Fun with Syntax
the story so far:
• phrase structure rules

NP--> (DetP) (AP) N (PP)
IP--> NP I VP
...

the story so far:

- phrase structure rules

\[
\begin{align*}
\text{NP} & \rightarrow (\text{DetP}) \ (\text{AP}) \ N \ (\text{PP}) \\
\text{IP} & \rightarrow \text{NP} \ I \ \text{VP} \\
\text{XP} & \rightarrow (\text{WP}) \ X' \\
X' & \rightarrow (\text{YP}) \ X' \\
X' & \rightarrow X \ (\text{ZP})
\end{align*}
\]
the story so far:

- phrase structure rules

\[
\begin{align*}
XP & \rightarrow (WP) X' \\
X' & \rightarrow (YP) X' \\
X' & \rightarrow X (ZP)
\end{align*}
\]

X-bar schema

fill in variables freely...

\[
X=N, \ W=\text{Det}, \ Y=A \ or \ P, \ Z=P...
\]
the story so far:
  • phrase structure rules

XP--> (WP) X'  X-bar schema
X'--> (YP) X'
X'--> X (ZP)

fill in variables freely...
  X=N, W=Det, Y=A or P, Z=P...
...subject to various conditions:

Projection Principle
the story so far:

• phrase structure rules

XP--> (WP) X'  \hspace{1cm} \textbf{X-bar schema}
X'--> (YP) X'
X'--> X (ZP)

fill in variables freely...

X=N, W=Det, Y=A or P, Z=P...

...subject to various conditions:

\textbf{Projection Principle, Head Direction Parameter...}
the story so far:
  • phrase structure rules
  • movement operations:

head-movement

Will you __ put rocks in the soup?
the story so far:
  • phrase structure rules
  • movement operations:

head-movement
  Will you ___ put rocks in the soup?

wh-movement
  what will you put ___ in the soup?
D-structure ("Deep Structure")

CP
  ┌─ C'
  │   ┌─ C
  │    └─ IP
  │        ┌─ NP
  │           └─ I'
  │               ┌─ N'
  │                   └─ I
  │                        └─ VP
  │                             ┌─ will
  │                                └─ N
  │                                   ┌─ V'
  │                                       └─ you
  │                                           ┌─ V
  │                                               └─ put
  │                                                   ┌─ N'
  │                                                      └─ P'
  │                                                          ┌─ N
  │                                                              └─ P
  │                                                                  ┌─ NP
  │                                                                         └─ np
  │                                                                             ┌─ what
  │                                                                                   └─ in
  │                                                                                       ┌─ the
  │                                                                                               └─ soup
What will you put in the soup?
Head-movement

CP
  NP
    C'
      N'
        C
          IP
            N'
              I'
                NP
                  I
                    V
                      VP
                        put
                          PP
                            P
                              P'
                                NP
                                  in
                                    the soup
                                      N
                                        you
                                          N
                                            N'
                                              what
                                                N
                                                  N'
                                                    C
                                                      IP
                                                        N'
                                                          I'
                                                            NP
S-structure ("Surface Structure")

```
CP
  NP C'
    N' C+I IP
      will
    N N P I'
      what
    N' I VP
      N V'
        you
      V
        put
      PP
        P'
          P NP
            in
            the soup
```
the story so far:
  • phrase structure rules
  • movement operations:

head-movement again
Will you ___ put rocks in the soup?
the story so far:
  • phrase structure rules
  • movement operations:

head-movement again
Will you __ put rocks in the soup?
Should you __ put rocks in the soup?
Can you __ put rocks in the soup?
the story so far:

• phrase structure rules
• movement operations:

head-movement again

**Will** you \_\_ put rocks in the soup?

You **-d** have rocks in your head.
You **-Ø** have rocks in your head.
the story so far:
  • phrase structure rules
  • movement operations:

head-movement again
Will you __ put rocks in the soup?

"had" ("Affix Hopping")
You -d have rocks in your head.
You -Ø have rocks in your head.
the story so far:
  • phrase structure rules
  • movement operations:

head-movement again
Will you __ put rocks in the soup?

-d you __ have rocks in your head?
-Ø you __ have rocks in your head?
the story so far:
  • phrase structure rules
  • movement operations:

head-movement again
Will you ___ put rocks in the soup?

Do+d you ___ have rocks in your head?

Do+Ø you ___ have rocks in your head?

("Do-insertion")
projection principle revisited:

All and only the sisters of a head must be selected by the head.
projection principle revisited:

All and only the sisters of a head must be selected by the head.

I devoured the kumquats
I put the kumquats in a bowl
*He fainted the idea
*He devoured
What happens when a head doesn't select for a sister?

....well, then it doesn't have a sister.

He fainted.
Notice, however, that there's nothing comparable in subject position.

*Rained.

It rained.
Notice, however, that there's nothing comparable in subject position.

*Rained.
It rained.

*Seems that John has died.
It seems that John has died.
These its don't seem to be ordinary ones...

It squeezed John.
It seems that John has died.
Extended projection principle:

All and only the sisters of a head must be selected by the head....

...oh, and Spec IP must be filled.
(...if there's nothing else to fill it, you can insert an **expletive** like **it**--which doesn't mean anything, but allows you to satisfy the Extended Projection Principle)
Another use for the Extended Projection Principle?

The snake squeezed John.
John was squeezed.

I put the kumquats in a bowl.
The kumquats were put in a bowl.
Another use for the Extended Projection Principle?

The snake squeezed John.
John was squeezed.

I put the kumquats in a bowl.
The kumquats were put in a bowl.

-->same reasoning that prompted us to posit wh-movement leads us to suspect movement here...
D-structure:

was squeezed John

EPP forces movement:

was squeezed John

S-structure:

John was squeezed
**NP-movement:**

a new kind of movement, driven by the EPP.

```
IP
  NP I'
  ▲
      I was VP
          V'
              V squeezed
```

John
NP-movement: a new kind of movement, driven by the EPP.

another instance of NP-movement:

\textbf{It} seems [that John is sick]

\textbf{John} seems ___ to be sick
another argument for NP-movement: **idioms**

- lots of V-XP idioms:

<table>
<thead>
<tr>
<th>Expression</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>kick the bucket</em></td>
<td>'die'</td>
</tr>
<tr>
<td><em>buy the farm</em></td>
<td>'die'</td>
</tr>
<tr>
<td><em>spill the beans</em></td>
<td>'reveal a secret'</td>
</tr>
<tr>
<td><em>yawn in Technicolor</em></td>
<td>'vomit'</td>
</tr>
</tbody>
</table>
• ...but there are no XP-V idioms:

*the armadillo bit...
• ...but there are no XP-V idioms:

*the armadillo bit...*

• this isn't because subject can't be part of an idiom:

  the cat is out of the bag
  the shit has hit the fan
John bought the farm the shit -ed

hit the fan -ed
the armadillo

- ed

VP

V

bit

NP

John

--> idioms must be constituents.
so what about....

The shit hit the fan.
so what about....

    The shit hit the fan.

    The shit seemed to hit the fan.
so what about....

The shit hit the fan.
The shit seemed to hit the fan.
The shit seemed to be likely to hit the fan.
idioms must be constituents in Deep Structure.

D-structure

seemed [the shit to hit the fan]

NP-movement

seemed [the shit to hit the fan]

S-structure

the shit seemed [to hit the fan]
Movement types:

• head-movement:
  will you ____ eat these kumquats?

• wh-movement:
  what is she eating ____?

• NP-movement:
  the cat seems [ ____ to be out of the bag]
Common ground:

- Head movement constraint

  He will have eaten all the kumquats by the time we get there.
  
  *have he will have eaten all the kumquats by the time we get there?

  --> given a choice between two moveable heads,
  move the higher one.
Common ground:

- NP-movement:

  __ seems [John to like kumquats]

  John seems [__ to like kumquats]

  * kumquats seem [John to like __]

  --> given a choice between two moveable NPs, move the higher one.
Common ground:

you gave what to whom?

What did you give __ to whom?

*To whom did you give what __?

-->given a choice between two moveable wh-phrases, move the higher one.
**Shortest Move:**

Make movement paths as short as possible.

\[ \alpha \]

\[ \beta \]
Shortest Move:

Make movement paths as short as possible.
Shortest Move:

Make movement paths as short as possible.
Shortest Move:

Make movement paths as short as possible.

(given a choice between two movement paths, pick the one that crosses the fewest nodes (where 'cross' is defined as 'go from being dominated by to not being dominated by'))
The timing of movement interactions: CED effects

Who did you buy [a book about ___]? Who did [friends of ___] buy a book?
The timing of movement interactions: CED effects

Who did you buy [a book about __]?  
* Who did [friends of __] buy a book?

CED (Condition on Extraction Domains):  
You can't move out of something in Spec IP.
Who was [a book about ___] bought?
* Who was [a book about __] bought?
a result of two operations:

was bought [a book about who]

NP-movement:

[a book about who] was bought ___
a result of two operations:

was bought [a book about who]

**NP-movement:**

[a book about who] was bought __

**wh-movement:**

Who was [a book about __] bought __ ?

-->*CED: no extraction from Spec IP
But why not do the operations in the opposite order?

\[
\text{was bought [a book about who]}
\]

\textbf{wh-movement:}

\[
\text{who was bought [a book about __]}
\]
But why not do the operations in the opposite order?

was bought [a book about who]

wh-movement:
who was bought [a book about ___]

NP-movement:
Who was [a book about ___] bought ___?
But why not do the operations in the opposite order?

was bought [a book about who]

wh-movement:
who was bought [a book about __]

NP-movement:
Who was [a book about ___] bought __?

Here CED wasn't violated--should be okay?
Apparently we need to prevent wh-movement from taking place before NP-movement.

But how?

to be continued....