.
- So where would you put them?



Differences between questions and relative clauses

The "question" inside a relative clause has a couple of odd properties, not shared with regular main clause or embedded questions.

- The problem what I solved.
- The problem which I solved.
- The problem which I will solve.
- The problem I solved.
- The problem that I solved.

Which/that/Ø

In addition to being able to say

• The book which Mary read

We can also say

• The book that Mary read

and

• The book Mary read

And they all mean the same thing. So we expect that they would all have basically the same structure (they all have a question adjoined in the nP)—so where is the wh-word in the last two?

Ωp

The secret to these last two kinds of relative clauses is Op, the silent wh-word.

That is, the book which Mary read and the book Mary read are really exactly the same except that in one case you pronounce the wh-word, and in the other, you don't.

the book [$_{CP}$ which_i Mary read t_i]

the book [_{CP} Op_i Mary read t_i]

Ωp

It is also possible to pronounce that with Op, giving us:

the book [_{CP} Op_i that [_{TP} Mary read t_i]]

Why can't we pronounce that with which?

*the book [_{CP} which_i that [_{TP} Mary read t_i]]

Doubly-Filled COMP filter

The Doubly-Filled COMP filter is the traditional "explanation":

Doubly-Filled COMP filter: *[CP wh-word if/that/for...]

You can't pronounce both a *wh*-word and C at the same time. Thus:

the book [$_{CP} Op_i$ [$_{TP} Mary read t_i$]]

the book [CP Op_i that [TP Mary read t_i]]

the book [$_{CP}$ which_i [$_{TP}$ Mary read t_i]]

*the book [$_{CP}$ which_i that [$_{TP}$ Mary read t_i]]

Ôp

- Skeptical of *Op*? Is there really *wh*-movement of *Op*, a silent *wh*-phrase?
- I read the book [_{CP} which_i [_{TP} Mary said [_{CP} that [_{TP} Bill bought t_i]]]].
- *I read the book [_{CP} which_i [_{IP} Mary wonders [_{CP} who [_{TP} bought t_i]]]].
- I read the book [_{CP} Op_i (that) [_{TP} Mary said [_{CP} that [_{TP} Bill bought t_i]]]].
- *I read the book [_{CP} Op_i (that) [_{TP} Mary wonders [_{CP} who [_{TP} bought t_i]]]].



Ôp

Recoverability condition: The content of a null category must be recoverable.

the place $[Op_i (that) Mary bought that book t_i]$

the day $[Op_i (that) Mary bought that book t_i]$

the reason $[Op_i (that) Mary bought that book t_i]$

the way $[Op_i (that) Mary bought that book t_i]$

In each case, we can tell what the *wh*-phrase is by looking at the head noun.











French negation This happens with respect to negation too-the finite verb ΤР move to the left of negative þas... DP_k Т [Neg+V_i]_j+T NegP Jean ne mange pas des pommes. Jean NE eat NEG of the apples ne mange '| doesn't eat apples.' pas Neg *Jean pas ne mange des pommes. But fortunately or unfortunately, things are more complex that this... ΡF

French and a problem...

- Finite verbs (main verbs and auxiliaries) in French precede adverbs and precede negative *pas*—they **must move to T**.
- Now let's look at infinitives, first the auxiliaries...
 - N'être pas invité, c'est triste. NE be_{inf} NEG invited, it's sad 'Not to be invited is sad.'
 - Ne pas être invité, c'est triste. NE NEG be_{inf} invited, it's sad 'Not to be invited is sad.'
- Nonfinite auxiliaries can either move past pas (to T) or not, it appears to be optional.

French and a problem...

- +Fin aux: V Adv, V neg : Moves to T.
- +Fin verb: V Adv, V neg : Moves to T.
- -Fin aux: (V) Adv (V), (V) neg (V): (Opt.) Moves to T.
- Nonfinite main verbs...and adverbs...
 - Souvent paraître triste pendant son voyage de noce, c'est rare. Often appear_{inf} sad during one's honeymoon, it's rare 'To often look sad during one's honeymoon is rare.'
 - Paraître souvent triste pendant son voyage de noce, c'est rare. Appear_{inf} often sad during one's honeymoon, it's rare
 'To often look sad during one's honeymoon is rare.'
- Nonfinite main verbs can either move past adverbs or not; optional like with auxiliaries.

French and a problem...

- +Fin aux: V Adv, V neg : Moves to T.
- +Fin verb: VAdv, V neg : Moves to T.
- -Fin aux: (V) Adv (V), (V) neg (V): (Opt.) Moves to T.
- –Fin verb: (V) Adv (V), …
- Nonfinite main verbs...and negation...
 - Ne pas sembler heureux est une condition pour écrire des romans. NE NEG seem_{int} happy is a prerequisite for write_{int} of the novels 'Not to seem happy is a prerequisite for writing novels.'
 - *Ne sembler pas heureux est une condition pour écrire des romans. NE seem_{inf} NEG happy is a prerequisite for write_{inf} of the novels 'Not to seem happy is a prerequisite for writing novels.'
- Nonfinite main verbs can *not* move past negation.





What is FP?

- Vous avez pris les pommes. you have taken the apples 3MSG 3FPL 'You took the apples.'
- Vous les avez prises. you them have taken **3PL 3FPL** 'You took them (3fpl).'
- Quelles pommes avez-vous prises? Which apples have you taken 3FPL 3FPL
 "Which apples did you take?"
- Vous avez pris la pomme. you have taken the apple 3MSG 3FSG 'You took the apple.'
- Vous l'avez prise. you it have taken 3SG 3FSG 'You took it (3fsg).'
- Quelle pomme avez-vous prise? Which apple have you taken 3FSG 3FSG 'Which apple did you take?'





A new FP

- So, suppose that FP has an uninterpretable feature (that attracts the object) that *can* be strong, optionally.
 - It's strong if it has to be, if the object will get trapped otherwise.
 - It's weak if it doesn't have to be strong (the system is lazy, strong features are work).
- If it's strong, the object moves into SpecFP and the features are checked.
- When the verb moves up to F and on to T, if the feature of F was strong, the agreement features are realized in the verbal morphology.









ECM v. BT

- Mary wants her to leave.
- Bill considers himself to be a genius.
- Before we said that the binding domain for anaphors and pronouns was a clause (say, TP).
- Her and himself above act like they are in the higher clause with the main clause subject.
- Our options are basically to
 - complicate the definition of binding domain in Binding Theory
 - suppose the object has really moved out of the embedded clause.





AgrOP

- Let's take stock here for a second.
- French told us:
 - There needs to be an FP between NegP and VP.
 - Objects that move past FP have to stop there (inducing object agreement)-so FP is AgrOP.
- How does the object get to AgrOP?
 - What differentiates the subject and object is case. So AgrOP is what's responsible for accusative Case. Not v.
- We solved an apparent problem with Binding Theory.
 - ECM subjects seem to be in the higher clause: Bill considers himself to be a genius. Mary wants her to leave.

An AgrO you can see?

So, yet another invisible head, inducing invisible movement. Great. Have you syntacticians no shame?

Recall from earlier this semester that Irish is VSO, but yet seems to be SVO underlyingly:

- Phóg Máire an lucharachán. kissed Mary the leprechaun 'Mary kissed the leprechaun.'
- Tá Máire ag-pógáil an lucharachán. Is Mary ing-kiss the leprechaun 'Mary is kissing the leprechaun.'

If an auxiliary occupies the verb slot at the beginning of the Otherwise, the verb moves to first position.

Northern Irish

- So, basically everything points to Irish being a head-initial language. But yet, there's this:
- Ba mhaith liom [Seán an abairt a^L scríobh] C good with IS S.ACC the sentence.ACC PRT write 'I want S to write the sentence.' S writing the sentence is good with us (lit.)
 - (cf. also I want him to meet me)
- Ba mhaith liom [Seán fanacht] C good with.1s S.ACC wait 'I want S to wait.'

phrase.

phrase?

[acc].

Morphology on French verbs

 Past, varying persons: je mange-ai-s 'eat'

tu mange-ai-s il mange-ai-t

• Fut, varying persons: 'eat'

tu mange-er-as il mange-er-a

je mange-er-ai

Tense morphology is inside and separate from subject agreement morphology.

- Kind of looks like after tense, another, subjectagreeing morpheme is attached...
- C'AgrSP? AgrSP AgrOP, Object agreement DP_k AgrS' AgrSP, Subject agreement AgrS TP Pleasingly symmetrical! Suppose now that AgrSP is responsible for [nom], the EPP $[uD^*]$ is a property of T, AgrOP is responsible for AgrOP DP_k AgrO Why the subject agreement on French verbs? AgrO • [[[[v+V]+AgrO]+T]+AgrS]

\mathbf{C}' Split-INFL AgrSP AgrS' • The assumption of this structure is sometimes AgrS referred to as the "Split-TP INFL" hypothesis; the INFLectional nodes have been "split" into subject agreement, tense, and т AgrOP object agreement. AgrO' Recall from "history" AgrO lessons that what we call TP used to be called "IP" or "InfIP". Hence: Split-DP INFL. DP V

Adopting the Split-INFL hypothesis

Lots of good syntax has been done both *adopting the Split-INFL hypothesis* (trees contain AgrSP, TP, AgrOP) or *not* (trees contain only IP/TP/InfIP).

 For many things, it doesn't matter which you choose—analyses can be directly translated into a Split-INFL tree or vice-versa.

Where it doesn't matter, it doesn't matter, but sometimes it matters.

 On the final and in the homework, for example, it doesn't matter. Stick with vP and TP on the final and homework. But know about AgrOP and AgrSP for future interactions with (particularly slightly older) articles in syntax.

Adopting the Split-INFL hypothesis

The general program is that every dissociable piece of the structure should get its own place in the lexicon, its own functional head...

- Subject agreement is basically common *across* verbs, an independent piece.
- Tense too is an independent piece.
- And object agreement
- And... plural marking... and progressive -ing, aspectual -en, ...
- In Syntax II, we'll spend a lot of the semester looking at places in the tree where functional projections need to be added.