Syntax

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I really do not know that anything has ever been more exciting than diagramming sentences.

— Gertrude Stein

1. S = Sentence
2. NP = Noun Phrase, N = Noun
3. VP = Verb Phrase, V = Verb
More diagramming

1. Adjp = Adjective Phrase, Adj = Adjective
2. Deg = “Degree” word (classically an Adverb)
3. VP = Verb Phrase, V = Verb
Choices

Which one is right?

S

NP  VP

Adj  N  V

Corporate  profits  rose

S

NP  VP

Adj  N  V

Corporate  profits  rose

S

AdjP  NP  VP

Adj  N  V

Corporate  profits  rose

S

VP  VP  NP

V  V  N

Corporate  profits  rose
More complicated

Bad: Omit Head

* very ___ profits suddenly rose

* very high profits suddenly ___

* very high ___ suddenly rose

Good: Omit modifier

___ high profits suddenly rose

very high profits ___ rose

___ profits suddenly rose
1. very modifies high

2. Terminology
   (a) Head: high
   (b) Modifier: very
   (c) Adjective Phrase: very high

3. The type of phrase is determined by the head

1. very high modifies profits

2. Terminology
   (a) Head: profits
   (b) Modifier: very high
   (c) Noun Phrase: very high profits
1. A head together with its modifiers makes a phrase.
2. A subject (NP) and a predicate (VP) makes a sentence.
Still more complicated

very high unexpected profits returned
*very ___ unexpected profits returned
very ___ unexpected profits returned

very modifies Adjectives.
## Modifier/Head rules

<table>
<thead>
<tr>
<th>Modifier</th>
<th>Head</th>
<th>Example</th>
<th>Phrase</th>
</tr>
</thead>
<tbody>
<tr>
<td>very</td>
<td>Adj</td>
<td>very unusual</td>
<td>ADJP Deg Adj very unusual</td>
</tr>
<tr>
<td>Adv</td>
<td>Adj</td>
<td>beautifully illustrated</td>
<td>ADJP Deg Adj beautifully illustrated</td>
</tr>
<tr>
<td>very</td>
<td>Deg</td>
<td>very beautifully illustrated</td>
<td>?? very illustrated</td>
</tr>
</tbody>
</table>
Modifier/Head rules

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<td>Deg</td>
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?? very illustrated
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<th>Phrase</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adv</td>
<td>V</td>
<td><em>currently working</em></td>
<td>VP</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>currently</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>working</td>
<td></td>
</tr>
<tr>
<td>Adv</td>
<td>V</td>
<td><em>working currently</em></td>
<td></td>
</tr>
<tr>
<td>Adj</td>
<td>N</td>
<td><em>beautiful book</em></td>
<td></td>
</tr>
</tbody>
</table>
## Modifier/Head rules II

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<th>Example</th>
<th>Phrase</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adv</td>
<td>V</td>
<td><em>currently working</em></td>
<td>VP</td>
</tr>
<tr>
<td>Adv</td>
<td>V</td>
<td><em>working currently</em></td>
<td>VP</td>
</tr>
<tr>
<td>Adj</td>
<td>N</td>
<td><em>beautiful book</em></td>
<td></td>
</tr>
</tbody>
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# Modifier/Head rules II

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<th>Phrase</th>
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<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>V</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
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</tr>
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<td></td>
<td></td>
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<tr>
<td>Adj</td>
<td>N</td>
<td>beautiful book</td>
<td>NP</td>
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<td></td>
<td></td>
<td>Adj</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>N</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>beautiful working currently</td>
</tr>
</tbody>
</table>

Syntax – p. 10/32
Choices revisited

Which one is right?

S

NP

Adj

Corporate

N

profits

VP

V

rose

S

NP

Adj

Corporate

N

profits

VP

V

rose
Choices revisited

Which one is right?

S

NP

Adj

Corporate

N

profits

VP

V

rose

S

NP

Adj

Corporate

N

profits

VP

V

rose

Corporate modifies profits.
They should be a phrase.
Which one is right?

S
  NP    VP
  Adj  N  V
  Corporate  profits  rose

S
  AdjP  NP    VP
  Adj  N    V
  Corporate  profits  rose
Which one is right?

Corporate modifies profits. They should be a phrase.
Which one is right?

S
  /      
NP  VP
   /    
Adj  N  V
   /    
Corporate  profits  rose

S
  /      
VP  VP  NP
   /    
V  V  N
   /    
Corporate  profits  rose
Which one is right?

Corporate modifies profits.
They should be a phrase.

Corporate is an Adj.

profits is a N. (in this sentence)

rose is a N (in this sentence).
Ambiguity

Newspaper headlines (thanks to Chris Manning)

1. Ban on Nude Dancing on Governor’s Desk
2. Iraqi Head Seeks Arms
3. Juvenile Court to Try Shooting Defendant
4. Teacher Strikes Idle Kids
5. Stolen Painting Found by Tree
6. Local High School Dropouts Cut in Half
7. Red Tape Holds up New Bridges
8. Clinton Winds on Budget, but More Lies Ahead
9. Hospitals are Sued by 7 Foot Doctors
10. Kids Make Nutritious Snacks
Syntactic ambiguity I

1. Ambiguous parts of speech \((\text{strikes, idle})\)
2. Different modification relations
Pure Structural ambiguity

1. No ambiguous parts of speech
2. No changes in word meaning (cf. *Iraqi Head Seeks Arms*)
3. Just different modification relations
4. I shot an elephant in my pajamas. How he got in my pajamas I’ll never know! (Groucho Marx)
Semantics of modification

1. The dancing is on the governor's desk: *nude dancing on teh governor's desk* is a phrase.

   Ban on

   ![Diagram](image)

2. The ban is on the governor's desk: *Nude Dancing on the governor's desk* is not a phrase

   ![Diagram](image)
Express the meaning

I hate raw fish and onions.
Express the meaning

I hate raw fish and onions.

I hate raw fish and I hate onions.
I hate raw fish and onions.

I hate raw fish and I hate raw onions.
Draw the tree yourself

Draw two trees for the following Noun Phrase

Synthetic buffalo hides

1. Hides from synthetic buffalo

2. Buffalo hides that are synthetic
   This tree will be revised!
Draw two trees for the following Noun Phrase

Synthetic buffalo hides

1. Hides from synthetic buffalo

```
  NP
  /   
 NP    N
  /     |
NP     hides
  |
  |
Adj    N
  |
  |
synthetic buffalo
```

2. Buffalo hides that are synthetic

This tree will be revised!
Draw two trees for the following Noun Phrase

Synthetic buffalo hides

1. Hides from synthetic buffalo

2. Buffalo hides that are synthetic

This tree will be revised!
Complements and Specifiers

X = N

Specifier that
Head picture
Complement of Mary
### 4 kinds of Examples

<table>
<thead>
<tr>
<th>Part Of Speech</th>
<th>Specifier</th>
<th>Head</th>
<th>Complement</th>
<th>Phrasetype</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preposition (P)</td>
<td>in</td>
<td>[NP</td>
<td>the house]</td>
<td>PP</td>
</tr>
<tr>
<td>Preposition (P)</td>
<td>[DEG right]</td>
<td>under</td>
<td>[NP the porch]</td>
<td>PP</td>
</tr>
<tr>
<td>Verb (V)</td>
<td>write</td>
<td>[NP</td>
<td>a letter]</td>
<td>VP</td>
</tr>
<tr>
<td>Verb (V)</td>
<td>[ADV never]</td>
<td>answer</td>
<td>[NP a letter]</td>
<td>VP</td>
</tr>
<tr>
<td>Noun (N)</td>
<td>[DET a ]</td>
<td>picture</td>
<td>[PP of the ocean]</td>
<td>NP</td>
</tr>
<tr>
<td>Noun (N)</td>
<td></td>
<td>pictures</td>
<td>[PP of the ocean]</td>
<td>NP</td>
</tr>
<tr>
<td>Adjective (Adj)</td>
<td>[DEG quite]</td>
<td>afraid</td>
<td>[PP of ducks]</td>
<td>Adjp</td>
</tr>
<tr>
<td>Adjective (Adj)</td>
<td></td>
<td>glad/sad</td>
<td>[S that John left]</td>
<td>Adjp</td>
</tr>
</tbody>
</table>
Fixes, Concepts
Anything string of words that comes under a single label (called a node) in a tree is a constituent:

```
S
  NP       VP
    |        |
    N   |   NP
   John | ate | Det | N
     |   the | apple
```

Constituents: John, ate, the, apple, the apple, ate the apple, John ate the apple

Non constituents: John ate, John ate the, ate the.
We will have only one way of building phrases: **Merging**.

Take two constituents: Put them together to make a phrase in accordance with Xbar theory. One constituent is a head, the other a modifier. So now we need LAYERS.

---

**Old**

```
S
  NP
    ADJP
      Deg
        very
      Adj
        unexpected
    Adj
      high
    N
      profits
  VP
    V
      returned
```

**New**

```
S
  NP
    ADJP
      Deg
        very
      Adj
        unexpected
    Adj
      high
    N
      profits
  VP
    V
      returned
```
Problem: Some adverbs behave differently

(1) a. He was a very tired man.
    b. * He very works.
    c. He was too tired to speak.
    d. * He too worked (to have fun).

Some “adverbs” only modify adjectives/adverbs/prepositions. We will call ALL modifiers of adjectives/adverb/prepositions *Deg* (for Degree).

Do this even for words that CAN modify
Sentences have no heads

We say the *tense* is the head.

Old → New

```
S
 /\  
NP  VP
    /\    /\ 
  Det  N  V  Det  N
   the  child reads  a  book
```

```
IP
 /\  
NP  I'
    /\    /\  
  Det  N  I  VP
   the  child  -Pst  
       read  Det  N
               a  book
```
Sentences now have heads

We say the **tense** is the head. A certain set of function words seems to be designed to ONLY have one tense: Modals: \((\textit{will}, \textit{would}, \textit{might}, \textit{shall}, \textit{should}, \textit{can}, \textit{could}, \textit{must}, \textit{may})\)

Old

```
S
  |NP
  |  |VP
  |  |  |V
  |  |  |  |VP
  |  |  |  |  |V
  |  |  |  |  |  |Det
  |  |  |  |  |  | a
  |  |  |  |  |  |N
  |  |  |  |  |read
  |  |Det
  |  | N
  |child
  |the
```

→ New

```
IP
  |NP
  |  |I'
  |  |  |VP
  |  |  |  |V
  |  |  |  |  |Det
  |  |  |  |  | a
  |  |  |  |  |N
  |  |  |  |read
  |  |NP
  |  |Det
  |  | N
  |child
  |the
```

Syntax – p. 27/32
The book does this:

```
NP
  Det
  N'
  the
  N
  child
```

You can do this:

```
NP
  Det
  N
  the
  child
```

```
IP
  NP
    N'
    I
    VP
      N
      +Pst
      V'
      Children
      V
      smile
```

```
IP
  NP
    N
    I
    VP
      Children
      +Pst
      V
      smile
```
Sometimes the trees we get from XBar theory don’t cover all the ground. We get modifiers separated from their heads. We explain this by movement. The existence of one kind of structure in the language IMPLIES the existence of another very closely related structure.

<table>
<thead>
<tr>
<th>Orig</th>
<th>Implied</th>
<th>Problem</th>
</tr>
</thead>
<tbody>
<tr>
<td>Someone stole the painting</td>
<td>The painting was stolen (t) (by someone)</td>
<td>Complement separated from head</td>
</tr>
<tr>
<td>John should leave.</td>
<td>Should John (t) leave?</td>
<td>Head separated from complement</td>
</tr>
<tr>
<td>John should give the book to someone?</td>
<td>Who should John (t) give the book to (t)?</td>
<td>Complement separated from head.</td>
</tr>
</tbody>
</table>
Trees related by movement

D-Structure for passives

S-Structure for passives

IP

NP

I'

VP

I

VP

be

VP

Det

the

NP

be

Det

the

stolen

N

painting

I'

VP

be

stolen

I'

VP

be

t
D-Structure for passives         S-Structure for passives

Movement Trees II

CP
   |
   C'
C
   |
   +Q
NP
   |
   N
Aristotle
I'
   |
   I
VP
   |
   V
speak
NP
   |
   Det
which
languages

CP
   |
   C'
NP
   |
   Det
which
languages
I'
   |
   I
could
VP
   |
   V
speak
NP
   |
   Det
which
languages

Aristotle
t
V
speak
t
1. Xbar theory provides the basis for a language universal approach to **phrase-structure**.

2. Structure is hierarchical: phrases inside phrases inside phrases

3. The structure is **RECURSIVE**: NPs can occur inside NPs, S’s inside S’s:

   \[ (2) \ [s \text{ John believes that } [s \text{ Mary is a fool }]. ] \]

4. There multiple tree representations for a single sentences related by MOVEMENT. So there is more than LEVEL OF REPRESENTATION is syntax: deep (D-Structure) and surface (S-structure).

5. Does this remind you of anything in phonology?