Syntax

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Linguistics 101
OUTLINE

INTRODUCTION

SYNTACTIC CATEGORIES

CONSTITUENCY TESTS

NOTES

Determining Word Categories
Tree Drawing
THE BASICS

**Definition**

The study of phrase/sentence structure.

- Syntax is one component of grammar.
**The Basics**

**Grammaticality**

- Given a set of words, such as the, a, cat, rat, chased, only certain orders are grammatical.
- The syntax of a language determines grammatical and ungrammatical orders.

The cat chased a rat.
A cat chased the rat.
The rat chased a cat.
A rat chased a cat.
* The cat a rat chased.
* Cat the chased rat the.
* Chased the cat a rat.
* The a cat rat chased.
The syntactic structure of an expression also reflects the order in which words are combined (thereby reflecting meaning).
The grammaticality of a syntactic structure is not dependent on meaning.

Native speakers share intuitions about even nonsensical sentences.

‘Colorless green ideas sleep furiously.’

* ‘Ideas green sleep colorless furiously.’
Grammatical Relations

- Grammatical relations and syntactic position (e.g. subject, object) are distinct.
- Sentences with the same meaning may have more than one grammatical order.
- In both sentences below, ‘the cat’ is the *chaser* and ‘the rat’ is the *chasee*.
  - [The cat]_{subject} chased the rat.
  - [The rat]_{subject} was chased by the cat.
THE BASICS

AMBIGUITY

• Just as words can be ambiguous (=**lexical** ambiguity), phrases can be as well (=**structural** ambiguity).

**Example**

‘We need more intelligent administrators’

• [more intelligent] administrators
• more [intelligent administrators]

**Example**

‘I saw the man with a telescope’

• I saw [the man] [with a telescope]
• I saw [the man [with a telescope]]
THE BASICS

RECURSIVENESS

- Syntax is **recursive**.
  
  **E.G.** A clause can be placed inside another clause.
  
  ‘John left.’
  ‘Bill said that [John left.]’

  **E.G.** A noun phrase can be placed inside another noun phrase.
  
  ‘John’s dog.’
  ‘Mary’s [brother’s [dog’s tail]]’

- Languages all appear to have recursion, though not always of the same type.
**THE BASICS**

**SENTENCE LENGTH**

- Because syntax is recursive, there is no maximum length of a sentence.

  John said that Mary said that Susan said that...that the sky is blue.

  The girl [at the store [with the expensive coat [made of wool [taken from sheep [living in a country [where sheep wear gold [which is plentiful in the mines [in which . . . ]]]]]]]] bought a glass of water.
SYNTACTIC CATEGORIES

QUESTIONS

1. How do we know if a word is a noun, verb, adjective, etc?
2. How do we even know that there are syntactic categories?
**Syntactic Categories**

- Evidence of different syntactic categories comes from the distribution of words.

  The _____ is on the table.  I _____ the flower.
  
cat
wallet
*run
*pretty

  smelled
picked
*cat
*pretty
Languages do not all have the same categories; however, they all seem to have nouns and verbs.

In English, we have the following word categories (and more):

1. determiners (D) a, the, an, my, his, each, that...
2. nouns (N) cat, book, wallet, happiness...
3. verbs (V) run, walk, surpass, alienate...
4. adjectives (Adj) pretty, old, small, likeable...
5. prepositions (P) in, on, up, to, with, from...
6. complementizers (C) that, whether, if...
7. auxiliaries (Aux) be, do, can, will...
8. adverbs (Adv) quickly, very, surprisingly...
Syntactic Constituents

- Combining words together forms **constituents**.
  - Non-constituents: a, small, dog
  - Constituents: [small dog], [a small dog]
- A **phrase** is a type of constituent.
  - Non-phrase: [small dog]
  - Phrase: [a small dog]
- In discussing constituents, we will concern ourselves only with phrases.
In English, we have the following phrasal categories (and more):

1. sentence (S)
2. noun phrase (NP)
3. verb phrase (V)
4. complementizer phrase (CP)
5. prepositional phrase PP

Note that phrases can occur inside other phrases.
SYNTACTIC CONSTITUENTS

ENGLISH PHRASAL CATEGORIES

S
  NP
    N
    John
  VP
    V
    said
    CP
      C
      that
      S
        NP
        D
        N
        the
cat
        V
        fell
        PP
          P
          off
        NP
          D
          N
          the
table
SYNTACTIC CONSTITUENTS

CONSTITUENCY TESTS

QUESTION

1. How do we determine whether a group of words forms a constituent?

2. How do we know what type of phrase a group of words forms?

- Various constituency tests are used to resolve these questions.
Some common constituency tests are listed below.

1. stand alone
2. substitution
   i. pronoun (picks out NPs)
   ii. ‘do (so)’ (picks out VPs)
   iii. ‘one’ (picks out NPs)
3. clefting
4. move-as-a-unit
5. deletion
Stand-alone Test

- If a group of words can stand alone in response to a question, it is a constituent.
- The stand-alone test does not distinguish between types of phrases.
**STAND-ALONE TEST**

**EXAMPLE**

‘The boy watched a funny movie.’

Q) Who watched a funny movie?  
A) The boy. = constituent
A) *The.
A) *Boy

Q) What did the boy watch?  
A) A funny movie. = constituent
A) *A funny. 
A) *funny movie

Q) What did the boy do?  
A) Watch a funny movie. = constituent
A) *Watch.
Stand-alone Test

Example

- The constituency of words is reflected in syntactic trees.

```
S
  NP  VP
    D   N  V
       the boy watched
          D  Adj  N
             a funny movie
```
**Substitution Tests**

- Certain words can substitute for groups of words. These words can determine what forms a constituent.
- Some substitution tests can distinguish between phrase types.
Substitution Tests
Substitution with Pronouns → NPs

‘The boy watched a funny movie’
The boy _He_ watched a funny movie. ‘The boy’ = NP
*The boy _he_ watched a funny movie.
*The _He_ boy watched a funny movie.

The boy watched _a funny movie_ _it_
*The boy watched _a funny movie_ _it_
*The boy watched _a funny movie_ _it_

‘a funny movie’ = NP
**Substitution Tests**

**Substitution with Pronouns → NPs**

Original sentence: "the boy watched a funny movie."

Substitution with pronoun: "He watched it."
**Substitution Tests**

Substitution with ‘do (so)’ → VPs

‘The boy watched a funny movie.’
I watched a funny movie did, too. ‘watched a funny movie’ = VP
*I watched did a funny TV show.*
**Substitution Tests**

**Substitution with ‘do (so)’ → VPs**

‘John said that Bill died, and...
‘...Tom said that Bill died did, too.’
‘...Tom died did, too.’

‘said that Bill died’ = VP
‘died’ = VP
**Substitution Tests**

**Substitution with ‘one’ → NPs**

‘I met a professor of linguistics with a sexy smile, and ...’

Sarah met a professor of linguistics with a sexy smile one, too.
Sarah met a professor of linguistics one with a great personality.

*Sarah met a professor one of math with a great personality.

- In the sentence above, ‘a professor’ is not a constituent!
- In other sentences, it can be:
  
  I met a professor. Sarah met a professor one, too.

- Constituency, therefore, must be determined one a case-by-case basis.
**Substitution Tests**

**Substitution with ‘one’ → NPs**

```
S
  NP  VP
    N  V
     met
    NP
      PP
        P
          with
          NP
            D
              a
              sexy
              smile
            P
              of
              N
                linguistics
          D
            a
            NP
              N
                professor
```
**Substitution Tests**

**Substitution with ‘one’ → NPs**

```
S
  └── NP
    └── V
        ├── NP
        │   └── NP
        │       └── N
        │           └── PP
        │               └── P
        │                   └── NP
        │                         └── N
        │                             └── PP
        │                                 └── P
        │                                     └── NP
        │                                           └── N
        └── NP
            ├── NP
            │   └── N
            │       └── PP
            │           └── P
            │               └── NP
            │                   └── N
            │                       └── PP
            │                               └── P
            │                                               └── NP
            │                                                   └── N
            └── NP
                ├── NP
                │   └── N
                │       └── PP
                │           └── P
                │               └── NP
                │                   └── N
                └── VP
                    └── NP
                        └── V
                            └── NP
                                └── N
                                    └── PP
                                        └── P
                                            └── NP
                                                └── N
                                                    └── PP
                                                        └── P
                                                            └── NP
                                                                └── N
                                                                    └── PP
                                                                        └── P
                                                                            └── NP
                                                                                └── N
                                                                                   └── PP
                                                                                       └── P
                                                                                           └── NP
                                                                                               └── N
                                                                                                   └── PP
                                                                                                       └── P
                                                                                                           └── NP
                                                                                                               └── N
                                                                                                                   └── PP
                                                                                                                       └── P
                                                                                                                           └── NP
                                                                                                                               └── N
                                                                                                                                   └── PP
                                                                                                                                 └── P
                                                                                                                                       └── NP
                                                                                                                                               └── N
                                                                                                                                                              └── PP
                                                                                                         └── P
                                                                                                             └── NP
                                                                                                                 └── N
                                                                                                                     └── PP
                                                                                                                         └── P
                                                                                                                             └── NP
                                                                                                                                └── N
                                                                                                                                    └── PP
                                                                                                                                              └── P
                                                                                                                                                  └── NP
                                                                                                                                                    └── N
                                                                                                                                                                                                                       └── PP
                                                                                                                                                                                                                                           └── P
                                                                                                                                                                                                                                                                               └── NP
                                                                                                                                                                                                ivirus
```
Substitution Tests

Substitution with ‘one’ → NPs

The diagram illustrates a sentence structure with the following labels:
- N: Noun
- V: Verb
- P: Preposition
- PP: Prepositional Phrase
- Adj: Adjective
- D: Determiner
- NP: Noun Phrase
- VP: Verb Phrase
- S: Sentence

The sentence structure is:
- S
  - NP
    - N
      - V
        - met
        - one
      - NP
        - D
          - a
          - professor
        - PP
          - of
          - NP
            - D
              - a
              - sexy
              - smile
            - linguistic
**SUBSTITUTION TESTS**

**SUBSTITUTION WITH ‘one’ → NPs**

* S
  └── NP
    └── VP
      └── V
          met
      └── NP
          one
            └── NP
                a
                professor
            └── PP
                P
                with
                    D
                    a
                    great
                    sexy
                    personality
      └── PP
          P
          with
          D
          a
          of
          N
          math
          linguistics
Clefting Test

• The clefting test involves placing a group of words in the frame:
  ‘It was/is a _____ that/who/when/etc S’

• The clefting test does not distinguish phrasal categories.

‘The boy watched a funny movie.’

It was a funny movie that the boy watched a funny movie.

It was the boy that/who the boy watched a funny movie.

*It was the boy watched that the boy watched a funny movie.

‘The man slept under the tree.’

It was under the tree that the man slept under the tree.
Move-as-a-unit Test

- If a group of words can move together, it is a constituent.
- The move-as-a-unit test does not distinguish phrasal categories.

John studied syntax because it was so fascinating.

→ Because it was so fascinating, John studied syntax.

...and without a second thought, he jumped into the pit.

→ ...and without a second thought, into the pit he jumped.
Deletion Test

- If a group of words can be deleted together, it is a constituent.
- The deletion test picks out VPs.

‘Robin was planning to see the movie on Tuesday, and...’
Lee was planning to see the entire movie on Wednesday.
Lee was planning to see the movie on Tuesday also.
Lee was planning to see the entire movie on Tuesday also.

- Note, however, that deletion can also pick out Vs alone.

‘John bought a book, and Mary, bought a bag.’
DELETION TEST

‘Robin was planning to see the movie on Tuesday, and...’
**Deletion Test**

‘Robin was planning to see the movie on Tuesday, and...’
Deletion Test

‘Robin was planning to see the movie on Tuesday, and...also’
DELETION TEST

‘Robin was planning to see the movie on Tuesday, and...also’
SYNTACTIC CONSTITUENTS

CONSTITUENCY TESTS: SOME NOTES

- Constituency tests are sentence-specific.
- Constituency tests are language-specific.
The following word and phrasal categories are the ones you must know when drawing syntactic trees for this course:

<table>
<thead>
<tr>
<th>N</th>
<th>noun</th>
<th>NP</th>
<th>noun phrase</th>
</tr>
</thead>
<tbody>
<tr>
<td>P</td>
<td>preposition</td>
<td>PP</td>
<td>prepositional phrase</td>
</tr>
<tr>
<td>V</td>
<td>verb</td>
<td>VP</td>
<td>verb phrase</td>
</tr>
<tr>
<td>C</td>
<td>complementizer</td>
<td>CP</td>
<td>complementizer phrase</td>
</tr>
<tr>
<td>D</td>
<td>determiner</td>
<td>S</td>
<td>sentence</td>
</tr>
<tr>
<td>Adj</td>
<td>adjective</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
DETERMINING WORD CATEGORIES

- The following slides summarize some ways to identify word categories.
- Word-category tests are language-specific.
- A word of caution: words do not necessarily pass all of the tests for the category they belong to.
- Even if you are already competent identifying word categories, you should look at ‘determiner’ and ‘complementizer’.
INTRODUCTION

Syntactic Categories

Constituency Tests

Nouns

Syntactic Tests

- Can ‘license’ determiners like the and a.
  the cat (cat = N)
  *the pretty (pretty ≠ N), the pretty bird (bird = N)

Morphological Tests

- Can often take plural marker -s
  one cat, two cat-s
- Can often take possessive marker –’s
  the cat’s tail, women’s health center
**Prepositions**

**Syntactic Tests**

- Must be followed by NPs (at least in our class).
  
  to the store

  (‘the store’ = NP)
**Verbs**

**Syntactic Tests**

- Can follow ‘to’ following verbs like *want* or *try*
  - want to leave / go / try
  - try to fly / eat / run
- Can license modals like *can, will, must, should.*
  - I can go / leave / try
  - *You must. / *You must quickly. (ungrammatical without context)
  - You must quickly go.

**Morphological Tests**

- Can often take past-tense marker *-ed*
  - walked, jumped
- Can take agreement marker *-s*
  - I walk, he walks
- Can take progress marker *-ing)*
  - I am trying to leave
COMPLEMENTIZERS

SYNTACTIC TESTS

• Must be followed by a full sentence.
  John say that Bill left.  
  John asked if/whether Bill left.  

  (Bill left = S)

• There is a complementizer ‘that’, and a determiner ‘that’. Do not confuse them.

• Determiner ‘that’ precedes nouns, not sentences.
  e.g. ‘that cute, little puppy’
Determiners

Syntactic Tests

- Must occur with (and precede) a noun.
  *I saw the.
  *I saw the pretty.
  I saw the pretty cat.

- May not occur with other determiners.
  My book.
  The book.

- Note that adjectives may occur between a D and a N.
- The traditional class of articles is a subset of the class of Ds.
- Caution: possessive pronouns (my, your, his...) are Ds, not Ns or Adjs.
- Examples: {a, an, the, my, you, his, this, that, these, those, each, no}
ADJECTIVES

SYNTACTIC TESTS

- Can occur between a D and the N that licenses it.
  the pretty cat (cat = N)
- Can follow intensifiers very or too.
  very hot, very smart
  too hot (for me to eat), too smart (for his own good)
- Can often follow comparative more or superlative most.
  comfortable → more comfortable → most comfortable

MORPHOLOGICAL TESTS

- Can often take comparative -er or superlative -est markers.
  happy → happier → happiest
NOUN PHRASES

- NPs must contain a N.
- NPs may contain a D or Adj.
- NPs may also contain a PP, if it modified the noun.
**Noun Phrases**

a. NP
   - N
   - John
   - you

b. NP
   - D
   - the
   - a
   - my
   - this
   - bike

b. NP
   - P
   - with
   - NP
   - hamburgers
   - N
   - ketchup

d. NP
   - D
   - Adj
   - Adj
   - N
   - the
   - crazy
   - little
   - girl
PREPOSITIONAL PHRASES

- PPs always contain a P.
- PPs always contain a NP.

a. PP
   \[ \text{P} \quad \text{NP} \]
   with \quad \text{N}
   ketchup

b. PP
   \[ \text{P} \quad \text{NP} \]
   at
   \[ \text{NP} \quad \text{PP} \]
   the \quad Adj \quad N
   the old \quad store
   \[ \text{P} \quad \text{NP} \]
   on
   the \quad N
   the corner
Verb Phrases

- VPs always contain a V.
- VPs may contain one or two NPs.
- VPs may contain PPs or CPs.
**Verbal Phrases**

a. VP
   - V
     - walk

b. VP
   - V
     - shot
     - D
     - N
     - a
     - bear

c. VP
   - V
     - gave
     - NP
       - D
       - N
       - the
       - dog
     - NP
       - D
       - N
       - a
       - treat

d. VP
   - V
     - gave
     - NP
       - D
       - N
       - a
       - treat
     - PP
       - P
       - to
       - D
       - N
       - the
       - dog
**Verb Phrases**

e. 

```
  VP
   /\    /
  VP  PP
   /    /
 V   PP
 /  /  |
walk to D
    N
     the river
```

f. 

```
  VP
   /\    /
  V   CP
    /\   |
   C   S
    /\   |
   that NP VP
         /\  |
         N  V
          \  |
           left
```
The sentences you will draw always contain an NP (subject) and a VP.

a. \[ S \]
   \[ NP \]
   \[ N \; John \]
   \[ VP \]
   \[ V \; walked \]

b. \[ S \]
   \[ NP \]
   \[ D \; the \]
   \[ N \; cat \]
   \[ VP \]
   \[ V \; chased \]
   \[ NP \]
   \[ D \; the \]
   \[ N \; rat \]
### Complementizer Phrases

- Complementizers introduce sentences, so a CP will always have a C and an S.
- The only complementizer we will use is ‘that’ (not to be confused with the determiner ‘that’).

#### a.

```
S
├── NP
│   └── N
│       └── Lisa
├── VP
│   ├── V
│       └── said
│   └── CP
│       ├── C
│           └── that
│   └── S
│       ├── NP
│           ├── N
│               └── John
│       └── VP
│           ├── V
│               └── bought
│       └── NP
│           └── N
│               └── a
│       └── D
│           └── N
|               └── book
```