1 Raising: Introduction

- In a grammar without movement, how can you capture the facts of Raising?

1. Raising by lexical entailment

Contra the Movement theory, Raising verbs denote a relation between an individual $x$, denoted by an NP, and a property $P$, denoted by an infinitival VP.

\begin{align*}
(1) \quad &\text{Obama}=\text{NP} : o \\
&\text{seems}=(\text{S}/\text{NP})/\text{VP}_{\text{inf}} : \lambda P \lambda x. \text{seem}'(x, P) \\
&\text{to.like.Michelle}=\text{VP}_{\text{inf}} : \ldots \text{like}'(m)(\ldots) \\
&\Rightarrow \text{Obama seems to like Michelle}=\text{S} : \text{seem}'(o, \text{like}(m))(\ldots)
\end{align*}

An analysis like this is often applied to Control verbs. And given this, a sentence like:

\begin{align*}
(2) \quad &\text{Hillary tries to seem to be nice}.
\end{align*}

might seem to force an analogous treatment of Raising. If “try” is just a relation to a VP-meaning, then there can’t have been Raising of NP in this sentence.

Attractions:

(a) No additions to the theoretical toolbox.
(b) Direct syntactic dependency between surface subject and verb with which it agrees.

Worries:

- No syntactic or type-theoretic distinction between Control and Raising. So they can be distinguished only in the interpretations of the verbs (i.e. the meaning postulates associated with them). Is that enough??

2. Raising by lexical inheritance (AW: ‘lexical Geaching’)

As assumed by the Movement theory, a raising verb like seems expresses a function from propositions to propositions, $\langle(s, t), (s, t)\rangle: \lambda \Phi. \text{seem}'(\Phi)$. Thus its expected syntactic type is $\text{S}/\text{S}$; we can assume that it is more specifically $\text{S}/\text{S}_{\text{inf}}$.

However, the verb in fact has a different category, namely one we would derive from $\text{S}/\text{S}_{\text{inf}}$ by Lambek Division, aka Geaching, over category NP:
\[(S\backslash NP)/(S_{inf}\backslash NP) : \lambda P \lambda x.\text{seem}'(P x)\]

This is what Geach suggested we do for S-adverbs that adjoin to VP, except done in advance.

(3) \(\text{Obama}=\text{NP} : o\)
\(\text{seems}=(S\backslash NP)/(S_{inf}\backslash NP) : \lambda P \lambda x.\text{seem}'(P x)\)
\(\text{to.like.Michelle}=(S_{inf}\backslash \text{NP}) : \lambda x.\text{like}'(x, m)\)
\(\Rightarrow \text{Obama seems to like Michelle} = S : \text{seem}'(\text{like}(o, m))\)

**Attractions:**
(a) No major additions to the theoretical toolbox.
(b) Traditional semantics for the verbs.
(c) The traditional semantics entails a difference between Control and Raising—and one that immediately predicts the ‘inheritance’ of the subject’s semantic dependence on the lower verb.
(d) Syntactic dependencies between the raising verb and its surface subject can be mediated by its lexical category, which mentions that NP. Importantly, this is not something that could be done if the Geaching were done on-line in the syntax.

**Worries:**
– Not obvious at the outset.

3. **Raising by Composition in the syntax**

Just like under the Movement theory, raising verbs are again of type \(\langle t, t \rangle\), and their syntactic category directly reflects this...

**But** actually their category is a bit funny, in that it necessarily combines with the adjacent by Function Composition: \(S//S_{inf}\).

(Jacobson writes: \(S//S_{inf}\))

(4) \(\text{Obama}=\text{NP} : o\)
\(\text{seems}=(S//S_{inf}) : \lambda \Phi.\text{seem}'(\Phi)\)
\(\text{to.like.Michelle}=(S_{inf}\backslash \text{NP}) : \lambda x.\text{like}'(x, m)\)
\(\Rightarrow \text{Obama seems to like Michelle} = S : \text{seem}'(\text{like}'(o, m))\)

We add at least this rule of combination:

(5) \(X//Y \ Y\backslash Z \Rightarrow_B X\backslash Z\)

And potentially others, as needed:

(6) a. \(X//Y \ Y/Z \Rightarrow_B X/Z\)
b. \( Y \backslash Z \quad X \backslash Y \Rightarrow \mathbb{B} \quad X \backslash Z \)

c. \( Y / Z \quad X \backslash Y \Rightarrow \mathbb{B} \quad X / Z \)

**Attractions:**

(a) The subject NP is in both syntactically and semantically an argument of the infinitival VP, and in no sense an argument of the raising verb. Raising is distinguished from Control both syntactically and type-theoretically.

(b) Preserves the direct reflection of semantic type in syntactic category—or does it?

**Worries:**

(a) A new category-type in the toolbox, one which puts a intrinsic wedge between semantic type and syntactic distribution.

(b) No syntactic dependency between subject NP and Raising verb.

## 2 Before we move on: raising verbs without Raising

- Anything like a CG-approach to Raising will have to assign a different category to ‘alternates’ of the raising verb which take a finite S complement:

(7) It seems that Hillary has lost her mind.

- From the point of view of the type/category correspondence, the most attractive solution would the category \( S / S_{\text{fin}} \).

But this would require something analogous to default insertion of the expletive, ‘for EPP reasons’ or whatever. And this is the sort of thing is considered profane.

- What Jacobson does instead is assign types like: \( (S \backslash \text{it}) / S \).

Since this too violates the simplest version of the type/category correspondence, it’s not clear to me why this is any less profane than the familiar ‘expletive by default’ approach.

## 3 Evidence for the FC Raising analysis

- Generally, evidence for the Movement theory will also support both the Syntactic Composition and Lexical Geaching over the Lexical Entailment theories.
But the Lexical Entailment theory can’t simply be dismissed as semantically inadequate. One needs grammatical evidence against it.

Jacobson endeavors to provide some arguments of this sorts, as well as some that favor Syntactic Composition over Lexical Geaching (which seems a more difficult task, at first blush).

• An important wrinkle in Jacobson’s account:
  She takes the Composition theory to be right for Raising with infinitival clauses—but not for Raising with bare predicates. For these she assumes Lexical Geaching.

(8)  a. Hillary only seems to be sane.  
    b. Hillary only seems sane.

Syntactic Composition
Lexical Geaching/Inheritance

(9)  a. *Hillary crazy.
    b. Hillary is crazy.
    c. I consider Hillary crazy.
    d. Hillary seems crazy.

The only exception is absolute sentential adjuncts and Alfred E. Newman questions. And if you have to choose which one to count as the special case, seems like it should be these.

(10)  a. With Hillary crazy, McCain stands a better chance.
    b. Hillary sane? You must be crazy.

So there is some initial plausibility to the idea that Raising verbs that take AP complements have a category that reflects this.
3.1 Complement Drop

• While the infinitival VPs in Control constructions sometimes drop, depending on the verb:

(11)  a. Bill tried to leave, and I tried as well.
     b. I hoped to leave, but I never promised.

(12)  a. Bill persuaded Al to run, but he did not persuade John.
     b. I convinced him to leave, but I didn’t convince her.

…the infinitival VP in a Raising constructions never drops.

1. Raising to Subject

(13)  a. Obama seems to like Michelle.
     b. * Bill also seems.

(14)  a. Bears tend to hibernate.
     b. * And amphibians tend as well.

(15)  a. Obama is certain to beat McCain.
     b. * Whereas Hillary is not certain.

2. Raising to Object

(16)  a. Smart money expects Obama to win.
     b. * But the Chinese expect Hillary.

(17)  a. My wife considers me to be incorrigible.
     b. * Just like I consider her.

• If this is considered a process of Complement Drop:

  – Then this is expected under either the Movement or the Composition theories, since the
    infinitival VP is not an Argument under either.

  – Whereas it is hard to explain under any account—the Entailment or Lexical Geaching
    theories—where the Raising verb has the VP as an argument.

• But what bare AP complements to raising verbs? Jacobson assumes that here the raising verb
  is lexically Geached. And yet, with respect to Complement Drop, these behave outwardly just
  like Raising with infinitival VPs?
(18) * Obama seems happy, and Michelle seems as well.
(19) * We consider Obama intelligent, and they consider as well.

Jacobson chalks this up to the “independent fact [that] an AP complement position never deletes”:

(20) * John feels angry, but I don’t think Mary feels.

Satisfied?

### 3.2 No VP/NP alternation

- Control verbs generally allow their infinitival complements to be swapped for an NP, without change of meaning.

(21) He tried something, namely to eat his own hand.

But Raising verbs never do:

(22) * He seemed something, namely to like his own hand.
(23) * Obama expects her something, probably to drop out of the race.

- This is expected, Jacobson argues, if what the NP replaces is an entire argument of the verb. The Raising verbs don’t have the infinitival as an argument to the exclusion of the ‘raised’ subject NP.

Thus all you could hope for is something like (??). But perhaps we can rule this out via whatever rules out (??).

(24) * Something seems (to me), namely Hillary to be crazy.
(25) * (For) Hillary to be crazy seems (to me).

And in the case of Object raising, we do get this:

(26) I want something, namely for you to leave.
3.3 Nominalization

- Jacobson discusses the well-known difference between Raising and Control verbs with respect to their special, or root nominalizations: appearance versus eagerness, for example.

- I think her point can be made more directly with the -ing gerunds. Gerunds of control verbs allow drop of the infinitival, while gerunds of raising verbs do not.

(27) Hillary’s trying (to leave) was commendable.
(28) McCain’s appearing *(to be insane) was distressing.

Again the suggestion is that Raising verbs do not have the infinitival as an argument to the exclusion of the raised subject.

- I don’t know why the lexically Geach’ed raising verbs should not permit this, however.

3.4 Raising is upwards

- If Raising dependencies were lexically mediated, there would be no fundamental reason why it couldn’t go from an overt NP in a lower position to a ‘blank’ in an upper position.

(29) * To be toilet paper didn’t seem there.

- But arguably there are such cases of Control:

(30) To lose would bother Mary.

- So why not backwards Raising via Lexical Geaching?

(31) * Angry seems John.

According to Jacobson, this is ruled out, not by anything deep, but just by whatever it is that keeps APs out of subjects generally:

(32) a. To be angry would bother His Holiness.
     b. * Angry would bother His Holiness.
3.5 Fronting of VP

- Jacobson discusses a putative contrast between Raising and Control verbs in the preposability of the infinitival VP, with only the Control verbs allowing it. But I don’t buy the data. For me, (33) is the best you can do, and that’s not good enough.

(33)  a. ?? To win, I will certainly try.
       b. ?? To take out the garbage, I actually remembered.

- However, there does seem to be a sharp contrast between Raising with VPs and Raising with APs. The latter clearly allow displacement.

(34)  * To be nice though he may appear, he is in fact the Devil Incarnate.
(35)  Nice though he may appear, he is in fact the Devil Incarnate.

- This is some of the best evidence that Raising verbs with AP complements actually do have the AP as an argument, separate from the subject.

3.6 Raising only out of arguments

- One possible advantage of any of these accounts, as opposed to the Movement account, is that they directly predict that Raising can only be ‘out of’ arguments, and not out of adjuncts.

This has to be independently added to the theory of Movement, it would seem.

4 The biggest unresolved problem

- Agreement on the raising verb.

(36)  a. Al seems to be tired.
       b. * They seems to be tired.
5 Some questions

- Formally, Jacobson’s theory treats Raising out of infinitivals as a lexically governed instance of **Forward Crossing Composition**.

Recall that \( B_x > B \) was **deliberately blocked** within Steedman’s system, in order to rule out, for example:

\[(37) \quad * \text{Kant Hume thought that was brilliant but wrong.} \]

So the theoretical question is, should we allow lexically governed instances of combinatory schemes that are **generally** excluded?

6 Binding

6.1 Steedman on Principles A and C

- Steedman has a close analog of the standard BT (version 2.0, but not higher), but stated over **semantic representations**, or “logical forms,” or “predicate-argument structures” (PAS).

1. Only reflexives that cannot be replaced with pronouns are controlled by the BT. It is pretended that true reflexives only occur in argument positions.

2. Reflexives and reciprocals are treated as denoting functions over verb meanings—e.g. *self‘* or *other‘*—but Steedman says next to nothing about their interpretation. What is clear is that these are not the functions that accomplish the covaluation of variables in the *derivation*. That is done by:

3. A lexical rule that reflexivizes a predicate—*but leaves its valence intact*:

\[(38) \quad RX[(S \backslash NP\_agr)/X : f] = ((S \backslash NP\_agr)/X\_+ANA,agr : \lambda g\lambda ygf(ana’y)y) \]

E.g.:

\[(39) \quad RX[(S \backslash NP\_agr)/X : loves’] = ((S \backslash NP\_agr)/X\_+ANA,agr : \lambda g\lambda ygloves’(ana’y)y) \]

Here \( g \) ranges over anaphor meanings, like *self‘* or *other‘*.

The function *ana‘* is essentially a diacritic marking ‘binding.’ If you didn’t have this, there would be nothing in the PAS hat told you that argument coincides syntactically with an anaphor, and hence it would be impossible to state the BT over PAS.
Thus we derive “John loves **himself**” as follows:

<table>
<thead>
<tr>
<th>0</th>
<th>NP&lt;sub&gt;3sm&lt;/sub&gt; : j</th>
<th>((S\NP&lt;sub&gt;3sm&lt;/sub&gt;) / X&lt;sub&gt;ANA,3sm&lt;/sub&gt; : λgλygloves'(ana'y)y</th>
<th>NP&lt;sub&gt;ANA,3sm&lt;/sub&gt; : self'&lt;br&gt;self&lt;sub&gt;3sm&lt;/sub&gt; : λyself'loves'(ana'y)y</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>NP&lt;sub&gt;3sm&lt;/sub&gt; : j</td>
<td>((S\NP&lt;sub&gt;3sm&lt;/sub&gt;) : λyself'loves'(ana'y)y</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>(S : self'loves'(ana'y))j</td>
<td></td>
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</table>

- **C-command** is defined in the obvious way over the structure of the semantic representations, with an order defined over arguments of relations.

The perceived ‘general case’ is that later arguments c-command earlier arguments: subjects c-command objects.

But remember, Steedman is no Wrapper. Therefore, in the case of double complement constructions, there is a systematic mismatch between order of application and c-command in the semantic representation: the first object in c-commands the second object in.

(40) **C-command**

A node α in a predicate-argument structure c-commands another node β if the node immediately dominating α dominates β and α does not dominate β—or if α is the argument [i.e. the variable part] in a pro-term [i.e. something like ana'y] and the pro-term c-commands β [i.e. things like ana'y don’t count as ‘branching nodes’].

- **Binding** is then defined, roughly, as being c-commanded by an identical variable.

In the case of constants, like j, being bound means being c-commanded by a token of the same constant, where both instances of that constant were supplied by the same word in the string.

- **There is no explicit Principle A.**

Rather a kind of “Implicit Principle A” follows from the assumed basics, since the only way that a reflexive pronoun is licensed is by the application of RX to a lexical functor. So the only domain in which a reflexive *could* be bound is the minimal clause projected by a verb.

- **There is an independently stipulated Principle C.**

(41) Principle C: Nothing but the argument in a pro-term may be bound.
(42)  * John said that Mary loves himself.

\[ said'\left(loves'(m)(ana'j))(j) \]

Underivable, by implicit Principle A

(43)  * He_k thinks that every man_k is a genius.

Principle C

(44)  Chapman tried to be easy to please

\[ try\left(easy\left(ONE, please\left(ONE, (ana'c))\right)\right) \]

Notice: no Principle A violation

Interestingly, Principle C rules out a class of otherwise possible Parasitic Gaps, where the main gap would c-command in the parasitic gap in PAS:

(45)  a.  * (That’s the guy who) I showed to in the mirror

b.  \[ show \text{ to} = (S\backslash NP)/NP : \lambda y\lambda x.\text{show}'(x, y, y) \]

7 Jacobson on Principle B

• Ordinary pronoun:

  1. Syntactic Category: $\text{NP}$

  Gloss: A category $A^B$ has the distribution of an $A$, but the semantic type of an $A/B$.

  2. Semantic Value: $\lambda x[x]$

  Gloss Identity function over individuals.

• How do verbs combine with pronouns?

  – Geach the verb: $A/B \mapsto_{\text{Geach}} (A/C)/(B/C)$

  \[
  \text{Geach}(\text{dance}'_{(e,t)}) = \lambda V_{(e,t)}[\lambda x_{(e)}[\text{dance}'(V(x))]]
  \]