Lexical Semantics

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Outline

1. Semantic features
2. Review Questions
3. Summary
4. Kinship Domain
5. Universal grammar

Semantic features

A lexical set

	?	?
?	man	woman
?	boy	girl

Contrasting semantic components

A lexical set

	Male	Female
Adult	man	woman
Child	boy	girl

Semantic dimensions/features

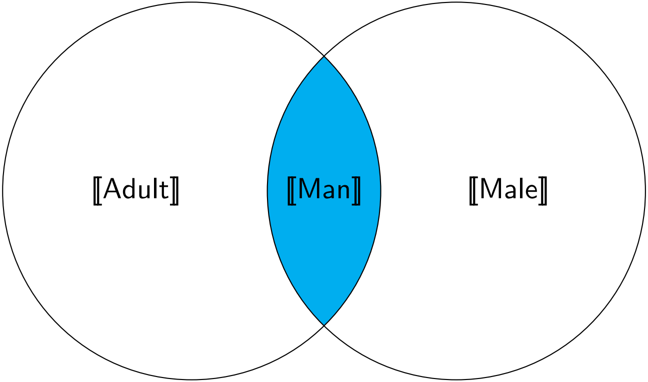
A lexical set

Maturity/Gender	Male	Female
Adult	man	woman
Child	boy	girl

Lexical entries

/man/	SEX	MALE
	MATURITY	ADULT
/woman/	SEX	FEMALE
	MATURITY	ADULT
/boy/	SEX	MALE
	MATURITY	CHILD
/girl/	SEX	FEMALE
	MATURITY	CHILD

$[\![\text{Man}]\!]$: the extension of *man*



$$
\begin{array}{lcl}
[\![\text{Adult}]\!] & = & \text{the set of adults} \\
[\![\text{Male}]\!] & = & \text{the set of males} \\
[\![\text{Man}]\!] & = & \text{the set of men } = [\![\text{Adult}]\!] \cap [\![\text{Male}]\!] \ \text{(blue area)}
\end{array}
$$

Like phonology?

There are many sounds in English. Can we decompose meanings into features in the same way we decompose sounds into features in phonology?

Table 2: The Distinctive Feature Composition of Some English Segments

	i	u	e	ɑ	ɪ	w	r	l	p	t	d	θ	ð	n	s	z	ʃ	k	h
Syllabic	+	+	+	+	+	−	−	−	−	−	−	−	−	−	−	−	−	−	−
Consonantal	−	−	−	−	−	−	+	+	+	+	+	+	+	+	+	+	+	+	−
High	+	+	−	−	+	+	−	−	−	−	−	−	−	−	−	−	+	+	−
Back	−	+	−	+	−	+	−	−	−	−	−	−	−	−	−	−	−	+	−
Low	−	−	−	+	−	−	−	−	−	−	−	−	−	−	−	−	−	−	+
Anterior	−	−	−	−	−	−	−	+	+	+	+	+	+	+	+	+	−	−	−
Coronal	−	−	−	−	−	−	+	+	−	+	+	+	+	+	+	+	+	−	−
Round	−	+	−	−	−	+													
Tense	+	+	+	+	−	−													
Voice							+	+	−	−	+	−	+	+	−	+	−	−	−
Continuant							+	+	−	−	−	+	+	−	+	+	+	−	+
Nasal							−	−	−	−	−	−	−	+	−	−	−	−	−
Strident							−	−	−	−	−	−	−	−	+	+	+	−	−
Lateral							−	+	−	−	−	−	−	−	−	−	−	−	−

The building blocks of word meaning

The idea

Just as we have a set of **phonological** features that completely determine the possible sounds and possible contrasts of a language, so we have a set of **semantic** features that completely determine the possible word meanings of a language.

What features do

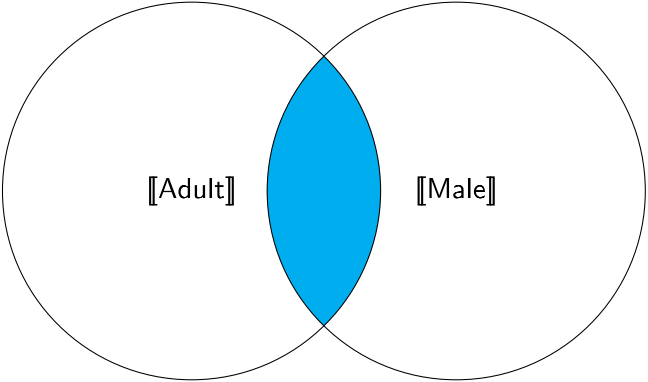
1. Account for the ways in which word meanings are similar (boy,man $\rightarrow$ [+ Male]).
2. Account for the ways in which word meanings are different (man [Maturity adult] $\neq$ boy [Maturity child]).
3. Account for truth conditions (this is actually the most important part).

Features

A feature carves up some domain into **disjoint** sets

SEX	⟦MALE⟧	⟦FEMALE⟧
MATURITY	⟦ADULT⟧	⟦CHILD⟧

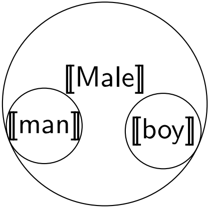
Man: What its features tell us



$$
\begin{aligned}
[\![\text{Man}]\!] &= [\![\text{Adult}]\!] \cap [\![\text{Male}]\!] \text{ ; therefore} \\
[\![\text{Man}]\!] &\subset [\![\text{Adult}]\!] \\
[\![\text{Man}]\!] &\subset [\![\text{Male}]\!]
\end{aligned}
$$

Man vs. *Boy*

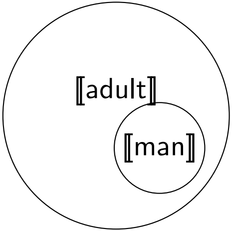
[SEX male]

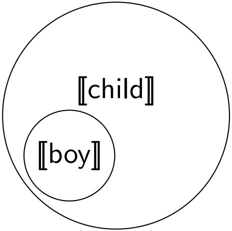


[MATURITY adult]

v.

[MATURITY child]



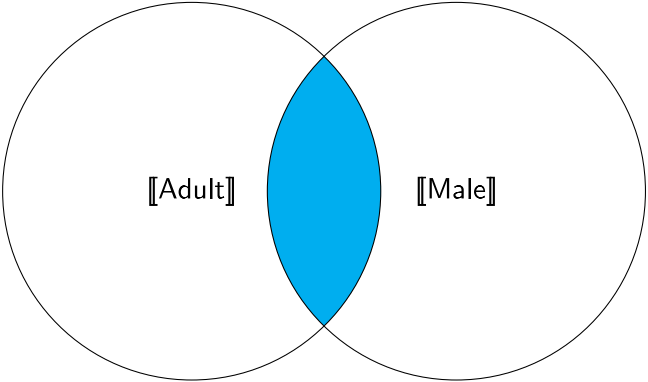


Horses: A second domain

$$/stallion/ = \begin{bmatrix} \textsc{Sex} & \textit{male} \\ \textsc{maturity} & \textit{adult} \end{bmatrix} \qquad /mare/ = \begin{bmatrix} \textsc{Sex} & \textit{female} \\ \textsc{maturity} & \textit{adult} \end{bmatrix}$$

$$/colt/ = \begin{bmatrix} \textsc{Sex} & \textit{male} \\ \textsc{maturity} & \textit{child} \end{bmatrix} \qquad /filly/ = \begin{bmatrix} \textsc{Sex} & \textit{female} \\ \textsc{maturity} & \textit{child} \end{bmatrix}$$

Truth-Conditions: Stallion



Questions

1. What is the difference between *stallion* and *man*?
   $\begin{bmatrix} \text{SEX} & \text{male} \\ \text{MATURITY} & \text{adult} \end{bmatrix}$
2. What do we say about *horse* and *foal*? (a *foal* is less than 12 months old and either male or female); *colts* and *fillies* are up to 4 years old).
3.

$$/\text{horse}/ \quad = \quad \begin{bmatrix} \text{TYPE} & \text{equine} \end{bmatrix} \qquad /\text{foal}/ \quad = \quad \begin{bmatrix} \text{TYPE} & \text{equine} \\ \text{MATURITY} & \text{nb}\rightarrow\text{chd} \end{bmatrix}$$

$$/\text{man}/ \quad = \quad \begin{bmatrix} \text{TYPE} & \text{human} \end{bmatrix}$$

Horses (Revised)

$$/horse/ = \begin{bmatrix} \text{TYPE} & \textit{equine} \end{bmatrix}$$

$$/stallion/ = \begin{bmatrix} \text{TYPE} & \textit{equine} \\ \text{SEX} & \textit{male} \\ \text{MATURITY} & \textit{adult} \end{bmatrix}$$

$$/mare/ = \begin{bmatrix} \text{TYPE} & \textit{equine} \\ \text{SEX} & \textit{female} \\ \text{MATURITY} & \textit{adult} \end{bmatrix}$$

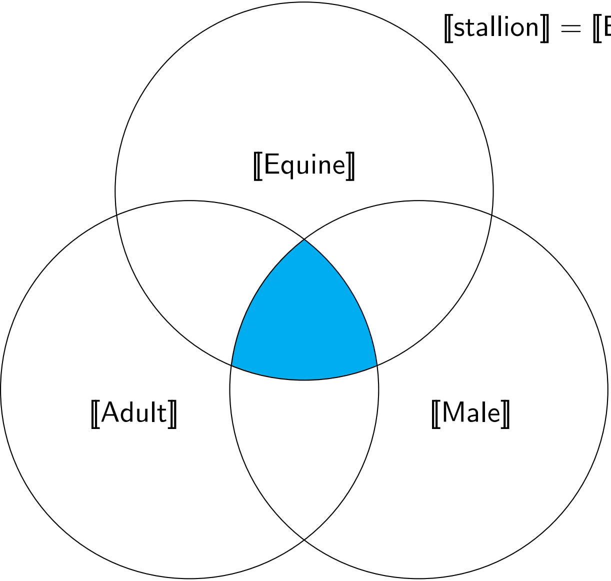
$$/foal/ = \begin{bmatrix} \text{TYPE} & \textit{equine} \\ \text{MATURITY} & \textit{nb} \rightarrow \textit{chd} \end{bmatrix}$$

$$/colt/ = \begin{bmatrix} \text{TYPE} & \textit{equine} \\ \text{SEX} & \textit{male} \\ \text{MATURITY} & \textit{chd} \rightarrow \textit{adlt} \end{bmatrix}$$

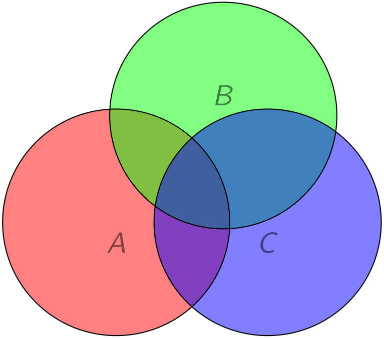
$$/filly/ = \begin{bmatrix} \text{TYPE} & \textit{equine} \\ \text{SEX} & \textit{female} \\ \text{MATURITY} & \textit{chd} \rightarrow \textit{adlt} \end{bmatrix}$$

Truth-Conditions: Stallion (Revised)

$[\![\text{stallion}]\!] = [\![\text{Equine}]\!] \cap [\![\text{Adult}]\!] \cap [\![\text{Male}]\!]$



Truth-conditions and features



$[\![w]\!] = A \cap B \cap C$

Feature extension $[\![f]\!]$	A set of entities
Word extension $[\![w]\!]$	Intersection of its feature extensions
Truth conditions	Word is a true description of **all** entities in its extension, and not a true description of **any** entities not in its extension

Contrastiveness Principle

Corollary of truth conditions requirement

Two words with distinct extensions must have at least one distinct feature. (*stallion* vs. *man*)

Subset Principle

Another corollary

If a feature f is useful in describing the meaning of a word, w, then

$$[\![w]\!] \subset [\![f]\!]$$

Equivalently

If

$$[\![w]\!] \not\subset [\![f]\!]$$

then the feature f is **not** useful in describing the meaning of word w.

Sheep: A new domain

$/sheep/ = \begin{bmatrix} \text{TYPE} & \textit{ovine} \end{bmatrix}$

$/ram/ = \begin{bmatrix} \text{TYPE} & \textit{ovine} \\ \text{SEX} & \textit{male} \\ \text{MATURITY} & \textit{adult} \end{bmatrix}$

$/ewe/ = \begin{bmatrix} \text{TYPE} & \textit{ovine} \\ \text{SEX} & \textit{male} \\ \text{MATURITY} & \textit{adult} \end{bmatrix}$

$/lamb/ = \begin{bmatrix} \text{TYPE} & \textit{ovine} \\ \text{MATURITY} & \textit{chd} \rightarrow \textit{adlt} \end{bmatrix}$

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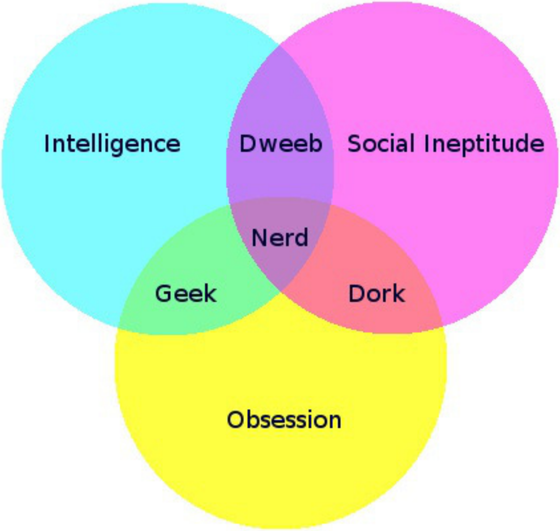
A new semantic field



What are the features for *nerd*, *dweeb*, *dork* and *geek*?

Horse issues: Contrastiveness

	Violation	Fixed
/gelding/	[TYPE equine, SEX male, MATURITY adult]	[TYPE equine, SEX male, MATURITY adult, CASTRATED yes]
/stallion/	[TYPE equine, SEX male, MATURITY adult]	[TYPE equine, SEX male, MATURITY adult, CASTRATED no]

Cousin issues: the subset principle

	Violation	Violation
cousin	$\begin{bmatrix} \text{TYPE} & \text{human} \\ \text{Sex} & \text{male} \\ \ldots & \ldots \end{bmatrix}$	$\begin{bmatrix} \text{TYPE} & \text{human} \\ \text{Sex} & \text{female} \\ \ldots & \ldots \end{bmatrix}$

Semantic components don't apply across the board

mare

TYPE	equine
SEX	male
MATURITY	adult
CASTRATED	no?

cousin

TYPE	human
SEX	female
...	...

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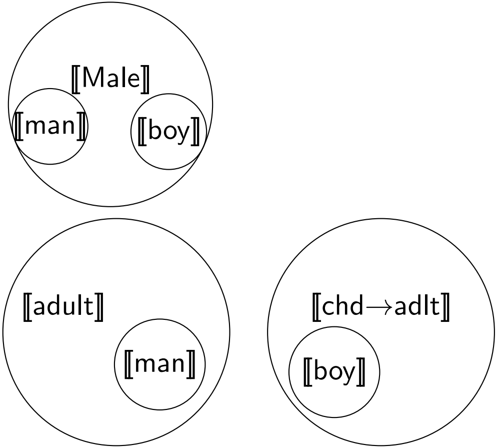
Summary: Truth conditions

Feature extension	A set of entities
Word extension	Intersection of its feature extensions
Truth conditions	Word is a true description of **all** entities in its extension, and not a true description of **any** entities not in its extension

Summary

What features do

1. Account for the ways in which word extensions are similar. (⟦boy⟧,⟦man⟧ $\subset$ ⟦Male⟧).
2. Account for the ways in which word extensions are disjoint (⟦man⟧ is disjoint from ⟦boy⟧ because ⟦adult⟧ is disjoint from ⟦chd→adlt⟧).



Summary: contrastiveness and subset

1. Two words with distinct extensions must have distinct features.
2. **Contrastiveness principle**: When two words end up with the same features yet have different extensions, you need a new feature. (*stallion* vs. *man*, *stallion* vs *gelding*)
3. **Subset principle**: When no word extensions in a given domain fall inside ($\subset$) a feature's extension, the feature is useless in that domain (the feature SEX (Male, Female) is useless for the word *cousin* because the set of cousins is not a subset of either the set Male oir the set Female.

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Kinship terms	are words used to designate members of one's close family.
Ego	The person whose relatives are being identified, the referent of *my* in *my father*
Alter	The relative being identified, the referent of *father* in *my father*
Kinship type	The sequence of links between ego and alter. For example, we discover upon questioning our informant *Joe* that a relative referred to as *Joe's great uncle* is actually Joe's **FFB** (Joe's Father's Father's Brother) while another referred to as *Joe's cousin once removed* is Joe's **FFsds**.
Consanguineal	relations share a common ancestor with ego.
Affine	relations are socially defined (wife, husband).

Descriptive tools for kinship terms

Kinship types: will be defined using . . .

Kinship links: mother (M), father (F), sister (S), brother (B), son (s), daughter (d), wife (w), husband (h). Kinship types designated by a sequence of links from the "Ego" (self) on outwards.

Kinship Type	*Description*	*English Term*
MSd	*mother's sister's daughter*	*Cousin*
MBd	*mother's brother's daughter*	*Cousin*
MFSd	*mother's father's sister's daughter*	*Mother's cousin, cousin once removed*
B	*brother*	*Brother*

Other kinship types in the extension of **cousin**: MSs, MBs, FSd, ...

Basic English kinship

Kin Terms	*Kin Types (affine in red)*
brother	*B*
sister	*S*
mother	*M*
father	*F*
uncle	*FB, FSh, MB, MSh*
aunt	*FS, FBw, MS, MBw*
grandfather	*FF, MF*
great-grandfather	*FFF, FMF, MFF, MMF*
(first) cousin	*MSs, MSd, MBs, MBd, FSs, FSd, FBs, FBd*

Basic Kinship Terms: one word for consanguineal relations, commonly used, not the hyponym of another kinship term. Excluded: second cousin, cousin once removed, relative, sybling, parent. What about *child*? What about *grandchild*?

Kinship features: first pass

1. Mother and father are both **parents**, female and male respectively.
2. Parents, grandparents, great grandparents, etc. are ancestors in various generations.

So we have three potential conceptual features:

PARENT, SEX , ANCESTOR, GEN

But the second observation suggests PARENT should be decomposed into

$$parent = \begin{bmatrix} \text{ANCESTOR} & \textit{yes} \\ \text{GEN} & \textit{-1} \end{bmatrix}$$

Now this means grandparent would be:

$$grandparent = \begin{bmatrix} \text{ANCESTOR} & \textit{yes} \\ \text{GEN} & \textit{-2} \end{bmatrix}$$

Redundant features

There's something a little funny about combining an ANCESTOR feature and a GENERATION feature, because after all, being an ancestor means being some member of a generation less than 0. This concept is REDUNDANT with GEN ; they overlap in content; and the basic concepts of our analysis should NOT be redundant with each other.

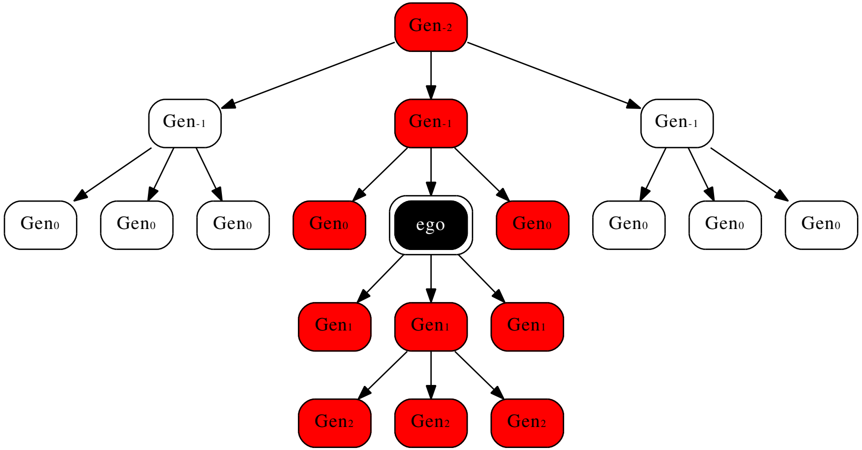
An improvement

One feature LIN (for **lineage**) with two different values: DIRECT and COLLAT (Kroeber 1909)

DIRECT
: Those related to ego by DIRECT lineage either have ego as an ancestor (sons, daughters, grandchildren) or are ancestors of ego (parents, grandparents, greatgrandparents) or share ALL their ancestors with ego (syblings)

COLLAT
: Those related to ego by COLLAT lineage are not related by direct lineage and yet share some subset of their ancestors with ego (cousins, aunts, uncles, great aunts, great uncles, and so on).

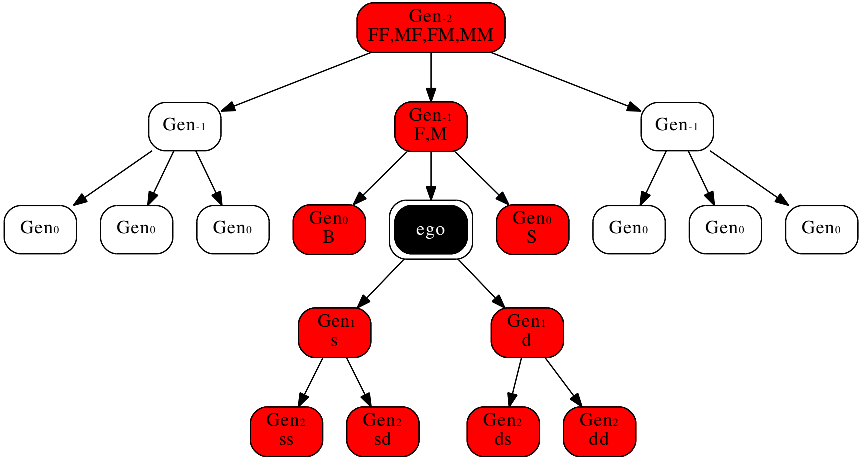
LINEAGE and GEN features



Direct lineage relatives (red)

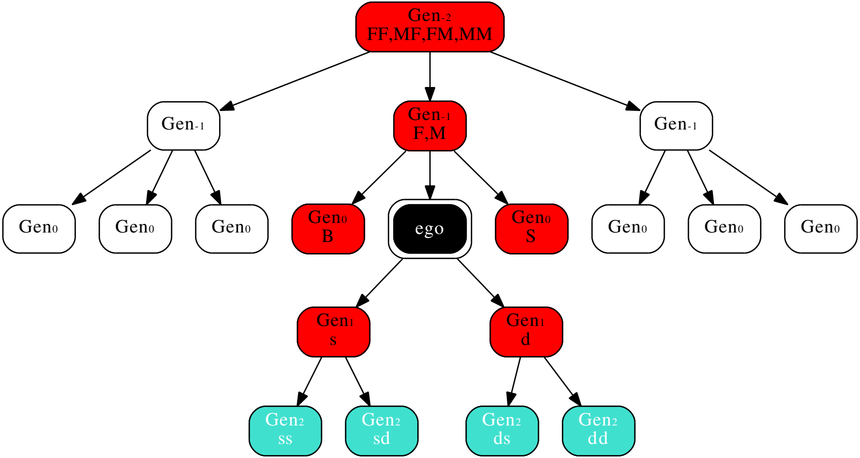
Are these two features sufficient to complete the description of Basic English Kinship terms?

Direct LINEAGE kinship types

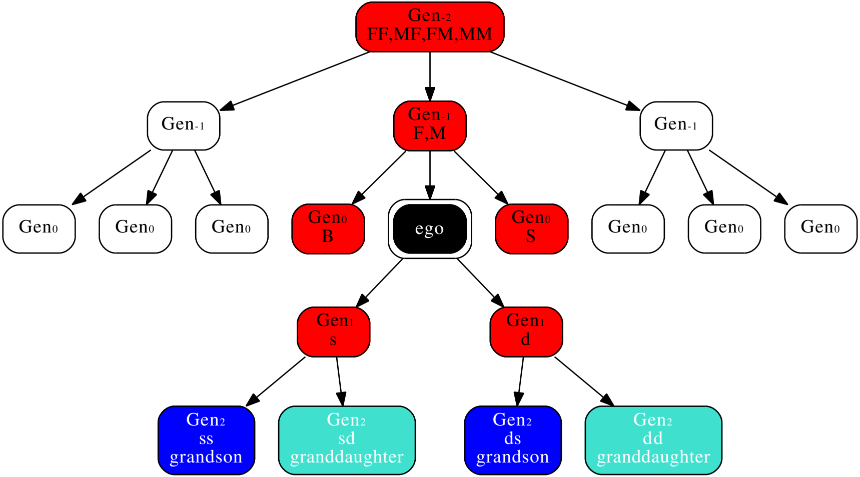


Direct lineage relatives (red)

Choosing specific values for LIN and GEN



GEN 2, LIN DIRECT kinship types



GEN 2, LIN DIRECT English kinship terms

English kinship analysis

This gives us the following analysis of basic English kinship terms, based on only 3 features, LIN , GEN , and SEX .

mother

LIN	DIRECT
SEX	FEMALE
GEN	*-1*

father

LIN	DIRECT
SEX	MALE
GEN	*-1*

aunt

LIN	COLLAT
SEX	FEMALE
GEN	*-1*

uncle

LIN	COLLAT
SEX	MALE
GEN	*-1*

English kinship analysis, ctd.

sister

LIN	DIRECT
SEX	FEMALE
GEN	*0*

brother

LIN	DIRECT
SEX	MALE
GEN	*0*

cousin

LIN	COLLAT
SEX	
GEN	*0*

English kinship analysis, ctd.

granddaughter

LIN	DIRECT
SEX	FEMALE
GEN	*2*

grandson

LIN	DIRECT
SEX	MALE
GEN	*2*

grandmother

LIN	DIRECT
SEX	FEMALE
GEN	*-2*

grandfather

LIN	DIRECT
SEX	MALE
GEN	*-2*

Observation: ⟦$\textsc{Gen}^n$⟧ an infinite set

Horizontal links (B,S). Links up (F,M). Links down (s,d)

Type	*up*	*dn*	*Gen*	DIR?	*Type*	*up*	*dn*	*Gen*	DIR?
B,S	*0*	*0*	$\textsc{Gen}^0$	*Yes*	*s, d*	*0*	*1*	$\textsc{Gen}^1$	*Yes*
FBs,FSs	*1*	*1*	$\textsc{Gen}^0$	*No*	*FBsd,FSss*	*1*	*2*	$\textsc{Gen}^1$	*No*
FFBss	*2*	*2*	$\textsc{Gen}^0$	*No*	*FFBssd*	*2*	*3*	$\textsc{Gen}^1$	*No*
FFFBsss	*3*	*3*	$\textsc{Gen}^0$	*No*	*FFFBssss*	*3*	*4*	$\textsc{Gen}^1$	*No*
...					...				
F, M	*1*	*0*	$\textsc{Gen}^{-1}$	*Yes*					
FFBs,FSs	*2*	*1*	$\textsc{Gen}^{-1}$	*No*					
MFFBss	*2*	*2*	$\textsc{Gen}^{-1}$	*No*					
MFFFBsss	*3*	*3*	$\textsc{Gen}^{-1}$	*No*					

...

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Universal grammar

1. a set of principles, a universal template, that transcends the peculiarities of any individual language
2. Chomskyan hypothesis
3. A much older idea (as Chomsky himself has emphasize) going back at least to thinkers like Humboldt and perhaps Descartes
4. Perhaps even older, extending back to a more Medieval concept of grammar which viewed logic as a kind of universal grammar.

> Leibniz's idea of a *characteristica universalis* or ideal language, which would make truth and inference crystal clear because of its formal properties.

Bierwisch's hypothesis

Universality of semantic features

Semantic features do not differ from language to language, but are rather part of the general human capacity for language, forming a universal inventory used in particular ways in individual languages.

Bierwisch (1967) [in Bierwisch 1970]

Potential sources of universals

1. Logical concepts: and, or, not, if-then, all, some
2. Spatial relations: in, on, at, under/over, behind/in-front-of, go
3. Kinship terms: father, mother, sister, brother, husband, wife
4. Bodypart language: head, arm, leg, hand
5. BECOME, CAUSE
6. Complex conncepts **decompose** into simpler ones:

$$\text{kill} = \text{CAUSE}\ (\text{BECOME}\ (\text{NOT}\ (\text{ALIVE})))$$

Kinship universals

Greenberg (1966), Murdock (1970)
Of 15 possible systems for referring to grandparents, only 4 are commonly found:

1. A single term for all grandparents, regardless of sex or lineage;
2. Two terms, one each for the maternal grandparents and paternal grandparents, regardless of sex;
3. Four terms, one for paternal male, paternal female, maternal male, and maternal female;
4. Two terms, one each for male grandparents and one for female grandparents (Murdock 1970); Greenberg's original study turned up few of these, but in fact, they're common.

Greenberg's 15 possible systems

There are 4 grandparents to cover:

FF, FM, MF, MM

A word might cover any **nonempty** subset of these, yielding 15 possibilities.

Thus it's significant that only 4 systems are commonly found. For example, a two-term system with one word for FF, and another for FM, MF, and MM is rare or nonexistent (I don't know which).

Features based on Greenberg's 2-term systems

The subset principle makes it look as though the right universal features for accounting for grandparents are SEX (rows) and SIDE (columns):

	Paternal	*Maternal*
Male	*FF*	*MF*
Female	*FM*	*MM*

What would a 2-term system that didn't use either of these features look like?

Lexical entries for 2-term Greenberg systems

Type	*Term 1*	*Term 2*
Paternal/maternal	[LIN DIRECT; GEN -2; SIDE PATERNAL] *FF, FM*	[LIN DIRECT; GEN -2; SIDE MATERNAL] *MF, MM*
male/female	[LIN DIRECT; GEN -2; SEX MALE] *FF, MF*	[LIN DIRECT; GEN -2; SEX FEMALE] *FM, MM*

A language with different grandparent features

Consider the grandparent terms of the Australian language Mari'ngar (Scheffler 1978)

tyan'angga	*FF, MM*
tamie	*MF, FM*

For example, ⟦tyan'angga⟧ (in red) isn't a subset of any of the following: ⟦MALE⟧, ⟦FEMALE⟧, ⟦MATERNAL⟧, or ⟦PATERNAL⟧:

	Paternal	*Maternal*
Male	*FF*	*MF*
Female	*FM*	*MM*

Thus the features suggested by Greenberg's study might be the common ones, or the unmarked ones, but they're **not** universal.

Conclusion

We found little evidence for some kind of strong universality of semantic features in the grandparent example. There are three possible ways of dividing 4 grandparents into two sets which both contain 2 grandparents. All three are attested!

Seneca kinship terms homework

In our next homework assignment, we investigate the universality of kinship term features by looking at a kinship system quite different from that of English, Seneca.

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