

## Lexical Categories

Introduction to syntax  
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## Goals

- Explore what is a word
- Establish criteria for word categories
  - Morphological
  - Syntactic
  - Semnatic
- Introduce the notion of a Lexical Item as a unit that us defined by the syntactic computations it participates in.

## Word vs lexical item

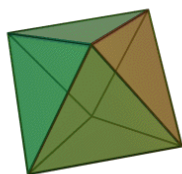
- Word:
  - Arbitrary pairing of sound and meaning
- Not a very useful definition, clapping can also be a word.
- Wee need to establish the dimensions that a relevant for classifying words
- Possible dimensions:
  - Morphology
  - Semantics
  - Syntax

## Lexical Item

- Lexical Item
  - A set of features: phonological, semantic, syntactic, morphological
- Category of a lexical item
  - Label that predicts that along specified dimensions a lexical item in a given category shares sufficiently similar behavior with other lexical items in that category.

## Dimension

- Octahedron complex shape



## Octahedron dimensions

Octahedron in different projections (From Wikipedia). It is one shape just has different properties in different dimensions.

Centered by	Orthogonal projections			
	Edge	Face Normal	Vertex	Face
Image				
Projective symmetry	[2]	[2]	[4]	[6]

## Morphology

The dimension is inflectional and derivational endings.

- Members of a given category C will exhibit similar properties along the dimension of what inflectional and derivational suffixes are possible

## Nouns Morphology

- A given LI is called a Noun (N) if it can take Inflectional endings that indicate:
  - Number: *book* vs *book+s*
    - I bought a *book* vs I bought *books*
  - Person: *he*, *I* *we*
  - Case: *who* vs *whom*
    - Who saw me? vs Whom did you see
  - Gender
    - actor vs actress
- A Noun can take derivational endings turn a Noun into other Lexical Categories:
  - Noun into an Adjective
    - president vs president+ial
      - I met the president vs I like to act very presidential

## Verbs -morphology

- A given LI is called Verb (V) if it can take Inflectional endings that indicate:
  - *Tense*
    - walk vs walk+ed
    - I walk a lot, but I never walk+ed to work
  - *Progressive*
    - walk vs walk+ing
    - I walk vs He is walk+ing
  - *Perfective*
    - I walk vs I have walk+ed
  - *Passive vs active*
    - The cat chased the mouse vs The mouse was chased by the cat
  - *Person agreement*
    - walk vs walk+s
    - I walk vs he walk+s
- A Verb can take derivational endings turn a Verb into other Lexical Categories: Categories:
  - Verb into a Noun:
    - perform vs perform+ance
  - I performed the perform+ance

## Adjectives - Morphology

- **Adjectives**
- The small cat likes fish
  - A given LI is called an Adjective (A), if it can take Inflectional endings that indicate gradation:
    - tall vs tall+er vs tall+est
- - An Adjective can take derivational endings turn a Adjective into other Lexical Categories:
  - Adjective into an Adverb:
    - quick vs quick+ly
    - John can run quick+ly but Mary is quicker

## Adverbs - Morphology

- **Adverbs**
- The cat ran quickly out of the house
- - Adverbs usually have No inflection
- - Can be derived from adjective

## Some words look like verbs but loose their meaning

- John has been dancing ≠
- a. John possesses something +
- b. John existed+
- c. John danced

## Syntax and semantic dimensions

- Our analysis of (3) means that we need to take into account two additional dimensions that determine the category of a LI:
- semantic compositionality, meaning
- and function within a sentence

## Nouns (N)

- Nouns denote entities/individuals: Boston, Mary, cat, boy, love, infinity...
  - Not necessarily real ones:
    - Unicorn, Goblin
- Nouns are often arguments of verbs. The term argument is used here technically.
- argument of a verb that part which is required for the verb to have full meaning.
- For example, the verb 'arrive' requires a noun like 'John' to complete the meaning: "John arrived."
- Syntactically, arguments of verbs are close to the verb.

## Verbs

- - Verbs denote actions, states, occurrence:
  - jump, suspect, love, request, ...
- Verbs form predicates that can turn into propositions (true/false statements).
- A predicate is a verb plus its argument(s). It is a mapping of the relation of an argument to a certain function that can assign that argument a property, state or relate it to another argument.
- For example, *John sneezed* maps the noun 'John' to the set of individuals who have the property: x sneezed.
- *John photographed Mary* maps the relationship between the arguments 'John' and 'Mary' as that of x photographed y.

## Verbs and auxiliaries

- The semantic dimension excludes words like 'have' and 'been' from being verbs in sentences like (A), but makes them into verbs in sentences like (B), (C).
- A. John **has been** dancing
- B. John **has** a book
- C. John **is** a doctor
- D. Verbs and nouns cannot be defined only morphologically, i.e. by the types of endings they take, they need to be also defined by their semantic denotation and composition properties as far as meaning.

### Subtypes of classes - verbs

- Three sub-types of verbs
- Intransitive: 1 Argument
  - x arrive -> John arrived
- Transitive: 2 Arguments
  - x photographed y -> x photographed Mary
  - > John Photographed Mary
- Ditransitive: 3 Arguments
  - x gave y z -> x gave y books -> x gave Mary books -> John gave Mary books

### Adjectives (A)

- Adjectives denote state, quantity, and quality. They are modifiers but also predicates.
- A modifier narrows the denotation of the element it modifies. In the case of adjectives it is usually a noun.
- fake brown rice
- fake+(brown+rice) = rice that is fake and brown colored.
- (fake+brown)+ rice we get rice that is real but the color is fake.
- The sequence in which we compose items matters.

### Adverbs (Adv)

- Adverbs are modifiers that denote manner, quality, place, time, degree, number, cause, opposition, affirmation, or denial. They appear to modify actions, states that are associated with verbs, or predicates.
- cats snore loudly

### Prepositions (P)

- Prepositions denote place, location, origin, destination.
  - He sleeps under bridges
- Prepositions take noun arguments

### Closed/open functional/lexical

- Nouns, Verbs, Adjectives, Adverbs are Open Class words, meaning there are new items being added to each category on a regular basis. 20 years ago there was no verb 'to Google', the word 'selfie' did not exist.
- Prepositions seem to be more fixed in each language, no need additions. Yet they are lexical in that they have a denotation that is not purely grammar oriented (like auxiliaries)

### Function words - Pronouns

- Categories that are biased towards the role of grammar markers are called Function Words. Function Words are usually Closed Class
- One might think that words like 'I', 'he', 'she', 'we', 'they', 'it', 'himself', 'herself', 'one' are Nouns since they can be used instead of noun.
- Jay likes syntax - he likes syntax
- But unlike nouns, pronouns are closed class. Also they differ in their denotation. Nouns refer to entities, whereas pronouns refer to nouns. They are what we call Anaphors, words that get their meaning from other words.

### Distribution- syntax criterion

- Pronoun semantics suggests that they are different from nouns,
- their morphology suggests that they are similar to nouns. English here being an exception because pronouns have a richer morphology than nouns in English,.
- **Distribution criterion tells us that, since pronouns can be used in the same position and function as noun, then they are nouns**

### Distribution

- Criterion of distribution. X and Y are the same category if:
  - a. We can replace X with Y without
    - - changing the structure of the sentence, or
    - - changing that part of meaning of the sentence that is independent of X or Y
  - b. X and Y compete for the same position in a given sentence.

### Determiners: [Articles, Demonstratives, Quantifiers, Numerals, Possessive Pronouns] (D)

- Articles, sometimes called determiners. Denote +/- definite
  - A/the boy went home
- Quantifiers are functions on denotation of the noun. In the example 'boy' denotes a set of all male humans under a certain age. 'Every' forces, via compositionality with 'boy' an interpretation that the sentence is true if the proposition applies to every member of the set denoted by the word boy. *There are good reasons to assume that they form their own category. But, for simplification, we will ignore those reasons for now.*
  - Every/some boy went home
- Demonstrative pronouns, distinguish a member of the set the noun denotes.
  - that/this boy went home
- Numerals combine with nouns to provide denotation of quantity, or a measurable scale.
  - One boy went home
- Possessive pronouns denote possession and combine with the noun that denotes the entity that is possessed.
  - Her/ his/ my boy went home

### Auxiliary verb (v) <- Note the 'v' is small compared to capital V

- Used for verbs. Some used underlined v in order to avoid confusion. The terms are called little v and big V.
- Auxiliary verbs are distributed in tandem with a main verb or Adjective. The aid in the formation of a predicate or indicate perfectiveness, progressiveness, voice (passive vs. active).
  - John has danced Perfective (action completed)
  - John is dancing Progressive (action in progress)
  - John has been dancing Perfective Progressive (completed past action in progress)
  - Cats are chased by dogs Passive (order of verb arguments is writhed relative to each other - compare with Dogs chase cats)
  - John is smart Copula (composed with adjective creates a predicate that can take an argument)
- Note that auxiliaries can co-occur with each other, unlike determiners

### Tense/Modal (T)

- The category Tense/Modal is differentiated from Auxiliary because, although Tense/Modals can co-occur with Auxiliaries, there is always one of them and it is always the first of the verbal elements.
  - John will/may/should/would/could/might/shall dance
  - John may have been dancing
  - John should have been dancing
  - John will be dancing
  - Cats will be chased by dogs
- 'to' is an infinitival marker in English. It denotes that a given verb is not finite. In simplified terms, non-finite verbs do not have an obvious temporal anchor.
  - John likes to swim
- Negation can optionally be with Tense/Modal, or on the Auxiliary
  - John couldn't have been dancing
  - John could have not been dancing

### Complementizer (C)

- Complementizer (C)
- Complementizers indicate whether a given clause is a question, or an assertion. They appear to be sensitive to finiteness.
- John said that he likes Mary
  - Indicative subordinate clause complementizer
- That John likes Mary is obvious
  - Indicative complementizer
- John wonders whether he likes Mary
  - Question
- John wonders if he likes Mary
  - Question
- It is important for John to like Mary
  - Indicative, non-finite subordinate clause
- Complementizers are at the beginning of what will be called a clause. There cannot be more than one complementizer per clause

### Negation (Neg)

- Negation has been mentioned already. Its denotation is negating the element it takes as its argument. Arguments of negation seem to be the verb or noun. When negating a verb negation attaches to the leftmost Auxiliary, or Tense; when not present, 'do' is used.
- John will not go home
- John has not been dancing
- John did not dance

### Degree (Deg)

- Degree modifiers modify expressions that indicate a scale. Typically these are Adverbs and Adjectives. Adjectives can take degree expressions like 'most', 'more', 'very' 'least'
- More salty than sweet
- Most salty fish in town
- Very salty fish
- Least salty fish

### Conjunctions (Conj)

- Conjunctions like 'and', 'or', 'but' are syncategorematic in that their meaning is only established within an expression.
- John and Mary went home
- John bought and read a book
- Susan danced but Mary jumped

### Constituents

- Conjunctions take two expressions and form a unit. Note that the expressions have to be of the same category:
- 63. John [will] and [can] dance
- \*64. John [will] and [has] dance
- 65. John lives [in Boston] and [in Philadelphia]
- 66. John inhabits [Boston] and [Philadelphia]
- \*67. John inhabits [Boston] and [in Philadelphia]
- Coordination cannot coordinate Tense with an auxiliary in (64), but it can coordinate two Tense/Modals. Examples (65) (66) and (67) show that coordination can target strings of words. This leads us back to the notion of a constituent



## Universality

- Are categories universal?
- Some are:
  - Noun, Verb, Preposition, Adjective (maybe)
- What about functional ones
  - Are there determiners?
    - Even when not pronounced?
- We will see