

1 General introduction

1. [Chomsky \(1957\)](#): a **language** is a set of its grammatical sentences.

1.1. Change “sentences” to “expressions”.

1.2. Change “expressions” to “expressions with their structural descriptions”.

1.2.1. String similarity is usually misleading:

- (1) a. John is easy to please.
b. John is eager to please.
- (2) a. I expected John to leave.
b. I persuaded John to leave.
- (3) a. We expected several students to be at the talk.
b. We persuaded several students to be at the talk.
- (4) a. A unicorn seems to be in the garden.
b. A unicorn tries to be in the garden.
- (5) a. John grows tomatoes.
b. John destroys tomatoes.
- (6) a. It is unlikely that Lee will be elected.
b. It is improbable that Lee will be elected.
- (7) a. They saw Pat with Chris.
b. They saw Pat and Chris.
- (8) a. Something disgusting has happened in this bed.
b. Something disgusting has slept in this bed.
- (9) a. He looked up the word.
b. He looked at the word.
- (10) a. Who do you want to see?
b. Who do you want to see Bill?
- (11) a. It is easy to play **this sonata** on **this violin**.
b. **This sonata** is easy to play on **this violin**.
c. **This violin** is easy to play **this sonata** on.

1.3. Item 1.2. brings meaning into picture:

It is assumed in *LSLT* (as in *SS*) that the theory developed is to be embedded in a broader semiotic theory which will make use of the structure of *L*, as here defined, to determine the meaning and reference of expressions and the conditions on their appropriate use, and will also encompass other investigations (statistical linguistics, etc.). ([Chomsky 1975](#):3)

2. **Grammar** is an explicit system of rules and representations that pairs phonetic forms (sound pathway) with logical forms (meaning pathway).

3. **Acceptability** (data) versus **grammaticality** (theory).

3.1. Factors effective in acceptability are manifold and complex.

3.2. Grammar is just one among many.

3.3. Such idealization is indispensable in science.

3.3.1. Economist Dani Rodrik:

All models are wrong. They are helpful [when] used in relevant context. Empirics without models yield no understanding.

To clarify, models are wrong in the same sense that a subway map is wrong. Leaves out, misrepresents real world details.

Simplicity in theory is a feature, not a bug. “But the real world is more complicated” is never good riposte. All causal theories simplify. (tweets, March 8, 2017)

4. **Descriptive** versus **explanatory** adequacy.

4.1. Description: “Given a language, what is possible to utter to mean what?”

4.1.1. A descriptively successful grammar for a given language has the widest possible coverage with a minimal set of rules and assumptions.

4.2. Explanation: “What is a possible human language?”

4.2.1. What is the common denominator of all the descriptively successful grammars?

2 Sound

1. Language is primarily based on sound.
2. Speech sounds are generated within the **vocal tract** (larynx, mouth, nose) by constricting the passage of air pumped by the lungs in various ways.
3. Three parameters: **place** of articulation, **manner** of articulation, and **voice**.
4. **Voice**.
- 4.1. Periodic sound waves are generated by vibrating vocal folds.¹
- 4.2. Only periodic sound waves have tone; an aperiodic sound wave is noise.
- 4.3. A voiced consonant (e.g. [v], [b] or [z]) is a mixture of noise and periodic sound.
- 4.4. A voiceless consonant (e.g. [f], [p] or [s]) is noise.

5. Place of articulation.

Place	Active articulator	Passive Articulator	Examples
Bilabial	upper and lower lips	none	[p b m ɸ]
Labiodental	lower lip	upper front teeth	[f v ɱ]
Dental	tongue tip	upper front teeth	[θ ð]
Alveolar	tongue tip or blade	alveolar ridge	[t d l n s z]
Postalveolar	tongue tip or blade	rear of alveolar ridge	[ɹ ʃ]
Retroflex	tongue tip	hard palate	[ɖ ɟ]
Palatal	tongue front	hard palate	[j ɲ]
Velar	tongue back	soft palate	[k ɡ]
Uvular	tongue back	uvula	[q ɢ]
Pharyngeal	tongue root	rear wall of pharynx	[ħ ʕ]
Glottal	vocal folds	none	[h ʔ]

6. Manner of articulation.

- 6.1. Degrees of stricture: Closure, narrowing, approximation.
- 6.2. The first two generate **obstruents**; it is impossible to create or sustain voice; pressure builds up in the vocal tract.
- 6.3. Approximation generates **sonorants**.
- 6.4. Stops (full-blockage):
 - oral e.g. [p b t d k g] versus **nasal** e.g. [m n] – you can force a nasal stop into an oral stop by blocking your nostrils;
 - **plosive** e.g. [p b t d k g] versus **affricate** e.g. [tʃ dʒ ts].
- 6.5. **Fricatives** (narrow but not full blockage):
 - median e.g. [s z ʃ v] versus lateral e.g. [ɬ ɮ].
- 6.6. **Approximants** (similar to fricatives but sonorant):
 - median e.g. [w j] versus lateral e.g. [ɭ ʎ].
- 6.7. **Taps** e.g. [d] versus [r] in US English; **trills** e.g. [r r] and **flaps** e.g. [ɾ].

7. Vowels

- 7.1. A vowel is a complex of periodic sound waves.
- 7.2. Vocal folds create a spectrum of frequencies with differing intensities. This spectrum gets filtered through the vocal tract to produce categorically perceptible vowel qualities.
- 7.3. Three parameters: height, location, lip position.

¹Piano: 27.5 Hz – 4,186 Hz; typical male: 80-210 Hz; typical female: 150-320 Hz; bass voice: very rarely as low as 50 Hz; soprano voice: up to around 1,000 Hz; human ear: 20 Hz – 20,000 Hz.

3 Sound structure

1. Basic concepts.

- 1.1. **Segment.** Take the word *cat*. There are three sound units in this word, which we name **segments**. How do we know that there are three, but not two or five? The reason is that the sounds are apparently there for us to do minimal replacements to arrive at other words: e.g. *hat, cut, cap*.
- 1.2. **Contrast.** In both Turkish and English the lateral approximant sound (orthographically *l*) have both a non-velarized [l] and a velarized [ɫ] version. In English non-velarized [l] appears before vowels and [j], as in *look* and *familiar*, whereas the velarized [ɫ] appears before consonants (e.g. *milk*) and pauses (e.g. *cool*). **Its distribution is predictable by rule.** In Turkish, however, the same sound distinction is not fully predictable; it may distinguish words (e.g. *sol* as a direction versus a musical note). For this reason [l] versus [ɫ] is contrastive in Turkish. Voice in plosives is contrastive in both languages (e.g. *pat* versus *bat* and *pul* versus *bul*).
- 1.3. **Phoneme.** English *l* sounds are not limited to [l ɫ]; before dental fricatives, one finds a velarized dental – rather than velar – lateral approximant [ɭ], e.g. as in *healthy*. Yet another *l* sound is voiced nasalized and velarized alveolar lateral approximant [ɫ̃], as in words like *film* and *kiln*. All these are **phones** that cannot make any meaning distinction in English. They all realize a sound abstraction called a **phoneme**, depicted as /l/. The set of phones [l ɫ ɭ ɫ̃] are called the **allophones** of the phoneme /l/.

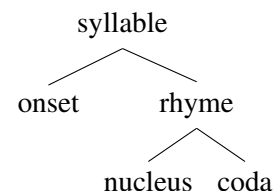
2. Aims of Phonology.

- 2.1. Sounds of (a particular) language – the possibility space of speech sounds;
 - 2.2. Rules of combination – **phonotactics**;
 - 2.3. Rules of change – how do sounds “adapt” to their context.
3. **Structure and process.** You can also look at phonology in terms of **structures** and **processes**.
- 3.1. Phonological structure is not simply a sequence of phonemes.

3.2. Speech is organized into natural “moves” of the speech organs called **syllables**.

3.3. One way to characterize syllables is templates like CVC, CV, VC, and so on.

3.4. Syllables themselves are not linear sequences of sounds, they display hierarchical organization.



3.5. Major phonological processes are: assimilation, dissimilation, deletion, insertion, weakening, strengthening.

4. **Feature theory.** Phonology further abstracts from phonetic features; around two dozen **distinctive features** characterize the notion of *a possible natural language phoneme* and take part in phonological rules.

4.1. Major class features:

syllabic (syl): forms a syllable peak; can bear stress. Notes: compare *ear* [ɪr] with *your* [jɪr]; the allophone of /r/ in the second is [+SYL].

sonorant (son): can be voiced without effort; no pressure build-up in the vocal tract. Notes: [+SON] does not mean vowel, English [w l ɹ j] are sonorant.

consonantal (cons): sounds produced with a main obstruction in the oral cavity (region after the glottis).

4.1. Place of articulation related features:

4.1.1. Vowel place features:

high: tongue is raised above the neutral position (= the position for [ɛ]).

low: tongue is lowered below the neutral position.

back: tongue is retracted from the neutral position.

round: lips are protruded.

4.1.1. Consonant place features:

coronal (cor): blade or tip of the tongue raised from the neutral position.

anterior (ant): produced with a constriction to the front of the alveolar ridge.

Note: You can use [s] versus [ʃ] as a cut-off point for this feature, the first is $[+ANT]$ and the second is $[-ANT]$.

distributed (dist): constriction is extended (e.g. blade of the tongue touching a passive articulator results in $[+DIST]$, whereas the tip results in $[-DIST]$.

This feature applies only to $[+COR]$ phones.

4.2. Manner of articulation related features:

continuant (cont): primary constriction does not totally block the flow through the *oral cavity*.

delayed release (del.rel): the relaxation of a stop is delayed, such that a fricative is formed; e.g. affricates [tʃ dʒ] are $[+DEL.REL]$.

nasal (nas): lowered velum, air can pass through the nasal cavity.

lateral (lat): the mid section of the tongue is lowered at the sides.

4.3. Laryngeal features:

spread glottis (s.g): vocal folds are spread far apart.

constricted glottis (c.g): vocal folds are tightly constricted.

voice (voi): vocal folds vibrate.

4.4. Prosodic features:

long has greater duration.

stress emphasized with greater pitch, amplitude and duration.

5. **Feature specifications.** A feature theory determines all the available abstractions over speech sounds. Any feature set defines a (possibly empty) set of phonemes for a given language. For instance $[+HIGH, -ROUND]$ designates the set [i u], $[+SYL]$ designates the set [i y e œ u a o u] in Turkish.

6. A feature specification may point to an empty set of phonemes for two reasons: (1) the phonemes may be physically impossible, say $[+HIGH, +LOW]$; (2) the phonemes may be combinatorially impossible in the sense that no

phoneme has that combination of features. Phonology, in comparison to phonetics, is an abstract science, it imposes constraints that are not physical.

7. A feature theory can make it impossible to distinguish some sounds. It is a prediction of that theory that there is no language that uses these sounds contrastively. For instance, there is a pair of phonetically distinct retroflex consonants, where the apical one is attested in Hindi, while the sublaminal one is attested in Telugu. No combination of phonological features is able to distinguish between these sounds – the phonological theory is simply blind to this distinction. If one day someone discovers a language that has these two sounds, then the theory will be falsified and a revision will be needed.

8. **Phonological rules.** Simpler rules using fewer features possess more explanatory power than complex rules. Rules are directly constrained by the feature theory. For instance, given the feature theory outlined above, it is simply impossible to characterize the set [s ʃ f z] in Turkish; you cannot pick a set of features that designates all and only these sounds – you cannot leave out v for instance. This has an immediate prediction: There can be no phonological process in Turkish that works solely on this collection of sounds.

9. **Phonological rule formalism.** A rule consists of an input, output and an environment. For instance, the following rule nasalizes vowels that come before nasal segments:

$$[+SYL] \rightarrow [+NAS] / \text{ — } [+NAS]$$

9.1. Some special symbols for the environment:

indicates word boundary;

+ indicates morpheme boundary;

· indicates syllable boundary.

9.2. The symbol \emptyset is used in input to model insertion, and in the output to model deletion.

9.3. Curly braces indicate disjunction; for instance,

$$[+SYL] \rightarrow [-LONG] / \text{ — } [-SYL] \left\{ \begin{array}{l} -SYL \\ \# \end{array} \right\}$$

shortens a vowel before two consonants or a consonant and a word boundary.

9.4. Repetition is handled by *. for instance,

$$[+SYL] \rightarrow [+ROUND] / \left[\begin{array}{c} +SYL \\ +ROUND \end{array} \right] [-SYL]^* \text{ —}$$

rounds a vowel preceded by a round vowel and zero or more consonants.

9.5. Parentheses are used to indicate optionality.

9.6. variables make it possible to relate the components of a rule. For instance, in english nasals assimilate (= become alike) to the place of articulation of the following consonant – nasals become [m] before [p] and [n] before [t]. The feature to be assimilated is coronality. This can be done as follows:

$$[+NAS] \rightarrow \left[\begin{array}{c} +ANT \\ \alpha COR \end{array} \right] / \text{ — } \left[\begin{array}{c} +ANT \\ \alpha COR \end{array} \right]$$

9.7. Sometimes [+SYL] and [-SYL] are abbreviated as V and C.

10. **Underlying form.** Morphology feeds underlying forms into phonology. Take the following data from Russian:²

²Odden (2013), Section 4.1.

(12)	<i>Nominative singular</i>	<i>Genitive singular</i>	
	vagon	vagona	'wagon'
	avtomobilʲ	avtomobilʲa	'car'
	vetʃer	vetʃera	'evening'
	muʃ	muʒa	'husband'
	karandaf	karandafa	'pencil'
	glas	glaza	'eye'
	golos	golosa	'voice'
	ras	raza	'time'
	les	lesa	'forest'
	porok	poroga	'threshold'
	vrak	vraga	'enemy'
	urok	uroka	'lesson'
	porok	poroka	'vice'
	tʰvet	tʰveta	'color'
	prut	pruda	'pond'
	soldat	soldata	'soldier'
	zavot	zavoda	'factory'
	xlep	xleba	'bread'
	grip	griba	'mushroom'
	trup	trupa	'corpse'

11. **Structure preservation.** Take the following data from Kerewe (Tanzania):³

³Odden (2013), Section 4.3.

(13)

<i>Infinitive</i>	<i>1sg habitual</i>	<i>3sg habitual</i>	<i>Imperative</i>	
kupaamba	mpaamba	apaamba	paamba	‘adorn’
kupaanga	mpaanga	apaanga	paanga	‘line up’
kupima	mpima	apima	pima	‘measure’
kupuupa	mpuupa	apuupa	puupa	‘be light’
kupeketfa	mpeketfa	apeketfa	peketfa	‘make fire w/ stick’
kupiinda	mpiinda	apiinda	piinda	‘be bent’
kuhiiga	mpiiga	ahiiga	hiiga	‘hunt’
kuheeka	mpeeka	aheeka	heeka	‘carry’
kuhaanga	mpaanga	ahaanga	haanga	‘create’
kuheeba	mpeeba	aheeba	heeba	‘guide’
kuhiima	mpiima	ahiima	hiima	‘gasp’
kuhuuha	mpuuha	ahuuha	huuha	‘breathe into’

Taking /h/ as underlying,

$$(14) \left[+S.G. \right] \rightarrow \left[\begin{array}{c} -CONT \\ +ANT \end{array} \right] / \left[+NAS \right] \text{---}$$

Taking /p/ as underlying,

$$(15) \left[\begin{array}{c} +ANT \\ -CONT \\ -VOI \end{array} \right] \rightarrow \left[\begin{array}{c} +S.G. \\ +CONT \\ -ANT \end{array} \right] / \left\{ \begin{array}{c} V \\ \# \end{array} \right\} \text{---}$$

For rule 14, a full specification would have $[-CONT, +ANT, +CONS, -SON]$ as output specification. But the first two is enough as they uniquely identify /p/, given the segment inventory of the language.

12. Rule ordering. Take the following data from Bukusu (Kenya):⁴

⁴Odden (2013), Section 5.1.3.

(16)

<i>Imperative</i>	<i>3pl pres</i>	<i>1sg pres</i>	
t̪fa	βat̪fa	ɲd̪za	‘go’
t̪fexa	βat̪fexa	ɲd̪zexa	‘laugh’
t̪f̥ut̪ʃuung̃a	βat̪f̥ut̪ʃuung̃a	ɲd̪z̥ut̪ʃuung̃a	‘sieve’
talaanda	βatalaanda	ndalaanda	‘go around’
teexa	βateexa	ndeexa	‘cook’
tiira	βatiira	ndiira	‘get ahold of’
piima	βapiima	mbiima	‘weigh’
pakala	βapakala	mbakala	‘writhe in pain’
ketulula	βaketulula	ɲgetulula	‘pour out’
kona	βakona	ɲgona	‘pass the night’
kula	βakula	ɲgula	‘buy’
kwa	βakwa	ɲgwa	‘fall’

Assuming that the underlying initial consonants are those that appear in the imperative, the first rule to state is voicing of consonants after a nasal:

(17) Post-nasal voicing

$$\left[-VOICE \right] \rightarrow \left[+VOICE \right] / \left[+NASAL \right] \text{---}$$

Also, the nasal 1sg pres marker assimilates to the place of articulation of the following consonant.

(18) Nasal place assimilation

$$\left[+NASAL \right] \rightarrow \left[\begin{array}{c} \alpha_{ANT} \\ \beta_{COR} \end{array} \right] / \text{---} \left[\begin{array}{c} -SYL \\ \alpha_{ANT} \\ \beta_{COR} \end{array} \right]$$

We know that the 1sg pres marker is underlyingly /n/, thanks to the following data:

(19)

<i>Imperative</i>	<i>3pl pres</i>	<i>1sg pres</i>	
jiixala	βeexala	niixala	‘sit’
jaasama	βaasama	naasama	‘gape’
joola	βoola	noola	‘arrive’
jeekesja	βeekesja	neekesja	‘show’

Note that the order of place assimilation and voicing rules does not matter, they lead to the same output no matter in which order they are applied.

The following data licenses yet another rule for dealing with another set of consonants:

(20)

<i>Imperative</i>	<i>3pl pres</i>	<i>1sg pres</i>	
lola	βalola	ndola	‘look’
lasa	βalasa	ndasa	‘shoot at’
leβa	βaleβa	ndeβa	‘push’
lwaala	βalwaala	ndwaala	‘be sick’
ra	βara	nda	‘put’
rara	βarara	ndara	‘be stung’
roβa	βaroβa	ndoβa	‘ripen’
rusja	βarusja	ndusja	‘vomit’
rja	βarja	ndja	‘fear’
βakala	βaβakala	mbakala	‘spread’
βala	βaβala	mbala	‘count’
βasa	βaβasa	mbasa	‘forge’
βoola	βaβoola	mboola	‘tell’
jama	βajama	nd͡ʒama	‘scout’
jaaja	βajaaaja	nd͡ʒaaaja	‘scramble with’
joola	βajoola	nd͡ʒoola	‘scoop’
juula	βajuula	nd͡ʒuula	‘snatch’

(21) *Post-nasal hardening*

$$\left[\begin{array}{c} +\text{VOICE} \\ -\text{CONT} \end{array} \right] \rightarrow \left[\begin{array}{c} -\text{CONT} \end{array} \right] / \left[\begin{array}{c} +\text{NASAL} \end{array} \right] ___$$

The rules 17 and 22 can be combined into:

(22) *Post-nasal voicing/hardening*

$$C \rightarrow \left[\begin{array}{c} +\text{VOICE} \\ -\text{CONT} \end{array} \right] / \left[\begin{array}{c} +\text{NASAL} \end{array} \right] ___$$

Arrival of new data gives a further twist to the story:

(23)

<i>Imperative</i>	<i>3pl pres</i>	<i>1sg pres</i>	
tima	βatima	ndima	‘run’
taapa	βataapa	ndaapa	‘hack’
tiija	βatiija	ndiija	‘filter’
rema	βarema	ndema	‘chop’
riina	βariina	ndiina	‘run away’
ruma	βaruma	nduma	‘send’
laanda	βalaanda	naanda	‘go around’
laangwa	βalaangwa	naangwa	‘be named’
liinda	βaliinda	niinda	‘wait’
loma	βaloma	noma	‘say’
loondelela	βaloondelela	noondelela	‘follow’
luma	βaluma	numa	‘bite’

(24) *l-deletion*

$$\left[\begin{array}{c} +\text{LAT} \end{array} \right] \rightarrow \emptyset / \left[\begin{array}{c} +\text{NASAL} \end{array} \right] ___ V_0 \left[\begin{array}{c} +\text{NASAL} \end{array} \right]$$

This rule must apply before the hardening rule.

4 Word structure

1. Morphology⁵ deals with⁶
 - word form (sound shapes)
 - word structure (abstracting from the shape)
 - word generation (building complex structures)
2. It aims to define notions “morpheme”, “word”, “inflection”, “derivation”
3. It aims to describe the mental system involved in word formation; internal structure of words; how they are formed.
4. What is structure?
 - For our purposes, structure is a network of membership and inclusion relations.
 - Words are made up of parts.
 - If there are parts, then there arise questions concerning how to bring parts together:
 - The order of parts (**morphotactics**);
 - How do parts are altered as they come together (**morphophonemics**).

4.1 Morphemes, morphs, allomorphy

1. What comes to your mind when you hear “word structure”, or just “structure”?
2. Let’s start with something basic and intuitive: part-whole structure of a word.
3. **Morpheme**: smallest linguistic unit with a grammatical function \simeq smallest meaningful part. For the notion of morpheme, we take meaning to be equivalent to function. By “smallest”, we mean a unit that is not decomposable further.

⁵The word ‘morphology’ means the study of form. Many scientific disciplines (most notably, linguistics, biology and geology) have sub-branches with the same name.

⁶The material in this section is largely adapted from Payne (2006); O’Grady et al. (2010); Aranof & Fudeman (2005); Fromkin et al. (2013) and Duygu Özge’s FLE 261 notes.

4. Another definition would be “sound-meaning pairing”. In some cases this proves problematic, we will come to them below.

Exercise 4.1 (Aztec)

List the morphemes:

a.	ikalwewe	‘his big house’	i.	petatc·in	‘little mat’
b.	ikalsosol	‘his old house’	j.	ikalmeh	‘his houses’
c.	ikalc·in	‘his little house’	k.	komitmeh	‘cooking-pots’
d.	komitwewe	‘big cooking-pot’	l.	petatmeh	‘mats’
e.	komitsosol	‘old cooking-pot’	m.	ko·yamec·in	‘little pig’
f.	komitc·in	‘little cooking-pot’	n.	ko·yamewewe	‘big male pig’
g.	petahwewe	‘big mat’	o.	ko·yameilama	‘big female pig’
h.	petatsosol	‘old mat’	p.	ko·yamemeh	‘pigs’

5. Morpheme classification:

Free morphemes can stand alone, while **bound** morphemes always need some other linguistic material to realize a complete(??) expression.

Another typing:

- Root (bound or free)
- Affix (bound)
- Clitic (bound)

6. Root is the semantically main part of a word, which cannot be further divided into morphemes. Examples?
7. Sometimes linguists talk of **stems** as well. The stem root distinction is subtle and sometimes confusing.
8. **Stem** is a base morpheme another morphological piece is attached.
9. **Root** is like a stem in constituting the core of the word to which other pieces attach, but the term refers only to morphologically simple units.

10. **Example:** What is the stem of the word ‘*disagreement*’? What is its root? ‘*disagree*’ is the base to which ‘*-ment*’ attaches, but ‘*agree*’ is the root. Take ‘*disagree*’ now, what is the root, what is the stem?

English:

a fish
ten fish- \emptyset

11. **Affixes** are added to a root or stem to form new words.
12. *dis-* goes before the stem so it is a **prefix**, *-ment* does after the stem, so it is a **suffix**.
13. Clitics are bound morphemes that differ from affixes by being related to a structure larger than those at word-level. E.g. Turkish *de/da* are clitics.

3. Two lessons:

Some morphological operations need to be thought as processes.

At an abstract level a morpheme defines a contrast.

4. **Morph:** individual **tokens** of a morpheme.
5. **Allomorphs:** The set of morphs of a morpheme. Two morphs from this set stand in an allomorphy relation.

Example: English plural allomorphs?

6. Note that in deciding on morphemehood, function (meaning) prevails over form. Compare *quickly* vs. *lovely*.

4.1.1 Some complications with the notion “morpheme”

1. Non-segmental morphemes: the morpheme does not correspond to a designated sequence of sounds (segment), but is more abstract.

English past tense:

run	ran
speak	spoke
eat	ate
read	read

Noun to verb morphology:

Noun	Verb
breath	breathe
cloth	clothe
house	house

where the voiceless fricative endings ([θ ,s]) turn to voiced fricatives ([δ ,z])

2. Zero morphemes:

Turkish:

gidiyor-um	gidiyor- \emptyset
going-1sg	going-3sg

4.2 What is a word?

Is it the smallest unit of syntax? (How about ‘-s’ in ‘*Harry’s car*’)

Is it the smallest unit of syntax that stands alone? (How about *my* in *My car*)

4.2.1 Empirical tests for wordhood

- Fixed order of elements
 - What happens when we change the order of morphemes? (e.g., *unbreakable*/**brakunable*/**unablebreak*)
 - What happens when we change the order of words? (e.g., *I get what I like* / *I like what I get*)
 - The order in which morphemes is fixed; we almost always end up with an ungrammaticality if we rearrange their order.
 - Changing the order of words does not always result in ungrammaticality.

2. Non-separability and integrity
3. Each word should bear at least one stressed element.
 - Words are non-separable: cannot be broken up by the insertion of segmental and phrasal materials (we ignore infixes for the time being).
 - Integrity: Syntactic processes cannot apply to morphemes (e.g., adjectives or adverbs modify words not morphemes).
 - Non-separability, integrity, and stress tests tell us something interesting about compounds
 - *a big dog house* / **a big doghouse*; *a very green house*; **a very greenhouse*
 - *a doghouse* / **two doghouse*; *a hotdog*; **a hotterdog*
 - Where does stress fall? *We ate two hotdogs each.* / *The hot dogs ran for the lake.*
 - **Conclusion:** Compounds consist of a single word; not a pair of words.

4.3 Inflection vs. derivation

1. **Inflections** express grammatical or functional categories.

Therefore they are general. E.g. In a given language if a verb has tense every verb has tense; if a noun has case, every noun has case.

Inflections are relevant for syntax.
2. Inflection does not change the lexical category or meaning of the root.
3. They are mostly productive; less restrictions on the class of roots they can attach.
4. They are semantically transparent: clear contribution.
5. **Most common inflectional categories:**
 - *Nominal categories:* number, case, gender

- *Verbal categories:* tense, aspect, mood, voice

6. **Derivations** form new words.

They typically change the lexical category and the meaning of the root.

They are more restricted; less productive: *build-ing*, **see-ing*, *view-ing*...

7. They are semantically less transparent.

4.4 Major morphological processes

Affixation:

Prefix: *anti-dis-establishment*

Suffix: *antidisestablish-ment-ari-an-ism*

Infix:

Tagalog *-um-* makes an agent out of a verb:

sulat	s-um-ulat	‘one who wrote’
gradwet	gr-um-adwet	‘one who graduated’

Circumfix:

Indonesian *ke-...-an* makes nouns from adjectives:

besar	‘big’	ke-besar-an	‘bigness, greatness’
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Chukchee *a-...-ke* expresses negation:

jatjol	‘fox’	a-jatjol-ka	‘without a fox’
cakett	‘sister’	a-cakettə-ke	‘without a sister’

Apophony (internal change; vowel changes within a root):

Shape change without an affix. Ex.: *ring, rang*; *foot, feet*; *see, saw*

Autosegmental variation:

What is “autosegmental”? Processes that refer to structures beyond single sounds are autosegmental processes or properties. For instance where the main stress refers to syllables (and their organization) rather than individual

sounds; there is no rule like “stress the vowels *a* and *e*, but not *i*, *o*, and so on”.

English stress:

convért → *cónvert*

permít → *pérmit*

Reduplication:

Indonesian plural is made by duplicating the root: *anak* ‘child’, *anakanak* ‘children’.

More interestingly, Ilakona, an Austronesian language, duplicates the first syllable only for plural: *ulo* ‘head’, *ululo* ‘heads’.

Non-concatenative (root-and-pattern) morphology:

In Semitic languages like Arabic and Hebrew: vocalic/syllabic units undergo internal variations while consonantal frames stay fairly stable.

ktb	Root	no meaning
kətoḇ	imperative	‘write!’
katob	infinitive	‘to write’
kotəḇ	present participle	‘writing’
katub	past participle	‘written’
katab	perfective	‘wrote’

Subtractive morphology:

Murle (East Africa) plurals are made by removing the final consonant: *nyoon* ‘lamb’, *nyoo* ‘lambs’, *onyiit* ‘rib’, *onyii* ‘ribs’.

Don’t confuse with languages that mark the singular rather than the plural:

Arbore (Ethiopia) is such a language: *tiisin* ‘a maize cob’, *tiise* ‘maize cobs’, *nebelin* ‘an ostrich’, *nebel* ‘ostriches’.

Suppletion:

Suppletive (irregular) form takes place when syntax requires a form that is not morphologically predictable: *be*: *am*, *is*, *are*, *was*, *were*; these are called *suppletive forms*.

Partial suppletion: *catch-caught*; *think-thought*

Initial phonemes remain the same, but there is both internal change and change to the end of the word.

Compounding:

- black + board = blackboard

Head of a compound: morpheme that determines the lexical category of the entire compound (Most English compounds are right-headed).

Backformation: Creating a word by removing a supposed affix from an existing word: *burglar* → *burgle*.

Clipping: Shortening a word by removing one or more syllables: *condominium* → *condo*.

Blending: Creating a new word by combining portions of two existing words: *spiced* + *ham* → *spam*.