LIN102 Notes

Introduction to Linguistics: Sentence Structure and Meaning

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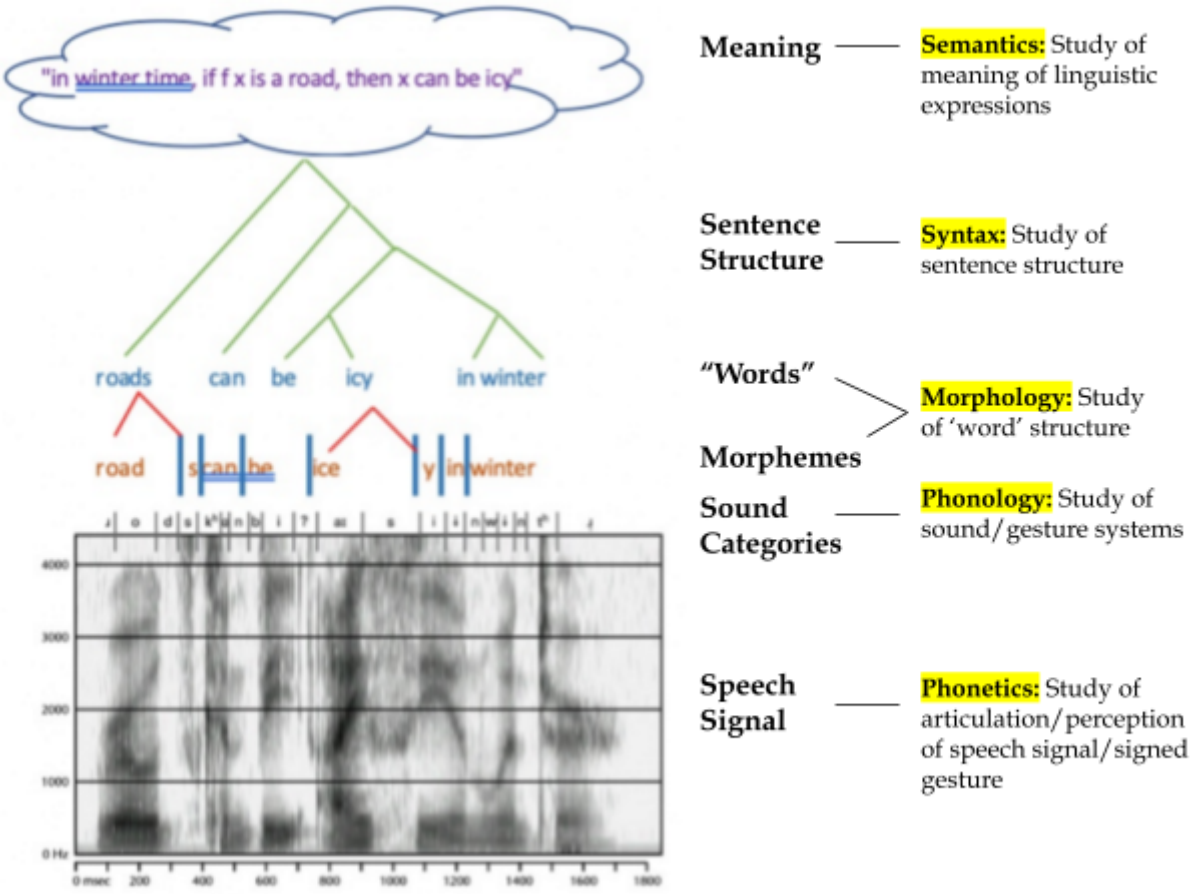
Table of Contents

1. Introduction



Obtaining Syntactic Data:

- **Syntactic Patterns:** Sequences of words/morphemes found in sentences
- **Grammaticality Judgments:** Judgments that speakers make about what sentences are grammatical/ungrammatical in their language
    - **Elicitation:** Sessions where linguistician interviews speaker, asks them to produce sentences or judge sentences
- *Also:* questionnaires, controlled psycholinguistic experiments

Linguistics: Scientific study of language

- **Formal/Theoretical Linguistics:** Structure, valid/invalid patterns, mental grammar
    - Methods are **qualitative** (eg. fieldwork, elicitation), but experimental methods are becoming popular
    - Analyses based on **formal models**
- **Psycholinguistics:** Cognitive processes behind sentence comprehension/production (sentence processing), children learning language (developmental linguistics/language acquisition)
    - Methods are **experimental**
    - Analyses based on **quantitative models**

- **Neurolinguistics:** Neural bases of language
- **Computational Linguistics:** Computational methods investigating questions about language
- **Sociolinguistics:** Impact of social systems on language variation/change
- **Linguistic Typology:** Study of common features between all languages

Grammar

Grammar: A model of a language speaker's tacit knowledge about the atoms of their language and how they combine.

Generative Grammar: Theory of linguistics by Noam Chomsky in 1950s-60s

- Before Chomsky, dominant view is language is a system of habits developed in childhood due to **behaviourism** (stimuli, punishments, rewards)
- Chomsky argues we're biologically preprogrammed to go through certain physiological stages, language acquisition being one of them. Not learned, but acquired, like growth/maturation
- Chomsky proposes capacity for language starts with a genetically-endowed initial cognitive state in infants, a metaphorical faculty of language that matures with interaction with the environment

Descriptive Grammar: Language as used by speakers IRL
Prescriptive Grammar: Established conventions about what language "should be"

- eg. Singular 'they' unacceptable, no 'hopefully' as sentence adverb (eg. "Hopefully, I will…")
- Prescriptive rules show more about social attitudes than mental grammar, not linguistically useful

Grammaticality: Whether a sentence has proper grammar (syntactically felicitous)
Acceptability: Whether a sentence has proper grammar and also "makes sense" (semantically felicitous)

- eg. "Colourless green ideas sleep furiously" is grammatical, but unacceptable.

Linguistic Data

Gloss: Translation of a language's word in your language (so you can read it)
Interlinear Gloss: Notation for linguistics to describe syntactic patterns in syntax. Contains three lines:

Data	pukah u r-asori
Word-for-Word Gloss	pig this 3SG-big
Translation	"This pig is big."

Specifics on notation:

- **Small caps** used for lexemes and markers like subject/object/nominative/accusative/whatever
- * means syntactically inappropriate/infelicitous (eg. *This is a person wrongly)
- # means semantically inappropriate/infelicitous (eg. A: Where is the bathroom? B: #I like cheese.)

Nonce Word: A made-up word by linguistics usually meant to demonstrate evidence of a linguistic property (eg. for a made-up adjective *canopchi*, the form *canopchiest* is grammatical)

2. Words

Morpheme: Smallest meaningful unit of language.

- **Allomorph:** Variant phonological forms of morphemes (eg. *a*, *an*)
- **Free:** Can stand alone as a word
- **Bound:** Cannot stand alone as a word
- **Root/Stem:** Word's primary piece of meaning in a word, on which affixes are added
    - Can be a bound root ('-fer' as in 'prefer, refer') or free root ('cat', 'pretty')
- **Affix:** Morphemes that attach to roots. Is always bound.
    - **Base:** What the affix attaches to.

Affix	Description	Example
Prefix	Before a stem	*re*-read
Suffix	After a stem	read-*ing*
Infix	Between a stem	abso-*bloody*-lutely
Circumfix	Surrounds a stem	*em*-bold-*en*
Zero Derivation (∅)	A null morpheme, ie. a soundless, "invisible" affix. Changes *syntactic category*, not form	glue (noun) + ∅ = glue (verb)
Stem Change	Edits form of base, doesn't add/remove	run (present) → ran (past)
Supra-Segmental	Edits *prosody* of base	PERmit (noun) → perMIT (verb)

- **Syntactic Category:** Classes of words - nouns, verbs, adjectives, etc. (see below)
- **Prosody:** Pitch/intensity/stress/length of speech
- **Tone:** Use of pitch to establish lexical/grammatical meaning

Syntactic Categories

Lexical		Functional		
Noun	N	Determiner/Article	Det	Article: the, every, each, this, that, a Possessive Determiner: my, your, his/her, our
Verb	V	Degree Word/Intensifier	Deg	very, really
Adjective	Adj	Conjunction	Conj	and, or, but, neither, nor, either
Adverb	Adv	Complementizer	Comp	that, if for, whether, while
Preposition	P	Tense	T	Modal Auxiliaries: can, could, will, would, may Infinitival Marker: to
		Be-Verb		am, are, is, was, were, been, being

- Bound morphemes only attach to specific syntactic categories
- Language-specific, categories may differ

- Lexical categories are **open class** - we *often* invent more words of that category
- Functional categories are **closed** - we *rarely* invent more words of that category

- Categories can be distinguished with **telegraphic language**, language that mostly omits functional categories and is used in newspaper headlines or texts
    - Toronto resident suspected in aquarium break-in
      eg. A Toronto resident is suspected in an aquarium break-in
    - Car in garage. Mechanic says broken.
      eg. My car is in the garage. The mechanic says it is broken.
- Categories can be identified through:
    - **Distribution:** Position of words in a sentence/phrase/clause
    - **Distinguishing Environment:** A distribution in which only a specific word type appears

- **Count Noun:** Countable things. Can be pluralized. Needs determiner if not plural
    - eg. suitcase, sofa, cup of milk, idea
- **Mass Noun:** "Stuff" that can't be individuated. Cannot be pluralized. Doesn't need determiner
    - eg. luggage, furniture, milk, information
- **Prepositional Qualifiers (PQual):** Add-ons to prepositions (eg. "*straight* through…", "*just* left")

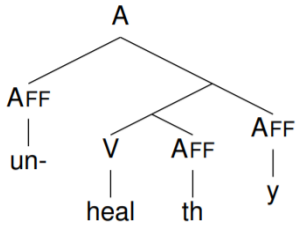
Derivation

Derivation: Modification of a word's meaning — usually its syntactic category — through **affixation**: attaching affixes. New form is called the **derived form**.

Affix	Meaning	Attaches to	Derives	Example
-ity	Quality of being X	Adj	N	Activ-*ity*
-ize	Make X	Adj/N	V	Visual-*ize*
un-	Not X	Adj	Adj	*Un*-true
un-	Do the opposite of X	V	V	*Un*-learn

- **Homophonous:** Affixes with the same form but different meaning (eg. the two *un-* above)
- **Nominalization:** Modifying a word into a noun
    - **Agentive Nominalization:** Turning a verb into an **agent noun** (eg. operat-*or*, shopp-*er*)
- Prefixes rarely change syntactic category
- This type of complex word-formation is represented with **tree diagrams**

Example: "Unhealthy"



Moving from bottom to top, all "intermediate" words must be words.

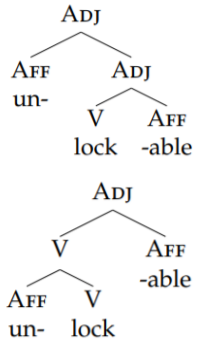
- ➢ Heal + -th = Health
- ➢ Health + -y = Healthy
- ➢ Un- + Healthy = Unhealthy

Structural ambiguity is also possible →

Inflection (below) always "ends" the tree (ie. it is the highest branch of the tree.

Compositionality: Property where meaning of complex structure = meaning & arrangement of parts

Example: "Unlockable"



Inflection

Inflection: Modification of a word's form to fit its usage in a sentence.

Lexeme: Set of words related via inflection, whose patterns are shown by an **inflectional paradigm** (below)

Form	Example	Syntactic Category	Grammatical Information
sing	He will *sing*	V	Bare infinitive
sing-*s*	He *sings*	V	3rd person singular, present tense
sang	He *sang*	V	Past tense
sing-*ing*	He is *singing*	V	Ing-participle
sung	He had *sung*	V	P-participle

- **Agreement:** When properties of an "agreed-with" element, usually the subject (**subject-verb agreement**), cause *verb inflections*.
    - eg. person (1st, 2nd, 3rd) (eg. French, je chant-*e*, tu chant-*es*, il chant-*e*)
    - eg. number (singular, plural) (eg. French, je chant-*e*, nous chant-*ons*)
    - eg. gender, living/non-living, human/non-human
- **Number:** Where the number of subjects/objects causes *noun inflections*.
    - eg. singular, dual, plural
- **Case:** Where the grammatical function causes *noun inflections*.
    - **Nominative Case (Nom):** *Subjects* are inflected
    - **Accusative Case (Acc):** *Objects* are inflected

Derivation vs. Inflection

Derivation	Inflection
Usually *changes* syntactic category Creates new lexical item with *new* meaning	Usually *keeps* syntactic category Creates new lexical item with *same* meaning
Lexical items never change to a derived form based on syntax (the word's role in a sentence)	Lexical items change to something in paradigm based on syntax (the word's role in a sentence)
Derivation is usually *less productive* • Not all nouns even have certain derivational affixes	Inflection is usually *more productive* • All verbs can be inflected with "-ing" • All countable nouns have plurals
Derivation is *semantically less regular* • What does "helpless" mean if you only know what "help" means?	Inflection is *semantically more regular* • What does "helped" mean if you only know what "help" means?
Derived words *can be further derived/inflected*	Inflected words *cannot be further derived/inflected* - they make the word **closed**

➢ **Productivity:** How many new forms (ie. words) a pattern can create

Compounding

Compounding: Derivational process of combining two free morphemes (ie. stand-alone words) to make all sorts of combinations and new words

- Irregular notation - one word, two words with hyphens, two separate words
- **Head:** Part of compound with same syntactic category as the compound
    - **Right-Hand Head Rule:** Rule in English where head is the compound's right-most part
    - **Exocentric:** Compounds without heads (eg. under (P) + water (N) = underwater (Adj))
    - **Endocentric:** Compounds with heads
        - *Noun-Headed Compounds:* __ + N (eg. wool sweater, wet-suit, underdog)
        - *Adjective-Headed Compounds:* __ + Adj (eg. foolproof, short-lived, outspoken)
        - *Verb-Headed Compounds:* __ + V (eg. undersell, handwrite)
    - **Deverbal:** Form N V-er/-ing (eg. truck driver, brick-laying)
- Behave more like words than phrases
    - Stress is on first syllable (eg. BLACKbird vs. black BIRD)
    - Internal parts cannot be modified (eg. *a very White House vs. a very white house)
    - No inflections allowed inside compound (eg. *polars bear vs. polar bear)
        - *Exception:* passerby, passersby
- Can be **recursive** (eg. bedroom, bedroom furniture, bedroom furniture company, etc.)
- Can be **ambiguous**
    - Structural ambiguity - European [history teacher] or [European history] teacher?
    - Relation between component words - *swan boat* = boat for swans or swan-shaped boat?

Productivity and Generativity

Productivity: How many new forms (ie. words) a pattern can create

Generativity: Idea that grammar is finite, but can produce infinite outputs

- Many aspects of language have to be memorised, but much is also derived through rule-based combinatorial processes
- Novel forms are created productively through derivation, inflection, and compounding
- **Wug Test:** Jean Berko Gleason's famous experiment in first language acquisition
    - Children presented with nonsense word "wug" will inflect them when asked
- Some morphological processes are less/not productive
    - eg. English suffix "-hood" only applies to Germanic-originating noun bases

Verb Types

Main Verb: Important "default" verb. Found in all clauses

Auxiliary/Auxiliary Verb: Gives additional meaning to main verb. Introduces a non-finite verb.

- **Modal Auxiliary:** Auxiliaries that convey **modality** - speaker's attitude towards what they say (eg. desire, imperative, stating fact).
    - eg. should, can, would, might, may, ought

- **Aspectual Auxiliary:** Grammatical category about time. Two types in English.
    - **Progressive:** On-going, **Be-Verb + Ing-Participle**
        - eg. They *are leaving*
    - **Perfect:** Already happened, **Have-Verb + P-Participle**
        - eg. They *had left*.

Finite Verb (F): Verbs when inflected for tense/person/number

- Includes all present/past tense verbs, modal auxiliaries (ie. most verbs)
- **Participles:** Language-specific purposes/usages. In English, it affects verb form
    - **Ing/Present/Progressive Participle (IP):** Suffix "-ing"
    - **Past/Passive/Perfect/P Participle (PP):** Suffix, "-en", "-ed", varies between verbs

Non-Finite Verb (NF): Verbs when not inflected.

- **Bare Form (BF):** Verb's default form, as seen in the dictionary
    - Similar to present tense (exception: *be*)
    - Appears after modal auxiliaries (eg. to be, should see)
    - **Infinitive: To + Bare Form**. Language-specific purposes/usages

Copula/Linking Verb: Links a sentence subject to an adjective/noun.

- eg. appears to, is, are, am, felt, seems, remains, looks, may be, is getting

Sentential Complement Verb: Introduces a clause (see section 4) (eg. said, regretted, accused, believed)

Subject: Topic of sentence

Verb: Action of subject

Complement: Anything else that is structurally important (can be obligatory or optional)

- **Object:** What the subject does something to.
    - **Direct Object:** The "main" object
    - **Indirect Object:** Appears with 2 NPs in a VP. Usually the "recipient" of the direct object

Adjunct: Anything else that isn't structurally important (always optional)

Verb Transitivity	Definition	Example
Transitive	Requires a complement object	"They *like* food."
Ditransitive	Requires two complement objects	"They *gave* me food."
Intransitive	Requires no complement objects	"They *slept*."
Ambitransitive	Can be transitive and intransitive	"They *study*", "They *study* syntax."

Active Voice: Sentence in form **Subject + Verb + Object**

- eg. "[He] [ate] [the pizza]."

Passive Voice: Sentence in form "Subject was Verb-ed"

- eg. "[The pizza] [was eaten] [by him]."
- Has the form **Be-Verb + P-Participle**, though some auxiliaries work (eg. *got*)
- Is said to *demote/remove* the subject, *promote* former object to subject position
    - eg. Subject "he" demoted to object or removed, object "the pizza" promoted to subject
- Can make sentences intransitive (eg. "The pizza was eaten.")

3. Phrases

Constituency/Syntactic Phrase: A grouping of words in larger units with *the same function as if it were just one word*. Morphemes < words < phrases

- All lexical syntactic categories have phrase versions: noun phrase (NP), verb phrase (VP), etc.
  - eg. [$_{NP}$ Students] [$_{VP}$ study] vs. [$_{NP}$ Students of linguistics] [$_{VP}$ study syntax]
- **Structural ambiguity** exists: "I saw [$_{NP}$ the boy] with glasses" vs. "I saw [$_{NP}$ the boy with glasses]"
- **Head:** Obligatory part of phrase with same syntactic category as the phrase
  - All phrases have 1 head, everything else is optional
  - Phrases can contain other phrases - recursion! (eg. The guy at [the end of [the road on…)
  - Relationship between words of a phrase are visualised with **tree diagrams**
    - **Node:** A value in the tree
    - **Parent:** The value above a given node
    - **Children:** The value(s) below a given node
    - **Sibling:** The value(s) with the same parent as a given node, if any
- **Dependent:** Non-head material in a phrase, may be obligatory or optional
  - eg. The very old [cheese] in the fridge - anything not enclosed in [] is dependent, optional
  - Includes the sentence's complement & adjunct
- **Phrase Structure Rule (PSR):** A language speaker's implicit knowledge about what's allowed in a syntactic category's phrase structure, allowing them to generate grammatical sentences.
  - Notated *PP → (PQual) P (NP)*. Means PP is made of optional PQual & NP, mandatory P
  - **Recursion** exists: [$_{NP}$ The bump [$_{PP}$ on [$_{NP}$ the log [$_{PP}$ in [$_{NP}$ the hole [$_{PP}$ down [$_{NP}$ the sea]]]]]]]

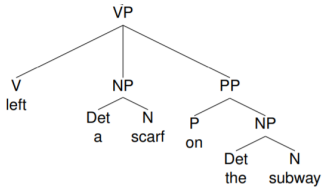
Phrase Structure Rules (English)

Noun	NP	(Det) (AdjP+) N (PP+) (CP+)	
Preposition	PP	(PQual) P (NP)	
Adjective	AdjP	(Deg/Adv) Adj (PP)	
Adverb	AdvP	(Deg/Adv) Adv	
Verb	VP	(AdvP+) V (NP) (NP/CP) (AdvP+) (PP+) (AdvP+)	
Tense (Phrases)	TP	NP/CP T VP	T = [past], [present], modal auxiliary, "to"
Complementizer (Clauses)*	CP	C TP	C = -Q (declarative), +Q (interrogative)

➢ *See next section on clauses

➢ **"+":** as many can be added as needed ➢ **"/":** exclusionary or

➢ **Brackets:** Dependents, all optional with some exceptions (see subcategorizations below)



- **Head-Initial:** Languages whose phrases' first items are usually the head
- **Head-Final:** Languages whose phrases' last items are usually the head
- **Prepreprepositional Phrase:** PP where P is before NP (ie. PP → P (NP))
- **Postprepositional Phrase:** PP where P is after NP (ie. PP → (NP) P)
- **Implicational Universals:** Idea that for all languages, they have feature A ⇒ they have feature B
  - Languages with *SOV order* (subject-object-verb) are overwhelming *postpositional*

- Assume a language's phrase/clause structure is TP → NP VP T and CP → TP C

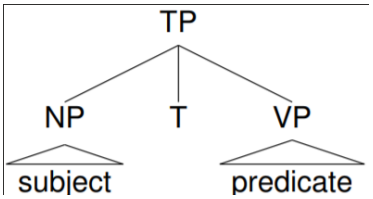
Identifying Adjuncts

- Find **modifiers**: words that give more meaning. Includes *AdvPs* in VPs, *AdjPs* and *CPs* in NPs
  - *Exception:* Copula verbs take *AdvP*s as complements
- Anything *(PP)* that isn't required by subcategorization (see below) is an adjunct

Tense Phrase

Tense: Non-phrasal obligatory part of sentence. An independent sentence's head.

- Tense phrase ≈ standalone sentence
- **Finite/Non-Finite TP:** A TP with a finite/non-finite main verb (eg. [$_{TP}$ Him to eat], [$_{TP}$ I ate])
- PSR for tense, *TP → NP/CP T VP*, doesn't work for imperative (LIN102 omits this)
  - "Subject" = NP
  - "Predicate" = VP
- T is either [past], [present], a modal auxiliary, or infinitival marker "to"
  - eg. [$_{TP}$ [$_{NP}$ The dog] [$_{T}$ will] [$_{VP}$ fart]]
  - eg. [$_{TP}$ [$_{NP}$ The dog] [$_{T}$ [present]] [$_{VP}$ farts]]



Subcategorization

Selection: The process whereby the head of a VP, the V, decides what may come after it.

- The verbs are "picky" - what is allowed after it differs for each verb
- Like verb transitivity, but specific - not just *how many objects*, but *what objects* are allowed

Subcategorization: The ability of lexical items to select for different complements.

Subcategorization Frame: A model of each lexical item and their subcategorization

Verb	Syntactic Category	Subcategorization Frame	Example
give	V	$V_{[\_\_NP\ NP/PP]}$	I gave [$_{NP}$ him] [$_{NP}$ food]. I gave [$_{NP}$ food] [$_{PP}$ to him].
explain	V	$V_{[\_\_NP\ (PP)]}$	I explained [$_{NP}$ linguistics] ([$_{PP}$ to him]).
tell	V	$V_{[\_\_NP\ (TP)]}$	I told [$_{NP}$ him] ([$_{TP}$ I was hungry]).

➢ The items within the brackets of the subcategorization frames are the **complements**

➢ The NPs within the brackets of the subcategorization frames are the **objects**

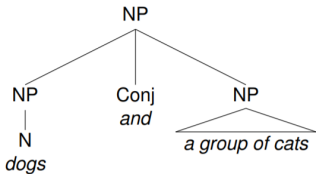
Lexicon: Storehouse of a language's unpredictable information - morphemes, subcategorizations, verbs

Morpheme	Syntactic Category	Grammatical Information
like	V	$V_{[\_\_NP]}$
with	P	$P_{[\_\_NP]}$
dog	N	Count noun
water	N	Mass Noun
-able	Aff	Suffixes to V, makes an Adj

Identifying Phrases

Constituency Test: Tests that disambiguate and identify phrases.

- Many tests must be done. Success = it's a constituent, but failure *doesn't mean* it isn't a constituent.
- **Substitution Test:** Substitute item with a known constituent to check its validity.
    - Substitute with **monomorphemic forms**, single-morpheme words, specifically **pro-forms**
        - **Function Word:** Words with little/ambiguous lexical meaning that give structure to a sentence's **content words** (ie. words with actual meaning)
        - **Pro-Form:** A function word that replaces an item whose meaning is recoverable from the context.
    - *Noun Phrases:* Pro-forms are pronouns **they/the, he/him, she/her, I/me, we, …**
        - eg. Enraged cow injures [$_{NP}$ farmer with axe] ⇒ Enraged cow injures [him]
    - *Prepositional Phrases:* Pro-forms are **there, here, then**
        - eg. She went [$_{PP}$ on the subway] ⇒ She went [there]
    - *Verb Phrases:* Pro-form is **do so/did so**
        - eg. He will [$_{VP}$ buy a hamburger] ⇒ He will [do so].
- **Movement Test:** Class of tests that move the item around a sentence. If the sentence is still grammatical afterwards, it is valid
    - **Topicalization:** Moving item to sentence's start
        - The person there will give [$_{NP}$ a new fork] to him
          eg. [$_{NP}$ A new fork], the person there will give to him.
    - **Clefting:** Moving item into the construction "It is/was __ that/who…"
        - [$_{NP}$ The person there] will give a new fork [$_{PP}$ to him].
          eg. It is [$_{PP}$ to him] that the person there will give a new fork.
          eg. It is [$_{NP}$ the person there] who will give a new fork to him.
    - **Pseudo-Clefting:** Moving item into the construction "Who/what/where/when … is __."
        - The person there will [$_{VP}$ give a new fork to [$_{NP}$ him]].
          eg. Who the person there will give a new fork to is [$_{NP}$ him].
          eg. What the person there will do is [$_{VP}$ give a new fork to him].
- **Fragment Test:** Fragment responses to questions are constituents
    - The girl [$_{PP}$ on the subway] left [$_{NP}$ a red scarf].
      eg. What did the girl on the subway leave? [$_{NP}$ A red scarf].
      eg. Where did the girl leave a red scarf? [$_{PP}$ On the subway].

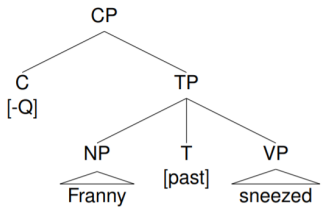


- **Coordination Test:** If two items can be coordinates, they are phrases with the same category
    - eg. "[$_{NP}$ The hot tea] or [$_{NP}$ cold coffee]", "They [$_{VP}$ went home] and [$_{VP}$ ate lunch].

4. Clauses

Complementizer: Words that introduce, combine, and describe phrases

- C = *that, while, for, if, whether* … otherwise, it is [-Q] or [+Q], which respectively mark the clause as declarative or interrogative
- Complementizer phrase ≈ clause.
- CPs are phrases, so all constituency tests still work.
- Syntax tree always starts with CP at the top
- Vs are picky selecting CPs, and Cs are picky selecting TPs
    - eg. "for" selects non-finite TPs, "that" selects finite TPs



Independent Clause: Can work as standalone sentences (eg. [He left])
Conjoined Clause: Two phrases/clauses combined with a conjunction (eg. [He lived], but [she died].)
Main/Root Clause: The highest-level clause.
Matrix Clause: Any clause containing an embedded clause
Embedded/Subordinate/Dependent Clause: Cannot work as standalone sentences. Any clause inside another clause (eg. [After he left])

- **Subject Clause:** Acts like a subject. (eg. [That I'm dumb] is sad.)
- **Complement/Object Clause:** Acts like a complement/object (eg. I said [that I'm dumb].)
- **Adjunct Cause:** Optional clauses that convey time, reason, cause, etc. (eg. [Since I'm dumb,] …)
    - **Relative Clause:** Clauses describing nouns. The (CP) in the NP's PSR.
        - eg. I finished the *homework* [$_{CP}$ that I hated __]
        - **Head:** The noun that the relative clause describes
        - **Gap:** The __, which stops the clause from being standalone
        - Introduced by *that* or **relative pronouns** - special pronouns marking a relative clause (ie. who-words *who, which, what, whose, whom, whoever*)
        - **Reduced Relatives:** Erasing the C of relative clauses (eg. The pizza [~~that~~ I ate])
            - English allows further deleting wh-word and auxiliary be-word. However, auxiliary *have* cannot be deleted.
                - eg. The pizza [~~which was~~ eaten by the dog]
                - eg. The dog [~~that is~~ eating the pizza]
                - eg. *The dog [~~who has~~ eaten the pizza]
            - Can result in **garden path sentences** - grammatically correct sentences that start in a way that a reader's most likely interpretation is incorrect.
                - eg. The horse [~~that was~~ raced past the barn] fell

Identifying Subjects

Subject-Auxiliary Inversion: Movement of auxiliary in front of potential subject

- [The dog] *should* go outside.
  eg. *Should* [the dog] go outside?

Tag Questions: Adding a tag question at the end of a non-question sentence

- [The dog] *will* go outside.
  eg. [The dog] *will* go outside, *will* [he] not?
- Tag contains same auxiliary as sentence, or *be/do* if sentence doesn't have one
- Tag has **polarity** (opposite meaning yes/no-wise) compared to non-question part
- Tag is subject-auxiliary inverted

Identifying Clauses

Number of Clauses = # of main verbs

Adjunct Clause: Look for following words at clause start:

➢ *because, if, when, after, before, although, at, with, since, even though, for (that reason)*

Relative Clause: Look for incomplete sentences describing noun, or words starting with:

➢ *that, who, where, whose, which*

Complement Clause: Can be substituted with NPs

Differentiating Clauses

Adjunct vs. Complement Clause

Optionality: Idea that adjunct clauses are *always optional*, complement clauses *sometimes optional*

- I knew [when I would fail] [after I left]
  eg. I knew something [after I left], which was [when I would fail] - complement
  eg. *I knew something [when I would fail], which was [after I left] - adjunct
- Ambiguities with ambitransitive verbs (eg. "I knew, [when he died]" vs. "I knew [when he died])"

Boxing the Clauses: Drawing out sentence structure with boxes. Ambiguities occur with *adjunct clauses*.

- eg. I heard [you screamed *after you ate*]
- eg. I heard [you screamed] *after you ate* → adjunct clause is [after you ate]

Root vs. Embedded Clause

Subject-Auxiliary Inversion: Inverting position of subject and auxiliary. Works with *root clauses only*.

- eg. *Did I hear* [you had screamed?]
- eg. *I heard [*had you screamed*?] → embedded clause is [you had screamed]

Tag Questions: Adding tag questions to the sentence end. Works with *root clauses only*.

- eg. *I* had heard [you had screamed], didn't *I*?
- eg. *I had heard [*you* had screamed], didn't *you*? → embedded clause is [you had screamed]

5. Parsing Ambiguity

Psycholinguistics: Cognitive processes behind sentence comprehension/production (sentence processing), children learning language (developmental linguistics/language acquisition)

- Involves psychological experiments measuring behaviour:
    - Processing time for specific tasks
    - Comprehension errors
    - **Shadowing Task:** When subjects repeat a speaker's sentences as quickly as the speaker pronounces them.
        - Talented people lag 0.25 seconds, showing that in that short time, meaning is recognized and integrated with entire sentence's meaning/structure
        - People are analysing, not just parroting, as they slow when meaningful sentences replaced with nonsensical sentences/made-up words/foreign language words
    - **Self-Paced Reading Task:** When subjects read sentences on computers one word/phrase at a time, pressing a button to advance. Time spent on each segment is recorded.
        - Weaknesses include **spillover effects** - people artificially press quickly. Reading time for one word is recorded as reading time for another word
    - **Moving Window Paradigm:** Attempt at making the above less "unnatural". Program now replaces words with __, shows next phrase and removes previous phrase each click
    - **Eye-Gazing Patterns:** High-tech/expensive version of the above. Show the whole sentence, track subjects' eye movements.
- Involves methods like:
    - Eye-tracking equipment
    - Corpora (real-world text) analysis
- Uses tools like:
    - **Magnetic Encephalography (MEG):** Detect brain-produced magnetic fields
    - **Electroencephalography (EEG):** Detect brain's electrical activity
    - **Functional Magnetic Resonance Imaging (fMRI):** Detect change in brain's blood flow

Parsing

Parsing: In language comprehension, process of assigning syntactic structure to incoming sentence words

- **Parser/Human Sentence Processor:** The mechanisms inside us that do parsing.
- **Structural Ambiguity:** When sentence can be assigned 2+ structures with different meanings
    - eg. "Put the [apple in the box] on the table" vs. "Put the apple in [the box on the table]"
- **Lexical Ambiguity:** When lexical items have multiple meanings
    - eg. "The bank was wet" ⇒ *bank* = "side of the river", not "financial institution"
- **Global Ambiguity:** When a sentences has 2+ structures and thus interpretations
    - eg. "I saw [the boy] with binoculars" vs. "I saw [the boy with binoculars]"
- **Local/Temporary Ambiguity:** When a sentence is temporarily ambiguous as one reads through it, but is disambiguated before they end by a **disambiguating word**.

Local Ambiguity	Example
Embedded Object/Matrix Subject	While Taylor was dressing(,) the baby *played*. While [Taylor was dressing the baby] … While Taylor was dressing(,) [the baby *played*] ⇒ confusion on *played*
Main Clause/Reduced Relative	The horse (that was) raced past the barn *fell*. [The horse raced past the barn] … The horse [(that was) raced past the barn] *fell* ⇒ confusion on *fell*
NP/S	He saw (that) the answer *was* in the book. [He saw the answer] … He saw [(that) the answer *was*…] ⇒ confusion on *was*

- **Garden Path Sentence:** Sentences with local/temporary ambiguities, luring the parser "down a garden path" to a dead-end, forcing them to re-parse it.
  - An example of **heuristics** - shallow, but fast information-processing shortcuts in our brains based on superficial clues that may lead to incorrect conclusions
- Experimentally shown to be challenging for the parser, a "processing cost" shown in *longer reading times* and *lower comprehension accuracy*
  - People aren't slowed by ambiguity, but the disambiguating word
  - All other words processed normally
- **Incremental Processing:** The idea that parsers are **hasty**, making sentence structure choices as they're heard on the fly, before the whole sentence is incorporated.

Parsing Models

Garden Path Model: The earliest model explaining how parsers handle local ambiguities

- Proposed that the parser has two distinct processing stages:
  1) We analyse the input for *syntactic categories* (nothing else - not even the specific words), build syntax trees from that
     - ➢ eg. While Taylor was dressing the baby played on the floor.
       Subsciously process this as C N V Det N V P Det N, make syntax trees
  2) We then interpret the sentence by applying semantic rules
     - ➢ As words are received, syntax tree grows. If it stops making sense, revise analysis
- Reveals the parser's **preferences** about building structure, including two principles:

Principle	Definition	Example
Late Closure	Work on the same phrase/phrase in the lowest-level of the syntax tree as long as possible	eg. While [Taylor was dressing…] + the baby = While [Taylor was dressing the baby]… ≠ While [Taylor was dressing] [the baby…] eg. The [steak with the sauce] + that is tasty = The [steak with the [sauce that is tasty]] ≠ The [steak with the [sauce] that is tasty]
Minimal Attachment	Choose the simplest possible structure. Causes NP/S ambiguities.	[The student knew] + the answer = [The student knew the answer]… ≠ The student knew [the answer…]

- Shows garden path effects arise because *parser sticks to 1 structure*, realises it's wrong, and changes
- Was a rich starting point for research - it fit views of cognition at the time, and made for clear, falsifiable predictions - but was criticised for being narrow.

Constraint-Based Parsing Models: Later group of models about how parsers handle local ambiguities.

- Believe the *parser considers multiple structures simultaneously* (not just syntactic category), and factors called **constraints** influence which structures are chosen
- Experiments have confirmed this approach
    - eg. "He realised the answer was right" vs. "He knew the answer was right"
      Garden path model *wrongly* predicts both create garden path effect
      Constraint-based model *rightfully* predicts sentence 1 is faster than 2, since the verb *realise* appears more often with a CP complement than *know*

Constraint	Description
Thematic Relations	The roles that a verb assigns (eg. *bite* implies a biter with teeth and a bitee)
Word Meanings / Context / Semantics	Whether the garden path sentence appears in a larger story, or uses specific vocabulary
Visual Information	Visuals to accompany what a garden path sentence means
Frequency of Syntactic Structure/Subcategorization	How frequently verbs choose different subcategorizations or certain words are used
Prosodic Cues	How a speaker physically articulates a garden path sentence out loud
Animacy	Whether the subject/object of garden path sentences are living things

Thematic Roles

Thematic Role	Description	Example	Cases
Agent	What performs an action	*The boy* ran.	
Theme	What undergoes an action	The boy ate *the food*.	
Location	Where an action occurs	The boy lives *in Canada*.	*on/in/…*
Goal	Where an action is directed	The boy went from his house *to his school*.	*to*
Source	Where an action originates	The boy went *from his house* to his school.	*from*
Instrument	How an action is performed	The boy ate the food *with chopsticks*.	*with*
Experiencer	What perceives something	*The boy* heard someone eating food.	*by*
Causative	A natural force causing an action	The roof was damaged *by the wind*.	*by*
Possessor	What has something	The homework *of the boy* was completed.	*of, -'s*

Case/Grammatical Case: A noun's morphological shape (eg. *the boy's* = genitive/possessive case of *the boy*). Languages may have morphemes corresponding to thematic roles.

Case Theory: Another word for the study of thematic roles

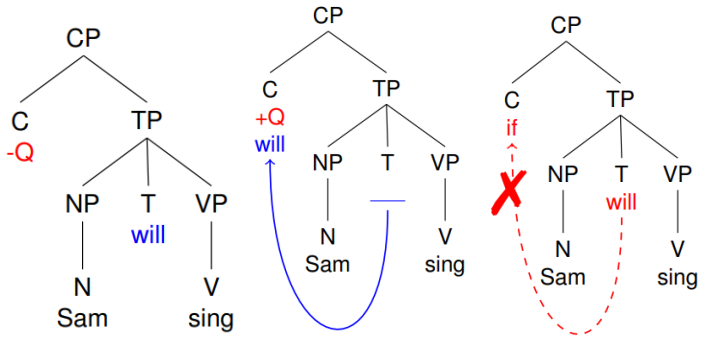
6. Syntactic Movement

Two levels of syntactic representation

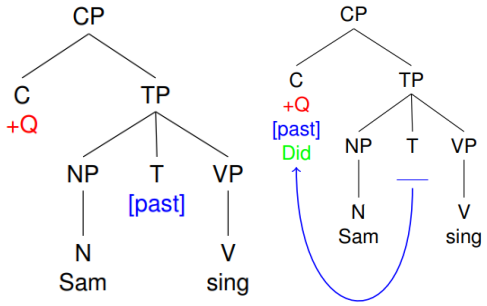
1) **Deep Structure (D-structure):** A sentence made after applying PSRs *(what we've done so far)*
2) **Surface Structure (S-structure):** A sentence made after moving the D-structure around

Movement Operation: Moving around elements of a sentence

- People think that in sentence structure, we start with words in lexicon, then use PSRs to get a default "D-structure", whose elements can be moved around to become the S-structure.
    - If there is no movement, S-structure = D-structure
- **T-C Head Movement:** When the head of a TP (the T) moves to another head position (ie. C)
    - Turns [-Q] into [+Q], we say the movement is **triggered** by +Q feature in C
    - Only works when no overt word exists in C already
        - eg. I wondered *if* [Sam will sing]. → *I wondered *if* [will Sam sing].
    - **Subject-Auxiliary Inversion:** Reversing position of subject and auxiliary
        - eg. Sam will sing. → Will Sam sing?



    - Supports T = modal auxiliary/be-verb (eg. May I eat? Is he eating?)
    - **Do-Support:** When T = [past]/[present], use placeholder "do" verb instead

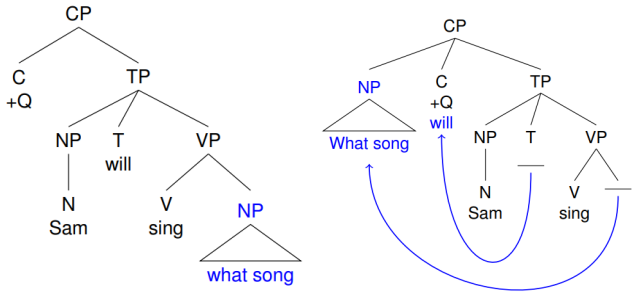


Phrasal Movement: Moving phrases around

- **NP Movement:** Moves an NP to TP or VP.
    - eg. Franny ate the cookie. → The cookie was eaten. **(Active/passive)**
    - eg. Ram passed the ball [to the kid]. → Ram [passed the kid the ball]. **(Object shift)**
- **Wh-Movement:** Move phrase to clause's left edge (often adding a wh-phrase)
    - eg. Franny ate *some cheese*? → *What cheese* did Franny eat? **(Wh-question)**
    - eg. Franny likes *green beans*. → *Green beans*, Franny likes. **(Topicalization)**
    - Leaves behind gaps

Gap Type	Example
Object Complement Gap	*What cheese* did [Franny eat __]?
Subject Gap	*Politicians*, we predict [__ will support the proposal.]
PP Object Complement Gap	*Who* did [Franny talk to __]?
Adjunct Gap	*On weekends*, [Franny studies Kurdish __].

    - Figure out the gap by reverting statement to original form
        - eg. *Who* did [Franny say __ studies it]? → Franny says *someone* studies it
- Can be **unbounded** - the wh-phrase and gap can span unlimited length/depth
    - eg. Who did Quy say that Ai believes people saw that the newspaper quoted __?
- Usually also causes T-C head movement, with some exceptions (this is English-specific)
    - Wh-movement of subjects in root questions
        - eg. *Who did leave? (unless *did* is emphasized, but that's different)
    - Embedded questions
        - eg. *We knew [who will Sam see].



- **Pied-Piping:** When a wh-movement moves other material along (usually preposition)
    - eg. *To which* country did [he send the package __]?
- **Stranding:** When the wh-movement doesn' move other material along
    - eg. *Which* country did [he send the package *to* __]? → preposition *to* is stranded
- **Island:** Specific sentence constructions that restrict wh-movement.
    - Overwhelmingly common in languages, may be universal but debated

Island	Example
Coordinate Structures	He drank this wine and ate *this pizza*. **Which pizza* did [Quy drink this wine and eat __]?
Adjunct Clauses	He chose this wine because she ordered *this pizza*. **Which pizza* did [he choose this wine because she ordered__]?
Subject Clauses	That Quy ordered *this pizza* surprised everyone. **Which* pizza did [that Quy ordered __] surprise everyone?
Embedded Question	He said how [they drove here *yesterday*]. **When* did he say [how they drove here __]?
Subject	The question about *that* surprised him. **What* did [the question about __] surprise him?

- **In-Situ Wh-Questions:** Specific cases when wh-phase doesn't move
  - **Echo Questions:** English's only form of in-situ wh-quesions. A question that expresses incredulity/asks clarification that you don't produce out-of-the-blue.
    - eg. You don't just go to the store and ask "I will find sandpaper *where*?"
  - English only allows moving one wh-phrase, but some allow more
    - eg. He put *the book on the table*.
    - eg. *What* did Quy put *where*? *Where* did Quy put *what*?
    - eg. **What where* did Quy put?

Remember…

Relative Clauses: A CP that modifies a head noun, has a gap formed by wh-movement

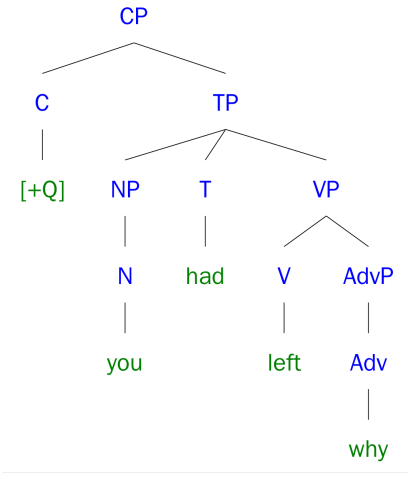
- Constrained by islands
  - eg. We saw [Mary and the kid who is happy] → *The kid [who we saw [Mary and __]] is happy.
- The gap can be in subject, object complement of V, object complement of P, indirect object
  - eg. The student [who __ sneezed] …
  - eg. The student [who we admire __] …
  - eg. The student [who we wrote to __] …
  - eg. The customers [who we gave __ a free coffee] …
- **Accessibility Hierarchy:** Hierarchy of restrictions on gap locations during relative clause formation

  Subject > *Direct Object* > *Indirect Object/Object of Adposition* > *Possessor*
  - **Adposition:** Prepositions and **postpositions** (*post*positions come *after* nouns, none in English)
  - All languages allow subject gaps, but moving right, languages have "cut-off" points
    - eg. English allows all until possessors: *The student [whose we graded [__ paper]], which must be pied-piped: The student [whose paper we graded __]

Example Structures

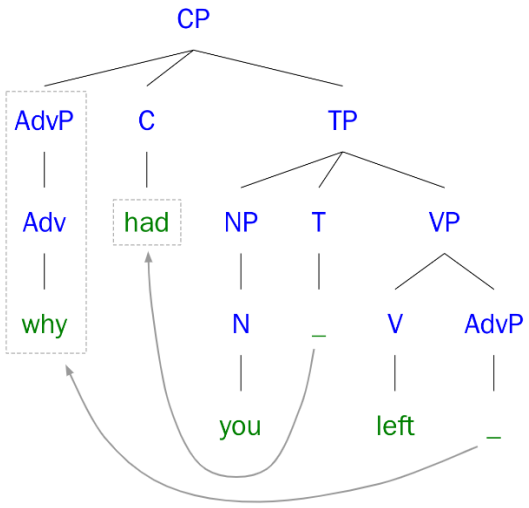
D-Structure:

You had left why?

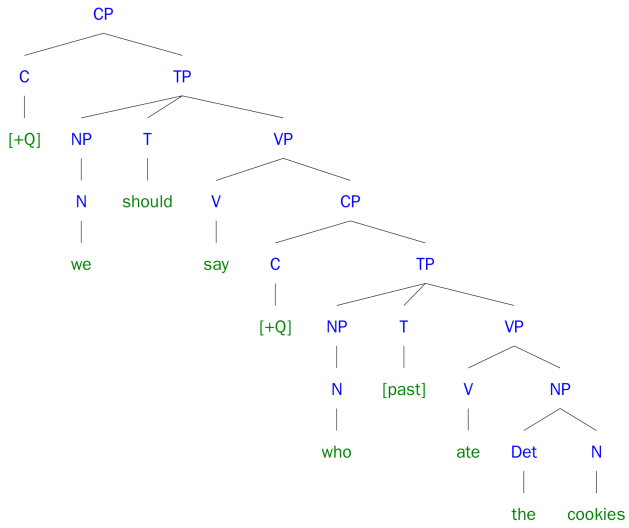


S-Structure:

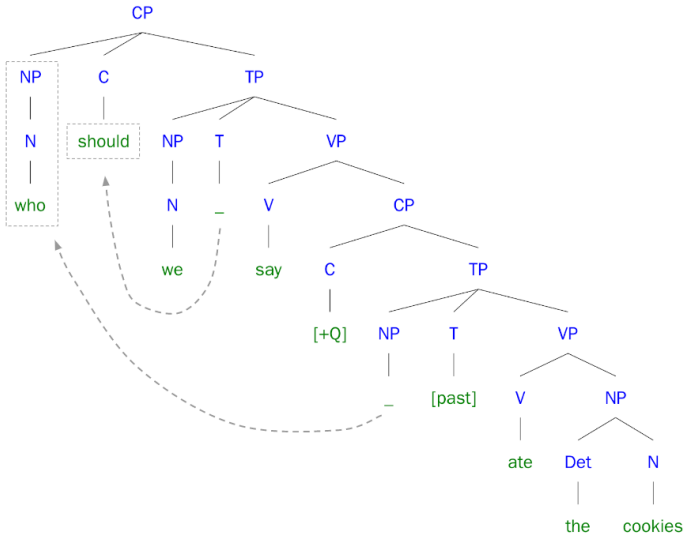
Why had you left?



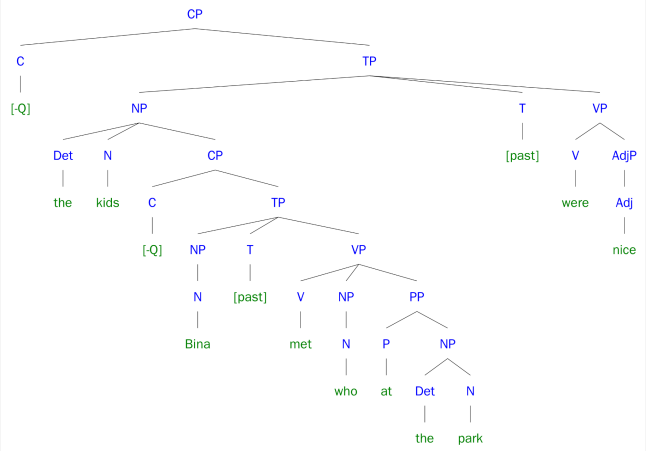
We should say [who ate the cookies]?



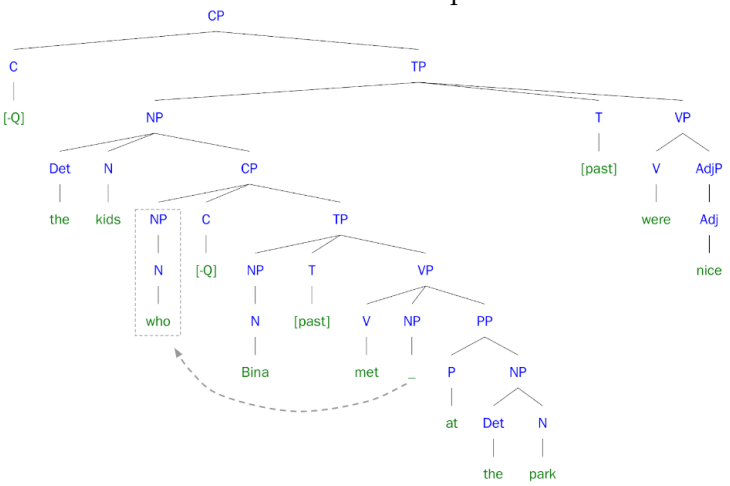
Who should we say ate the cookies?



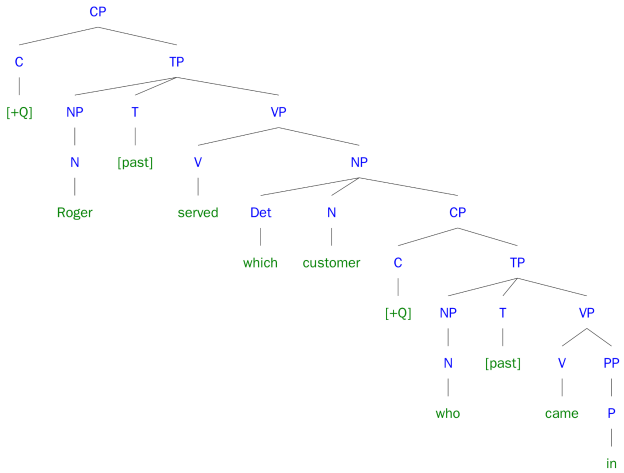
The kids [Bina met who at the park] were nice.



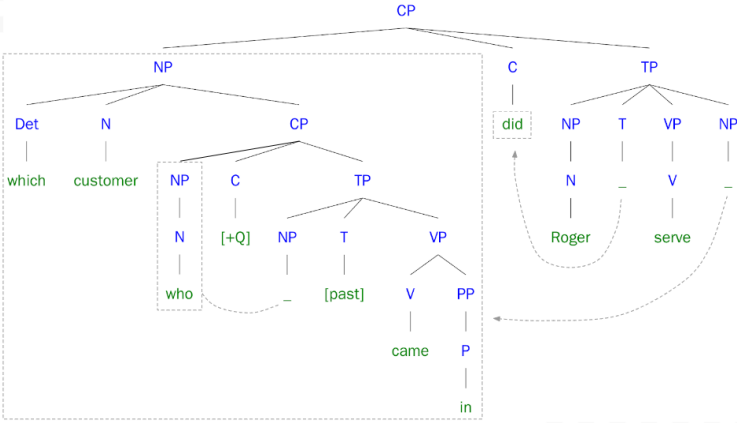
The kids who Bina met at the park were nice.



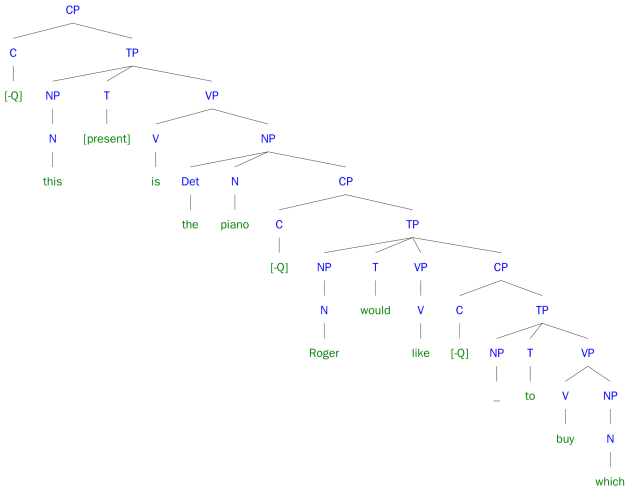
Roger served which customer who came in?



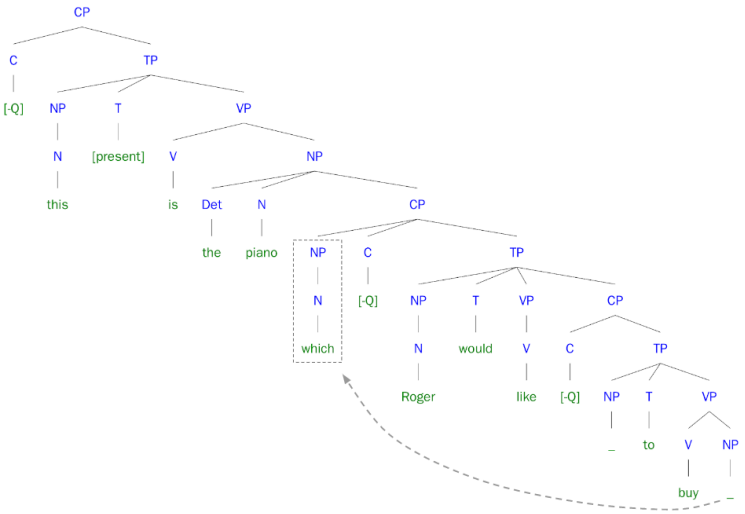
Which customer who came in did Roger serve?



This is the piano [Roger would like to buy which]



This is the piano which Roger would like to buy



➢ *Note:* Verbs resembling "want/like/seem" are weird selecting CPs → no NPs needed inside them

Relative Clause Gap Type	**Example**	
Subject	A person [who __ is funny]	⇒ [$_{NP}$ *A person*] is funny
Preposition Object	A person [who I talked to __]	⇒ I talked [$_{PP}$ to *a person*]
Object (Possessor)	A person [whose wallet I found __]	⇒ I found [$_{NP}$ *a person's* wallet]
Indirect Object	A person [to whom I sent __ mail]	⇒ I sent [$_{NP}$ *a person*] mail

➢ *Note:* Indirect object is a **recipient**. "Mail" = direct object, "A person" = indirect object

➢ *Note:* Since English doesn't allow possessive gaps, the object is pied-piped, and it's an object gap

7. Parsing Gaps

Long-Distance Dependency: Often hard-to-parse linguistics structures that span across many words.

- **Filler-Gap/Unbounded Dependency:** A gap created during wh-movement between the wh-phrase (**filler**) and **gap**
- **Active Filler Hypothesis:** When a filler is found, parser tries hastily assigning it to gaps. It takes a "top-down"approach, not waiting for sentence to complete
    - Frazier & Clifton (1989)'s **self-paced reading task**
        - ➢ eg. "What did he rehearse __?" —*fast reading*
        - ➢ eg. "What did he rehearse for __?" — *slow reading*, expected gap after "rehearse"
- **Filled Gap Effect:** When readers expect a gap, but are confused when they don't get one
    - Stowe (1986)
        - ➢ eg. "Could he have forced us to sing last year?"
        - ➢ eg. "Who could he have forced *us* to sing *for* __ last year?" — pause at *us, for*, expecting gap
- Parser however *respects subject island restrictions*, is sensitive to detailed grammatical restrictions even during incremental processing
    - Stowe (1986)
        - ➢ eg. "He asked **what** *(Wh-word)* [the story about her] was supposed to mean __."
        - ➢ eg. "He asked **if** *(Complementizer)* [the story about her] meant anything."
        - ➢ No meaningful difference in reading-time
    - The parser *identifies gaps in the subject position*, but has no filled gap effect for some reason.
- Children have *adult-like parsing behaviour* regarding island restrictions.
    - Often they **overgeneralize** — overextending regular past tense (eg. *goed*, not *went*) — but not here. Some linguists think islands "hard-wired" into universal grammar, others not.
    - de Villiers et al. (1990) - ask children questions about a story
        - eg. "A girl took a shortcut home across a wire fence, and then later at bedtime confessed to her mother that she had ripped her dress that afternoon."
        - When did she say she ripped her dress? ⇒ *ambiguous structure, got 2 answers*
        - When did she say how she ripped her dress? ⇒ *clear structure, got 1 answer*
- **Memory** makes some clauses easier/harder to process
    - Subject gap relative clauses *easier than* object gap relative clauses
        - eg. The person [who __ spotted the killer] yelled. — *subject gap, easy*
        - eg. The person [who the killer spotted __] yelled. — *object gap, hard*
    - Sentences with many **dependencies** and object gaps may overload memory
        - **Doubly-Center-Embedded Relative Clauses:** Sentences with many dependencies that overwhelm working memory
            - eg. "The senator [who the reporter [who the president detested __] spotted __] shouted." — object gaps
            - Simplify to "The president detested the reporter who spotted the senator who shouted."

Identifying Filled Gap Effects

Starting from wh-word, go incrementally through each word of the sentence. If you can grammatically end the sentence there, you've identified a potential gap.

Can you guess *which* article Ali wrote [] about [] last week?
Who could the little child have forced [] us to sing those French songs for [] last Christmas?
Lennox wants to borrow the book *which* you bought [] yesterday.
What did Yuxi paint [] with?
What did you buy [] clothes from the flea market for?
Who had the mayor expected [] Betty to sing those stupid ballads for [] on New Year's?
What did you learn [] to do [] at your meeting today after school?
What did John say [] he wanted [] you to buy [] him [] from the vending machine?
Which man, after you saw the Eiffel Tower, did you show [] photos to?
What did you see [] the kid doing?
Who did you tell [] Mary that you saw?

8. Semantics

Semantics: The study of linguistic meaning

Semantic Feature: The additional meanings/properties a word contains

- eg. *father* includes *+male, −female, +human, +parent,* something that can *splash* is *liquid*
- **Redundancy Rule:** Semantic features that belong to a "higher level" and aren't necessary to add
  - eg. *father* ⊆ *human* ⊆ *animate*. Don't need to add *animate* in *father*
- **Classifiers:** Morphemes that mark a semantic class

Sense/Intension: A description of a role. Said to have **reference** if something fills the role.

Referent/Extension: The specific thing occupying the role described by a sense

- One can know a sense and not its referent (eg. Australia's Governor General in 1952)
- Proper names have only one reference.
- Roles can have different senses, or be **coreferential** (eg. Liberal Party Leader, Canada's PM)
- Roles can have sense, no reference (eg. our descendents 3000 years from now). References can change

Declarative Sentence:

- **Sense** is the sentence's **truth condition** - the conditions that make it true/false.
  - We know a sentence's meaning if we understand the truth conditions
- **Referent** is whether the sentence is actually true/false
- Follows principle of **compositionality**
  - Switching word order changes meaning (eg. "I saw the cat" vs. "The cat saw me")
  - Structural ambiguity exists (eg. "I saw [him] with glasses" vs. "I saw [him with glasses]")

Classes of Adjectives

- **Intersective:** Says X *and* the thing they describe (eg. *fluffy* dog = fluffy *and* a dog)
- **Subsective:** Says X *for* the thing they describe (eg. *skillful* pianist = skillful *for* a pianist)
- **Non-Subsective:** Anything that is neither of the above two (eg. *possible* winner, *alleged* criminal)
  - **Privative:** Says the thing they describe is not true (eg. *phoney* cheque, *false* positive)

Compositional Semantics

Compositional/Phrasal/Sentential Semantics: Meaning of phrases/sentences

Sentence Type	Description	Example
Analytic Sentence/Tautology	Always true	Two halves make a whole
Contradiction	Always false	Cats are not animals
Synthetic Sentence	Truth depends on real-world conditions	There's a duck on the porch

- **Truth Relations:** Relationships between different sentences' truth conditions
  - **Paraphrase:** Sentences with the same truth conditions (ie. A ⇔ B)
    - Some have differing **emphasis**, but truth conditions are same
    - Includes all constituency tests with movement
    - Includes all active/passive, except those with **quantified** NPs

        - eg. "Everyone loves someone" ≠ "Someone is loved by everyone"
    - **Entailment:** Sentences where one necessarily implies the truth of another (ie. A ⇒ B)
        - eg. "Jorts is a fluffy cat" ⇒ "Jorts is a cat" (only works one way)
    - **Contradiction:** Sentence where one necessarily implies the false of another (ie. A ⇒ ~B)
        - eg. "Jorts is a cat" ⇒ not "Jorts is not a cat"
    - **Presupposition:** A sentence that already implies something is true
        - eg. "Franny's dog is a shitsu" presupposes "Franny has a dog"
        - **Common Ground:** All assumptions shared by a discourse's participants
        - Triggered by certain structures:
            - **Definite Descriptions:** Class of objects including definite singular NPs (eg. the capital of Canada) and possessive NPs (eg. Franny's dog)
            - **Factive Predicates:** Verbs that connect a presupposition to something
                - eg. "Franny *regrets* she failed" presupposes "Franny failed"
            - **Aspectual Predicates:** Verbs that say when a presupposition happened
                - eg. "Franny *stopped* failing" presupposes "Franny failed"
            - **Temporal Clauses:** A type of adjunct clause relating to time
                - eg. "*Before* Franny failed, she ate" presupposes "Franny failed"
        - Sometimes categorised as a subset of entailment

Presupposition vs. Entailment

Question Formation: Converting to questions *erases entailments*, not presuppositions

- *Entailment:* Is Jorts a fluffy cat? ⇏ Jorts is a cat
- *Presupposition:* Is Franny's dog a shitsu? ⇒ Franny has a dog

Negation: Converting to negatives *erases entailments*, not presuppositions

- *Entailment:* Jorts is not a fluffy cat ⇏ Jorts is a cat
- *Presupposition:* Franny's dog is not a shitsu? ⇒ Franny has a dog

Breaking Rules

Anomaly: A grammatical but unacceptable sentence

- Semantic properties may contradict (eg. "*Colourless green* ideas sleep furiously")
- Some words are **uninterpretable**, nonsensical meaning (eg. Poem *Jabberwocky*, "*vorpal* sword")
- We understand them nevertheless; anomalous sentences often make for interesting imagery in literature (eg. "Children building this rainman out of snow")

Metaphor: Nonliteral meaning based on inferred semantic properties

- Understanding them requires knowing **situational context** — who's speaking, listening, what's discussed, general facts about the world
- eg. "He's a butcher" can be taken literally, but can also metaphorically mean someone is harmful/murderous/ruthless/bloody

Idiom: Fixed phrases where usual compositionality does not apply

- May or may not have frozen forms (eg. "I snapped out of it" vs. #"It was snapped out of by me")
- Can break rules on semantic properties (eg. "Eat your heart out" violates subject of *eat* = edible)
- Often originate from metaphors that "took hold". Must be entered into lexicon as single "items"

Lexical Semantics

Lexical Semantics: Meaning of words/morphemes

Lexical Ambiguous: Lexical items with multiple senses (meanings)

- **Polysemy:** One word with multiple senses (eg. *foot* = "unit of size", "body part")
    - In a dictionary, listed as one entry.
    - Meanings of the words are usually similar conceptually/historically
- **Homonym:** Different words that *sound* alike (eg. *higher*, *hire*)
    - In a dictionary, listed as multiple entries.
    - **Homophone:** Homonyms with different spelling and meaning
- **Homograph:** Different words that are *spelled* alike (eg. *lead* (verb), *lead* (noun))
    - **Heteronym:** Homographs with different pronunciation and meaning
- Ambiguities often used for humorous purposes

Sense Relations: Meaning relationship between words' senses

- **Synonymy:** Two senses, if replacing one for the other produces a paraphrase
    - Perfect synonymy arguably does not exist (eg. *couch, sofa* differ: *couch* potato ≠ *sofa* potato)
- **Antonymy:** Two senses, if replacing one for the other produces a contradiction
    - **Complementary Pairs:** "Default" antonyms. One implies not the other (eg. alive/dead)
    - **Gradable Antonyms:** Words that exist on a scale, where negative of one pair is not synonymous with the other (eg. not big ≠ small)
        - Often picked from continuums (eg. tiny, small, medium, large, huge, gargantuan)
        - One member of the pair is **unmarked**, serves as default form used in questions (eg. "How tall is that tree?", not "How short is that tree?")
        - Meaning is always relative, no information about absolutes
    - **Relational Opposite:** Words describing two sides of a relationship (eg. buy/sell)
        - Replacing words and switching argument order creates paraphrases (eg. Franny is his employee = He is Franny's employer)
    - Antonyms have to share *all but one* semantic feature to count
    - In English, often formed with prefixes *un-*, *non-*, *in-*, *il-*, *mis-*, *dis-*, *-less*
        - *Exceptions:* "antiantonyms" like *valuable/invaluable*, *loosen/unloosen*, *ravel/unravel*
- **Hyponymy:** A generic-specific relationship between two senses (eg. food/bread)
    - **Superordinate/Hyperonym:** More generic term
    - **Hyponym:** More specific term
- Dictionary definitions rely on the above three sense relations
- **Metonym:** Words used in place of larger words/expressions (eg. *Bay Street* = financial industry, *Crown* = monarchy, *brass* = military officers)
- **Meronym:** Parts of a larger entity that aren't used in place of them (eg. *leaf, branch, root* for *tree*)
- **Retronym:** Word combinations necessary today but would be redundant if used in the past (eg. *silent movie*, since all movies were once silent)
- **Proper Names:** Words that describe senses with reference to a specific object/entity
    - They are **definite**, meaning they can be identified based on context

9. Pragmatics

Pragmatics: The study of language use and meaning in context.
Linguistic Context: The discourse preceding the phrase or sentence to be interpreted
Discourse: The combination of multiple sentences to express complex thoughts/ideas

- **Discourse Analysis:** How speakers combine sentences into broader speech units

Deictic/Indexical Term: Words whose meanings depend on context of usage

- **Person Deixis:** Words referring to people whose identity depends on context (eg. *these* men)
    - Involve **demonstrative articles** – *this, that, those, these*
- **Time Deixis:** Words referring to a certain time relative to context (eg. now, next April, yesterday)
- **Place Deixis:** Words referring to a location relative to context (eg. here, over there, these parks)
- Pronouns involve much deixis:
    - Makes distinctions between **addresser/addressee** (eg. I, you)
    - Makes distinctions regarding the **distance of an object** (eg. this/that, here/there)
    - Refer to an **already mentioned subject** in a previous sentence (eg. they, it, he/she, that)
    - Be accompanied by **a motion** (eg. say *they* while pointing at someone)
- Often ambiguous since it is dependent on context/intention
- **Speech Act:** An utterance that does something
    - **Performative Sentences:** Sentences that are "done" just from it being said (eg. "I resign.")
        - Simple test is to say "I hereby __". If the sentence still works, it's performative
    - **Illocutionary Force:** The type of a speech act. Can match with sentence type
        - *Illocutionary Forces:* Assertion, Question, Request, Command
        - *Sentence Types:* Declarative, Interrogative, Imperative

	Assertion	Question	Command or Request
Declarative	**You left the window open.**	*I'm wondering if you left the window open.*	*I can't stand having that window open.*
Interrogative	*Didn't you leave the window open?*	**Did you leave the window open?**	*Can you please shut that window?*
Imperative	*Remember that you left the window open.*	*Tell me whether you left the window open.*	**Shut the window.**

- **Utterance Meaning:** A speaker's utterance and intention behind the utterance. Relies on **context** of sentence, **inferences** not explicitly stated in the sentence.

Cooperative Principle

Cooperative Principle: Idea that participants of a conversation engage meaningfully and appropriately

- Developed by Paul Grice in 1960/70s. Contains four subcategories

1) **Maxim of Quality:** One says the truth (no lies, conjecture without evidence)
2) **Maxim of Quantity:** One gives as much information as required, not too much/little
3) **Maxim of Relevance:** One gives responses relevant to the conversation
4) **Maxim of Manner:** One speaks clearly, briefly, and orderly (without ambiguity/verboseness)

- Other principles exist, like **turn-taking**
- When maxims appear to be violated but hearer still assumes cooperative principle, they can reason the message in a way such that it still makes sense.
    - eg. "Want to see *Endgame*?" "I have to study." ⇒ appears to violate *maxim of relevance*
      But the hearer reasons: Have to study ⇒ Busy ⇒ Cannot see *Endgame* ⇒ "No" ⇒ Relevant
    - eg. "Can you pass the salt?" ⇒ appears to violate *maxim of quantity* (answer is obvious)
      But the hearer reasons: question is asked because speaker *wants* salt ⇒ Enough info
- **Flouting:** Deliberate/obvious violations of maxims, often expresses negativity
    - eg. [in a reference letter] "Fred has clear handwriting" ⇒ violate *maxim of quantity*, implies there is not much else good about Fred.
    - eg. "Maybe I'll win the lottery." "Maybe pigs will fly." ⇒ violate *maxim of quality*, implies previous speaker's statement is stupid like the hearer's.
    - eg. "How was the singer?" "He produced a series of sounds corresponding closely to the song he intended to sing." ⇒ violate *maxim of manner*, implies singer was bad.
- **Implicature:** Something implied that isn't explicitly said, that isn't necessarily true but usually is
    - **Conversational Implicature:** Inferences made from conversational context.
        - eg. "Want to see *Endgame?*" "I have to study" ⇒ "No"
    - **Scalar Implicature:** Inferences made from degree modifiers (which must be on non-maximal points of a scale — ie. no extreme ends)
        - eg. "I ate most/some of the cheese" ⇒ "I didn't eat all the cheese"
        - eg. "The water is warm" ⇒ "The water is not hot"
        - Based on maxim of quantity —if water was hot, speaker would've said so
    - **Defeasible:** Can be "cancelled/erased" without being redundant/contradicting oneself
        - eg. "Want to see *Endgame?*" "I have to study, *but sure, I'll go anyways.*" ⇒ "Yes"
        - eg. "The water is warm; *in fact, it's hot*!"

Differentiating Inferences

Implicature	**Presupposition**	**Entailment**
Is *defeasible* • "She saw most of the movie; *in fact, she saw all of it!*"	Is *not defeasible* • #"Her dog is a shitsu, *but she doesn't have a dog.*"	Is *not defeasible* • #"She killed the wasp, *but it didn't die.*"
Is *reinforcable* (implicature can be overtly stated without redundancy) • "The water is warm, *but not hot.*"	Is *not reinforcable* • #"She stopped failing; *in fact, she used to fail.*"	Is *not reinforcable* • #"The water is warm; *in fact, it is not cold.*"
Negation/questions *don't preserve* • "Is the water warm?" "The water isn't warm" *Don't know if water is not hot*	Negation/questions *preserve* it • "Did she stop failing?" "She didn't stop failing" *Still know "she failed"*	Negation/questions *don't preserve* • "Is the water warm?" "The water is not warm." *Don't know if water is not cold.*

10. First Language Acquisition

Early (wrong) views of language acquisition were influenced by psychological theory **behaviourism**

1) **Imitation:** Child simply imitates what they hear. Wrong.

ADULT: He's going out.	CHILD: He go out.
ADULT: That's an old-time train.	CHILD: Old-time train.
ADULT: Adam, say what I say: Where can I put them?	CHILD: Where I can put them?

   - ➢ Child doesn't imitate — they produce novel forms, not following the adult's example
   - ➢ We don't classify **child language** as errors; they have real grammars that are just different

2) **Reinforcement:** Child is trained with positive/negative praise (eg. praise). Wrong.

CHILD: Nobody don't like me.
MOTHER: No, say "Nobody likes me."
CHILD: Nobody don't like me.
(dialogue repeated eight times)
MOTHER: Now, listen carefully, say *"Nobody likes me."*
CHILD: Oh, nobody don't likes me.

   - ➢ Child don't "correct" for grammatically, it's at most about the content of the sentence

3) **Analogy:** Child extends the form of sentences to novel forms. Wrong.
   - ➢ Child cannot rely totally on it: "I *painted* a barn red" cannot extend to "I *saw* a barn red"
   - ➢ Many cases where you expect child to make analogies, but don't.
     - Child doesn't extend "The boy [who was there __] is sleeping?" to *"Was the boy who there __ is sleeping?" ⇒ they somehow recognize restriction
   - ➢ **Connectionism:** A computer model of language representation/acquisition based on behaviourist principles like analogy/reinforcement.
     - Linguistic knowledge is represented by neuron-like connections between phonological forms (eg. *play* connected with *plays*, *played*), which strengthen with exposure and can predict new forms (eg. *prance* becomes *pranced*)
     - Model's assumptions not consistent with actual input given to children, however (eg. past tense not based on phonology alone. *Mickey Mouses*, not *Mickey Mice*)

4) **Child-Directed Speech (CDS)/Motherese/Parentese/Baby Talk:** Child learns grammatical language because adults speak to them in special "simplified" language. Wrong.
   - ➢ CDS is not syntactically simpler, many complex structures
   - ➢ This theory places emphasis on baby's linguistic environment, but cultures exist where adults hardly talk to babies
   - ➢ Although infants prefer listening to CDS than normal adult speech, studies show CDS does not significantly affect child language development

- Perhaps the absence of ungrammatical forms in the stimulus (the environment where the child hears) prevents the child from acquiring them. Nope.
  - Children produce novel utterances, meaning they know what's wrong/right despite the stimulus not telling them what's wrong

- Children sometimes over-extend patterns, being ungrammatical anyways
- Children understand **recursive properties** unlearnable from experience alone
- **Poverty of the Stimulus:** Idea that children are not exposed to enough data in linguistic environments to acquire every feature of their language ⇒ thus, they learn from something else too
  - Serves as contrary evidence to behaviourism

Two Opposing Theories:

1) **Innateness Hypothesis/Grammatical Innateness View:** Idea that certain properties of language/grammar are innate, part of a universal grammar (UG) in our biology that tells us about movement operation restrictions, syntactic categories, etc.
   - View is associated with Noam Chomsky
   - *Justification:* acquisition is rapid — just two years. Uniform across children and languages. Would explain the poverty of the stimulus
   - Predicts all human languages share certain properties as they're based off a common UG
   - **Critical Period:** Period from birth to puberty, where language learning is fast and easy, no external intervention or conscious effort required. Afterwords, acquisition is difficult, and for some, never fully possible
     - *Evidence:* Examples of children with no critical period linguistic input may peak, but cannot develop a complicated grammar
2) **Domain-General Learning View:** No properties of language/grammar are innate; it's instead based off general learning mechanisms, statistical learnings (frequencies of forms in environment)

- Most researchers agree that is a combination of both views that occur

Input: The environment of language in which a child grows and learns to speak around.

- Determines what languages we learn, plus, morphemes, words, word order (eg. SOV)

Mean Length of Utterance (MLU): Average length of sentences (measured in morphemes) of a child

- More effective proxy for measuring a child's "grammar" than chronological age (which worsens in accuracy especially in later stages)

Syntactic Bootstrapping: Use of syntax to help acquire word meaning, usually with **nonce words**

- eg. Experiment with nonce word *blick*, where children see picture of animal jumping and hears either "See the blick" (implies noun) or "See the blicking" (suffix *-ing* implies verb)
  - Asked to show "blicking" ⇒ child jumps
  - Asked to show "a blick" ⇒ child points to animal
- Helps because often, children **overextend** meaning because learning meaning can be ambiguous, especially for abstract ideas (eg. to know)
  - eg. Adult points to cat on a mat and says "cat".
    Is *cat* the mat? The cat? The situation where an animal sits?

~6 Months of Development:

Babbling: Unrecognisable utterances produced by babies

- Shows the readiness of human mind to respond to linguistic cues from a very early age
- The 12 most common consonants in the world make up 95% of consonants produced by babies
- Early babbles are repeated consonant-vowel sequences (eg. mama, gaga), later babbles more varied
- Gradually, babbles sound like words in specific languages — adults can distinguish babbles of babies with different languages
    - The infant's perceptions/productions fine-tune to their surrounding language!
- Deaf infants produce unique babbles − random, nonrepetitive — but those exposed to sign language begin to use different hand motions repetitively while hearing babies don't

~1 Year of Development:

Protowords: Word-like utterances with consistent meaning (eg. *dodo* for "blanket")

Holophrastic Sentences: Proto-sentences where 1 word = 1 sentence (eg. *down* for "I want down")

Acquisition of Morphology

Stage	Explanation
broke, brought	Children have no rules for past tense formation; each inflectional form is stored separately in their lexicon
breaked, bringed	Children learn a general rule, and **overgeneralize**. This happens early in development (eg. Wug Test)
broke, brought	Children learn the exceptions.

- Children in richly-inflected languages quickly acquire agreement morphology
- Derivational rules are learned quickly as well (eg. English, using noun as a verb)

Acquisition of Syntax

Stage	Explanation
Two-Word Stage *more wet. allgone sock.*	• Begins at ~2 years, no inflection yet • Prosodic evidence that each of these words is 1 unit
Telegraphic Stage *he play tune. no sit here.*	• Functional morphemes still missing (eg. determiners, tense), though in English-learning children they begin to emerge in a common sequence: *-ing* is early, then preposition *in/on*, plural *-s*, etc. • Evidence that complete syntax is in their grammar now — they acquire word-order, subject-verb agreement (which requires knowing the subject)
Later Stages	• Rapid grammatical development from 2;6 (ie. 2 years, 6 months) to 3;6 • Complete sentences, consistent functional morphemes

- Lastly, for pragmatics, some aspects are acquired early, others take months/years
    - Children say *he*, not introducing who *he* is, call themselves *you*, misuse *a/the*, no auxiliaries

Acquisition of Signed Language

Deaf children show similar stages of language acquisition as spoken languages at similar times

- *Babbling*
- *Single signs* (similar to holophrastic stage)
- *Combining Signs* (similar to two-word stage)
- *Telegraphic Stage* (where grammatical signs are omitted)

Deaf children also make similar mistakes to speaking children

- Reversing pronouns for "I" and "you"
- Using the symbols for NO and NEG in ASL interchangeably, like speaking children starting negative sentences with *no*