(1985/2017). In A. Bunger (Ed.)., *Special volume: Reissue of Innovations in Linguistic Education Volume 4. IULC Working Papers in Linguistics*, Vol. 17, No. 5.

the meaning machine

Zev bar-Lev

THE MEANING MACHINE

Zev Bar-Lev

San Diego State University

CONTENTS

THE MEANING MACHINE is an introductory textbook in linguistic structure: phonetics and phonology; transformations and deep structures.

Its approach is PARTICIPATORY: rather than just learning ABOUT concepts of linguistic structure, students are involved actively. In a sense, they CONSTRUCT the concepts by working through the fill-ins. This is not a programmed text, but it is self-teaching to a large degree. The fill-ins can be done at home, or in class; in either case, the teacher should ensure that the students are doing them themselves, rather than waiting for the answers in class. Of course, the teacher's discussion of the answers is valuable as confirmation and enrichment of understanding.

One or two of the later sections in the two units can be omitted at teacher discretion., In no case should sections a-e be skipped (although they require little class time if done at home); patience with these sections will be rewarded with greater competence at later points.

I have kept phonetic and other terminology, and notation, at a bare minimum. My experience is that students can more easily pick these up AFTER they have gotten a firm idea of what the structural insights are all ABOUT, and what they are FOR. Too many students come out of introductory courses with a jumble of poorly understood terms, and a distaste for linguistic structure.

language history

This set of sections is an introduction to sound in language.

Sounds in language are very special. They are different from sounds in music, for example. The types of changes they undergo, the types of relationships they participate in--all these are unique to human language. Complex, but highly integrated and systematic. Sound system is difficult to study not because of masses of unrelated detail, but because it hangs together so tightly. Hard to study in the beginning, it is amazing to know, to be in command of, as you will be if you study and practice the relationships to be exemplified here.

The sections trace sound system from a 'Tralfamadorian' perspective--observing first the many rich examples of how sounds have changed, leaving their traces on English. On the base of these accessible examples, it builds an integrated understanding, accompanied by a real 'feel'. At the end it draws the distinction between sound-change as historical, and sound-change as (synchronic) phonology.

"It is just an illusion we have here on Earth that one moment follows another, like beads on a string, and that once a moment is gone, it is gone forever. . .The Tralfamadorians can look at all the different moments just the way we can look at a stretch of the Rocky Mountains. . ."

(Vonnegut, SLAUGHTERHOUSE FIVE)

and

saund in læŋgwəj

section a language families

Fill in the following language-family chart, with the help of the data on the facing page and class discussion.

Indo-European	Germanic	_____
		_____
		German
		Scandinavian (Swedish, Norwegian, Danish)
		_____
	Romance	Latin
		Italian
		_____
		_____
		_____
	Hellenic	Greek
	Slavic	_____
		_____
		_____
	Celtic	Gaelic, ...
	Albanian	
	Armenian	
	Baltic	Lithuanian, ...
	Indo-Iranian	Sanscrit, Hindustani, ...
		_____
Basque		Basque
Ural-Altaic		Finnish, Hungarian, Turkish, Mongolian
Semitic		Arabic
		_____
		_____
Sino-Tibetan		Chinese (Mandarin, Cantonese, ...) Tibetan, Burmese
Japanese-Korean		Japanese, Korean
Bantu		Swahili, Zulu
...		

	2	3	8	10	100
English	two	three	eight	ten	hundred
Dutch	twee	drie	acht	tien	honderd
German	zwei	drei	acht	zehn	hundert
Swedish	två	tre	åtta	tio	hundra
Latin	duo	tres	octo	decem	centum
Italian	due	tre	otto	dieci	cento
Spanish	dos	tres	ocho	diez	ciento
French	deux	trois	huit	dix	cent
Greek	dyo	tria	okto	deka	-kato
Russian	dva	tri	vosem'	desyat'	sto
Serbian	dva	tri	osam	deset	sto
Polish	dwa	trzy	osiem	dziesiec	sto
Rumanian	doi	trei	opt	zece	sută
Sanscrit	dvayah	trayah	ashtau	dasha	sata
Hindustani	do	tin	att	das	sau
Persian	do	se	hasht	dah	sad
Arabic	ithnain	thalath	thamanya	ʕashar	mia
Hebrew	shnayim	shalosh	shmone	eser	mea
Aramaic	tre	tlat	tmanya	ʕeser	mea
Yiddish	tsvai	drei	akht	tsen	hundert
Swahili	mbili	tatu	nane	kumi	mia
Chinese	èr	sān	bā	shí	bǎi
Japanese	ni futatsu	san mitsu	hachi yatsu	ju to	hyaku
Albanian	dy	tre	tetë	dhjetë	qint
Irish Gael.	do	tri	ocht	deich	cead

section **b** place of articulation

1. voicing change in Latin verbs.

Fill in Latin words and their meanings, and English derivatives, using the data at right.

form 1	form 2	meaning	derivatives from form 1	derivatives from form 2
ducere facere				
rapere				

form 1	form 2	meaning	derivatives from form 1	derivatives from form 2
pungere fragere				
scribere				

SOUND-CHANGE:

g > k	
b > p	

exs.

fragere	fractus
escribere	

data for section 

1. first table

form 2: factus, ductus, raptus
meanings: seize, make, lead
derivatives from form 1: facile (original meaning: 'make-able'), deduce, rape
derivatives from form 2: deduction, fact, rapture (orig. meaning: 'seizure')

second table

form 2: punctus, scriptus, fractus
meanings: write, poke, break
derivatives from form 1: scribe, fragment, pungent
derivatives from form 2: punctuation, script, fracture

Additional examples:
Can you explain the connection between the following words, based on the original meaning as given, and referring to the sound-change?

legible and *lecture* orig. meaning: read
agent and *actor* orig. meaning: do

Can you pronounce the Latin words correctly, with "hard" *c* and *g*?

agere, legere, pungere
ducere, facere

IMPORTANT NOTE: *c* and *g* were never pronounced "soft" as *s* and *j* in Latin. The sound-change makes much more sense this way. In any case, the symbols *g* and *k* are used to remind you. Pronounce them correctly as you practice the sound-change. (You should practice each sound-change over and over, until it feels natural, and you can reproduce it from memory. Also, you should be able to say it in any direction, preserving the parallel, e.g. p-k, b-g.)

2. voicing in Spanish

Can you match the Spanish words with their Latin originals? Match also meanings, and English derivatives from the Latin, all using the data at right.

Spanish	Latin	meaning	Eng. deriv. from Latin
abril abierto			
padre comunicado			
agua segundo			

Summarize the sound-change by filling in:

Latin	>	Spanish
p	>	_
_	>	d
_	>	g

exs.

apertus	abierto
	padre
secundus	

Again, study this sound-change by practicing it. Say it over and over again. (One of the pleasures of linguistics is being able to say silly things.) Practice it left to right and right to left, top to bottom and bottom to top.

After you've been practicing it a while, you might enjoy noticing that it's the same sound-change as studied in part 1, with two differences: it goes in the reverse direction; and it's more general, involving 6 rather than only 4 sounds.

This sameness exemplifies a general point: SOUND-CHANGE ALWAYS OPERATES IN PARALLEL WAYS, so that the same system of relationships can be seen in sound-changes in many different languages at many different times.

What you are doing in this workbook is learning UNIVERSAL PHONETIC RELATIONSHIPS, the universal system of sounds, by seeing examples from several different languages.

data for part 2.

Latin words: pater, aprilis, aqua, apertus, communicatus, secundus
meanings: April, open, communcate(d), father, water, second
Eng. derivs.: aperture, paternal, communicate, April, second, Aqua-Fresh

Additional question: How can you tell that the English word *incommunicado* is derived from Spanish, rather than from Latin?

additional examples:

Explain the following on the basis of the sound-change:

Sp. iglesia, Eng. ecclesiastical
Sp. cabra 'goat', Eng. Capricorn 'Goat's Horn'
Sp. madre, Eng. maternal
Sp. fuego 'fire', Eng. focus (Latin meaning: 'fireplace')
Sp. domingo 'Sunday', Eng. Dominican

Further practice with tables:

Fill in (without looking at completed tables):

1.	b p	2.	p _	3.	p t _	4.	g d _	
	d _		t _		b d _		_ _ p	
	g _		_ _					
5.	p b	6.	t d	7.	k g	8.	b p	9. d b
	k _		p _		t _		g _	t _

3. Grimm's Law (voicing).

The linguist Grimm (of fairy-tale fame) discovered the relationship between the Germanic languages and other Indo-European languages, by discovering the sound-changes relating them. These changes are so great that it took a special act of discovery; but the changes are very systematic, as you can see by completing the fill-in. The borrowings from Latin (and other Indo-European languages!) into English, English now has many pairs of words exemplifying the relationships.

Eng. borrowing	orig. Latin	native English word
	labia	li_
	duo decem dente edere	_wo _en _ooth ea_
	granum genus	_orn _in, _ind

sound-change:

_ > p
d > _
g > _

exs.

labia ___
duo ___
_____ kin

Additional examples:

Lat.	sua_ere	sweet
	_icere	teach
	_elu	cool
	a_er	acre
Gk.	_raphei	carve
	a_onia	ache
	_yne	queen

data for 3. First table.

For the native English word, you have to fill in a single letter (representing the sound involved in the sound-change). If you have any trouble, the summary of the sound-change may help---even though you have to fill that in too!

Eng. borrowings: you should also be able to figure out some of these by yourself, with the help of the table, guesswork, etc. Some of the harder ones are:
edible, grain, labial, dual, general (as well as *genus*).

additional examples.

Eng. borrowings include: agriculture, gelatin, dictionary, persuade, gynecology, graphics.

"Place of articulation" means WHERE a sound is produced. The sound-changes studied in this section all relate to three places of articulation:

LABIAL: involving lips.

DENTAL: in the area of the teeth.

VELAR: in the back of the mouth.

Labial sounds are produced with two lips, or with teeth and lips.
Dental sounds are produced with the tip of the tongue touching the teeth. This includes between the two sets of teeth, or the backs of the teeth, or the gum ridge immediately behind the teeth.
Velar sounds are produced with the back of the tongue humped up to touch the very back of the roof of the mouth (the area called the 'velum').

Labial sounds are: p b (and also: f v m).

Dental sounds are: t d (and also: th s z n).

Velar sounds are: k g (and also: h ng).

If you've been practicing, you ought to be able to produce the 3x2 analogy you've been studying, without any hesitation, e.g. as either *ptk = bdg*, or as *pb = td = kg*. You also ought to be able to produce it in any other direction, although not necessarily as quickly, e.g. *gdb = ktp*. In any case, fill in:

	(voiceless)	(voiced)
labial:	_	_
dental:	_	_
velar:	k	_

(You have now studied the 'stops', both 'voiceless' and 'voiced'. Don't bother learning these terms now: they are mentioned here only for ease of future reference.)

section C manner of articulation.

1. Grimm's Law (fricatives).

Here's the second part of Grimm's Law.

Eng. borrowing	orig. Latin, etc.	native English
	pro nepos pater	_or ne_ew _ather
	tres trans dente	_ree _rough too_
	kardia (Gk.) canis centum	_eart _ound _undred

sound-change:

_ > f t > _ k > _	

exs.

	for
tres kardia	

Recall that Latin *centum* was pronounced *kentum*; compare also Greek *(he)-kato* '100'.

You're studying three new sounds now: *f th h*. What is the place of articulation of each of them? How do they pair with *p t k*?

Fill in:

1. p _ k
f th h
2. p f
_ _
_ _
3. f _
th _
h k
4. t th
p _
5. h k
f _

Notice that the system of sounds is growing: the triplet *p t k* is related not only to *b d g*, but also to *f th h*. Keep practicing the relationships, get their music humming in your ear as you learn them on paper. That way, as the system keeps on growing (as it will), you will stay on top of it.

The new dimension of phonetic relationship is called MANNER of articulation: HOW sounds are produced.

p t k are STOPS, produced by suddenly releasing stopped-up air;
b d g are also stops.

f th h are FRICATIVES, produced with continued friction of air. Fricatives can be pronounced continuously: fffffff... Stops cannot be extended this way.

data for section C

1.

Again, you have to fill in sounds. Find your own derivatives in English. Don't be disturbed if this section is harder than previous ones: it's supposed to be. Now that you've gotten used to the way the material is presented, you can move on to really work hard with it, and in this way really master it.

Some harder derivatives: nepotism, trans-world, canine, cardiac.

Additional examples (native and borrowed English words):

native: mother, few, horn, fish, first, head, (orig. heofd), father, horse, thin

borrowed: Capri-corn, paternal, Pisces, course, primary, maternal, paucity, decapitate, tenuous

('course' originally means what you run through.)

In case you've noticed that *th* has two different pronunciations, let's mention it here. (If not, you can wait till section D.)

> Originally all *th* were pronounced as in *three*. Later, some of these changed to the sound of *the*.
>
> All of the examples in the table have the original sound. Above, however, all but one of the examples have the new sound. (Can you tell which is which in the above examples?)

In any case, it's worth noting that *th* is not *t+h*. It's not two sounds in sequence, but only one sound, namely the 'dental fricative'.

In the same way, *f* is the 'labial fricative'---not two sounds, even when spelled *ph*!

Actually, Anglo-Saxon had a separate letter for this sound: þ. So, for example, 'the old shop' was spelled: þe olde shoppe. The signs on shops lasted longer than the letter, so the old letter þ was sometimes misinterpreted as a *y*: ye old shoppe.

Later on, you'll learn symbols for the two *th* sounds. For now, you can keep using *th*.

2. German.

Can you guess the meanings of the following German words by figuring out their English equivalents? (Harder answers can be found on the facing page.)

Pfeffer	Fuss	Woche	(*ch* is pronounced as a kind of *h*)
helfen	weiss	Koch	
schlafen	beissen	machen	
Schiffe	besser		

sound-change: stop > fricative exs.

labial	_	>	f
dental	_	>	s
velar	_	>	h

	helfen
	Fuss
	machen

This sound-change is identical to the preceding one, except that it uses the other 'dental fricative', namely *s* instead of _. (There is no *th* in German.)

One complication in the sound system, then, is that there are two dental fricatives.

Can you fill in the following table, which represents the various phonetic relationships studied?

	labial	dental	velar
voiced stops:	b	_	_
voiceless stops:	_	_	_
fricatives: (voiceless)	_	_/_	_

And can you fill in these 'analogies'?

1.	p t	2.	p t	3.	t s	4.	t th	5.	t s
	b _		f _		k _		k _		p _
6.	d t	7.	h k	8.	b p	9.	t d	10.	t s
	g _		f _		d _		k _		k _

facing part 2.

English words include:

sleep, white, week, bite, cook, foot.

In this and the following section, English is regarded as, in effect, the 'source' for German and Dutch. Of course this is not actually the case: these three languages all go back to a single ancestor, which is not English, Dutch, or German. But it happens to be the case that English consonants are closer to the consonants of the ancestor language.

section d voicing

1. Dutch.

Can you recognize the following Dutch words?

vader	zingen
vrijdag	zaterdag
voet	zondag
vluchten	zwemmen
vormen	zeven
vier	zucht
	zuster

sound-change:

voiceless fricative > voiced fricative

f	>	z	exs.	voet
s	>			zuster

2. English.

How many of the following words make a change in their final consonant, either when forming the plural, or when forming the verb? Is this change always indicated in spelling?

knife
wife
roof
loaf

house

bath
breath

the details vary from speaker to speaker. But the sound-changes, when they occur, are of a consistent type:

voiceless fricative > voiced fricative

f	>	
s	>	z
θ	>	ð

Here, and also in section B, you have worked with **VOICING**, which refers to vibration of the vocal cords in the throat. You can feel this vibration with your hand if you extend the VOICED fricatives *vvvvv*, zzzzz. The vibration is not there when you say *fffff*, *sssss*.

Stops are harder to test, because you can extend them, and the vowel after them is voiced. But if you can fill in this long analogy, you really know voicing:

	fricatives				stops		
voiceless	f	θ	s	h	p		
voiced						d	g

facing section 

1. Harder English words (for Dutch): foot, swim, form, fly, sigh, Friday, four, father.

2. As you can see, English doesn't always indicate sounds very clearly. For example, 'houses' and 'to house' really end in the sound *z*---for many speakers. The change from 'voiceless' to 'voiced' still happens in English, although it no longer happens all the time.

f becomes *v*, *s* becomes *z*
and voiceless *th* becomes voiced *th*.

This parallel will help you learn the difference between the two *th* of English.

The symbols for them are:

θ (Greek *th*eta) for voiceless *th* of *three*, *think*, *thumb*, *bath*

δ (Greek delta, or more properly *th*elta, δelta)
for voiced *th* of *the*, *they*, *this*, *there*, *then*, *bathe*

Exercise:
Indicate whether *th* spells θ or δ.

thank
then
thaw
through
these
thimble
thus
breath
breathe
path
mother
thou
thin
thirty
bother
both

(You can write the delta as here, with a hook on top going to the right, or simply as a d with a line across the top. Don't turn it into an o with an x on top. Legitimate deltas:

δ ɗ ð

section e the 3d system

You have already studied the three dimensions of sound system. Fill in to review and consolidate:

dimension one; _____ of articulation.

a) labial	p/_	f/_	m
b) _____	_/d	θ/_ s/_	n
c) _____	k/_	h	ŋ

dimension two; _____ of articulation.

a) _____	_/b	t/_	k/_
b) _____	_/v	_/ð _/z	_
c) nasals	m	_	ŋ

dimension three: _____.

a) _____	_	t	k	_	θ	_	h
b) _____	b	_	_	v	_	z	(m n ŋ ...)

Complete the following analogies:

1. p:b = t:_
2. t:θ = p:_
3. p:m = t:_
4. t:θ = k:_
5. t:d = k:_
6. s:θ = z:_
7. ð:d = v:_
8. ŋ:g = n:_

Name the following NATURAL CLASSES with the above phonetic 'features'. Use exactly the right number of phonetic features to name all and only the members of the given class. Do not use unnecessary features (e.g. "voiced or voiceless", which is unnecessary since any sound is one or the other).

1. p b f v m
2. p b t d k g
3. p t k
4. f v
5. f θ s h
6. t θ s

Fill in the following comprehensive 3d table.

	p/_	_/d	_/_
	_/_	_/_ _/_	_
	_	_	_

new concepts:

'Nasals' (nasal resonants) are sounds produced through the nose. (If you have a cold, you can't pronounce them, because your nose is closed up.)

The symbol ŋ represents the sound of *ng* in *sing*. It is a single sound, of course, not *n+g*.

IPA (the International Phonetic Alphabet) is used by linguists to represent sounds. Its symbols are always used consistently, unlike alphabets in ordinary use. Symbol combinations are never used to represent single sounds. Otherwise, it uses ordinary Roman letters, such as t, s, etc.

Spell the underlined letters phonetically:

please
sing
sink
as
ass
hats
beaches
toys
goes
kicks
limb
limber
long
singer
longer

(Speakers vary on one or two examples.)

section f palatals

1. Italian.

Recall that Latin *c*, *g* were pronounced *k*, *g*. Fill in the original pronunciations, and, where they exist, English derivatives that show the original pronunciation (from the facing page).

		pronounced	deriv. from orig. pron.
centum	'hundred'	_entum	
cancer	'crab'	_an_er	
Caesar	'emperor'	_aisar	
duce	'leader'	du_e	
genus	'kind'	_enus	
gente	'people'	_ente	

In Italian, these sounds develop regularly.

cello		pron.	čello
da Vinci			davin_i
Cesare	'Caesar'		_ezare
cento	'hundred'		_ento
duce	'leader'		du_e
gente	'people'		ǰente

sound-change;

velar		palatal		exs.		
k	>	_	_____	_____	duce	
g	>	_	_____	gente	_____	

2. French.

French shows a parallel development for *k*, except that a further development occurs in Modern French.

Lat. cappa 'hood'	Old Fr.	čapel	M. Fr.	šapo	
_astellum		častel		_ato	
_aput 'head'		čef		_ef	

Judging from their pronunciation, which language did the following words each come from: Latin, Old French, or Modern French?

cap, chapeau
chateau, castle
chief, chef, captain

Note also the parallel development: Lat. gente, OFr. ǰent, MFr. ža^{n}.

k > č > _	exs.	kastellum	častel	_ato
g > _ > ž		gente	_ent	ža^{n}

data for section 

1. Eng. words showing orig. pronunciations;
duke, canker, Kaiser

Note the following IPA symbols;

č	chart
ǰ	jug, gentle
š	ship
ž	garage, pleasure

These are all 'palatal' sounds, representing the fourth place of articulation: on the roof of the mouth, with the front half of the tongue.

š,ž are fricatives. č,ǰ form, along with the stops studied, the larger class of 'explosives'. Fill in the larger comprehensive chart:

	labial	dental	palatal	velar
explosive				
fricative				
nasal				

(For convenience, I will continue to use the word 'stop' when it is appropriate to exclude č,ǰ.)

Cutting across the above classification is another category, that of SIBILANTS (hissing sounds). The sibilants are:

č,ǰ š,ž s,z

Thus, s-z differ from θ-ð in that they are sibilants.

Transcription exercise:

sure
please
pleasure
age
rouge
mission
literature
nation
natural

3. English.

What sound change is exemplified in the following examples?

captive — capture
native — nature
proceed — procedure

dental explos. > _____ _____

t	>	_	voiceless
d	>	_	voiced

space — spacial
race — racial
missile — mission

dental > _____ _____

seize — seizure
please — pleasure

s	>	_	_____
z	>	_	_____

How are *t* and *d* pronounced in ordinary conversation, when followed by *y*?

want you
need you

_____ _____ > _____ _____

t	>	_	_____
d	>	_	_____

Most of the sound-changes we have considered are historical ('diachronic'): they happened at a specific point in the history of languages, and can generally be revealed only through comparison of two languages.

The changes in 3 are different: they are sound-changes that are still alive in Modern English. Every speaker of English knows them (subconsciously), uses them in speaking. These, then, are sound-changes that exist on the SYNCHRONIC or STRUCTURAL level in Modern English. They are part of the structure of Modern English, not just its historical background.

This page intentionally left blank

section  the concept of the 'phoneme'

1. aspiration in Chinese and English.

'Aspiration' is a puff of air accompanying a consonant;

p^h is an aspirated p

The h is pronounced along with the p. You can do a fair imitation of an aspirated *p* simply by pronouncing it very energetically.

In Chinese, aspiration distinguishes meaning;

tai	'to wear'	t^hai	'excessively'
pau	'newspaper'	p^hau	'to be afraid'
kou	'dog'	k^hou	'mouth'

You may be surprised to learn that aspiration also exists in English. You can probably feel the difference if you put your hand in front of your mouth as you say:

apple	(p)	parent	(p^h)
rack	(k)	car	(k^h)
mint	(t)	tie	(t^h)

(For further examples of unaspirated consonants, use words beginning with *s*, e.g.

scar (skar) vs. car (k^har)

Is English just like Chinese? Would a native speaker of English have an easy time learning pairs of words like the Chinese ones listed above?

The difference is that aspiration in English never distinguishes meaning. It is not significant within the system of English. Or, as we might say in linguistics:

In Chinese, *p* and p^h are DIFFERENT 'phonemes'.

In English, they are just different variants of the SAME 'phoneme'.

A phoneme is a SIGNIFICANT SOUND, as defined by the system of a given language. That is, it is a sound used to distinguish different meanings.

A given single phoneme may consist of two or more different objective physical sounds. In other words, a phoneme is an ABSTRACT, PSYCHOLOGICAL sound. The speaker of a language hears only these abstract sounds, and ignores the phonetic details that are irrelevant for his language. We do not hear actual physical sounds, but rather the abstract sounds defined by the system of our native language.

2. Spanish z.

Native speakers of Spanish have trouble pronouncing English *z*: they substitute *s* for it.

But the sound z does exist in Spanish, in words like: desde, mismo. Why can't Spanish speakers simply hear the English z, and pronounce it?

It can't be just a spelling problem: words can be spelled the same and yet pronounced differently. It must be a deeper factor, involving the sounds themselves (which the Spanish spelling reflects by not having a separate symbol for z). What is this factor?

additional example.

In English there are two *l*:

l	ɫ
live	mill, milk

In Polish, these are two different phonemes:

las	'forest'	ɫatvi	'easy'
luti	'February'	ɫuško	'bed'

For a contrasting example (one in which another language makes fewer contrasts), we can think of Japanese, in which *l* is not distinguished from *r*, so that English words get borrowed with sound-substitution:

remon
bes'bor'

section h abstract phonology

1. change in nasals.

What is the prefix meaning 'together' exhibited in the wrods in group (a)?
How is it actually pronounced in the words of group (b)? Why?
And how does this same prefix change in the words of group (c)? Why?

(a) syntax, synthesis, synagogue, syndicate, synopsis

(b) synchronize, syncopated, syncretism

(c) symbiosis, symposium, symphony

SUMMARY:

n in a prefix changes to _ before _____ consonants, and to _ before _____ consonants;
that is, it changes its _____ of articulation to that of the following consonant.

The ABSTRACT PRONUNCIATION of the prefix is: *sɪn-*. By the operation of sound-change, the *n* sometimes changes:

abstract pronunciation:	sɪn-tæks	sɪn-kronaɪz	sɪn-foni
actual pronunciation:	sɪn-tæks	sɪŋ-kronaɪz	sɪm-foni

Abstract phonology recognizes the deeper level of abstract pronunciation, often distinct from actual pronunciation. Although we pronounce words in their actual pronunciation, we store them subconsciously in their abstract pronunciation.

Abstract pronunciation should not be confused with spelling. It is true that sometimes English spelling does represent the abstract pronunciation---but just as often it does not.

(For other examples of abstract phonology, see section F-3 on English palatals.)

exercise;

Fill in the missing sounds in the abstract and actual pronunciation.

abstract:	sɪ_-diket	sɪ_-kopet	sɪ_-pozium
actual:	sɪ_-diket	sɪ_-kopet	sɪ_-pozium
(word as spelled:	syndicate	_____	_____)

To check your answers, make sure that the prefix has a single abstract pronunciation, which then changes into three different actual pronunciations.

based of F-3;

abstract:	kæpt-yur	prosid-yur	si_-yur	spe_-yal
actual:	kæpčur	prosi_ur	si_ur	spe_əl
(word as spelled:	_____	_____	_____	_____

(Don't worry if the vowels are represented in surprising ways; you haven't studied the vowels yet.)

2. the English past tense.

Make a list of 20 or so English verbs that have a "regular" past tense (the ending spelled *-ed*).

You probably think its a single ending *-ed*, but with a little checking, you may be able to hear that there are actually three different endings: *d*, *t*, and *əd*, as in *saved*, *raked*, and *hated*.

Check the various examples you've collected. See which consonants precede each of the three endings.

ending	after the sounds:	forming the natural class:
d		
t		
əd		

SUMMARY:

The ending becomes *t* after _____ consonants, and inserts ə after another _____ _____.

Discussion:

Is there one past-tense ending or three? On the level of actual pronunciation, there are three. But there's another sense in which there's only one ending, which just changes phonetically, in terms of the phonetic environment.

We don't learn a separate ending for each verb. That's why, even if we make up new verbs, we automatically know how to make their past-tense form. If we make up new verbs like *to ruck*, *to fudd*, *to mib*, all native speakers of English will automatically make their past tense the same way, without any thought or discussion. Notice, too, that no-one ever taught you (e.g. in high-school English) to form the past tense, e.g. by saying, "Now John, don't say 'He rapped' say 'He rapp't'".

There IS only one past-tense ending---on the abstract level. That is, the abstract pronunciation for the past-tense ending is *d*. This *d* changes its voicing, to be like a preceding voiceless consonant, and it inserts the vowel ə when another consonant of the same place and manner of articulation precedes.

Why do we believe that *d* is the abstract pronunciation, rather than e.g. *t*?

Because *d* is the form that appears after nasals, vowels, etc. If the ending were *t*, it would have no reason to change after these sounds, and would therefore appear as *t*.

And because *d* is the consonant that appears after separation with ə, where again, if the ending were *t*, it should appear as *ət*.

Our reasoning is indirect: we do not see the abstract pronunciation, but infer it, hypothesize it. This is our theory. (But don't think there's anything wrong with theories: we haven't started calling atomic theory the "atomic fact" just because everybody accepts it already!)

Exercise:
Fill in the abstract and actual pronunciations for past-tense forms such as:

abstract:	ræp-d	mar-d	lɪv-d	pɛt-d
actual:	ræp-t	mar-_	lɪv-_	pɛt-_
abstract:	laik-_	bəs-_	nad-_	bam-_
actual:	laik-_	bəs-_	nad-_	bam-_

(The verbs, in spelling, are: to rap, mar, live, pet, like, bus, nod, bomb.

Notice again how the abstract pronunciation is not the same as the spelling. It is true that we spell the past-tense ending in a single way, just as we subconsciously store the ending in a single abstract pronunciation. But the spelling is not the same as the abstract pronunciation. Illiterate speakers (as long as they're native speakers) form the past tense exactly the same way as literates.

The spelling of English is historical: the past-tense ending USED TO BE pronounced -ed. But English has changed. Its abstract pronunciations are not from Anglo-Saxon. (Native speakers are handling the past-tense endings just fine many years before they study Anglo-Saxon!)

Abstract pronunciations are simply part of our subconscious, as native speakers of English. They make it easier to remember words and endings. Instead of having to remember three different past-tense endings, with lists of verbs that they each go with, we just remember one ending, and then apply sound-changes to it.

additional example:

You can work through a parallel analysis for the present-tense ending, seeing how it changes from its abstract pronunciation z to the three variant forms z, s, and əz. (Figuring out the condition for insertion of ə is specially challenging.)

Note, in conclusion, how:

1) the sound-changes are parallel for the two endings *d* and z;
2) the abstract pronunciation differs from the spelling.

1. pronunciation of the five vowel symbols *aeiou*.

The pronunciations of these vowel symbols in IPA match those that they have in almost all other languages but English, e.g. Spanish. By knowing their IPA values, you have a short cut to reading in any language that uses the Roman alphabet.

a as in Sp. papa; Eng. father, hot (never as hat or hate)

i as in Sp. si; Eng. police, see (never as kite)

o as in Sp. no (never Eng. hot)

u as in Sp. numero uno (never Eng. but or unique)

e as in Sp. olé (never Eng. see, and never silent)

Read the following words aloud, pronouncing each vowel clearly with its IPA value.

Rumanian:	universitate	Swahili:	kitabu	'book'
	literatura		uhuru	'freedom'
	important		usiko	'night'
	aer		elea	'clear'

2. diphthongs.

Two vowels together can form a single, unified syllable; but each vowel still keeps its quality.

oi as Eng. toy
ai as Sp. amais, Jai Alai; Eng. mice, kite, night
au as Eng. house, now

You can verify that these phonetic spellings are correct by pronouncing them vowel by vowel: a + i = ai, a + u = au. Be careful with them, since English spelling is very misleading.

An additional example showing *ai* is the Southerner's pronunciation: in the South, *i* is dropped from *ai*, leaving *a*. For example, *my pie* is pronounced, in effect, as *Ma Pa*. Phonetically, this is simply *ma pa* instead of *mai pai*.

3. other vowels.

æ hat, sand

ə but, sofa (ər as in bird, father)

4. lax and tense vowels in English.

English distinguishes "lax" and "tense" vowels.

The tense vowels (as in: mate, seat, pool) sound most like the IPA vowels, although they are longer and tend to drag out into diphthongs.

The lax vowels are pronounced shorter: met, sit, pull. They are represented with "funny" versions of the vowel letters:

ɪ ɛ ʊ

Notice the pairing:

lax		tense	
mɛt	(met)	met	(mate)
sɪt	(sit)	sit	(seat)
pʊl	(pull)	pul	(pool)

features:

	front	back
high	i	u
mid	e	o
low	æ	a

ANALYSES.

1. Turkish

Sg.	Pl.	
adam	adamlar	'person'
baba	babalar	'father'
cep	cepler	'pocket'
gazete	gazeteler	'newspaper'
dil	diller	'language'
dişci	dişciler	'dentist'
dost	dostlar	'friend'
kuzu	kuzular	'lamb'
boru	borular	'pipe'

2. Italian

buono	'good'	from	bonus
f__co	'fire'		focus
dieci	'ten'		decem
v__le	'wants'		volit (volt)
p__de	'foot'		pede

(*i* and *u* are added before *e*, *o*. But which vowel is added before which, and why?)

3. Yiddish

Sg.	Pl.	
folk	felker	'a people'
štot	šteter	'city'
bruder	brider	'brother'
hut	hit	'hat'
vorem	_____	'worm'
zun	___	'son'
___	teg	'day'

k supplement

Although IPA is supposed to be universal, actually customs for using it vary. The introductory student should stick with one system. But for later reference, I provide the following summary of main variations.

consonants:

j is commonly used for	y
ʃ, ʒ	for š, ž
tʃ, dʒ	for č, ǰ

Also, x is distinguished from h: x is the sound of Spanish j, German ch, Russian/Greek x.

vowels:

Several systems are used to distinguish English long (tense) vowels and short (lax) vowels:

1. the long vowels can be indicated with : instead of ¯, as:
   e: o: (instead of ē ō)
2. or the long vowels can be interpreted as diphthongs:
   ey (or ei) ow (or ou)
   These can be particularly confusing to the English speaker, since the spelling *weight* and *know* are completely atypical in English, although phonetically the most accurate.

Many phonetic terms are commonly used beyond those taught here. Usually they simply elaborate on the phonetic detail, which takes away from linguistic insightfulness, even as it adds to memory work. In linguistics as in science generally, detail is no more important than GENERALITY. For reference, however, let us note:

With 'labial', there is often a distinction made between 'bilabial' and 'labiodental'. It is most important to remember that the latter is a kind of labial, not a kind of dental.

Within 'dental', there is often a distinction made between 'interdental', 'dental', and 'alveolar'. The latter is particularly confusing and unnecessary, since it only serves to point to the way English dentals are pronounced differently from dentals in other languages, and has no significance within the system of English or these other languages.

Compound terms are sometimes used to indicate part of the tongue, e.g. apico-dental vs. lamino-palatal.

The term 'affricate' is common although introductory students invariably confuse it with 'fricative': the present classification of them as 'sibilant explosives' is therefore preferable.

(The idea behind the title can probably be understood at this point: language is a meaning machine, in the sense of a complex system of relationships, whose purpose is to deal with meaning.

Maxwell Maltz, in PSYCHOCYBERNETICS, and others, speak about the tremendous power of the 'subconscious computer' that everybody has. Nowhere as in linguistics can you see the tremendous intricacy and power of the subconscious computer.)

This page intentionally left blank

transformations

The following sections will consider the two basic concepts of 'Transformational' linguistics: TRANSFORMATIONS, and DEEP STRUCTURES.

Transformational linguistics is the creation of Noam Chomsky, and many other researchers. The first major work of transformational syntax was Chomsky's book, SYNTACTIC STRUCTURES, published in 1957. Within the decade or so since, transformational syntax became the standard for American linguistics, and a major force in other countries, and a variety of other research fields as well. References to one or another aspect of transformational syntax and its implications can be found in modern works in psychology, philosophy, computer science, and other fields.

The field itself is not as monolithic as this might imply; within syntactic research there are now, as there were even in the very beginning, many disagreements among researchers, some on details, others on fundamental issues. The introductory student should best ignore these variations. Even analyses that we may feel, as researchers, are "out of date" are still useful, on the pedagogical level, to the extent that they demonstrate, clearly and dramatically, the mode of linguistic argumentation that is the permanent contribution of 'Transformationalism', whatever the fate of specific hypotheses.

and

deep structures

section 0 deep structures

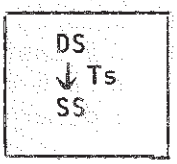
1. definitions of basic concepts.

A TRANSFORMATION is a CHANGE in the structure of a sentence. More specifically, it is a change from deep structure to surface structure.

The SURFACE STRUCTURE of a sentence is the sentence the way we say it and hear it.

The DEEP STRUCTURE of a sentence is the sentence as we understand it.

Any sentence, then, is a pair of structures, related by transformations.



deep structure
changed by transformations
into surface structure

Deep structure is closer to meaning; in fact, it's not harmful for the introductory student to think of it as BEING the meaning of the sentence, although researchers debate this question pro and con.

deep structure = meaning
surface structure = form

Everyone has always known that sentences have surface structures; they used to be called 'the structure' of the sentence. The main contribution of transformational linguistics was to introduce the second, abstract level of deep structure.

You will catch on to the idea of transformations fairly easily. The idea of deep structure will take a little time. This is because it is an abstract idea: if you could see it, it wouldn't be deep structure! So work through the examples to follow, referring back to the above definitions until you understand them in a concrete way.

Example of a deep structure (DS):

DS: Q Harry will live in which house

SS: which house will Harry live in

Q is an abstract question marker. What three transformational changes take place in this sentence? (I.e. how does this DS turn into the SS?)

1. Q is _____;
2. 'which house' is _____ to the beginning of the sentence;
3. '_____' and '_____' change places.

2. introduction to the deep level.

Sentences in deep structure consist of:

a) a SUBJECT, such as: Harry, the tree, my horse, this predicament.

b) an AUXILIARY, such as: can, will.

c) a VERB, such as: go, stay, kick, drink, give.

d) one or more COMPLEMENTS (depending on the particular verb), such as:

Harry, the tree, my horse, this predicament;
to Harry, to the tree,...;
near Harry, near the tree,...

In terms of this outline, analyze the following sentences:

1) Harry can kick my horse.

2) The engineer will stay near the tree.

3) My horse will give the apple to that engineer on Tuesday.

4) These investigators find the solution to everything.

5) Max may stay.

These are such simple sentences that their deep and surface structures happen to be identical. The following are more complicated. How do they diverge from the above scheme? What CHANGES do they exhibit?

6) On Tuesday, my horse will give the apple to that engineer.

7) In Moscow, people wear fur hats.

8) Can Harry read the article without help?

9) Will my horse forget his apples?

10) Which house will the engineer live in?

11) Which horse can the teachers give the apple to?

12) Which article will Maxine read?

(Describe these changes informally.)

3. verb-particles.

The VERB can be complex, containing a VERB-PARTICLE:

wake up, stand up, throw up, blow up

Verb-particles are like prepositions, but they attach to the preceding verb, rather than the following noun-phrase.

PARTICLE: The terrorists may blow up the library.
PREPOSITION: The hat may blow up the street.

Another difference is transformational: only one of them can undergo a certain change. What change is this, and which can undergo it?

The terrorists may blow the library up.
*The hat may blow the street up.

(* marks an impossible sentence.)

summary:

The outline on the top of the facing page is a good one for English (as opposed to languages in which, for example, the verb is regularly at the end of the sentence).

But it really doesn't work as a description of English SURFACE STRUCTURES: many surface structures are so mixed up because of the operation of transformations that they do not seem to conform to the English pattern.

Actually, of course, they do conform---on the deep-structural level.

The deep structures of English are actually more complex than this outline indicates. Note for future reference, in particular, that:

a) sentences can be compound, e.g. consisting of 2 sentences joined with *and*;
b) questions such as sentences 8-12, and also commands, begin with an abstract morpheme *Q* and *Imp* (for 'question' and 'imperative', respectively).

section p types of transformational changes

Fill in the numbers while learning about some important transformations of English, and the types of change they represent. (The numbers are simply indexes to keep track of words as they change. They are always in order on the input side of the transformation, and rearranged as appropriate on the output side.)

1. MOVEMENT transformations rearrange words.

   a) ADVERB PREPOSING moves certain types of complements to the beginning of the sentence:

   Maxine disappeared yesterday
   1 2 3 → 3 1 2

   b) PARTICLE MOVEMENT:

   Jack gave up the boat
   1 2 3 4 → _ _ _ _

   c) PASSIVE:

   Jack caught the bear.
   1 2 3 → 3 was _ by _

2. ADDITION transformations add meaningless words in surface structure, such as too.

   'too'-addition
   Maxine speaks French, and George speaks Basque. (stays unchanged)
   Maxine speaks French, and George speaks French.
   1 2 3 4 5 → 1 2 3 4 5 too
   where 2=_

(Fill in the number so that the identity condition is stated correctly. Note that 'too' is meaningless in the sense of being a redundant indicator of identity elsewhere in the compound sentence. This does not mean, of course, that 'too' is not important, only that it does not have its own meaning.)

3. DELETION transformations are the opposite of additions: by wiping out meaningful elements of deep structure, they produce MEANINGFUL NOTHINGS, words that can be understood even though they are not present in the surface structure.

   a) imperative:

   Imp you will go away this instant!
   1 2 3 4 5 → _ _

   b) adjective deletion:

   Max is old and Marvin is fat.
   Max is old and Marvin is old (too)
   1 2 3 4 5 6 7 8 → 1 2 3 4 _ _ 8
   where _=_

4. REPLACEMENT transformations delete and add at the same time. Their main function is to create PRONOUNS.

   a) reflexive:

      This horse kicked that horse.

      This horse kicked this horse.
      1 2 3 → 1 2 him-self
      where _=_

   b) pronoun (non-reflexive):

      Max said that Maxine kicked Max
      1 2 3 → 1 2 him
      where _=_

      The (non-reflexive) pronoun transformation replaces the second of two identical nouns with a pronoun, whatever words or structures may separate them. (Details of which pronoun results, whether *him* or *he* or *she*, etc., are ignored here.)

Many details are left out. If you find yourself adding some of these details as you think things out, be careful: you may turn into a syntactician! The main goal for the introductory student should be just to get a clear picture of the basics.

It is especially important to sort out deep and surface structure so you don't get them backwards. This means really looking at language from the inside in an unaccustomed way. It's difficult, but very important.

For example, it's very important to see transformations as changing deep structures into surface structures. Don't mix up deletions and additions, for example. And remember which direction words move in, in movement transformations.

Exercise: give the deep structure corresponding to the following surface structures. If a given DS is identical, so indicate.

1. Yesterday, my book disappeared.
2. My book disappeared yesterday.
3. The article was read by the engineers.
4. The terrorists blew the library up.
5. The terrorists blew up the library.
6. Max is old and Marvin is too.
7. Read this page to the horse!
8. Max told Maxine that he is crazy.
9. Max told Maxine that she is crazy.
10. George hates himself in the morning.

supplementary notes:

a) Note that transformations may be OBLIGATORY or OPTIONAL, i.e. they must apply, or, alternatively, they may or may not apply. An optional transformation, in other words, is a transformation whose input is also a surface structure. Typically, inputs are not possible surface structures; but with optional transformations, they are.

b) Transformations do not apply singly to sentences: typically several transformations will apply to a single sentence. Often, they apply in a complex way, one after the other. For example, adjective deletion applies after *too*-addition.

On the introductory level, however, this shouldn't confuse you: just use your knowledge of how deep structure should look to reconstruct it. (Conversely, as a speaker of English, you should automatically know how to pronounce a given deep structure.)

This page intentionally left blank

section q questions

There are two main types of questions, distinguished by the kind of answer they expect.

1. yes/no-questions:

Q Maxine can read the book
1 2 3 4 5 → _ _ _ _

Q the engineers stay in the house
1 2 3 4 → _ _ _ _

2. wh-questions:

Q George can live in which house
1 2 3 4 5 → 5 _ _ _

Q horses eat apples from which tree on Tuesdays
1 2 3 4 5 → 4 _ _ _ _

Can you find the same processes operating in the different kinds of questions?

SUMMARY:

wh-movement moves a wh-phrase from anywhere to _____, deleting ___.
subject-auxiliary inversion switches the places of _____ and _____.
do-insertion adds '____' whenever there is no _____.

These are three different transformational processes, three separate (although interacting) transformations. The first operates in wh-questions only, but the second and third operate in both types of questions. They depend only on the structure of questions, not their meanings.

You can further see the independence of these processes by observing which of them do and do not operate in the following types of sentences:

a) Which rule is operating in the following sentence (even though it isn't a question)?

Never will George reveal the answer.

b) Which rule is NOT operating in the following sentence (even though it IS a question)?

Who can read this book? (Cf. also: who read this book?)

additional material for consideration:

1. In many languages, the subject and verb invert to form questions, e.g. German *Johann geht* 'John goes' vs. *Geht Johann.* In contrast, English inverts the _____ and the _____, and if there is no _____, it adds '___' to make up for it.

   Conversely, in French, the verb inverts with a pronoun: *il sait* 'he knows', *sait-il* 'does he know?'. If there is no pronoun, one is added: *Jean sait* 'John knows', *Jean sait-il* 'does John know?'

2. In Chinese and many other languages, questions are formed:
   a) with a question-marker, like English Q, but one that does not delete: *Wang lai* 'Wang is coming', *Wang lai-ma* 'is Wang coming?'
   b) or with a question 'tag' that duplicates the verb: *Wang lai bu-lai* 'is Wang coming?', literally: 'Wang come not-come'.

3. English has another type of question, formed with a 'tag':

   Jack can read the article, can't he?
   The engineers read, don't they?

   What are the three parts of the 'tag', and how are they derived? (I.e., what other words in the sentence are two of them based on?)

section  adjectival clauses (relative clauses)

1.
When two sentences have identical parts, they can undergo *too*-addition. But if their subjects are identical, the first sentence can become an ADJECTIVAL CLAUSE, attached to the subject of the second sentence:

[the Martian has landed] and the Martian is beeping at me.

The Martian [the Martian has landed] is beeping at me.

A special pronoun transformation applies to adjectival (relative) clauses, substituting the special 'relative' pronouns *who*, *which* for the inner noun, giving:

The Martian [___ has landed] is beeping ...

In this particular sentence, no further transformations can apply. But if a form of the auxiliary be appeared in the adjectival clause, a further simplification would be possible:

The Martian [who is landing in the garden] is beeping at me.
The Martian [who is hated by all Earthlings] is beeping at me.
The Martian [who is green all over his back] is beeping at me.
1 2 3...

→ 1 3...

This process is called (conveniently and cutely) *wh-is* deletion.

2.
What if, after wh-is deletion, the adjectival clause is one word, such as 'landing', 'hated', or 'green'?
Then it has to undergo the following transformation:

Adjective movement: moves a one-word adjectival clause to _____.

This, then, is the source of "simple" adjectives---which are not really so simple after all. A simple noun-phrase like 'the green Martian' is actually derived, by complex processes, from complex structures:

[The _____ is _____] and the Martian is beeping.
The Martian [the Martian ___ ____] is beeping.
The Martian [_____ ___ ____] is beeping.
The Martian [____] is beeping.
The _____ Martian is beeping.

3.
Getting back to fully complex adjectival clauses, what if we start with:

[I hate the Martian] and the Martian is beeping.
The Martian [I hate the Martian] is beeping.
The Martian [I hate whom] is beeping.

What additional rule do we need to get the right word-order? Can you find this rule among those studied earlier?

additional material.

1. Spanish adjectival clauses work very much as English ones do; they even also follow their noun. Spanish adjectives, however, are very different from English adjectives: they follow their noun, as *el libro rojo* 'the book red', for 'the red book'. How can we characterize the difference between adjectives in the two languages, in terms of transformations that do or do not apply?

2. In Hebrew (as in Arabic) regular pronouns appear in adjectival clauses:

hem garim ba-batim	'they live in-the-houses'
hem garim ba-hem	'they live in-them'

ha-batim [she-hem garim ba-hem] 'the-houses which-they live in'

What is happening, transformationally speaking?

section  affix-hopping

1.
Let us assume that the endings for past and present tense are *d* and *z*. (Apart from phonological changes, *z* will often disappear: in fact, it appears only with 'he/she' subjects. But we will assume that it is always present, on the linguistic levels that we will be discussing.)

These tense endings have been ignored so far, partly because they are extremely intricate.

On the deep-structural level, they are part of the auxiliary. More specifically, the auxiliary consists of a MODAL followed by one of the tense-endings:

will / can / may + d / z

(z disappears completely with modals. *d* combines with them to form 'would', 'could', 'might'.)

The modal, however, is an optional element. So it is also possible to have deep structures like:

Jack d live in the house
Jack z live in the house

These structures may remind you of 'Jack did live..., does live'. But these are special 'emphatic' constructions, which actually result from *do*-addition, a process you saw in questions.

The normal, non-emphatic surface structures are different: *Jack live-d, live-z*. In other words, the normal fate of the tense-endings, when they are not accompanied by a modal, is to undergo a transformation of AFFIX-HOPPING, which hops them to the other side of the verb.

2.
There are still further parts to the auxiliary, which are also involved in affix-hopping.

be-ing — expresses a continued action
have-n — expresses a completed action (n is sometimes pronounced n, but usually it turns into d)

Jack can be-ing go → Jack can be go-ing
Jack can have-n go → Jack can have go-n

How many instances of affix-hopping are there in the following sentence?

DS: Jack z have-n be-ing go

SS: Jack have-z be-n go-ing

sentences within sentences V

A. 'recursion': Sentences contain sentences, and the sentences that sentences contain contain sentences, and...

Types: relative (adjectival), already studied:
within an NP, along with a head NP

S
'the book (I read)' = NP

nominal, naming an event or state:
is the whole NP
(except possibly for 'the fact')

NP
'that I read the book'

B. examples of recursion:

relative: 'The book (that I read) (that you saw) (that I liked) is on the table'

'He threw
the book (...)
away'

nominal: '(That you know (that I know (that you're asleep)))
disturbs me'

'I'm happy
(that you know (that I know (that you're asleep)))'

C. nominal clauses: complementizers

1. preserving sentence structure: that
2. breaking sentence up into subject & pred.: for...to...
..'s...ing...

examples: that Jack snores
for Jack to snore
Jack's snoring

E. reduction: subject-deletion

'Jack wants for me to leave' stays as-is, but under identity:
Jack wants Jack to leave
1 2 3 4 = _____

F. extraposition (='putting out to the right')

optional: (That you're asleep) disturbs me
1 2 → it _ _

obligatory: (That you're asleep) seems to me
1 2 → _ _ _

G. raising

1. subj.-to-obj.: I want (for-to Jack go) = I want for Jack to go

2. subj.-to-subj.: It seems to me (for Jack to be asleep) = Jack seems...

3. obj.-to-subj.: It is easy (for someone to eat the chicken) = _____

section W summary

Because language exhibits a contrast between two levels of structure (the deep or content level, and the surface or form level), it shows complexities of such a unique kind that they distinguish human language from all non-human communication systems, and from most of the "complex" formal systems designed by humans as well.

1. Human languages exhibit complex SYNONYMY: there are many different ways to say any single idea. This is an important feature of human language---which you can use effectively even in a foreign language. But don't try to use it on your dog: synonymy is beyond his cognitive abilities, and he'll learn best if you keep drilling him with one word for a given meaning.

Can you explain the following instances of synonymy with specific transformations studied earlier?

a. Jack wrote the graffiti = The graffiti was written by Jack
b. Georgette threw out the idea = Georgette threw the idea out
c. He left yesterday = Yesterday he left

2. Human languages also all exhibit a particular kind of COMPLEXITY, very frustrating to non-native speakers, but completely natural to native speakers. This complexity emerges, in most interesting form, in silly sounding sentences that only linguists (and sometimes non-native speakers) would ever put together, which native speakers find ridiculous, but cannot explain why unless they've studied linguistics. Examples:

a. *He ran the hill up.
b. *Go away this intant, won't she?
c. *The horse kicked yourself.
d. *Can who read this book?

How many of these non-sentences can you explain?

3. Human languages also exhibit AMBIGUITY, in particular a single surface structure corresponding to two deep structures. Many sentences are ambiguous: usually we just automatically interpret them correctly in context. But looking at them linguistically, we discover new depths in our native language. Examples:

a. The terrorists blew up the street
b. If the baby cries when you give it the bottle, put it in boiling water for a few minutes.
c. Flying planes can be dangerous.
d. The chicken is ready to eat.

X supplement on phrase-structure

Complex transformational derivations are best handled in LINEAR form, as we have done. Each level of structure (e.g. deep and surface) is indicated as a sequence of words.

Sometimes it is necessary to indicate the categorization of words or phrases. This is best handled informally, on an ad-hoc basis, on the introductory level: trees are too hard to handle, and offer too little advantage to the introductory student. For linguistics majors, who may need trees for more advanced course-work, I recommend a brief study of their structure AFTER a good understanding of transformations has already been acquired, as a sort of footnote. At this point, I have found, they can be learned almost automatically.

The following are some basic notes on categorization.

You don't have to know traditional definitions of parts of speech to be a good syntactician. But you do have to work easily with category names---and their abbreviated symbols, such as:

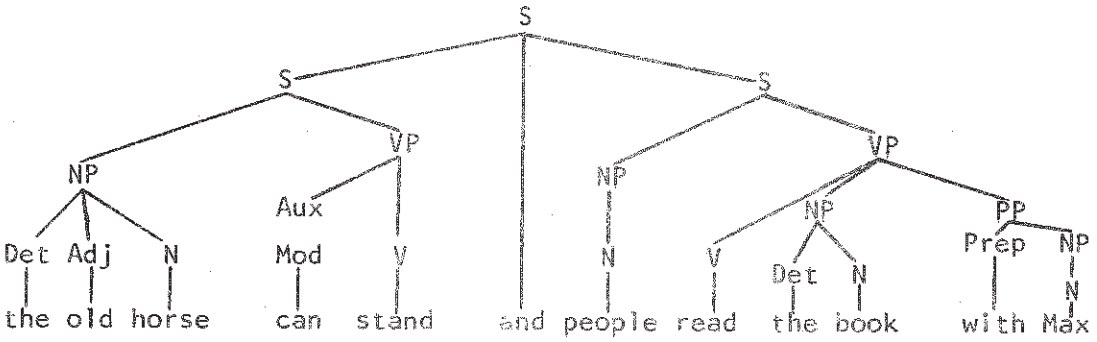
N noun, such as: engineer, tree, predicament
V verb, such as: stay, go, read, hate, kick, give.
Adj adjective, such as: old, brilliant, good, mellifluous.
Det. determiner, such as: a, the, this, my, his.
Aux auxiliary, including Modals like 'will', 'can', etc.

Important 'phrases' (word-groups):

NP noun-phrase, e.g. Det + N, as 'my horse'
PP (PrepP) prepositional phrase, = Prep + NP, as 'on my horse'
VP verb-phrase: verb with following complements, as 'read the book'
S sentence or clause (i.e. a whole sentence, whether standing alone or joined to another sentence)

NP and S are particularly important to recognize in sentences. PP and VP are more of a bother than they are worth, but they are commonly used.

Category information is commonly presented in 'tree diagrams', in HIERARCHICAL form.



grammar comparison 

A. parts of speech.
   1. no nouns (Nootka)
   2. adjective as kind of verb (Chin., Anc. Hbrw & Arab.)

      Chin.: ni hau ma 'you well Prt'

   3. instead of prepositions (Chin.):
      a) nouns (e.g. *li* 'inside', *shang* 'top')
      b) verbs (e.g. *dau* 'arrive', *gei* 'give', *yung* 'use', *gen* 'accompany')

B. number
   1. dual (Hbrw., Ar.) *yom, yomayim, yamim* (H. 'day')
   2. no plural (Chin., Jap., Viet.)
      Ch. *men-kou you ren*

C. gender
   1. M/F or M/F/N (many Eur. lgs.)
   2. Common vs. Neuter, e.g. Du. de vriend, de vrouw, het huis
   3. non (Turkish, Farsi) Farsi u 'he,she'
   4. shape-based (Chin., Jap., Swahili)

      yige ren 'one person' (Ch.)
      yiben shu 'one book'
      yityau lu 'one road'
      yijang hwar 'one picture'

D. "case"
   1. 3 to 8 or more different forms of nouns, etc., expressing subject, object, etc. (Gm., Gk., Russ., Lat., Cl. Arab.)
      O andras vlepi ton andra 'The man sees the man' (MGk.)
   2. expressed with particles (Jap.)
      Hito ga hon o mitta. 'Man-ga book-o saw'
   3. none (Chin.)

      Wo ai ni. 'I love you'
      Ni ai wo.

   4. different case meanings
      a) Gk. to vlivlio tu andros 'the book of the man'
         Dino to vlivlio tu andros. 'I give the book to the man.'
      b) "ergative" (Lezgin)

         Buba-di kivalax-Ø iyizva. 'Father-di work-Ø does'
         Buba-Ø ksanava. 'Father-Ø sleeps'

E. "aspect" vs. tense

1. "aspect" distinctions

Eng.	is running/runs	
Sp.	tomaba/tome	
Gk.	grafusa/egrafa	'I wrote'
	tha grafo/tha grapso	'I will write'
	na grafo/na grapso	'(I want) to write'

2. languages without tense (Cl. Hbrw. & Arab., Chin., Viet.)

Ch. ta lai 'he was/is/will be on the way'
ta lai-le 'he arrived/arrives/will arive'

F. pronouns

1. treated as particles, e.g. Swahili

hamkuniandikia 'you did not write to me'

ha-	'not'
-m-	'you'
-ku-	'past'
-ni-	'me'
-i-	'to'
-a	verb-ending

2. omitted, e.g. Jap.

Wakarimasu ka	'Understand Q'
Wakarimasen	'Understand-not'

G. questions

1. Chin. ta hau 'he is well'
ta hau ma 'is he well?'

2. Chin. ta hau bu-hau 'is he well?'

3. Gm. Johann weiss 'John knows'
Weiss Johann 'Does John know?'

4. Fr. Jean sait 'John knows'
Jean sait-il 'Does John know?' (il - 'he')

5. Chin. Ta yau shu 'he wants (a) book'
Ta yau shenma 'What does he want?'

H. relative clauses

1. Chin.

hau shu	'the good book'
hen hau de shu	'the very good book'
ta yau de shu	'the book he wants'

2. Hbrw. (Arab.)

garti ba-arim	'I-lived in-the-cities'
garti ba-hen	'I-lived in-them'
ha-arim	'the-cities'
ha-arim she-garti ba-hen	'the-cities that-I-lived in'