In the last several lectures, we've taken a close look at two kinds of movement. One is Wh Movement, which I've argued involves putting a DP in two positions, as (1) reminds.

(1) Which philosopher’s book about her should every linguist forget?

Presupposition: The output of $f(j_1)$ is a philosopher

And the second is QR, which causes an NP to be shared between a Determiner and a Quantifier, as (2) reminds.

(2) A student read every paper yesterday.

$\forall x. \text{paper}(x) = 1 \rightarrow \text{a_student_read_yesterday}(x) = 1$

$\lambda q. \forall x. \text{paper}(x) = 1 \rightarrow q(x) = 1$

Presupposition: 2 is a paper

In the Wh Movement example, there is a determiner that contains a function and causes the phrases containing it to have a meaning that ranges over different values for that function. The Q morpheme that marks the scope of the question converts those alternatives into the semantic value for the question. Because the Q is in an Agreement relationship with the D, it must merge to a reasonably small phrase containing the Determiner, and it's this phrase that “moves.”

In the QR example, the Q and D must both semantically combine with the same NP. Their selectional requirements force them to combine with an NP, and because they must do so in such a way that allows them to fuse, they will merge to the same NP. They must fuse because English only has vocabulary items that correspond to the D+Q combination and not to Q alone. Because of the constraints
on the fusion operation, the method by which these structures are linearized will force QRd phrases to be spoken in their lowest position.

What I’ve tried to illustrate with these two cases is how “movement” can be seen as the result of demands made by the morphology (Agreement and fusion) in concert with the semantics and the linearization algorithm. These demands can only be met — I claim — by allowing one term to remerge, and that gives us movement.

What I’d like to look at now is how these two kinds of movement can be combined. They have an interesting interaction.

I’ll start by pointing to a difference in the lower DPs of questions and the lower DPs of QR. In the case of questions, the determinant of the lower DP introduces alternatives. These alternatives propagate up through the phrase marker and are used, finally, by the Q operator to form a question. There is no binding, then, between the D and Q in questions. But there is in the DPs that QR. The quantifier in the higher position binds the variable introduced by the DP in the lower position.

(3) The Q in a QRd phrase binds the variable in the lower DP. The Q in a Wh moved phrase does not bind the lower DP, but instead operates on the meaning of the clause it combines with.

This difference in QR and Wh Movement plays an important role in cases of successive cyclic derivations. The evidence for these derivations is strongest in the case of Wh Movement, and so my discussion will be confined to cases of Wh Movement. Successive cyclic derivations are ones in which two sequential applications of movement apply to reposition a term. The evidence for these derivations came first from a consideration of Wh Movement out of embedded clauses, which can occur with the use of movement indicated in (4).

(4) Which book did she say that you should read?

The proposal I will make is that the first movements in a successive cyclic derivation of Wh Movement are in fact QR. Only the last movement is Wh Movement. That wh-phrases can, in principle, QR is suggested by the fact that wh-in-situ phrases can support what look like ACD.

(5) Which child said that you had read which book (yesterday) that he had △?

There are two reasons for this. One is that it gives us an account for why overt Wh Movement in English does not show Beck effects. If the syntax for sentences like (6) is as indicated, then we should expect these sentences to have the same degraded status that they do in certain wh in situ languages.

(6) Which person should only Minsu see?

[\[CP\] = { only Minsu saw \( f \)
only Minsu saw \( f' \)
only Minsu saw \( f'' \), ...}
\[CP\]^\( f \) = ∅]

\[\[TP\] = ∅
\[TP\]^\( f \) = { only Minsu see \( f \)
only Minsu see \( f' \)
only Minsu see \( f'' \), ...}
\[CP\]
\[CP\]^\( f \) = ∅]

\[\[TP\] = ∅
\[TP\]^\( f \) = { only Minsu see \( f \)
only Minsu see \( f' \)
only Minsu see \( f'' \), ...}
\[CP\]
\[CP\]^\( f \) = ∅]

Presupposition: The output of \( f, f', f'', \ldots \) is a person.

Beck’s account of Beck effects is that focus sensitive operators, like only, use the focus semantic values of the things they combine with, and this disturbs the use of
these focus semantic values that a higher question morpheme makes. The syntax in (6) predicts that this problem should arise in English questions as well, but it doesn’t.

However if we let this sentence have a successive cyclic derivation, and allow the first step in such a derivation to be QR, we’ll have a representation like (7).

(7) Which person should only Minsu see?

In this example, there is a DP headed by a determiner that will get spelled out as which, under Agreement with Q. These are the DPs that we’ve seen before function as the “traces” of Wh Movement. In this example, however, this DP shares its NP with another DP, DP′, whose head also introduces variables over functions. These are the kinds of DPs that we’ve seen functioning as the traces of QR. So we must let the DPs that are headed by which be among those things that can QR.

Notice that because the higher determiner is getting matched to a vocabulary item by way of Agreement with Q, it need not fuse with the determiner of the lower DP. One of the consequences of fusion is that the QR’d phrase must get spelled out in its lower position. When fusion is lifted, as it is in this example, so also is that consequence for where the expression gets spelled out. As a result, where the which phrase gets linearized will be determined by what the language particular component says about wh-phrases in general. For English, this means it will show up at the left edge of the question.

Adopting this view of successive cyclic movement, then, requires that whether fusion is forced or not hinges on the nature of Q. It also means that we must let the English lexicon include an unpronounced determiner that is functioning as the “trace” in this example. We can’t let fusion be forced, in other words, by the need to spell out the determiner in the lower copy of QR. So, we’ll need a system like that in (8).

(8) **Principle of Full Interpretation**

Every terminal in $\phi$ must have an exponent in Spell Out ($\phi$).

a. Spell Out $\left( \begin{array}{c} D \\ \llbracket \text{the} \rrbracket \\ n \end{array} \right) = \text{silence}$

b. Spell Out $(\forall) = \emptyset$

c. Spell Out $\left( \forall + \begin{array}{c} D \\ \llbracket \text{the} \rrbracket \\ n \end{array} \right) = \text{every}$

d. Spell Out $(D_{wh}) = \text{which}$

That QR must be covert — that is, invoke fusion and all its consequences — whereas Wh Movement can have an “overt” step devolves to how the language has decided to map its determiners and quantifiers onto lexical items.

This gives us a way of modeling the “exceptions” to terseness that arise when DPs move. Recall that in cases of verb movement, terseness is lifted in cases where the verb makes a different word in both its positions. This allows that verb to show up twice in the resulting string. That doesn’t happen with DP movement, however. When a DP moves, we don’t see the noun, say, showing up in the two positions in the string. That’s because the noun is inside a different word in those positions, and phrasal movement can’t achieve that. Phrases can’t be parts of words. What does happen, however, is that sometimes the lower position of a moved DP appears in the string as a pronoun. This happens most often in relative clauses. If we think of pronouns as intransitive determiners, this syntax allows for a way of understanding that. A relative clause might have the structure in (9).
(9) the girl that you visited

This would be the syntax for a “head raising” analysis of relative clauses. In such examples, we have to let there be an operator associated with the complementizer that binds the variable left by movement. I’ve represented that with an index on the relative operator. The key idea in the head raising analysis of relative clauses is that the NP part of the moved expression is also what the relative clause modifies. The representation shown here could achieve that. This is another instance where the NP is semantically interpreted in both of its positions, but the linearization scheme allows it to show up in the string by virtue of only one of these positions. In English the determiner in the lower position is silent. But it's perfectly possible that in other languages, it would be possible for that determiner to be overtly pronounced. If it were, no problem for linearization would emerge. When determiners are pronounced alone, they can be expressed as pronouns. This might be how we get resumptive pronouns.

The structure in (7) does not lead us to expect Beck effects. The relationship between DP$_3$ and DP’ is one of variable binding, and that can happen over focus sensitive operators like only. The focus semantic values introduced by which don’t commence until a larger portion of the phrase marker is encountered. As a consequence, there are no focus sensitive operators between Q and the DP headed by which, and therefore no Beck effect is expected.

That is one reason for believing that the first step in a successive cyclic derivation of Wh Movement is QR. Another reason has to do with the ability of Wh Movement to bleed disjoint reference effects. (10) is an example of that sort.

(10) Which picture behind Sam$_1$ does he$_1$ dislike?

It is possible to understand Sam$_1$ and he to corefer in this example. Without the representations made available by successive cyclic derivations, this is unexpected. (10) should get the representation in (11), which places Sam within the scope of he.$^1$

(11)

That should make (10) parallel to (12) with regard to coreference, and that is wrong.

(12) * He$_1$ dislikes a picture behind Sam$_1$.

The standard solution to examples like (10) is to let the PP containing Sam“late merge” into a higher NP, and therefore not be in the lower NP where it would incur a disjoint reference effect.$^3$ If we are to adopt that solution, it means that there

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$^1$ The idea goes back to Lebeaux (1988).
must be a higher position in which this PP can be semantically interpreted. That higher position cannot be the merged-to-Q position, however, since the question Q does not semantically combine with the phrase it has merged to. Without successive cyclic movement, our representations only offer one position for the material within a Wh-moved phrase to be interpreted, and that is the lowest position. But as these examples show, there needs to be some higher position that the material can be interpreted in.

If successive cyclic movement can involve QR steps, then those needed higher positions can be produced. Letting QR feed Wh movement in (10) will produce a representation like (13).

\begin{equation}
\text{(13) } \begin{array}{c}
\text{CP} \\
\text{QP} \\
\text{Q} \\
\text{C} \\
\text{TP} \\
\text{does} \\
\text{DP}_3 \\
\text{which} \\
\text{NP} \\
\text{the} \\
\text{PP} \\
\text{behind Sam}_1 \\
\text{PP} \end{array}
\end{equation}

Presupposition: 3 is a picture
Presupposition: The output of f is a picture behind Sam

QR merges the DP which picture behind Sam to TP in this example, and this DP binds the picture. Because the higher DP is outside the scope of he, Sam and he can corefer.

This technique allows us a means of expressing the full gamut of reconstruction type effects. One that requires some thought, however, is what Barss (1986) calls the “multiple binding domain effect,” illustrated by (14).

\begin{equation}
\text{(14) } \begin{array}{c}
\text{a. } \text{* Sally}_1 \text{ said that you bought a book about herself}_1. \\
\text{b. Which book about herself}_1 \text{ did Sally}_1 \text{ say that you bought?}
\end{array}
\end{equation}

The representation we would give to (14b) is (15).

\begin{equation}
\text{(15) } \begin{array}{c}
\text{CP} \\
\text{QP} \\
\text{Q} \\
\text{C} \\
\text{TP} \\
\text{did} \\
\text{DP}_1 \\
\triangle \text{Sally} \\
\text{T} \\
\text{VP} \\
\text{say} \\
\text{CP} \\
\text{CP} \end{array}
\end{equation}

In this representation, book about herself is semantically interpreted in two positions. The higher of its two semantically interpreted positions puts it close enough to Sally for herself to be bound by Sally and still meet the locality conditions of Principle A. We need to formulate the locality condition that governs how far a reflexive can be from its binder in a way that is sensitive to the possibility of an
anaphor having more than one position. So, for instance, something like (16) won’t work correctly in this case.

(16) A reflexive must be bound by something that is in its binding domain. A binding domain for $\alpha$ is the smallest TP that dominates $\alpha$. $X$ is smaller than $Y$ if $Y$ dominates $X$.

The multidominant trees make it hard to define what’s needed here. Here’s a stab at it. I’ll leave everything of the traditional binding domain definition intact, and redefine “smallest TP that dominates $\alpha$.”

(17) Let $P(\alpha) = \{n_1, n_2, \ldots, n_m\}$ be a series of nodes, such that each $n_{i+1}$ immediately dominates $n_i$, $n_1$ immediately dominates $\alpha$, and $n_m$ is a root. The smallest $\beta$ dominating $\alpha$ is that $n_i$ with the smallest $i$ which is in every $P(\alpha)$.

It is thought that Principle C effect cannot always be overcome by Wh movement. There are certain circumstances where a name in a Wh moved item behaves as if it must be semantically interpreted within the scope of something that wh-phrase has moved past. The technique for controlling reconstruction effects here can capture these cases in a way that is parallel to the standard account. Consider, for instance, (18).

(18) * Whose looking up Sally$_1$ did she$_1$ talk about?

(Assume that behind whose is which of one’s.) The expression “whose looking up Sally” is a nominal gerund in English that mixes nominal and verbal syntax. It’s not found (I have discovered) in everyone’s English, but it’s described in Wasow and Roeper (1972) and Baker (1985) and it exists in my English. Roughly speaking, what happens is that a VP is nominalized and this allows that VP to exist within a DP. Instead, this sentence must get the representation in (19), and this triggers a Principle C effect.

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2 See Fox (1999).
So, if this is right, one component of the contrast between cases were Principle C is triggered by reconstruction and cases where it’s not is the transitivity of the head noun or verb involved. This, unfortunately, is a very slippery area, as most nouns are not obligatorily transitive. To trap them into their transitive meaning can be done (I think) by choosing deverbal nouns, supplying them with a subject argument and fixing on their process meaning. (Those ingredients are the ones recommended by Grimshaw.) Let me briefly sketch out some of these factors.

Consider the following paradigm.

(20) a. The (many) examinations stunk.
   b. John’s (many) examinations stunk.
   c. The (many) examinations of Steve stunk.
   d. John’s (many) examinations of Steve stunk.

(21) a. The (lengthy) examination wasn’t well attended.
   b. John’s (lengthy) examination wasn’t well attended.
   c. The (lengthy) examination of Steve wasn’t well attended.
   d. John’s (lengthy) examination of Steve wasn’t well attended.

Consider first the b-examples. In (21b), John must be the object argument of examination, whereas in (20b), John can be understood as the subject (or possessor) argument. We learn from the pair (21c) and (21d), that subject arguments of nouns are always optional. We can explain why (21b) does not allow John to have the subject argument role if examination, when it is argument taking, must take an object. (21b) would have the same status as (22).

(22) ?* John examined throughout the week.

If the same examination is present in (21a) that is present in (21b), then (21a) should also be ungrammatical. I think examination has taken on an eventive/process reading that is non-argument taking. I speculate that examination, then, has three meanings: a result meaning (= (20)), a meaning parallel to the verb evaluate (= (21b-d)), and a non-argument taking, eventive reading (= (21a)). I think parallel things could be said about promotion.

Consider now a question that involves movement of a DP with a noun inside, rather than a verb.

(23) * Whose examination of Sally did she talk about?

We can see that the version of examination in the lower position must be the one that does not take arguments. But the one that is found in the higher position is the one that takes arguments. These are not the same noun, though, and so this representation fails.
It may well be the general fuzziness of the distinction between these two kinds of nouns that is responsible for the chaotic judgements reported in the literature, and their general fuzziness. I find contrasts of the sort that suggests the result vs. process distinction is playing a role in our reconstruction examples as well.

(24)  
a. ?* Which examination of Jane₁ was she₁ a part of?  
b. ?* Whose examination of Jane₁ does she₁ dislike?  
c. Which examination of Jane₁ does she₁ dislike?

(25)  
a. * Whose kissing (of) Jane₁ does she₁ recall?  
b. * Which kissing (of) Jane₁ did she₁ witness?  
c. * Whose painting (of) Jeremy₁ blue did he₁ see?  
d. ?? Which paintings of Jeremy₁ did he₁ want framed?

In those examples where a process reading is forced, either by the predicate that is selecting the DP or by the internal make-up of the DP, we get a Principle C effect. That successive cyclic Wh movement can involve steps that are QR has independent support from cases where the wh-phrase contains a quantifier. A well-studied example of that kind is found in how many questions, like (26).

(26)  
How many examples of Wh movement will we have to endure?

Let’s take a closer look at how the system here captures these facts. We should begin by getting a fix on what the structure for a how many DP is. Let’s start with the simpler, non-interrogative, cases of many DPs. Hackl (2000) has argued that these expressions involve degree phrases in which the degrees being measured are numerical amounts. That permits a unified analysis of the expressions in (29).

(29)  
a. He dodged (that) many questions.  
b. He dodged more questions (than you).  
c. He likes soup more than he likes kumquats.

more is the comparative form of many: it means what manier would. We can see from (29b) that many can be part of a comparative construction then, and from (29c), we see that these comparatives can involve comparisons of amounts that aren’t numerically expressible. A standard way of expressing the amounts that are involved in these expressions is with “degrees” on a scale that is invoked by the predicates involved. So our first step is, following Hackl, to take many to express an amount of a degree. In the case of simple expressions like (29a), those degrees can be thought of as simple numerical amounts. So the meaning we’ll assign to (29a) will be something tantamount to “He ate an amount of kumquats that is many.” Here’s a stab at that:

(27)  
a. * How many stories about Diana₁ is she₁ likely to invent?  
b. How many stories about Diana₁ is she₁ likely to reinvent?  
(fashioned after Fox 1999, (19): 167)

(28)  
a. * How many houses in John’s city does he₁ think you should build?  
b. How many houses in John’s city does he₁ think you should rebuild?  
(Fox 1999, 20: 167)

The creation verbs invent and build favor an interpretation in which many stories is interpreted in the embedded clause. This forces Diana to be interpreted in this position, and a disjoint reference effect arises as a consequence.
(30) He dodged that many questions.
(31) \[ [\text{that}] = \text{a contextually fixed degree} \]
(32) \[ [\text{many}] = \lambda d \lambda P \lambda x. \text{d-many}(x) \land P(x) = 1 \]

\[
\begin{array}{c}
\text{TP} \\
\text{DP} \\
\triangle \\
\text{he} \\
\text{T} \\
\text{dodged(somex that-many}(x) \land \text{questions}(x) = 1) \\
\text{VP} \\
\text{some } x \text{ that-many}(x) \land \text{questions}(x) = 1 \\
\text{DP} \\
\text{dodged} \\
\text{D} \\
\lambda x. \text{that-many}(x) \land \text{questions}(x) = 1 \\
\text{NP} \\
\text{DegP} \\
\lambda x. \text{questions}(x) \\
\text{NP} \\
\text{that } \lambda d \lambda P \lambda x. \text{d-many}(x) \land P(x) = 1 \\
\text{questions} \\
\end{array}
\]

I've existentially closed off the \( x \) variable introduced by \textit{many} at the DP level. I've represented that with "some." We can think of this as coming about by a existential closure operator that is inserted to fix free variables and shift the types, or we can think of this as being contributed by the "D" in this representation.

In \textit{how many} questions, the \textit{how} quantifies over the degree variable: \( d \) part. That is, the part that is occupied by \textit{that} in (30). There is evidence that we should see \textit{how} as being equivalent to \textit{which degree}. That evidence is that \textit{how} many questions can be understood to seek functions as answers, just as we've seen \textit{which} questions do.

(33) How many books should everyone read?
A: 6
A: more than her professor

The second of these two answers expresses a function, one that gives amounts of books that depend on the value given to \textit{everyone}. What we're seeing here, then, is that the degree variable which the question determiner binds is parallel to the individual variable that \textit{which} binds in simpler questions like (34).

(34) Which book should everyone forget?
A: \textit{Movement in Language}
A: Her first

In the case of \textit{which}-phrases, we built the variable up from a definite determiner and an "index" that contains the function.

(35) \[ [\text{which book}] \text{ in trace position } \approx \]
\[
\begin{array}{c}
\text{[DP]} \\
\text{D} \\
\text{NP} \\
\text{the } f \\
\text{book} \\
\end{array}
\]

The meaning we require for (33) is something equivalent to "which degree many books should no one read?" So we're going to want to equate \textit{how} with the "the degree" part.

(36) \[ [\text{how}] \text{ in trace position } \approx \]
\[
\begin{array}{c}
\text{[DP]} \\
\text{D} \\
\text{degree} \\
\text{the } f \\
\end{array}
\]

So, this means that the DP which moves in \textit{how many} questions looks like (37).

(37) \[
\begin{array}{c}
\text{DP} \\
\text{D} \\
\text{NP} \\
\text{DegP} \\
\text{NP} \\
\text{how} \\
\text{many} \\
\text{books} \\
\text{DegP} \\
\text{NP} \\
\text{degree} \\
\text{the } f \\
\end{array}
\]
Consider next what the highest “D” position in this phrase is. The D associated with these expressions can be indefinite, as in (38), and when it is it shows up after the DegP.

(38) How many a book (have you read?)

I’ll assume that English has a silent plural definite article as well. We might parse the indefinites as (39) indicates.

(39)

```
(39)                      (40)
       CP                      CP
          QP                    QP
            Q                    C
               |                    |  TP
               ＿                  ＿
               is                  is
               DP1                 TP
                  ＿                ＿
                  she                ＿
                  T                 AP
              ＿                ＿
             likely              to
                ＿                ＿
               VP                 ＿
                  ＿                ＿
                 ＿                ＿
                VP                 ＿
                  ＿                ＿
               invent              reinvent
               ＿                ＿
               ＿                ＿
             DP                  DP
               ＿                ＿
               ＿                ＿
             DegP                DegP
               ＿                ＿
               how               how
               many              many
               D                 D
               NP                NP
              ＿                ＿
             the                the
            degree            degree
            ＿                ＿
                     ＿
                    ＿
                   ＿
                  ＿
                 ＿
                ＿
               ＿
              ＿
            ＿
           ＿
          ＿
        ＿
      ＿
    ＿
  ＿
＿

We can leave the denotation I’ve given for many the same if we understand the indefinite determiner to be semantically vacuous.

These DPs provide us with a way of forming representations for how many questions that captures the contrasts in (27) and (28). In one representation, there has been no successive cyclic movement, and many is interpreted in the lower position.

Presupposition: The output of $f$ is a degree

This representation is the only one that will fit creation verbs like invent, as we’ll see in a moment. As you can see, this representation puts Diana within the scope of she, and this is the reason we find a disjoint reference effect in the case where invent is used.
The other representation is one in which the how many phrase QRs first.

(41)

Presupposition: The output of $f$ is a degree.

Presupposition: 3 is a story.

This representation doesn't fit well with creation verbs like invent. When we work out what (41) means, we'll see that many introduces an existential quantification, and the DP in object position is a variable bound by this existential quantification. So, this sentence is going to say that there exist some stories about Diana, and then adds that she is likely to invent them. But inventing stories that already exist is an anomalous thing to say. By contrast, when indeterminates are interpreted in the object position of creation verbs, as in (40), they lose their existential force, and that is why (40) is not anomalous. Because this is the only representation that puts Diana outside the scope of she, it is the only representation in which Diana and she can corefer. This explains, then, the contrast in (26).

It is useful to compare these examples with ones in which how is part of a predicate, not a DP, as in questions like (42).

(42) How happy is Sally?

The idea about adjectives like happy is that they are relations between degrees and individuals. So a sentence like (43) has the representation in (44).

(43) Sally is happy.

(44)

The how in (42) is the same one that we saw in how many questions. As in how many questions, questions like (42) can get a functional reading.

(45) How happy is every student?

A: Way more than her professor!

So (42) gets an analysis like that indicated in (46).
Now, an interesting difference between examples like these, where *how* is part of an AP, and those like (26), in which *how* is part of a DP, is that in these AP cases there is no possibility of QR, and therefore no possibility of successive cyclic movement. If successive cyclic movement is not possible, then everything in the moved phrase (except Q) must be interpreted in its lowest position. This predicts that Principle C effects should be unavoidable, and this is known to be the case.

(47)  a. *How satisfied by Sarah’s debate was she?*
    b. *How satisfied because of Sarah’s performance did she say you were?*

(For a discussion of these cases, see Barss 1986, Huang 1993 and Takano 1995.)

The reason there is no possibility of QR is because the AP that is moved is not a definite description. The cases we have seen where a variable exists in the lower position are both cases in which a definite description is placed in this position. If the position a term moves from is not a position in which a definite description can be interpreted, then we will not have an example of movement that gets translated into a variable-binder relationship. Instead, these cases of movement will all be instances where the moved item behaves, semantically, as if it hadn’t moved.

I think this provides us with a place to test the semantics for questions that I adopted. If these wh-APs, which cannot be QRd, are interpreted in their lowest position then we should find that they are incapable of overcoming the interrupting effect of focus sensitive operators. So we should find a contrast, then, between the examples in (48).

(48)  a. How many pictures has only Minsu purchased?
    b. How happy is only Minsu?

I don’t believe there is a contrast. I made a mistake, perhaps. It doesn’t look like the semantics of questions in Korean and Japanese is the same as that for English questions.

References


