Mechanisms of Language Change

Holger Diessel
University of Jena

holger.diessel@uni-jena.de
http://www.holger-diessel.de/

Language evolution

Human beings are the only species with language.

Language evolution

Attempts at teaching nonhuman primates language have failed.

Language evolution

Where does language come from?

Language evolution

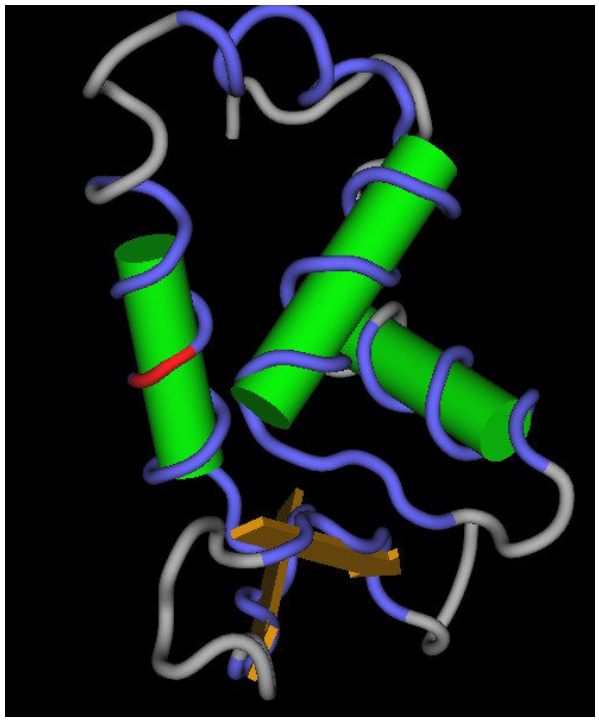
What are the genetic prerequisites for language?

Language evolution

FOXP2 - the language gene

People with a defective FOXP2 gene are unable to produce the fine movements with the tongue and lips that are necessary to speak clearly.

Language evolution



‘A Language Gene is identified.’

[Washington Post Oct. 2001]

Language evolution

FOXP2 seems to play an important role in controlling motor movement, but motor movement has nothing to do with language and cognition.

Language evolution

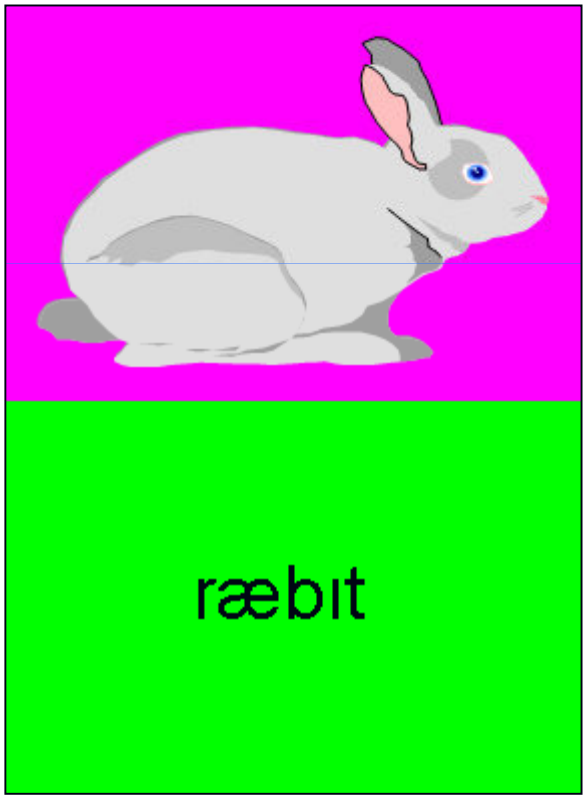
How did language (notably grammar) evolve?

Language evolution

Many researchers agree that language evolution / development has two important cognitive prerequisites:

- The ability to understand (linguistic) symbols
- The ability to combine symbols to larger units

The symbolic nature of language



The symbolic nature of language

What are the cognitive prerequisites for understanding symbols?

In order to understand/use symbols I need to understand that other people are mental beings like I am.

[Tomasello 1999]

The evolution of grammar

Where does grammar come from?

1. Where do constructions come from?
   (1) Peter was hit by a car.
   (2) The letter was written by Mary.
   (3) She was kissed by someone.

2. Where do grammatical morphemes come from?

   Articles: *the, a, some, any*

   Prepositions: *on, in, under, between*

   Auxiliaries: *is, be, will*

The evolution of grammar

Words are commonly divided into two basic types:

- Content words
- Grammatical markers

The evolution of grammar

Content words are prototypical signs (or symbols) that combine a sequence of speech sounds with a particular concept (or meaning).

Grammatical markers are semantically more abstract and their occurrence seems to be dependent on the occurrence of content words.

The evolution of grammar

The categories of content words (i.e. nouns and verbs) are universal.

But the categories of grammatical markers are language-specific: There are many languages that do not have articles, auxiliaries, relative pronouns, complementizers, modal verbs etc.

The evolution of grammar

Content words and grammatical markers are two different types of expressions that may have evolved differently in the evolution of human language.

The evolution of grammar

If human language is symbolic, as commonly assumed, one can easily imagine a scenario in which our ancestors came up with words for *fire*, *tree* or *stone*:

But how do we explain the evolution of grammatical markers?

How do we explain the evolution of bound morphemes such as the English past tense suffix –*ed* or the grammatical case markers in German: *der Mann, den Mann, dem Manne, des Mannes*

The evolution of grammar

(1) Jack'**s gonna** come **because he has** won.

- *is gonna* > motion verb (is going to)
- *because* > PP (by cause)
- *he* > DEM
- *has* > verb of possession

Grammaticalization

Grammaticalization is the process whereby lexical items develop into grammatical items and items that are already grammaticalized assume new grammatical functions.

[Hopper and Traugott 1993]

Grammaticalization

Auxiliaries

gonna	motion verb
will	verb of intention
have	verb of possession

Grammaticalization

Conjunctions

while	DEM hwile SUB (hwile = ‘time’)
therefore	DEM + P
given	PTC

Grammaticalization

Prepositions

during	V-ing
in front of	PP
ago	prefix-*gone* (‘a-gone’)

Grammaticalization

Indefinite markers

somebody	NP
a	numeral (‘one’)

Grammaticalization

Epistemic markers

y'know	'(do you) you know' [question]
(I) think	main clause
guess	imperative main clause

Grammaticalization

Transparent forms

nevertheless
however
moreover
in case
is about to
that's why
in order to
gotta
regarding
in the course of

The origins of grammatical function words in German

Grammaticalization

Weil ich gerne lese, hat mir jemand ein Buch geschenkt, das jetzt auf meinem Schreibtisch steht und das ich noch vor den Ferien lesen werde.

Grammaticalization

Pronouns/determiners

ein	numeral
der	DEM
jemand	je ein Mann (=irgendeine beliebige Person)

Grammaticalization

Conjunctions

weil	Phrase include the noun ‘Weile’
nachdem	P + DEM
falls	Fall
dadurch	DEM + P
deswegen	DEM + P
vorausgesetzt	PTC

Grammaticalization

Prepositions

(1) *Anhand* des Beispiels

(2) *Infolge* des Angriffs auf den Irak

(3) *Anlässlich* seines Geburtstags

Grammaticalization

(1)	An der Hand dieses Beispiels	>	anhand
(2)	In der Folge dieses Ereignisses	>	infolge
(3)	Aus Anlass dieses Ereignisses	>	anlässlich

Grammaticalization

Where do bound morphemes come from?

Grammaticalization

Spanish	Gloss
cantaré	‘I’ll sing’
cantarás	‘you’ll sing’
cantará	‘he’ll sing’
cantaremos	‘we’ll sing’
cantaréis	‘you’ll sing’
cantarán	‘they’ll sing’

Grammaticalization

Spanish	Gloss	Latin
cantaré	‘I’ll sing’	cantare habeo
cantarás	‘you’ll sing’	cantare habes
cantará	‘he’ll sing’	cantare habet
cantaremos	‘we’ll sing’	cantare habermus
cantaréis	‘you’ll sing’	cantare habetis
cantarán	‘they’ll sing’	cantare habent

Grammaticalization

Bound morphemes

N-ly	noun meaning ‘with an x-appearance’
N-hood	noun meaning ‘person/sex/quality’
N-*ful*	hand full of x
V-ed	auxiliary ‘do’ (uncertain)

The grammaticalization of demonstratives

Grammaticalization

All grammatical morphemes have developed out of lexical morphemes, principally nouns and verbs…

[Bybee 2003]

Cline of grammaticalization

Grammaticalization of demonstratives

There is at least one other (important) source for grammatical morphemes: demonstratives (or spatial deictics) such as English *this* and *that* and *here* and *there*.

Grammaticalization of demonstratives

Third person pronouns

he / it

er / sie / es

Grammaticalization of demonstratives

Definite article

the

der/die/das

Grammaticalization of demonstratives

Relative pronouns

that

der/die/das

Grammaticalization of demonstratives

Complementizers

that

dass

Grammaticalization of demonstratives

Sentence connectives/conjunctions

thus / therefore

deshalb / dadurch

Grammaticalization of demonstratives

Directional preverbs

hin-gehen

her-kommen

Grammaticalization of demonstratives

Copulas

NP, [DEM NP] > NP be NP

Der Mann, der ein Polizist. >

Der Mann ist ein Polizist.

Grammaticalization of demonstratives

Common assumption: demonstratives are function words, thus they must have developed from content words.

But there is no evidence from any language that demonstratives developed from content words.

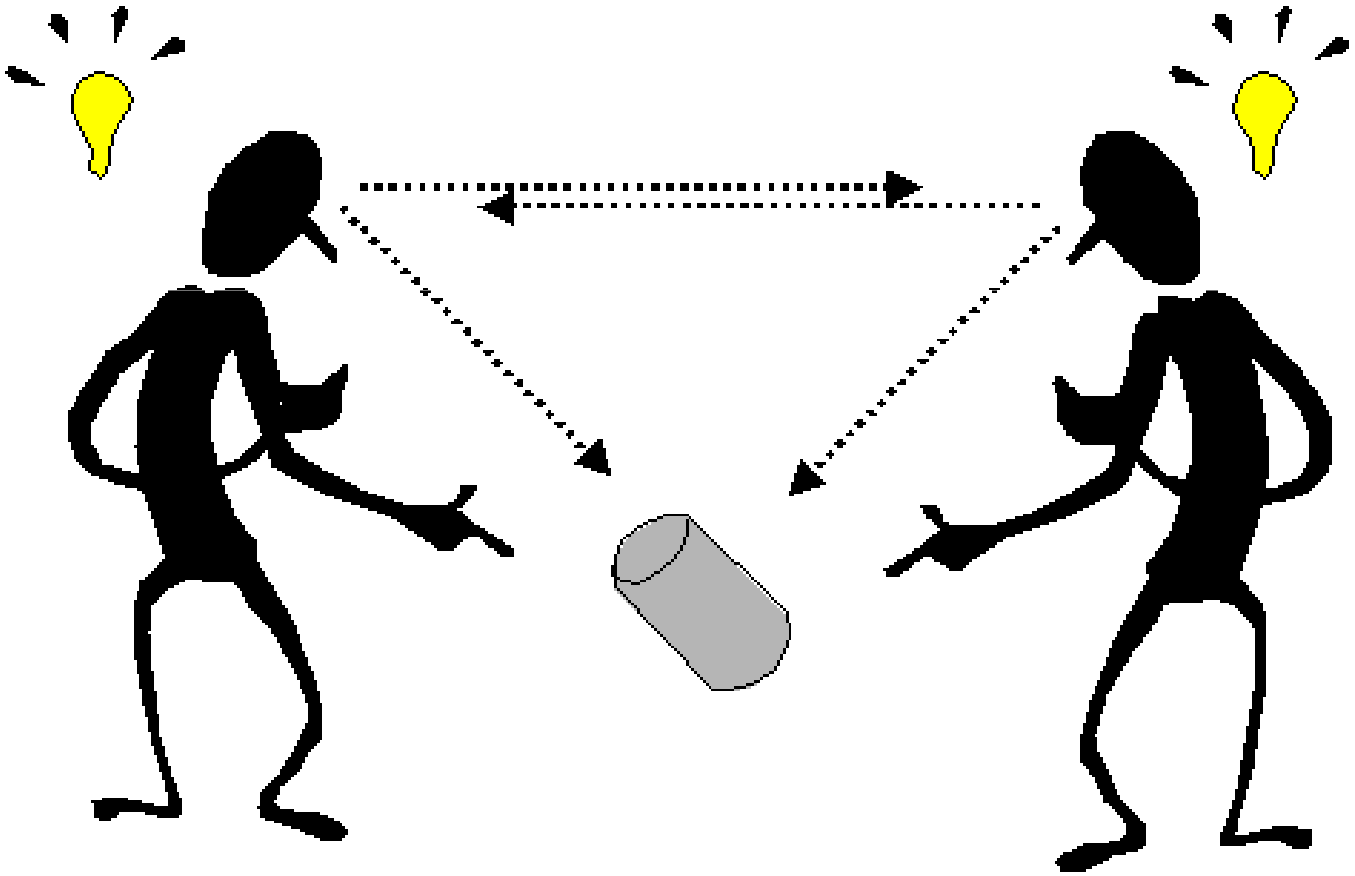
Thus, we may assume that demonstratives are older than other function words.

Grammaticalization of demonstratives

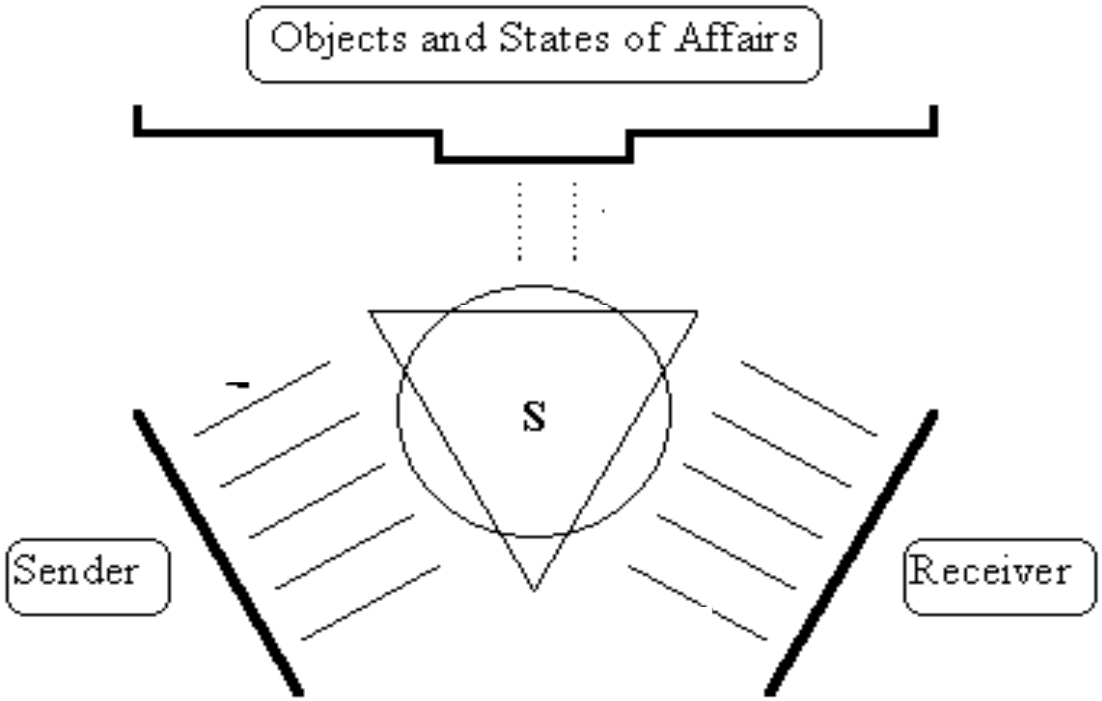
Demonstratives have a special status in language; they serve one of the most basic functions of human communication.

In their basic use, demonstratives function to establish joint attention.

Joint attention



Joint attention



Joint attention

dyadic interactions

Joint attention

The shift from dyadic to triadic interactions is reflected in the emergence of joint attentional behaviours such as eye gaze and pointing.

Joint attention

Scaife & Bruner 1975; Butterworth 1998; Franco 2005;
Brooks & Meltzoff 2005

Joint attention

- Proto-imperatives
- Proto-declaratives

Bates et al. (1976, 1979)

Joint attention

Proto-imperatives are pointing gestures that resemble reaching gestures produced with the intention to obtain an object.

Proto-declaratives are pointing gestures produced with the sole intention to focus the addresses' attention on a particular object.

Joint attention

Declarative pointing is a unique trait of human communication.

Declarative pointing gestures are produced with the sole intention to establish joint attention.

Declarative pointing (and joint attention) presupposes that the communicative partners understand each other as mental or intentional agents and are able to engage in triadic interactions.

Joint attention

Demonstratives have a special status in language because they are the quintessential linguistic device to establish joint attention.

Demonstratives

- Demonstratives are universal.
- Demonstratives emerge very early in language acquisition.

Demonstratives

	Eve	Naomi	Nina	Peter	Total	%mean
1. **that**	860	327	241	366	1794	3.1
2. it	481	488	142	303	1414	2.5
3. a	581	97	234	349	1261	2.3
4. **there**	299	175	52	500	1026	2.1
5. the	340	145	341	74	900	1.9
6. my	348	61	314	161	884	1.8
7. what	146	511	10	162	829	1.5
8. no	353	138	117	115	723	1.2
9. mommy	283	187	148	29	647	1.2
…	…	…	…	…	…	…
13. **this**	41	406	52	97	596	1.2
…	…	…	…	…	…	…
15. **here**	67	31	247	96	441	1.1
Total	20.512	13.072	8.551	12.255	54.390	100

Demonstratives

- Demonstratives are universal.
- Demonstratives emerge very early in language acquisition.
- Demonstratives are very old.

Demonstratives

Reinforcement:	German	*der hier*	*der da*
	French	*celui-ci*	*celui-là*
	Swedish	*denhär*	*dendär*

Latin	*ille*
Vulgar Latin	*ecce ille*
Old French	*cest cel*
French	*ce*

Demonstratives

Demonstratives emerged very early in the evolution of language so that we simply do not know how they evolved.

Demonstratives are part of the basic vocabulary of every language.

Demonstratives provide a common historical source for some of the most frequent grammatical markers.

Demonstratives

The grammaticalization of demonstratives originates from the anaphoric and discourse-deictic uses.

(1) The Yukon lay a mile wide and hidden under three feet of ice. On top of **this** ice were as many feet of snow.
(2) Oh, pretty big. Big enough so that the rock doesn't look nearly as tall as it is. The top's bigger than the base. The bluff is sort of worn away for several hundred feet up. **That**'s one reason it's so hard to climb.

Demonstratives

Anaphoric and discourse-deictic demonstratives involve the same psychological mechanisms as demonstratives that speakers use with text-external reference. In both uses, demonstratives focus the interlocutors' attention on a particular referent.

Joint attention is thus not only important to coordinate the interlocutors' attentional focus in the speech situation, it also plays an important role in the internal organization of discourse.

Demonstratives

When anaphoric and discourse deictic demonstratives are routinely used to express a particular relationship between two linguistic units, they often loose their deictic force and develop into grammatical markers.

Demonstratives

Demonstratives > complementizer

(1) Listen to **this**: Jack told me that he won't come.

Demonstratives

Demonstratives > complementizer

(1) *Middle High German*

joh gizalta in sâr **thaȝ**,
and told them immediately that

thiu sâlida untar in uuas
the luck among them was

‘And he told them immediately that good fortune was among them.’

Demonstratives

Demonstratives > complementizer

(1) *Old English*

þt gefremede Diulius hiora consul
that arranged Diulius their consul

þt þt angin wearð tidlice Durthogen
COMP that beginning was in.time achieved

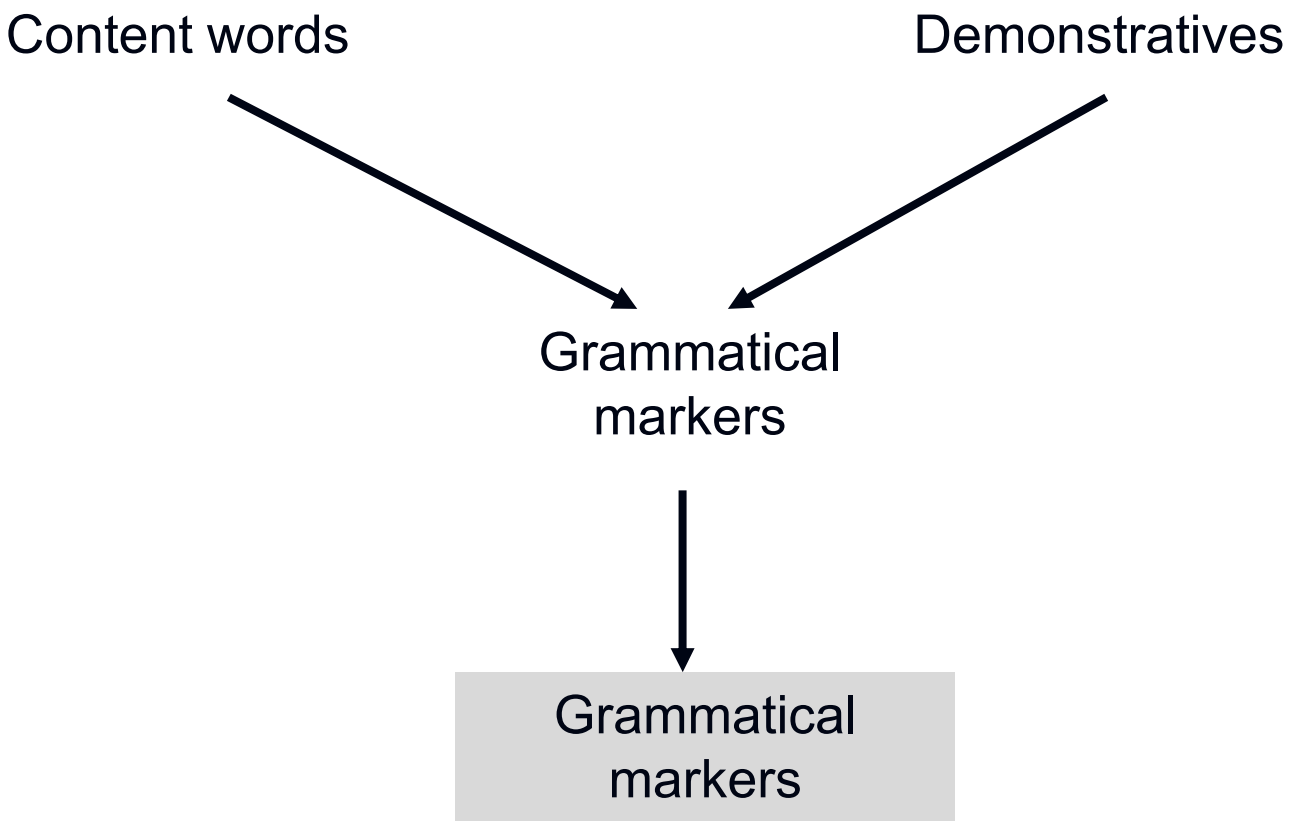
‘Their consul Diulius arranged (it) that it was started on time.’

Demonstratives

Grammatical markers that commonly develop from demonstratives:

- Complementizers
- Relative pronouns
- Third person pronouns
- Definite articles
- Conjunctions
- Directional preverbs
- Copulas
- Focus markers

Demonstratives



Mechanisms of Language Change

Review

Questions:

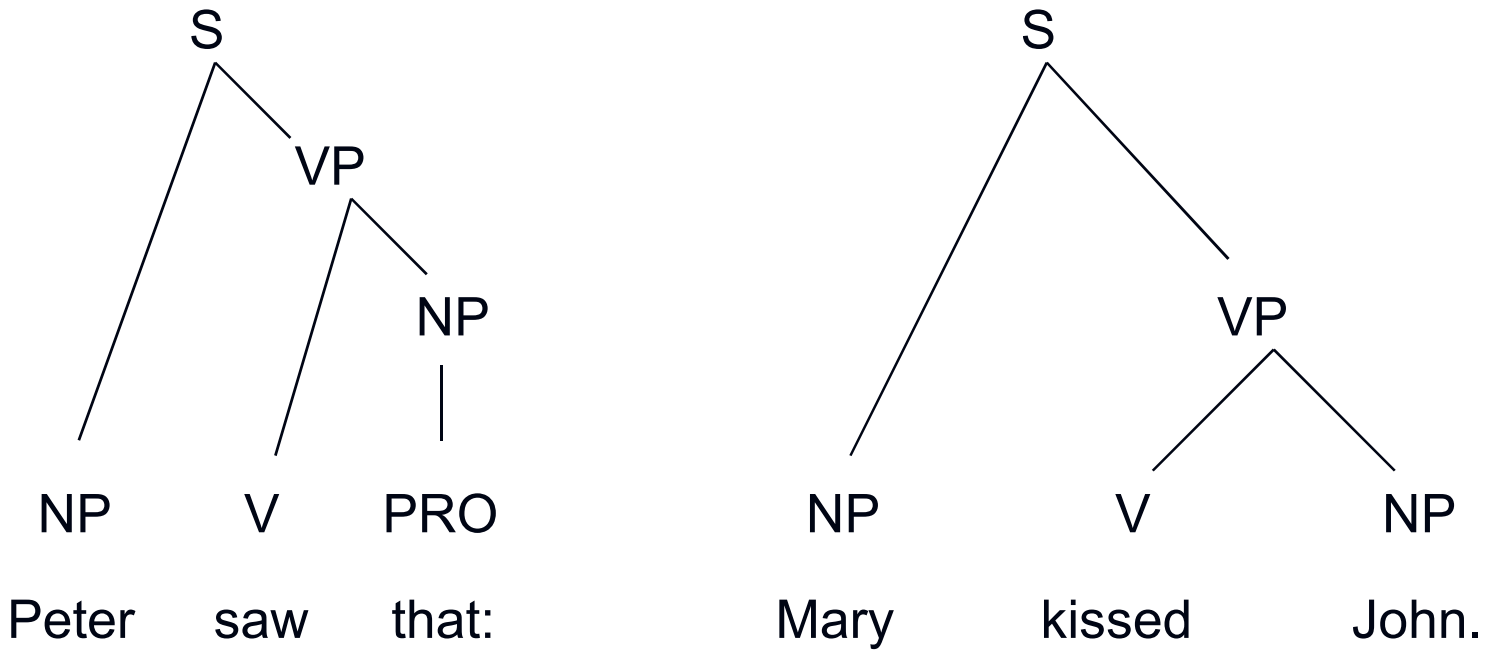
- Where do grammatical morphemes come from?
- Where do grammatical constructions come from?

Sources of grammatical markers:

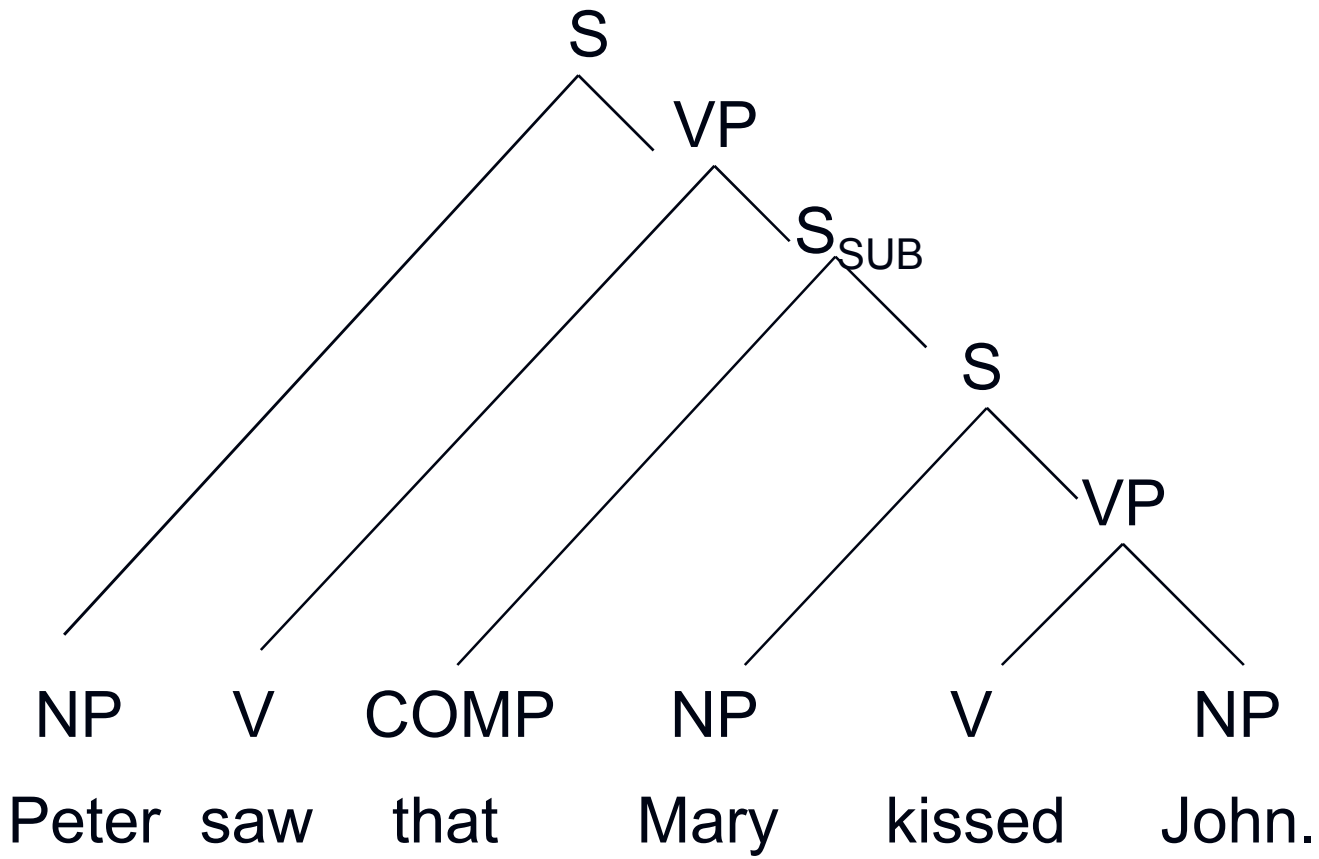
- Content words
- Demonstratives

Where do grammatical constructions come from?

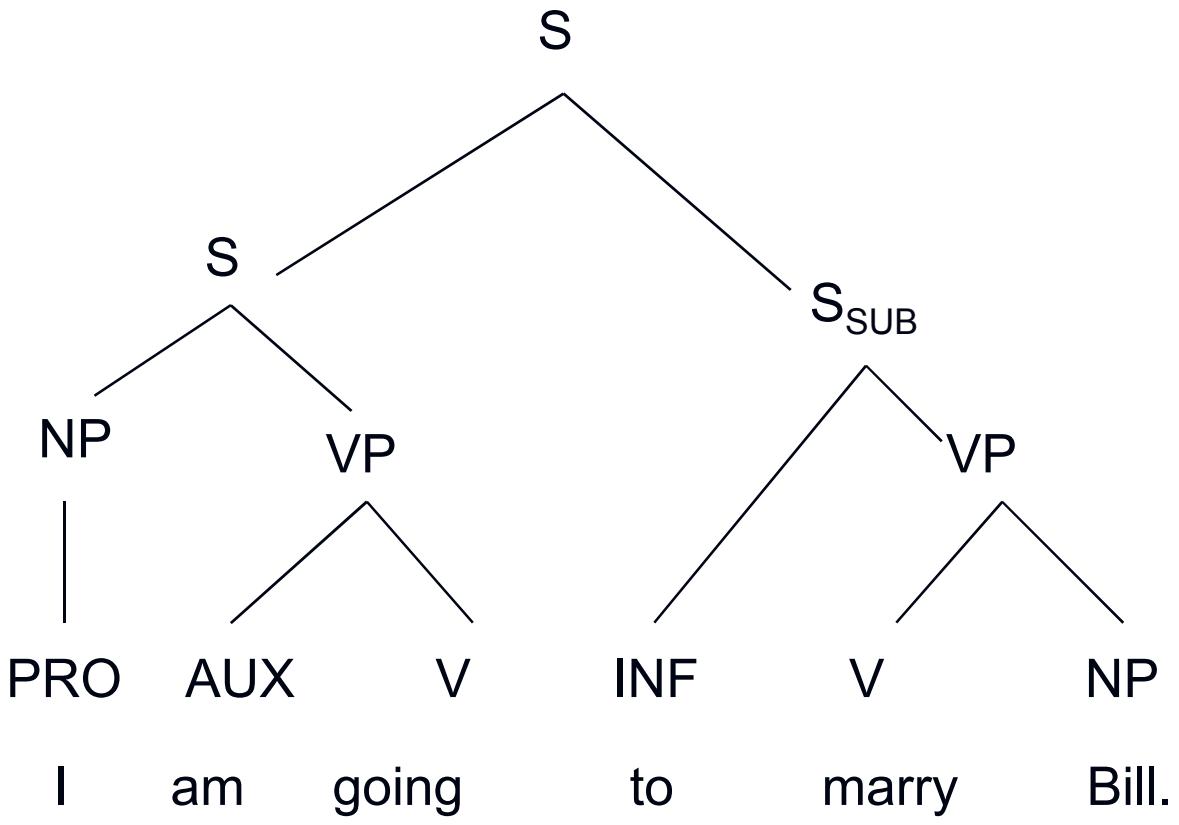
The development of constructions



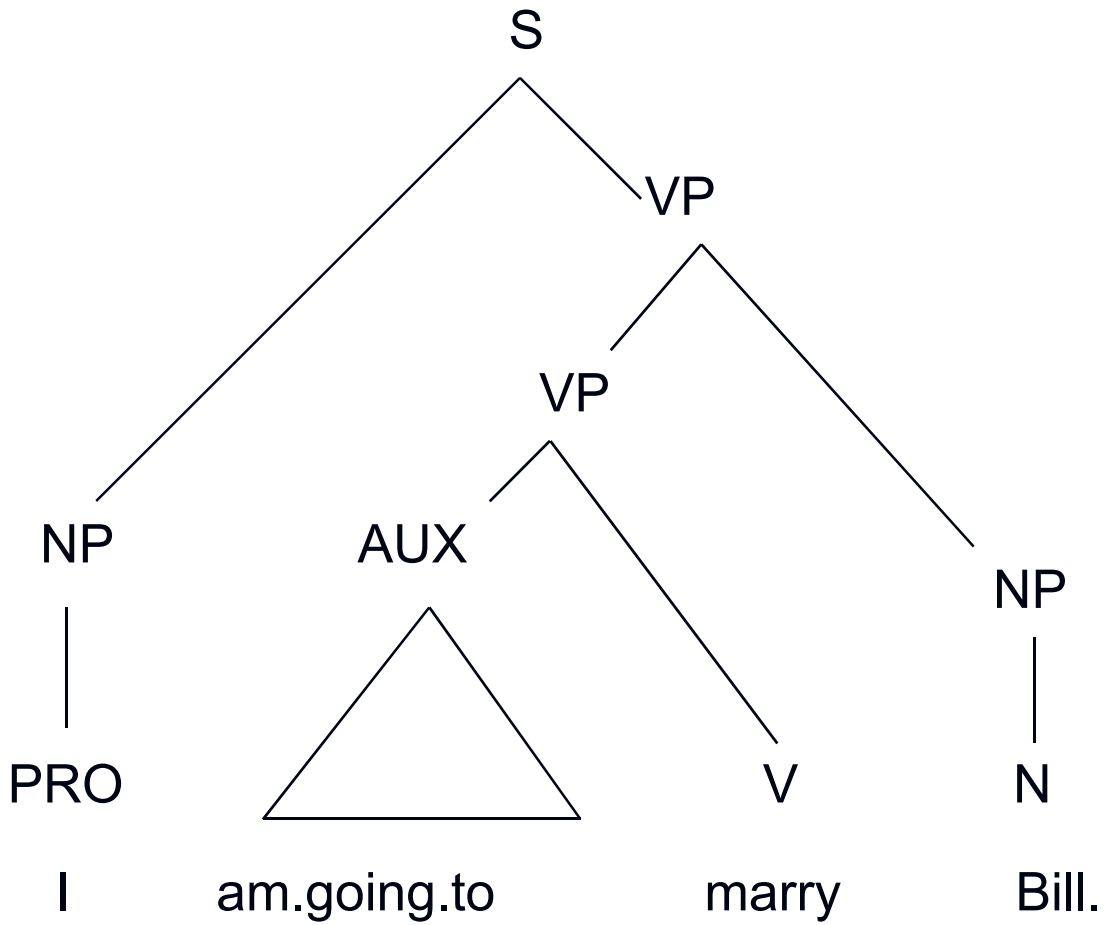
The development of constructions



The development of constructions



The development of constructions



The development of constructions

Free discourse configurations -> phrase structure

Grammaticalization

Phonetic reduction

going to	>	*gonna*
I will	>	*I'll*
I am	>	*I'm*
do not	>	*don't*

Grammaticalization

Loss of inflectional properties

that /those	>	*that [complementizer]*
go-ing	>	*gonna*
give	>	*given*

Grammaticalization

Loss of constituent structure

want to	>	*wanna*
[in [front [of__]]]	>	*[in front of [__]]*
some DET body N	>	*[somebody] PRO*

Grammaticalization

Semantic bleaching

have (poss)	>	*have (aux)*
go (motion)	>	*gonna (aux)*
stomach (concrete)	>	*in (relational)*

Grammaticalization

Grammaticalization is unidirectional.

Grammaticalization

ups and downs

if and buts

I dislike her use of isms

a downer

siezen/duzen

das Für und Wider

Grammaticalization

- It provides a straightforward answer to the question ‘Where does grammar come from?’
- It challenges the assumption that linguistic categories have rigid category boundaries: Is *in front of* a PP or a preposition? Indirect support for a prototype approach to linguistic categorization.
- It challenges the static view of grammar: Linguistic structures and linguistic categories are constantly changing. What we need is a dynamic theory of grammar.

Grammaticalization

Grammaticalization involves general cognitive or psychological process.

Grammaticalization often involves a mapping between two cognitive domains.

From space to time

(1) a. The priest stood **before** the altar.
b. St. Michael's day is **before** Christmas.

(2) a. Bill is **in** Leipzig.
b. He will come **in** the spring.

(3) a. The balloon flew **over** the hill.
b. The game is **over**.

(4) a. He **followed** him.
b. World War II was **followed** by a 45 year period of Cold War.

From space to time

(5) a. That's a pretty **long** log.
b. It has been a pretty **long** day.

(6) a. They were driving **along** the river.
b. He new it **all along**.

(7) a. He is **going** to the village.
b. The rain is **going** to help the farmer.

(8) a. At the **end** of the queue.
b. At the **end** of the day.

From space to time

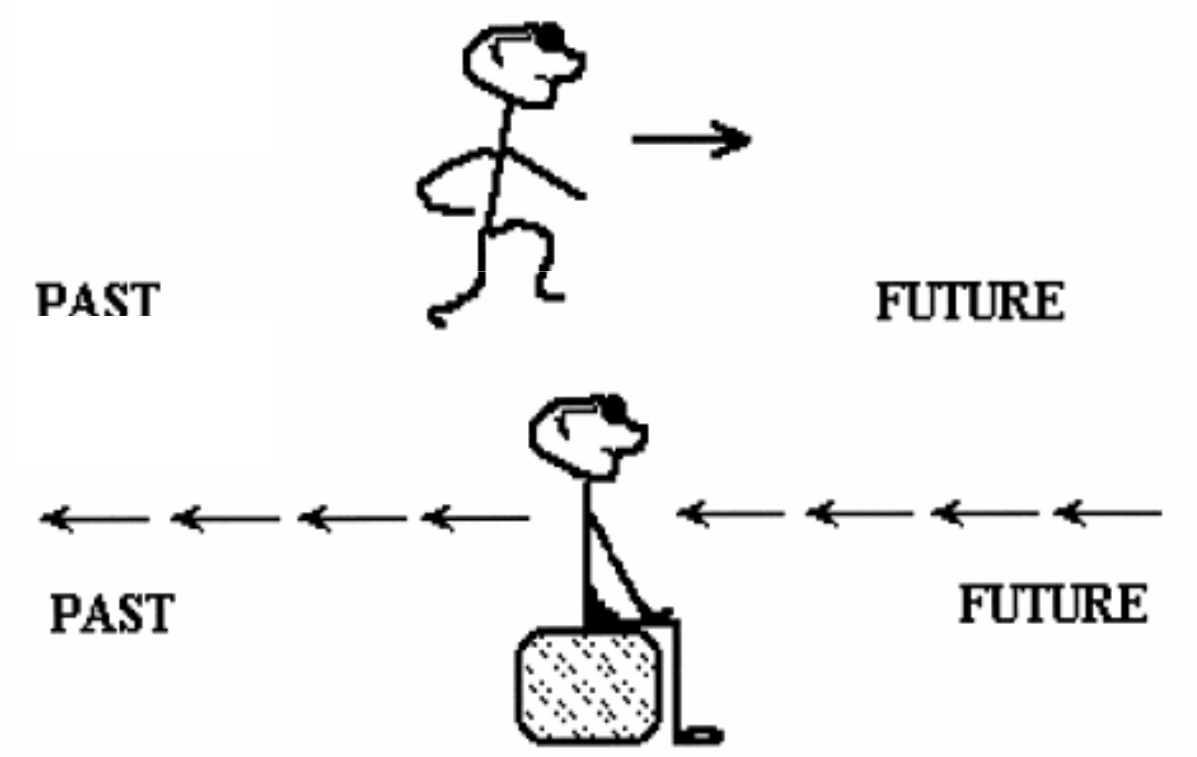
From space to time

is going to

Christmas is coming up soon

Boroditsky 2000

From space to time



is going to

komma att

Christmas is coming up soon

Boroditsky 2000

From space to time

(1) The revolution is before us. (ego-moving)

(2) The revolution is over before breakfast. (time-moving)

From space to time

(1) a. I have been waiting for you **since** the train left this morning.
b. **Since** I have an exam tomorrow, I won't be able to go out tonight.

(2) a. **Wenn** wir angekommen sind, rufen wir dich an.
b. **Wenn** er dort angekommen ist, hätte er angerufen.

(3) a. all die Weile > weil
b. while

On the role of frequency in diachronic change

Frequency and change

Give	12
Keep	3
Bring	4
See	12
Think	7
Know	5
Eat	2

7 types

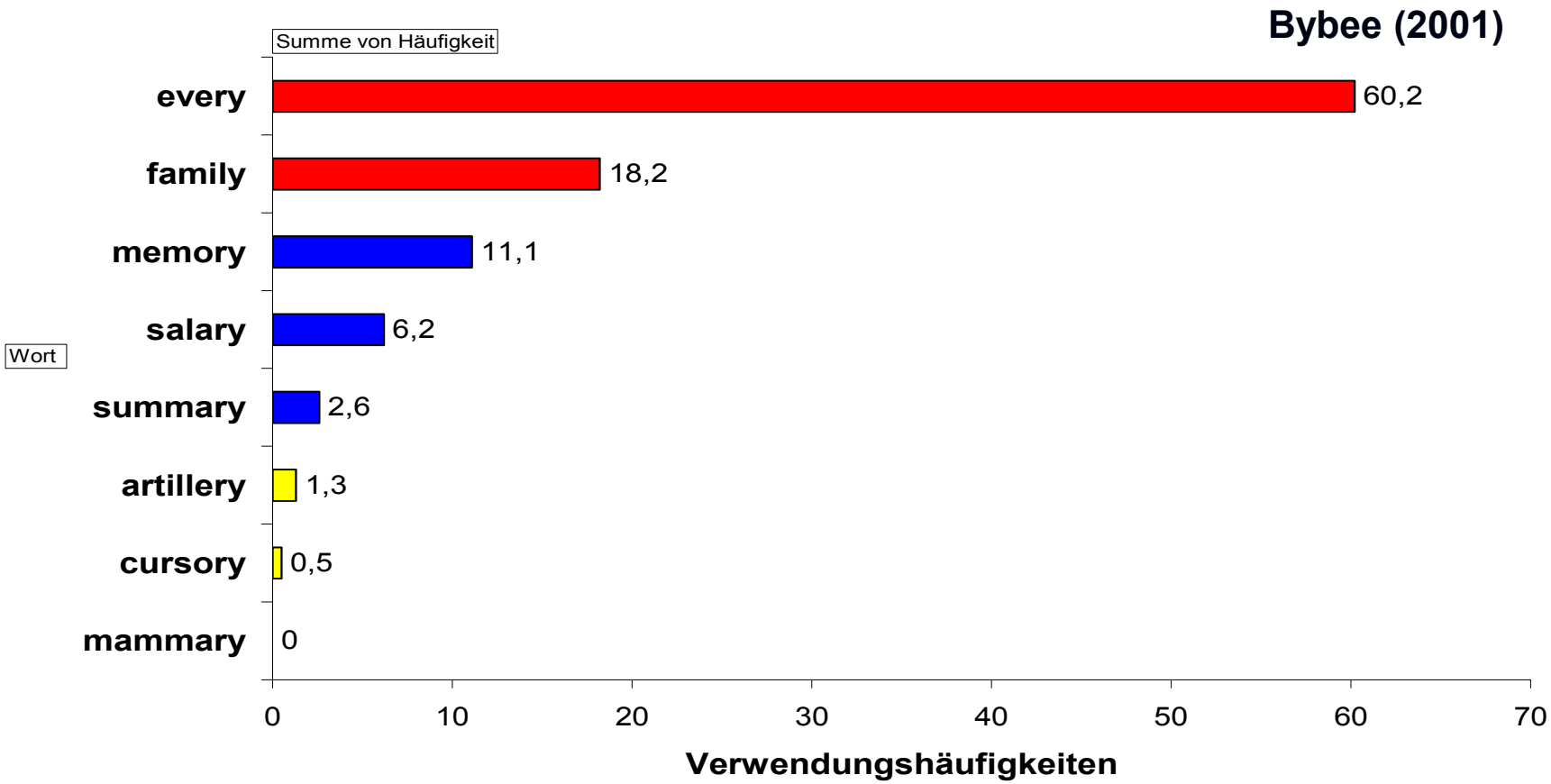
47 tokens

Frequency and change

summary	[sʌməri]
mammary	[mʌməri]

summary, memory, family, salary, artillary, cursory

Frequency and change



Zipf’s law

Frequently used expressions tend to undergo phonetic reduction.

Since frequently used expressions are more easily predictable, they are more easily identifiable even if they are phonetically reduced.

Pollack & Pickett (1964)

Only about 50% of all words produced in continuous speech are phonetically recognizable in isolation.

Especially difficult to identify in isolation are grammatical markers and frequent content words.

Frequent words tend to be phonetically reduced because in a given context they are easily predictable (e.g. you know that nouns are often preceded by an article, which therefore is easily identified even if it is phonetically reduced).

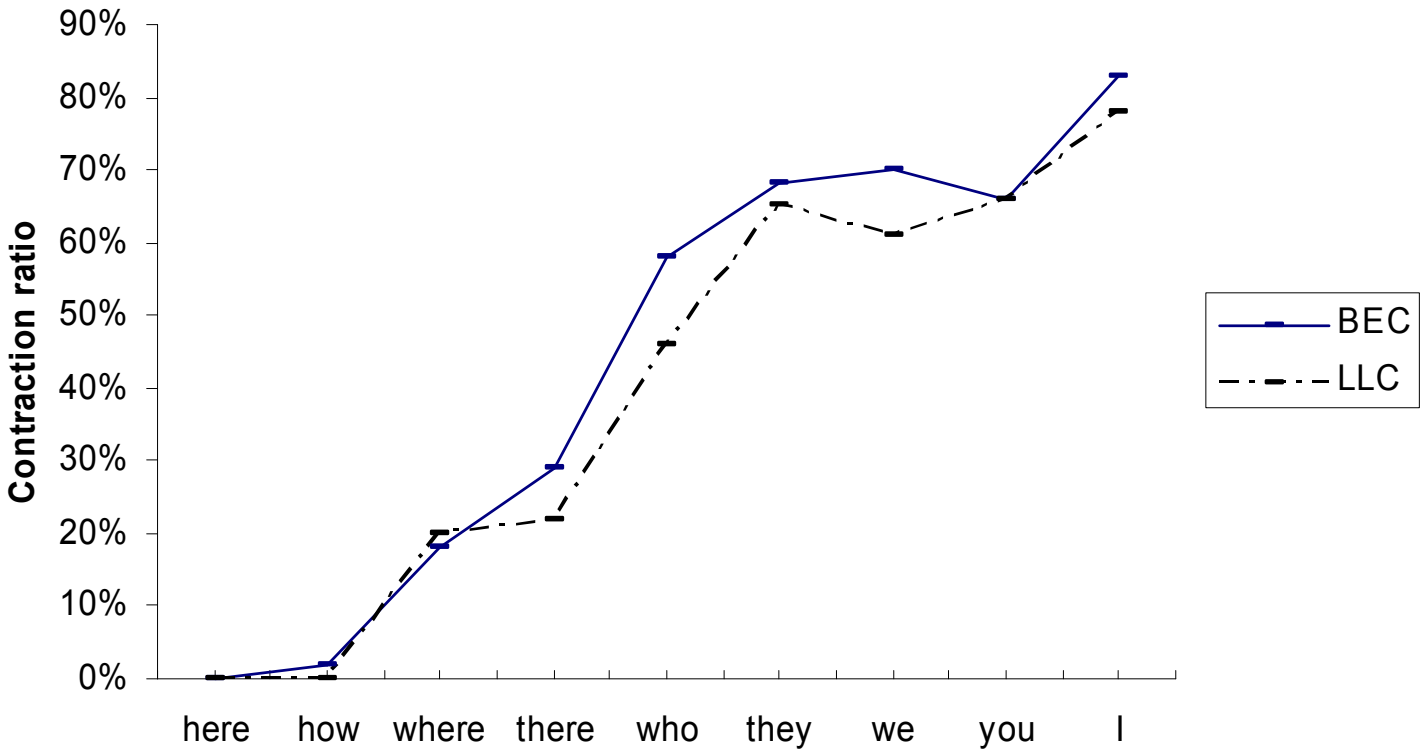
Frequently used expressions may be shorter because speakers have more practice producing them.

Krug (1998)

The reduction effect can also be observed in sequences of linguistic expressions.

that is	vs.	that’s
we will	vs.	we’ll
I have	vs.	I’ve

Krug (1998)


90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Contraction ratio
here
how
where
there
who
they
we
you
I
BEC
LLC

Bybee & Scheibman (1999)

- Tokens with an initial [d] and a full vowel [dõt, dõn]
- Tokens with an initial flap and a full vowel [ɾõt, ɾõ]
- Tokens with a flap and a reduced vowel [ɾ̃ə]
- Tokens with just a reduced vowel [ɾ̃ə, ə]

Bybee & Scheibman (1999)

	[dõt, dõ]	[rõt, rõ]	[rə̃]	[rə̃, ə]	Total
I	16	22	38	12	88
You	7	7			14
We	2	6			8
They	1	3			4
NP	5				5

Bybee & Scheibman (1999)

	[dõt, dõ]	[rõt, rõ]	[rə̃]	[rə̃, ə]	Total
know	2	8	24	5	39
think	7	6	6	1	20
have	1	7	1	1	9
have to	1	2	1		4
want to	1	1	3		5
see	3	1			4
like		2			2

Bybee & Scheibman (1999)

High frequency strings such as *I don't know* and *I don't think* have turned into processing units.

Processing units originate as variants of full forms, but may become conventionalized.

The conventionalization of small biases in language production leads to diachronic change.

The development of irregular verbs

Frequency can also be a conservative force.

	Old Form	New Form
climb	clomb	climbed
creep	crope	crept
laugh	low	laughed
yield	yold	yielded
step	stope	stepped

The development of *do*-support

Questions

(1) Know you where Peter is?

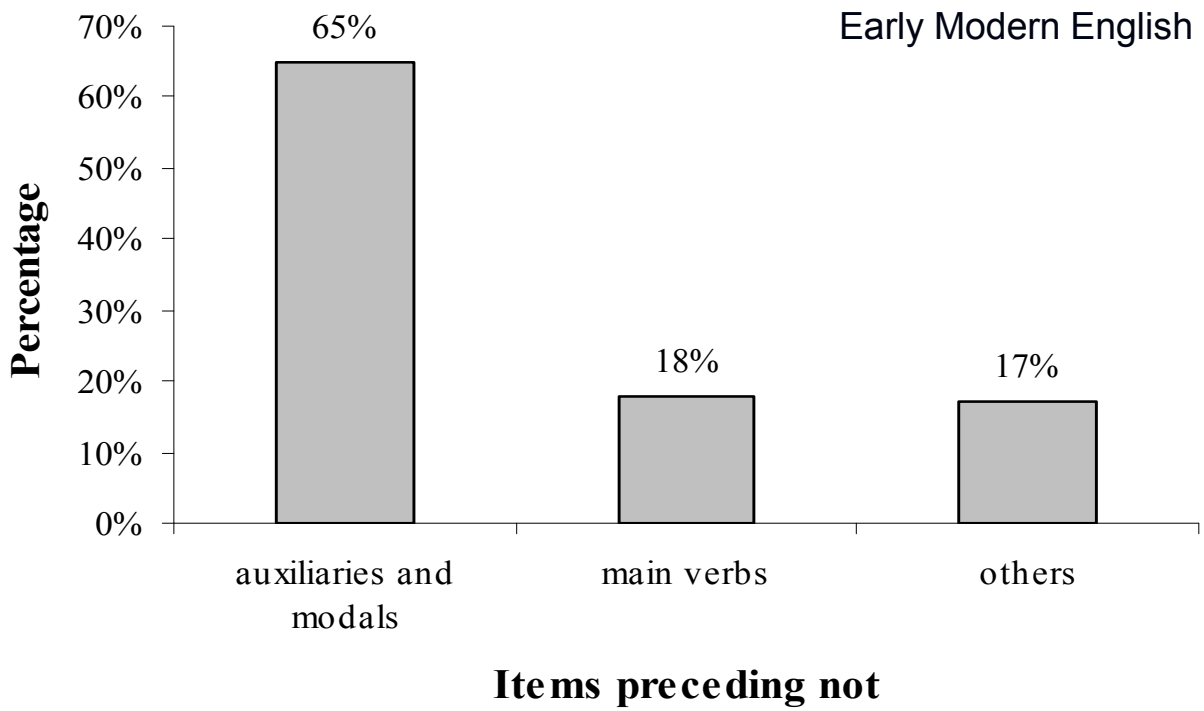
(2) **Do** you know where Peter is?

Negation

(1) Peter know not that we are here.

(2) Peter **does** not know that we are here.

Krug (1998)



They know not what they do.

Two frequency effects

- Reduction effect: Development of new forms
- Preserving effect: Protection of high frequency items from analogical leveling

Two types of markedness

The two frequency effects have given rise to some striking cross-linguistic tendencies, which typologists characterize with the notion of markedness:

- Structural markedness
- Behavioral markedness

Structural markedness

	Singular	Plural
English	tree-Ø	tree-s

Structural markedness

	Singular	Plural
English	tree-Ø	tree-s
Chinese	tree-Ø	tree-Ø

Structural markedness

	Singular	Plural
English	tree-Ø	tree-s
Chinese	tree-Ø	tree-Ø
Latvian	tree-x	tree-y

Structural markedness

	Singular	Plural
English	tree-Ø	tree-s
Chinese	tree-Ø	tree-Ø
Latvian	tree-x	tree-y
	tree-x	tree- Ø

Structural markedness

If singular nouns occur with an overt number marker, plural nouns also take a number marker.

Structural markedness

Turkish	Singular	Plural
Nominative	adam	adam-lar
Accusative	adam-ɪ	adam-lar-ɪ
Genitive	adam-ɪn	adam-lar-ɪn
Dative	adam-a	adam-lar-a
Locative	adam-da	adam-lar-da
Ablative	adam-dan	adam-lar-dan

Structural markedness

If a language uses a case marker for the object it also uses a case marker for the subject.

Structural markedness

How do we account for the asymmetries?

- Frequently used categories are structurally unmarked because their endings have been reduced.
- Frequently used categories are structurally unmarked because they function as the default, and marking the default would be redundant.

Local markedness

Turkana

ŋa-muk1	‘shoes’
a-muk-**àt**	‘shoe’

English

fish, deer, sheep

Behavioral markedness

	Present
1st SG	am
2nd SG	are
3rd SG	is
1st PL	are
2nd PL	are
3rd PL	are

Behavioral markedness

	Present	Past
1st SG	am	was
2nd SG	are	were
3rd SG	is	was
1st PL	are	were
2nd PL	are	were
3rd PL	are	were

Behavioral markedness

How do we account for the asymmetry?

The preserving effect of frequency accounts for behavioral markedness: Frequent (irregular) forms can be memorized more easily than infrequent ones (and thus infrequent forms are more easily regularized).

Behavioral markedness

- Since the singular is more frequent than the plural, singular verb forms tend to have more irregularities than plural verb forms.
- Since the present tense is more frequent than the past tense, present tense forms tend to have more irregularities than past tense forms.

Conclusion

Frequency is an important determinant of language change.

Linguistic knowledge is determined by our experience with language.

Grammar is shaped by language use.

Conclusion

Grammar is a fluid system that is constantly changing by virtue of the psychological mechanisms involved in language use.

Conclusion

In the past, linguistic research was concerned with invariable categories and eternal rules.

In the future, linguistics should focus on cognitive and psychological mechanisms driving the emergence of linguistic structure.

What we need is a dynamic theory of grammar, in which linguistics categories and constructions are seen as emergent phenomena that we will only understand if we take into account how they evolved, both in history and in language acquisition.

This is the end.