What is Syntax?

Definition: the study of the way in which sentences are constructed from smaller units called constituents; how sentences are related to each other

Hierarchical Structure

Lexical Categories

Definition: classes of words grouped together based on their morphological and syntactic properties, traditionally known as parts of speech
- morphological frames: position of a word with respect to the bound morphemes that can attach to it
- syntactic frames: position in which a word occurs relative to other classes of words in the same phrase

Open vs. Closed Classes

Open class/open set (content words): a word class whose membership allows the unlimited addition of new items, the chief classes being nouns, verbs, adjectives, and adverbs
Closed class/closed system (function words): a word class whose membership is fixed or limited, such as the class of determiners, pronouns, prepositions, auxiliary verbs, or conjunctions

Open Class I: Nouns

morphological frames
- _____ + pl. marker
  - dog-s, child-ren, sheep-φ

syntactic frames
- DET + _____ (a, the, some, many, several, several)
  - the class, several stars, φ + John
- DET + ADJ + _____
  - a fierce dog, some stupid kid
Nouns: Subcategories

- **count nouns**: nouns denoting objects that are discrete, countable units (ex) table, computer, wheel
  - a/one/two/every/each
  - singular count nouns need determiners

- **mass nouns**: nouns denoting objects that are not countable or divisible into discrete units (ex) grass, rice, sand, water, paper
  - singular mass nouns can occur without determiners

- **abstract nouns**: nouns that denote a mental object, an idea, or concept (ex) justice, truth, beauty
  - singular abstract nouns can occur without determiners

Open Class II: Verbs

- **morphological frames**
  - _____ + tense morpheme
    - go-went, ring-rang, kick-kicked, rig-rigged, sit-sat
  - _____ + progressive morpheme
    - talk-talking, type-typing
  - _____ + 3rd person singular morpheme
    - think-thinks, say-says

- **syntactic frames**
  - AUX + _____ (may, might, will)
    - might be, may eat, will talk
  - (please) + _____ + imperative form
    - Please listen to me!; Shut up!; Leave!
  - ADV + _____/_____ + ADV
    - instantly speak, run breathlessly

Verbs: Subcategories

- **intransitive verbs** (V_i): verbs that only take subject noun phrases and no object noun phrases (ex) die, look, walk, exist
  - He looked but couldn’t find anyone around.

- **transitive verbs** (V_t): verbs that take a noun phrase direct object (ex) hit, wash, murder
  - You should wash those dishes before you go to bed.

- **ditransitive verbs** (V_dt): verbs that take both a direct object and an indirect object (ex) give, sell, tell
  - I gave her 50 dollars.

- **verbs with sentential complements** (V_v): verbs that take a following whole sentence, some of them also require a complementizer (COMP) (ex) ask, say, think
  - I think that we can go to the mall together.

- **linking verbs** (V_l): verbs that indicate a relationship of identity between the subject and the predicate of the verb, or of a quality possessed by the subject and found in the predicate (ex) be, look, seem, become
  - He became a doctor.

Open Class III: Adjectives

- **morphological frames**
  - more + _____ or _____ + -er (comparative)
    - more beautiful, pretti-er
  - most + _____ or _____ + -est (superlative)
    - most wonderful, ugli-est

- **syntactic frames**
  - DET + _____ + N
    - the haunted house, an honest man
  - LINKING V + _____ (be, seem, look, feel)
    - seems funny, is serious
  - ADV + _____
    - very quiet, helplessly absent-minded

Adjectives: Subcategories

- **stative adjectives**: adjectives denoting more or less permanent qualities (ex) red, small, wooden, short
  - *Kathy is being very _____
  - Kathy is very _____

- **nonstative adjectives**: adjectives denoting temporary or changeable qualities (ex) mad, noisy, cute
  - Kathy is being very _____
  - Kathy is very _____

Open Class IV: Adverbs

- **morphological frames**
  - [ADJ + -ly]_ly
    - happily, said-ly, glad-ly
  - exceptions: friend-ly, love-ly, like-ly
  - exceptions: counter-clock-wise, east-ward

- **syntactic frames**
  - _____ + ADJ / ADV / V
    - unusually quiet, very cynically, carefully observe
  - V + _____
    - devour hungrily, sit restlessly
Closed Class (I)

- **determiner:** a, the, many, each, all, possessive (your, my, John's)
  - syntactic frame: _____ + (ADJ) + N
    - the secret garden, my beloved son

- **auxiliary (= auxiliary verb):** will, may, would, shall, can
  - syntactic frames:
    - NP + _____ + VP: Rose should arrive at 8:30.
    - _____ + NP + VP: Would you leave?
    - _____ + not: I cannot go.

- **pronouns:** used to replace nouns
  - subjects: I, he, she, we, they
  - objects: me, him, her, us, them
  - both subjects and objects: you, it

Caution!

- a word will sometimes belong to more than one lexical categories
  - It's cold. (ADJ) vs. I got a cold. (N)
  - a past week (ADJ) vs. in the past (N)
  - a promise (N) vs. I promise (V)

- a word will sometimes belong to more than one subcategories
  - I walked in the park. (V) vs. I walked the dog in the park. (V)
  - He sang beautifully. (V) vs. He sang the song beautifully. (V)
  - homonyms: two or more distinct words with the same pronunciation and spelling but different meaning
    - tree barks (N) vs. dog barks (V)

Closed Class (II)

- **preposition:** to, on, in, at, with
  - syntactic frame: _____ + NP
    - in the room, on Friday

- **postposition:**
  - syntactic frame: NP + _____
    - [C] zhuozi shang 'table on = on the table'

- **conjunctions:** used to combine words or phrases of the same categories, (ex) and, or, but
  - syntactic frames: N + _____ + N, S + _____ + S, ADJ + _____ + ADJ, V + _____ + V
    - coffee or tea; I eat cereal but he eats rice; ugly but cute; walk and talk

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Constituents

- **Definition:** groupings of words that form a coherent syntactic or semantic unit
  - The President kissed the baby.
  - ?? [The President [kissed the]] [baby]
  - ?? [The President [kissed] the] [baby]
  - ?? [[The President [kissed] the] [baby]]
  - ?? [The President] [kissed [the baby]]

Constituent Tests I

- ability to stand alone (can be used to answer a wh-question)
  - [[The President] [kissed [the baby]]]
    - Who kissed the baby? The president.
    - Who did the president kiss? The baby.
    - What did the president do? Kissed the baby.
  - [[The President] [held a press conference] [last night]]
    - [held a press conference last night] is not a constituent
  - [[Smith] [dated [a woman from Boston]]]
    - [dated a woman] not a constituent

Constituent Tests II

- substitution by a pro-form
  - pronouns: I, you, we, us, me, it
  - proverbs: do, be, have
  - proadverbs: there, then
    - [[The President] [held a press conference] [last night]]
      - The President held a press conference last night, and he regretted it. He should have done it then.
    - [[Smith] [dated [a woman from Boston]]]
      - Smith dated a woman from Boston. He didn't like her and he regretted it.
Constituent Tests III

- movement: if some part of a sentence can be moved, it is a constituent
  - \[[The President] {held a press conference} {last night}]\]
  - Last night, the President held a press conference
  - \[[Smith] {dated} \{a woman from Boston\}]\]
  - It \{the woman from Boston\} that Smith dated

- Caution! This test does not always work!
  - *Held a press conference the President last night*

Caution!

- a group of words can be a constituent in one sentence but not in the other
  - Brian kissed [Mary and Jason], did too.
  - Brian kissed [Mary and Jason]

- constituent structures are hierarchical
  - \[[Brian] {kissed} \{Mary and Jason\}]\]
  - \[[Smith] {dated} \{a woman from Boston\}]\]
  - \[[The President] {kissed} \{the baby\}]\]

Phrasal Categories

- Definition: a syntactic category whose members are composed of one or more words that form a phrase; one type of phrase is usually interchangeable with another phrase of the same category
  - NP (noun phrase), VP (verb phrase), PP (prepositional phrase), ADJP (adjective phrase), S (sentence)

NPs: Noun Phrases

- Definition: a construction with a noun as head
  - NP can function as subjects or objects
  - John laughed.
  - The man
  - The woman from Boston
  - The little boy
  - I like John.
  - the little boy.
  - the man.
  - The woman from Boston

- phrase structure rules for NP
  - NP → DET ADJ N
  - NP → DET N
  - NP → N (proper name)
  - NP → NP PP

VPs: Verb Phrases

- Definition: a group of words with a verb as a head which together have the same syntactic function as a single verb
  - John laughed.
  - walked into the room.
  - took a nap.
  - gave a speech in the conference room.

- phrase structure rules for VP
  - VP → V (ex) V
  - VP → V, NP (ex) V
  - VP → VP PP

PPs: Prepositional Phrases

- Definition: a constituent structure formed by a preposition and a noun phrase
  - into the room, on the table, on Friday

- phrase structure rule for PP
  - PP → P NP

- a PP can be a constituent of a wide range of phrases
  - walk towards the stadium (VP)
  - my cousin in Florida (NP)
  - crazy with ice cream (ADJP)
ADJPs: Adjectival Phrases

Definition: a construction with an adjective as head
- The candidate is very old.
- extremely intelligent.
- certain to win the election

Phrase structure rule for ADJP
- ADJP → ADV ADJ

ADJPs are often used to modify nouns and often appear as elements of NPs
- [very intelligent]_{ADJP} man_{NP}

Ss: Sentences

Definition: the largest structural unit in terms of which the grammar of a language is organized
- The dictionary is very old.
- I am reading something on Atlantis.

Phrase structure rule for S
- S → NP VP

A sentence may also appear as an element of another expression
- the fact that [the earth is round]_{NP}
- my assistant [who works part-time]_{NP}
- tell her [that I don’t feel like going]_{VP}
- excited [that you will be staying with us]_{ADJP}

Tree Diagrams (I)

A blind man robbed the bank.
- a blind man_{NP}
- robbed the bank_{VP}
- the bank_{NP}
- a blind man robbed the bank_{S}

Phrase Structure Rules (PS Rules)

Definition: rules that show the possible (i.e. grammatical) relationships between phrasal categories and the words or phrasal categories that they dominate
- generativity: property of human languages to use a finite set of rules and elements to produce an infinite set of grammatical sentences
- ambiguity: property of sentences of having two or more meanings
- hierarchical structure: term used to describe the dominance relationship among elements in a word, phrase, or sentence
- infinite recursion (productivity): property of languages allowing for the repeated application of a rule, yielding infinitely long sentences or an infinite number of sentences

Tree Diagrams (II)

Labeled tree diagram tells us
- linear word order
- categories of constituent of a sentence
- hierarchical structure of a sentence (constituent)
- (ex) The President kissed the baby.

A Toy Grammar

X, Y are phrasal categories, a, b, c, d are lexical categories
- S → X Y
- X → ab
- a → X
- Y → b c d
- Y → c d
- Y → cd
PS Rules for English (I)

\[ S \rightarrow NP \ VP \ (ex) \ [John] \ [sings] / [John] \ [ate an apple] \]
\[ NP \rightarrow \text{DET} \ ADJP* \ N \ (ex) \ [a] \ [very nice], \ [very honest] \ [person] \]
\[ NP \rightarrow \text{PRO} \ (ex) \ [He] \ [likes to eat pizza] \]
\[ NP \rightarrow (\text{DET}) \ ADJP* \ N \ (pl) \ [very nice], \ [very honest] \ [women] \]
\[ NP \rightarrow (\text{DET}) \ ADJP* \ N \ (m) \ [many] \ [women] \]
\[ NP \rightarrow (\text{DET}) \ ADJP* \ N \ (pl) \ [extremely white] \ [beach sand] \]
\[ NP \rightarrow (\text{DET}) \ \text{ADJP*} \ N \ (pl) \ [the] \ [extremely white] \ [beach sand] \]
\[ NP \rightarrow \text{PRO} \ (pl) \ [the] \ [man] \ [with glasses] \]
\[ NP \rightarrow \text{PRO} \ (pl) \ [the] \ [man] \ [in the park] \]

PS Rules for English (II)

\[ \text{VP} \rightarrow \text{V} \ NP \ (ex) \ [The students] \ [ate their dinner] \ [at the commons] \]
\[ \text{VP} \rightarrow \text{V} \ NP \ (ex) \ [He] \ [jogged] \ [in the park] \]
\[ \text{VP} \rightarrow \text{V} \ NP \ (ex) \ [She] \ [gave] \ [him] \ [my ID] \]
\[ \text{VP} \rightarrow \text{V} \ NP \ (ex) \ [The roach] \ [scurried] \ [across the kitchen floor] \]
\[ \text{VP} \rightarrow \text{V} \ ADJP* \ ADJ \ (ex) \ [very] \ [very] \ [intelligent] \]
\[ \text{VP} \rightarrow \text{V} \ (ex) \ [We] \ [sang] \ [and] \ [danced] \]

Structural Ambiguity (I)

\[ \text{S} \rightarrow \text{NP} \ \text{VP} \ \text{ADJP} \ N \ (pl) \ [very] \ [very] \ [intelligent] \]
\[ \text{S} \rightarrow \text{NP} \ \text{VP} \ \text{ADJP} \ N \ (m) \ [many] \ [women] \]

Structural Ambiguity (II)

\[ \text{S} \rightarrow \text{NP} \ \text{VP} \ \text{ADJP} \ N \ (m) \ [extremely white] \ [beach sand] \]

Ambiguity

- Definition: property of words or sentences of having two or more meanings
- **lexical ambiguity**: a situation in which a lexical item has two or more meanings
  - He found a bat (a flying animal vs. a baseball bat)
- **structural ambiguity**: a characteristic of phrases that have more than one possible constituent structure and therefore more than one semantic interpretation
  - We need more intelligent leaders (a greater number of intelligent leaders vs. leaders that are more intelligent)
  - The mother of the boy and the girl left (1 vs. 2 people)
  - John killed the man in the park (the man in the park was killed vs. the man was killed in the park)

Structural Ambiguity (III)

\[ \text{S} \rightarrow \text{NP} \ \text{VP} \]
Syntactic Acquisition (I)

- Holophrastic stage (one-word stage): a phase in child language acquisition in which children are limited to one word at a time in their production
  - no, gimme, mine, allgone, whasat

- Two-word stage: a phase in child language acquisition in which children start to put two words together
  - agent + action (ex) dolly eat
  - action + object (ex) hit kitty
  - action + locative (ex) walk park
  - entity + locative (ex) cookie floor
  - possessor + possession (ex) Jimmy bear
  - entity + attribute (ex) box big
  - demonstrative + entity (ex) that milk

Syntactic Acquisition (II)

- Telegraphic stage: a phase during child language acquisition in which children use utterances composed primarily of content words
  - Tense/Aspect:
    - Tommy kick kitty. → Chris eat apple.
    - Marty saw the mice → I seed sawed two mans. → Toby saw the geese.
  - Negatives:
    - No I wear mittens → Timmy no cry. → I not eat cereal.
  - Interrogatives:
    - Teddy go? → Can Liz go? → Why Dad go?

Syntax Problem I

- The clouds rolled across the sky.

Syntax Problem II

- The thieves opened the door with a credit card.

Syntax Problem III

- The walk through the park was very pleasant.

Syntax Problem IV

- Tonika's favorite show is about a rich family from California.
Syntax Problem V

The lifeguard found my cousin from Alabama's ring in the pool.