Ling 151/Psych 156A: Acquisition of Language II

Lecture 20

Structure I

Announcements

HW7 is due by the end of class today

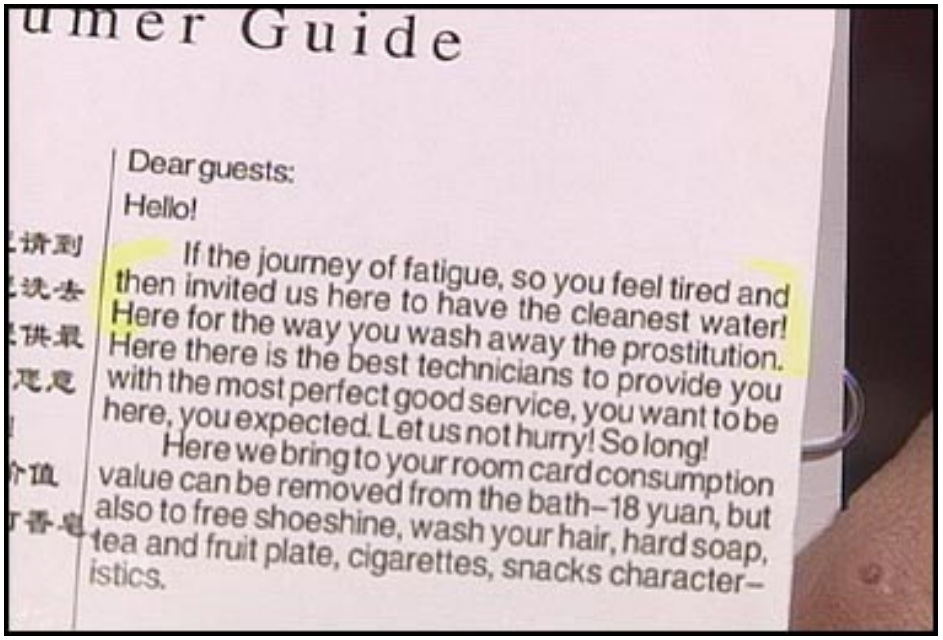
HW8 available

Review questions are available for structure

Online course evaluations are available for this class - please fill them out if you haven't already!

Language variation:
One reason why translation is so hard

Translation is not so easy: more than just word-by-word



http://www.nbc.com/nbc/The_Tonight_Show_with_Jay_Leno/headlines/

Translation is not so easy: more than just word-by-word

translate.google.com

Through dangers untold and hardships unnumbered, I have fought my way here to the castle beyond the goblin city to take back the child that you have stolen.

Hebrew

דרך סכנות עצומות וקשיים לא ממוספרים, יש לי נלחם בדרך שלי כאן לטירה מעבר לעיר גובלין לקחת בחזרה את הילד שיש לך נגנב.

Literally:

Through dangers immense and difficulties not numbered, there-is to-me fighting through my here castle transition city goblin take back you child there-was to-you stolen.

Translation is not so easy:
more than just word-by-word

translate.google.com

Through dangers untold and hardships unnumbered, I have fought my way here to the castle beyond the goblin city to take back the child that you have stolen.

Haitian Creole

Atravè danje inonbrabl ak difikilte inonbrabl, mwen te goumen jan m 'isit la yo chato la pi lwen pase lavil la Goblin yo pran tounen timoun nan ke ou te vòlè li.

Literally:

Through danger countless and difficulties countless, I was fight how me here they mansion the more far than cities the Goblin they take back children of that you was thief it.

Translation is not so easy:
more than just word-by-word

translate.google.com

Through dangers untold and hardships unnumbered, I have fought my way here to the castle beyond the goblin city to take back the child that you have stolen.

Hindi

अनकहा और बेशुमार कठिनाइयों खतरों के माध्यम से, मैं तुम्हें चुराया है कि बच्चे को वापस लेने के लिए भूत शहर परे महल को यहाँ अपने तरीके से लड़ाई लड़ी है.

Literally:

Untold and uncountable difficulties threats medium through, I you stole is that children back take the ghost city beyond palace the here your methods from fight fought.

About human knowledge: Language & variation

Navajo Code Talkers

Crucial cryptographic method used in World War II

https://www.youtube.com/watch?v=5rSvm3m8ZUA
(~3 min video)

http://en.wikipedia.org/wiki/Code_talker#Use_of_Navajo

"…Johnston saw Navajo as answering the military requirement for an undecipherable code. Navajo was spoken only on the Navajo lands of the American Southwest, and its syntax and tonal qualities, not to mention dialects, made it unintelligible to anyone without extensive exposure and training. One estimate indicates that at the outbreak of World War II fewer than 30 non-Navajos could understand the language…."

Navajo Code Talker Paradox (Baker 2001)

English must be very different from Navajo

Japanese could decode English, but couldn’t decode Navajo when they didn’t know it was Navajo.

Navajo Code Talker Paradox (Baker 2001)

English must be very different from Navajo

Japanese could decode English, but couldn't decode Navajo when they didn't know it was Navajo.

English must be similar to Navajo

English can be translated into Navajo and back with no loss of meaning. (Languages are not just a product of the culture - pastoral Arizona lifestyle couldn't have prepared the code talkers for Pacific Island high tech warfare. Yet, translation was still possible.)

Types of variation

Vocabulary

English “think” verbs: think, know, wonder, suppose, assume, …

Multiple types of the action verb “think”.
Each has certain uses that are appropriate.

✔ “I **wonder** whether the girl saved her little brother from the goblins.” [grammatical]

✘ * “I **suppose** whether the girl saved her little brother from the goblins.” [ungrammatical]

Types of variation

Vocabulary

English “think” verbs: think, know, wonder, suppose, assume, …

Navajo “carry” verbs: depends on object being carried

aah (carry a solid round-ish object)

kaah (carry an open container with contents)

lé (carry a flexible object)

Types of variation

Morphology (word forms)

English: invariant word forms

"the girl is crying", "I am crying"

Navajo: no invariant forms (there may be 100-200 prefixes for verb stems)

At'éédyicha. "Girl crying"

Yishcha. "I am crying"
(yi + sh + cha)

Ninááhwiishdlaad. "I am again plowing"
(ni + náá + ho + hi + sh + l + dlaad)

Types of variation

Word order (syntax)

English: Subject Verb Object (invariant word order)

"The boy saw the girl"

Navajo: Subject Object Verb, Object Subject Verb

(varying word orders, meaning depends only on verb's form)

Ashkii at'ééd **yiyi**il**ts**á

boy girl saw

"The boy saw the girl"

Ashkii at'ééd **bi**il**st**á

boy girl saw

"The girl saw the boy"

Types of variation

wals.info: The World Atlas of Language Structures

Types of variation

Let's look at syntax…

81	Order of Subject, Object and Verb	Matthew S. Dryer	Word Order
82	Order of Subject and Verb	Matthew S. Dryer	Word Order
83	Order of Object and Verb	Matthew S. Dryer	Word Order

Chapter Order of Subject and Verb

by Matthew S. Dryer cite

Values of Map 82A. Order of Subject and Verb

Value	Representation
Subject precedes verb (SV)	1193
Subject follows verb (VS)	194
Both orders with neither order dominant	110
Total:	1497

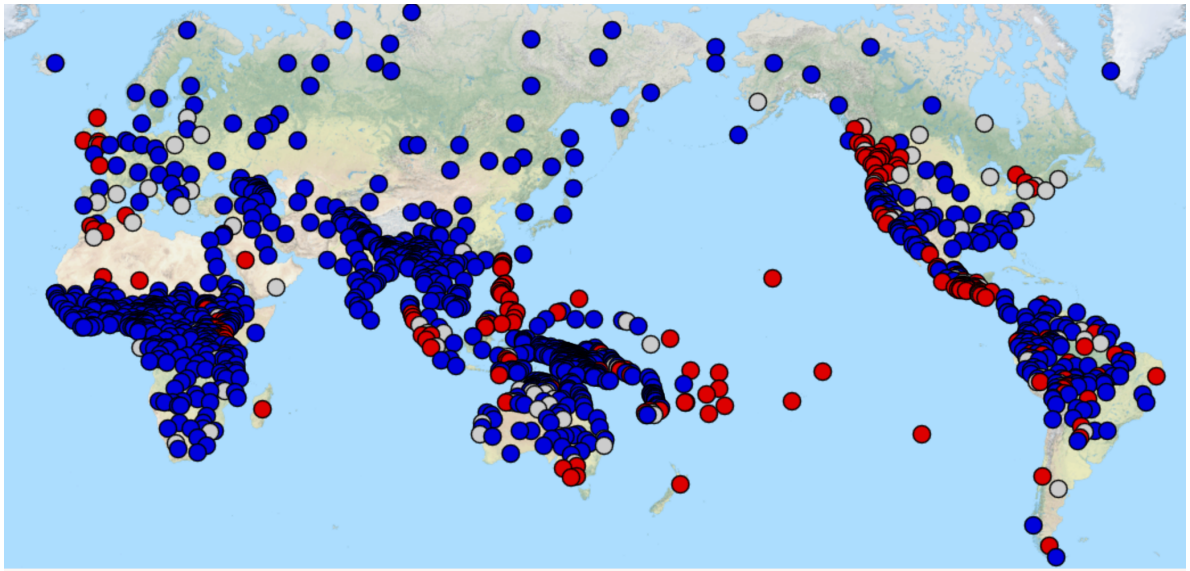
Jack laughs.

Laughs Jack.

This tells us that most languages have the Subject come before the Verb…but not all do.

Types of variation

Let's look at syntax…



Values

●	SV	1193
●	VS	194
●	No dominant order	110

How are the different Subject and Verb orders distributed around the world?

Home | Features | Chapters | Languages | References | Authors

Features

A feature is a structural property of language that describes one aspect of cross-linguist maps. Most features correspond straightforwardly to chapters, but some chapters are a

82A	Order of Subject and Verb	Matthew S. Dryer	Word Order	1497

Types of variation

Let's look at syntax…

What value does English have?

English	SV

What about Fijian?

Fijian	VS

What about Spanish?

Spanish	No dominant order

Home | Features | Chapters | Languages | References | Authors

Features

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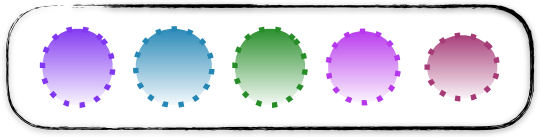
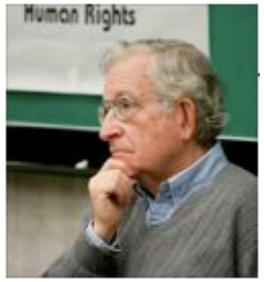
82A	Order of Subject and Verb	Matthew S. Dryer	Word Order	1497

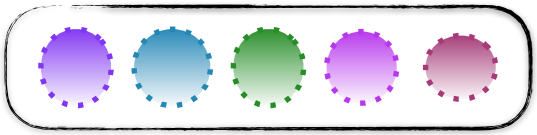
Thinking about variation

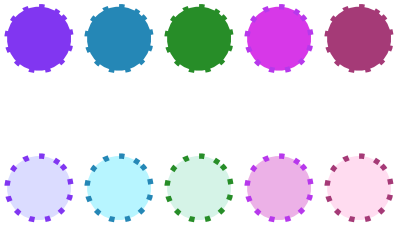


Similarities & differences: Parameters

Chomsky: Different combinations of different basic elements (parameters) would yield the observable languages (similar to the way different combinations of different basic elements in chemistry yield many different-seeming substances).



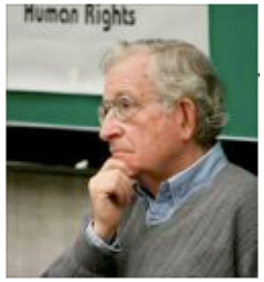


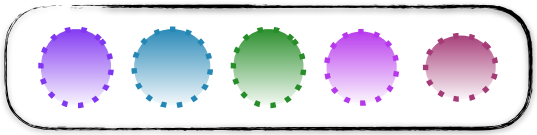


Big Idea: A relatively small number of parameters yields a large number of different language systems.

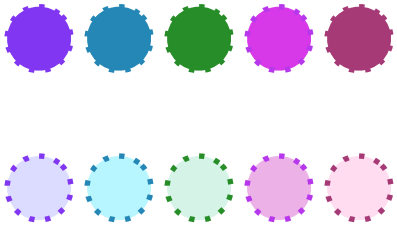
Similarities & differences: Parameters

Big Idea: A relatively small number of parameters yields a large number of different language systems.





5 different parameters of variation



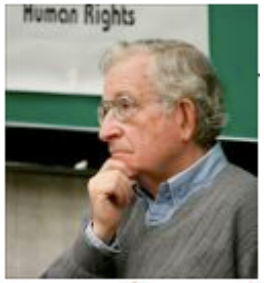
2 different parameter **values** of each parameter

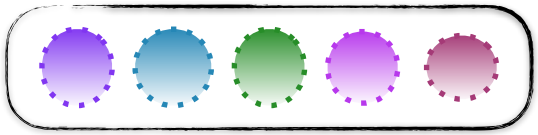
2 * 2 * 2 * 2 * 2

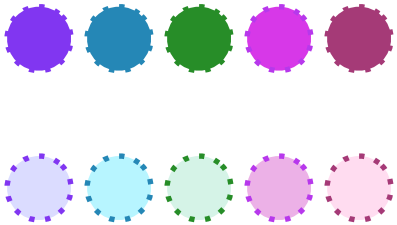
Total languages that can be represented: $= 2^5 = 32$

Similarities & differences: Parameters

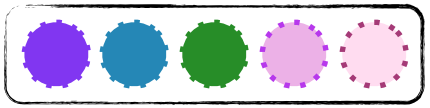
Big Idea: A relatively small number of parameters yields a large number of different language systems.



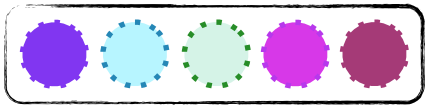




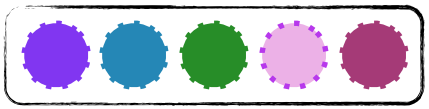
Japanese



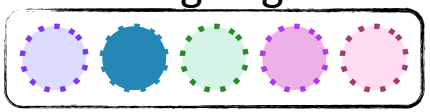
English



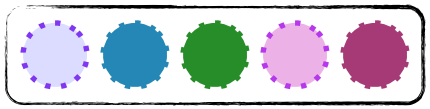
Navajo



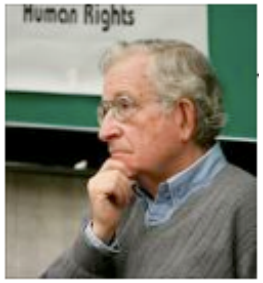
Tagalog



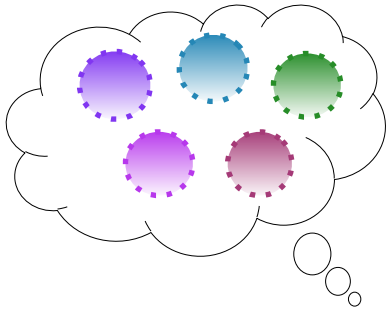
French

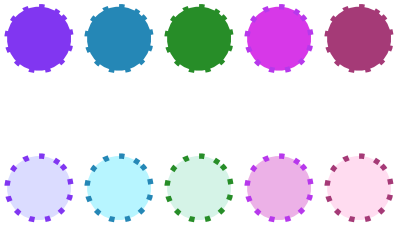


Similarities & differences: Parameters

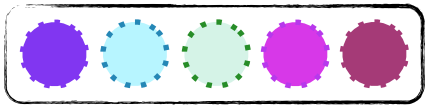


Chomsky (representing the linguistic nativist view): Children are born knowing the parameters of variation. This is part of Universal Grammar. Input from the native linguistic environment determines what values these parameters should have.





English



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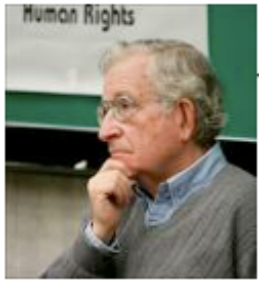

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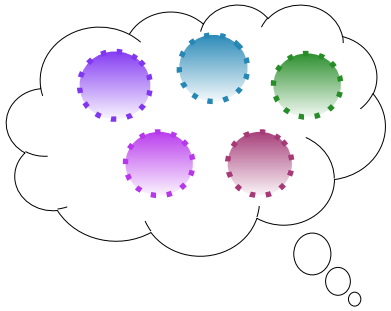
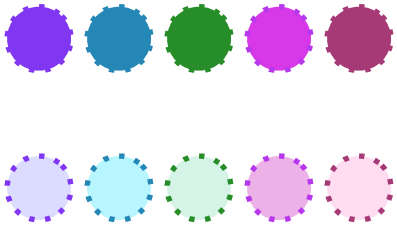
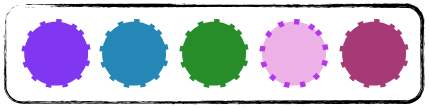
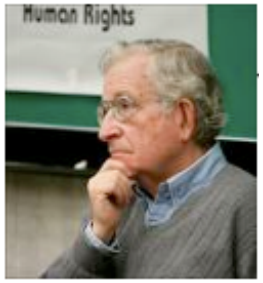




Navajo



Similarities & differences: Parameters



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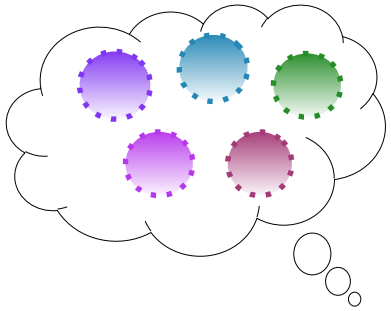
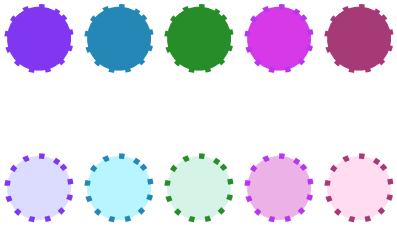
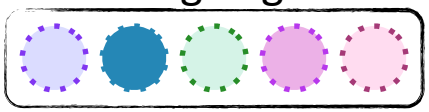
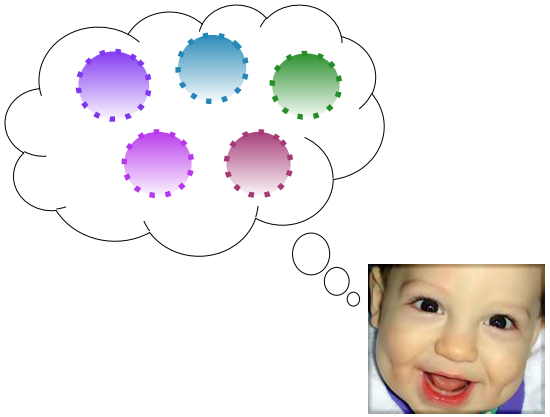




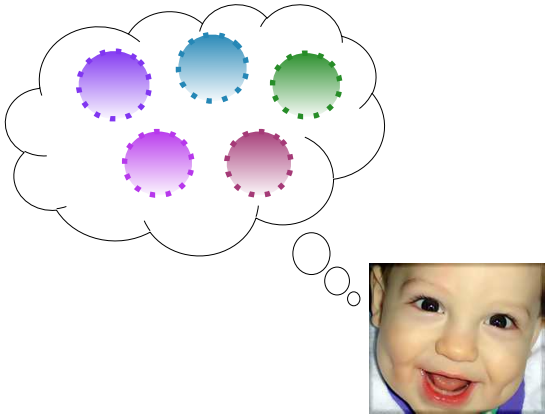
Tagalog



Generalizations about language structure



Greenberg's word order generalizations



Navajo

Basic word order:
Subject Object Verb

Ashkii at'ééd yiyiiltsá
boy girl saw

"The boy saw the girl"

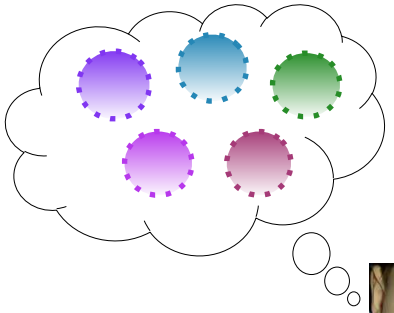
Japanese

Basic word order:
Subject Object Verb

Jareth-ga Hoggle-o butta
Jareth Hoggle hit

"Jareth hit Hoggle"

Greenberg's word order generalizations



Navajo

Basic word order:
Subject Object Verb

Postpositions:
Noun Phrase Postposition

'éé' biih náásdzá
clothing into I-got-back
"I got back into (my) clothes."

Japanese

Basic word order:
Subject Object Verb

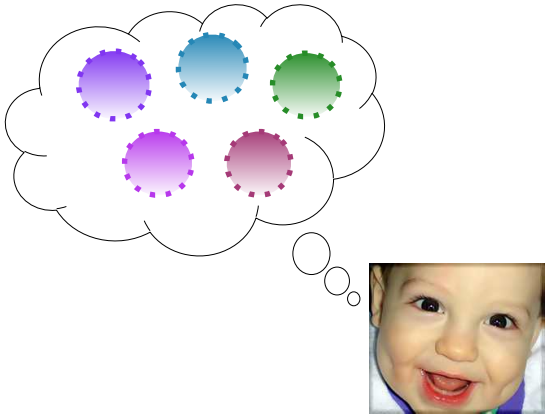
Postpositions:
Noun Phrase Postposition

Jareth-ga Sarah to kuruma da
Jareth Sarah with car by

London ni itta
London to went

"Jareth went to London with Sarah by car."

Greenberg's word order generalizations



Navajo

Basic word order:
Subject Object Verb

Postpositions:
Noun Phrase Postposition

Possessor before Possessed

Possessor Possession

Chidí bi-jáád
Car its-leg

"the car's wheel"

Japanese

Basic word order:
Subject Object Verb

Postpositions:
Noun Phrase Postposition

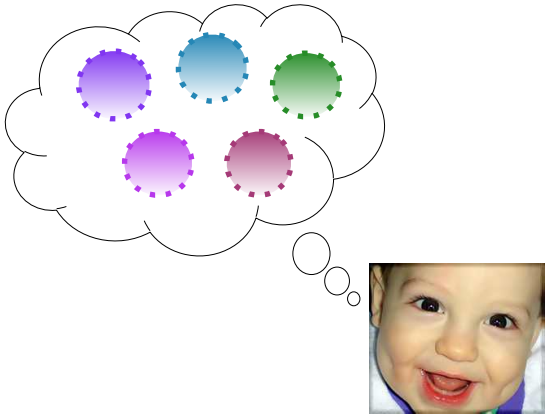
Possessor before Possessed

Possessor Possession

Toby-no imooto-ga
Toby's sister

"Toby's sister"

Greenberg's word order generalizations



Navajo

Basic word order:
Subject Object Verb

Postpositions:
Noun Phrase Postposition

Possessor Possession

Japanese

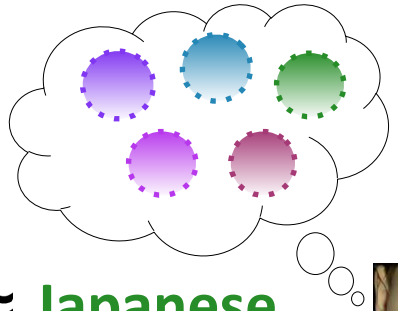
Basic word order:
Subject Object Verb

Postpositions:
Noun Phrase Postposition

Possessor Possession

Despite the differences in the languages (and their cultural histories), both Japanese and Navajo are very similar when **viewed through these three structural descriptions**.

Greenberg's word order generalizations



Navajo ≈ Japanese

English

Basic word order:
Subject Verb Object

Sarah found Toby

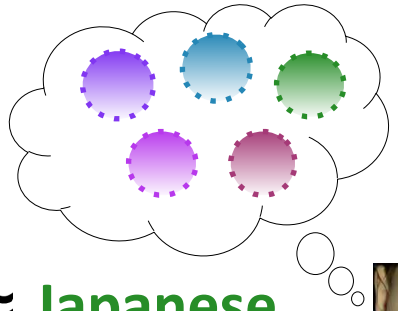
Edo (Nigeria)

Basic word order:
Subject Verb Object

Òzó mién Adésuwá

Ozo found Adesuwa

Greenberg's word order generalizations



Navajo ≈ Japanese

English

Basic word order:
Subject Verb Object

Prepositions:
Preposition Noun Phrase

Jareth gave the crystal to Sarah

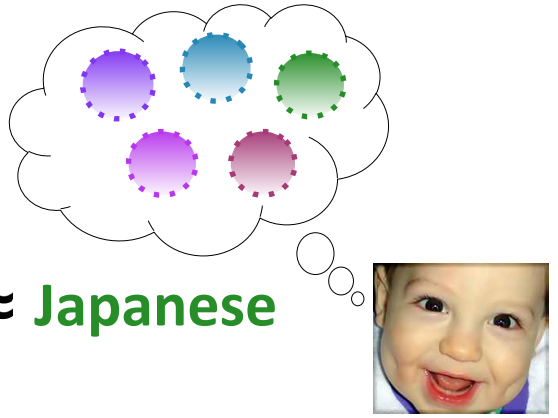
Edo (Nigeria)

Basic word order:
Subject Verb Object

Prepositions:
Preposition Noun Phrase

Òzó rhié néné ebé né Adésuwá
Ozo gave the book to Adesuwa

Greenberg's word order generalizations



Navajo ≈ Japanese

English

Basic word order:
Subject Verb Object

Prepositions:
Preposition Noun Phrase

Possessed before Possessor

Possession Possessor

quest of Sarah

(alternative: Sarah's quest)

Edo (Nigeria)

Basic word order:
Subject Verb Object

Prepositions:
Preposition Noun Phrase

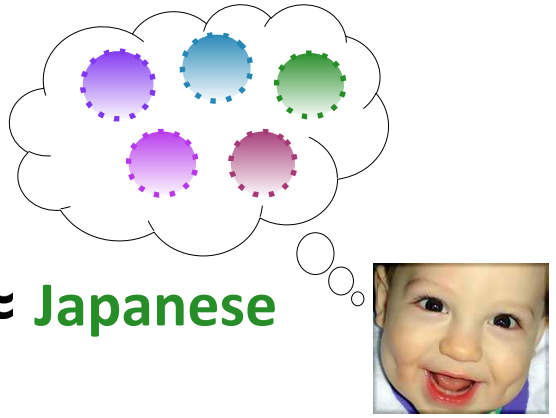
Possessed before Possessor

Possession Possessor

Omo Ozó
child Ozo

"child of Ozo"

Greenberg's word order generalizations



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Basic word order:
Subject Verb Object

Prepositions:
Preposition Noun Phrase

Possession Possessor

Edo (Nigeria)

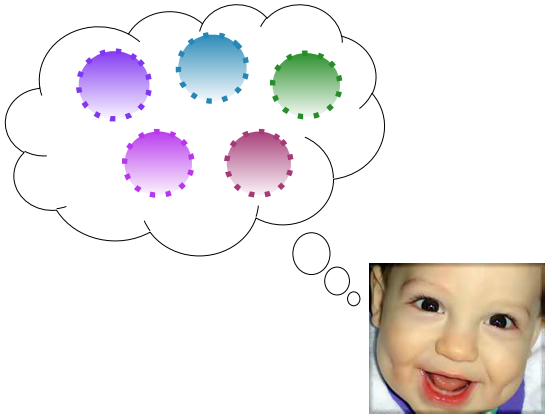
Basic word order:
Subject Verb Object

Prepositions:
Preposition Noun Phrase

Possession Possessor

Again, despite the differences in the languages (and their cultural histories), both English and Edo are very similar when viewed through these three structural descriptions.

Greenberg's word order generalizations

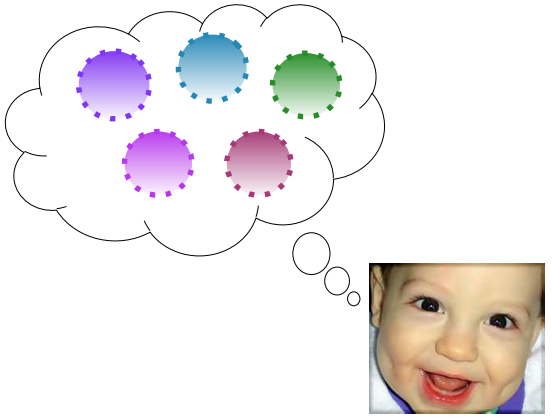


Navajo ≈ Japanese

English ≈ Edo

Greenberg found forty-five "universals" of languages - patterns overwhelmingly followed by languages with unshared history (Navajo & Japanese, English & Edo)

Greenberg's word order generalizations



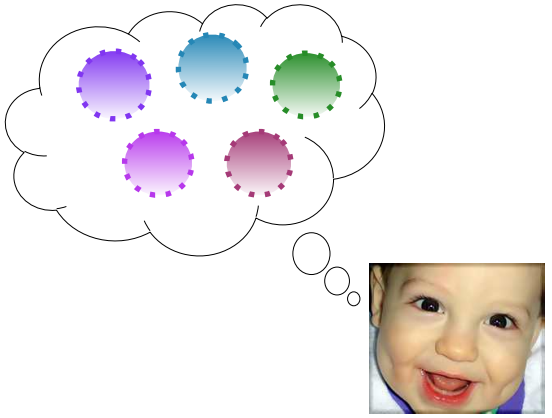
Navajo ≈ Japanese

English ≈ Edo

Not all combinations are possible - some patterns rarely appear

Ex: Subject Verb Object language (English/Edo-like) + postpositions (Navajo/Japanese-like)

Greenberg's word order generalizations



Navajo ≈ Japanese

English ≈ Edo

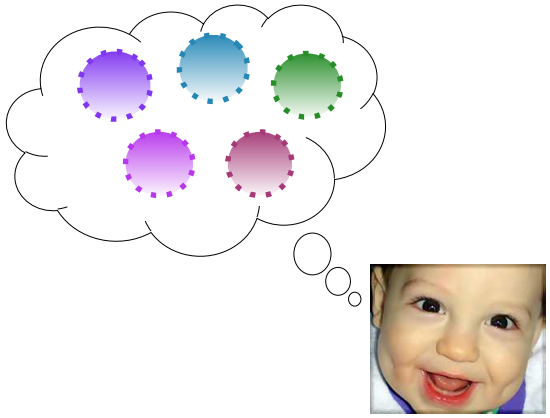
Moral: Languages may be more similar than they first appear "on the surface", **especially if we consider their structural properties**.

Greenberg's word order generalizations

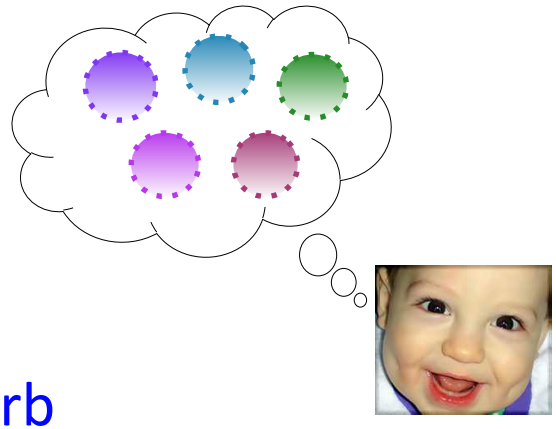
Navajo ≈ Japanese

English ≈ Edo

structural properties = linguistic parameters



One proposed parameter



English

✔ Subject Verb

"Jareth will come."

Italian

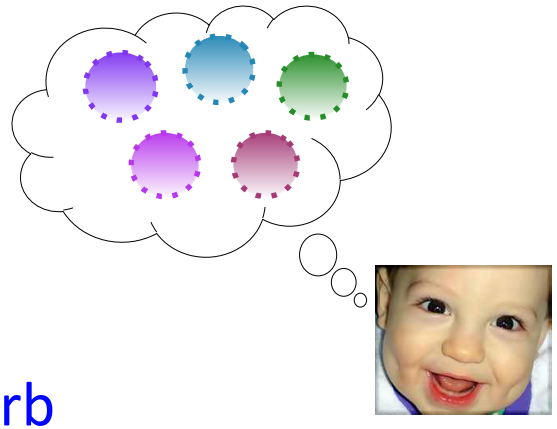
✔ Subject Verb

Jareth verrá

Jareth will-come

"Jareth will come."

One proposed parameter



English

✔ Subject Verb

✘ *Verb Subject

**Will arrive Jareth*

Italian

✔ Subject Verb

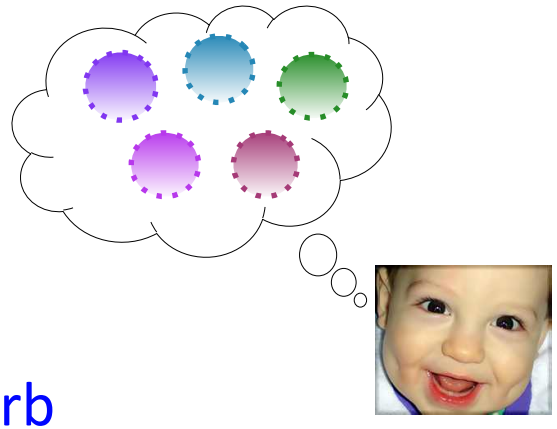
✔ Verb Subject

Verrá Jareth

Will-arrive Jareth

“Jareth will arrive”

One proposed parameter



English

✔ Subject Verb

✘ *Verb Subject

✘ *Verb
Will come

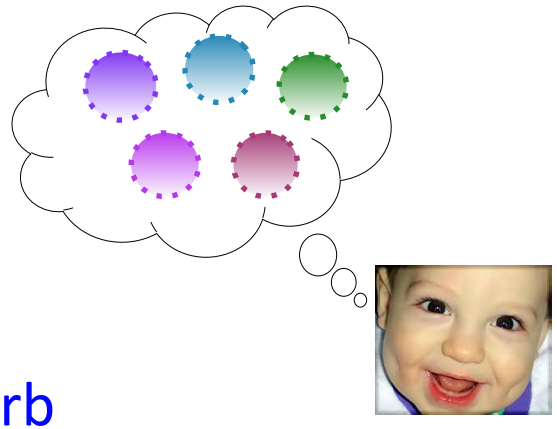
Italian

✔ Subject Verb

✔ Verb Subject

✔ Verb
Verrá
He-will-come
"He will come"

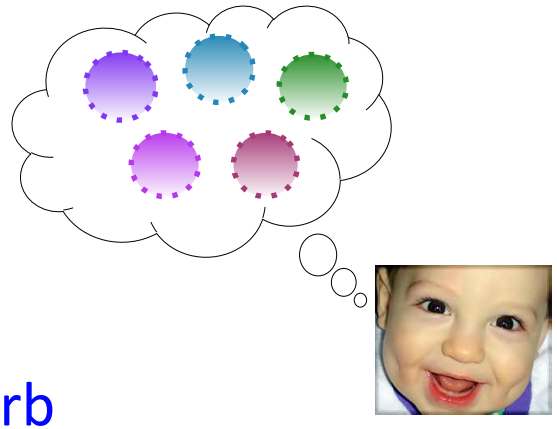
One proposed parameter



English	Italian
✔ Subject Verb	✔ Subject Verb
✘* Verb Subject	✔ Verb Subject
✘* Verb	✔ Verb

These word order patterns might be fairly easy to notice. They involve the combinations of Subject and Verb that are grammatical in the language. A child might be able to notice the prevalence of some patterns and the absence of others.

One proposed parameter



English	Italian
✔ Subject Verb	✔ Subject Verb
✗* Verb Subject	✔ Verb Subject
✗* Verb	✔ Verb

Expletive Subject required

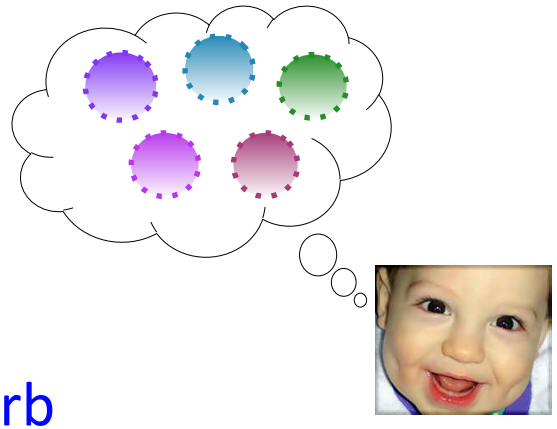
✗ Raining.

Instead:

"It's raining."

Expletive subjects: words without content
(may be more difficult to notice precisely because they have no content)

One proposed parameter



English

✔ Subject Verb

✗ *Verb Subject

✗ *Verb

Expletive Subject required

✗ Raining.

Instead:

"It's raining."

Italian

✔ Subject Verb

✔ Verb Subject

✔ Verb

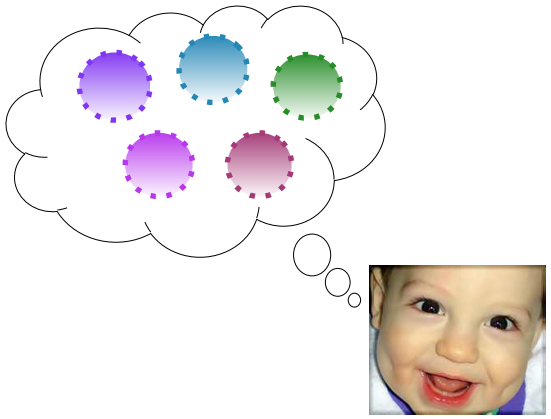
No Expletive Subject required

✔ Piove.

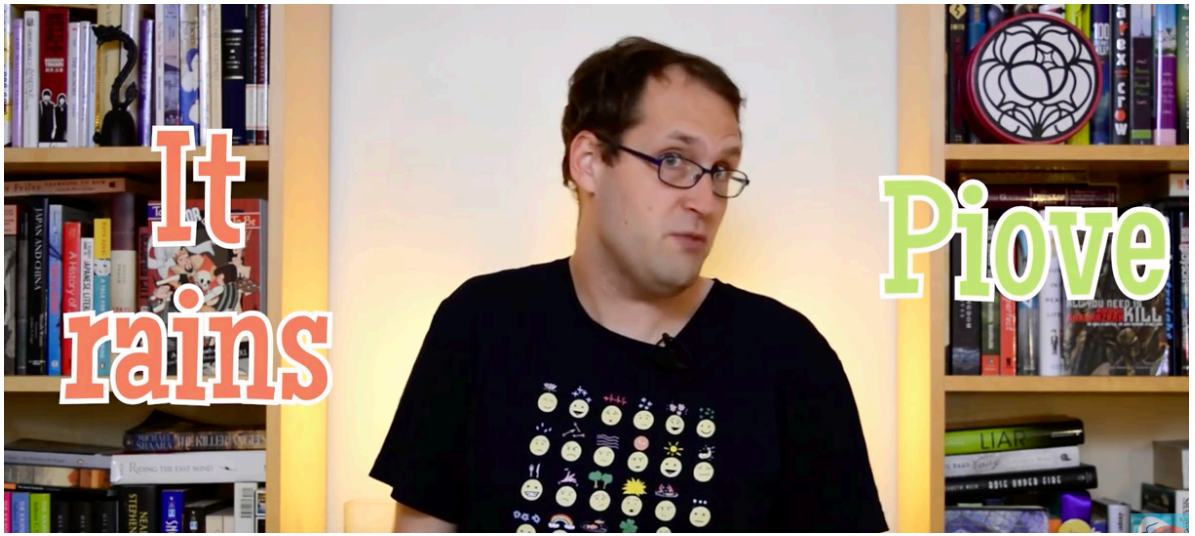
It-rains.

"It's raining."

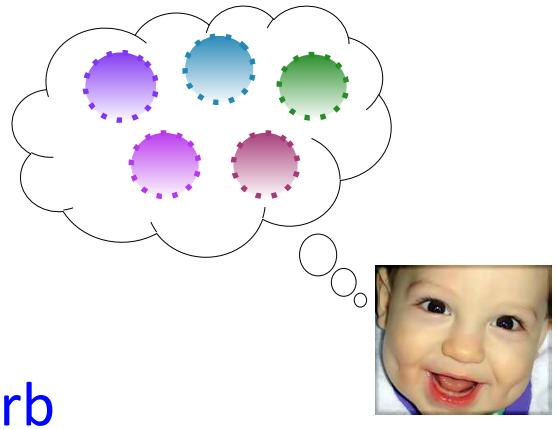
One proposed parameter



http://www.thelingspace.com/episode-52
https://www.youtube.com/watch?v=SYoYNeaSYrU
2:38 - 3:06 (null subjects & expletives)



One proposed parameter



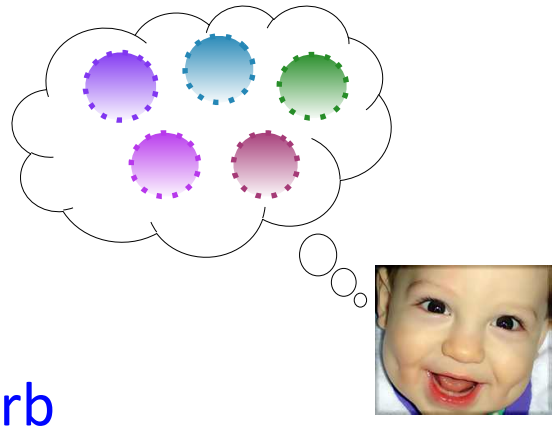
English	Italian
✔ Subject Verb	✔ Subject Verb
✗ *Verb Subject	✔ Verb Subject
✗ *Verb	✔ Verb
Expletive Subject required	**No Expletive Subject required**
✗ Raining.	✔ Piove.

No complementizer *that* for a Subject trace

✗ Who do you think (*that) will come?

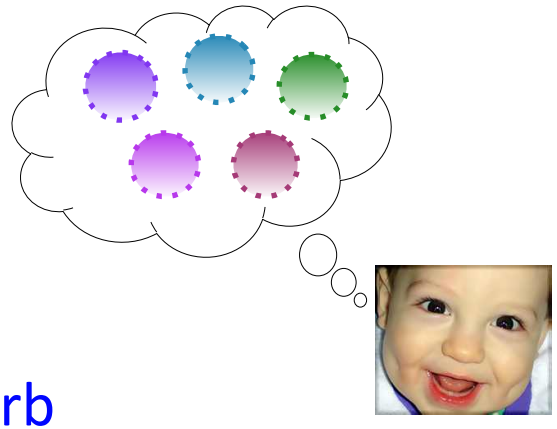
I think (that) Hoggle will come.

One proposed parameter



English	Italian
✔ Subject Verb	✔ Subject Verb
✘ *Verb Subject	✔ Verb Subject
✘ *Verb	✔ Verb
Expletive Subject required	**No Expletive Subject required**
✘ Raining.	✔ Piove.
✘ **No complementizer *that* for a Subject trace**	**Complementizer *that* for a Subject trace is fine**
	✔ Che credi che __ verrá? *Who think-you that will-come?* “Who do you think will come?”
	Credi che Jareth verrá. *You think that Jareth will-come.* “You think that Jareth will come.”

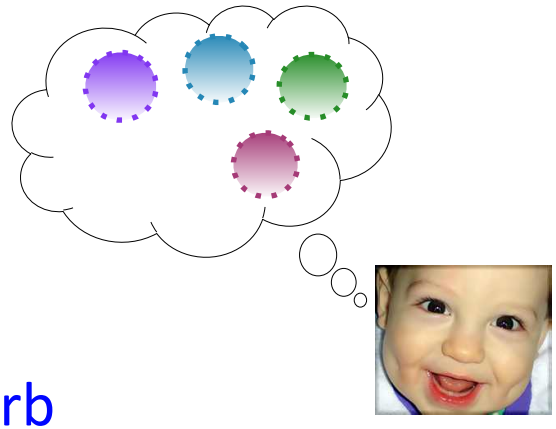
One proposed parameter



English	Italian
✔ Subject Verb	✔ Subject Verb
✘ *Verb Subject	✔ Verb Subject
✘ *Verb	✔ Verb
Expletive Subject required	**No Expletive Subject required**
✘ Raining.	✔ Piove.
✘ **No complementizer *that* for a Subject trace**	✔ **Complementizer *that* for a Subject trace is fine**

This last pattern is probably pretty hard to notice — it's a pretty complex *wh*-dependency, and we know the vast majority of the *wh*-dependencies in English children's input are far simpler.

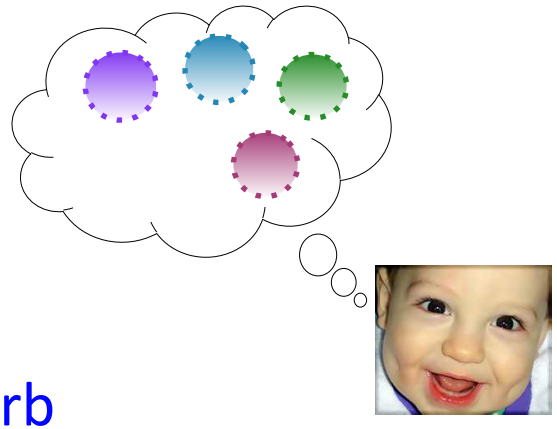
One proposed parameter



English	Italian
✔ Subject Verb	✔ Subject Verb
✗ *Verb Subject	✔ Verb Subject
✗ *Verb	✔ Verb
Expletive Subject required	**No Expletive Subject required**
✗ Raining.	✔ Piove.
✗ **No complementizer *that* for a Subject trace**	✔ **Complementizer *that* for a Subject trace is fine**

All these involve the subject in some way - coincidence?
Idea: No! There's a language parameter involving the subject.

One proposed parameter

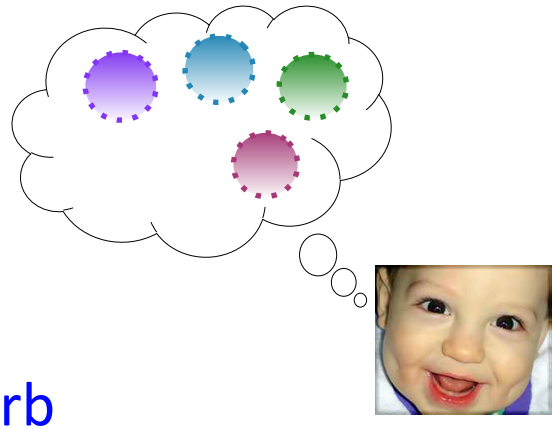


subject parameter

English	Italian
✔ Subject Verb	✔ Subject Verb
✘ *Verb Subject	✔ Verb Subject
✘ *Verb	✔ Verb
Expletive Subject required	**No Expletive Subject required**
✘ Raining.	✔ Piove.
✘ **No complementizer *that* for a Subject trace**	✔ **Complementizer *that* for a Subject trace is fine**

This would be very useful from a learning standpoint, because it connects all these different structural properties together.

One proposed parameter



subject parameter

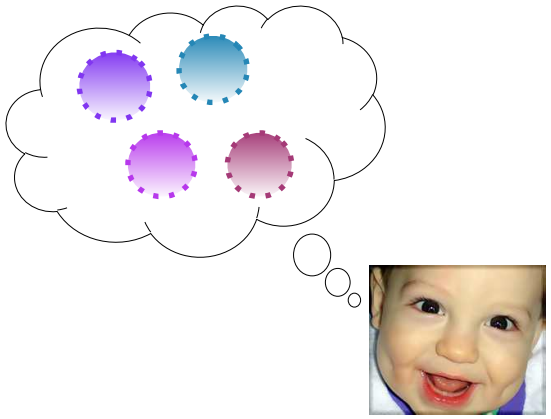
English	Italian
✔ Subject Verb	✔ Subject Verb
✘ *Verb Subject	✔ Verb Subject
✘ *Verb	✔ Verb
Expletive Subject required	**No Expletive Subject required**
✘ Raining.	✔ Piove.
✘ **No complementizer *that* for a Subject trace**	✔ **Complementizer *that* for a Subject trace is fine**

Useful for learning

Set it one way and you get English.

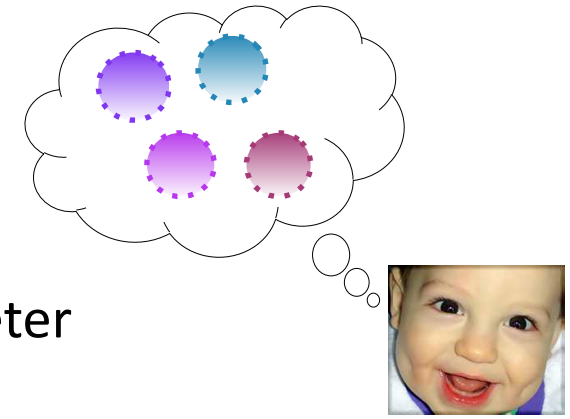
Set it the other way and you get Italian.

Another proposed parameter



Syntax: the Head Directionality parameter (Baker 2001, Cook & Newson 1996): heads of phrases (ex: Nouns of Noun Phrases, Verbs of Verb Phrases, Prepositions of Preposition Phrases) are consistently in either the leftmost or rightmost position

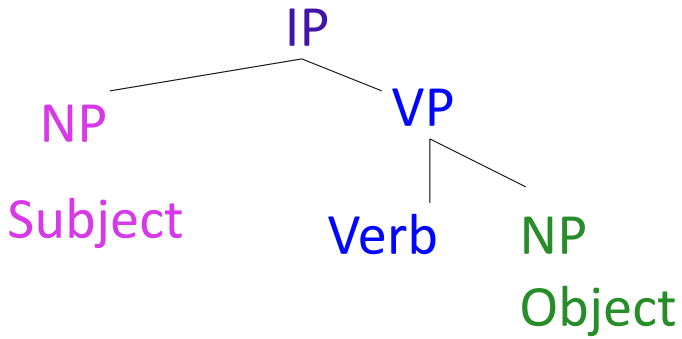
Another proposed parameter



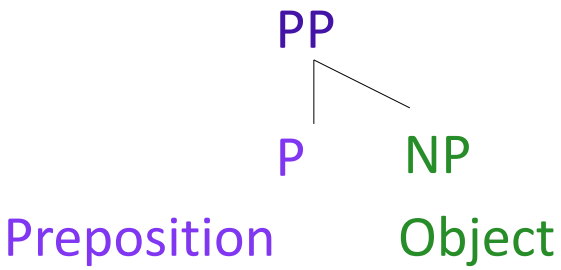
the Head Directionality parameter

Edo/English: Head-first

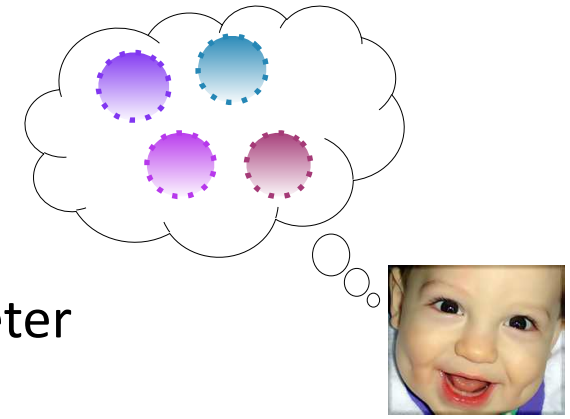
Basic word order:
Subject Verb Object [SVO]



Prepositions:
Preposition Noun Phrase



Another proposed parameter

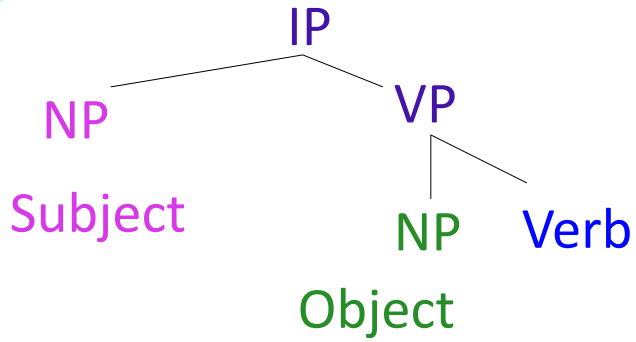


the Head Directionality parameter

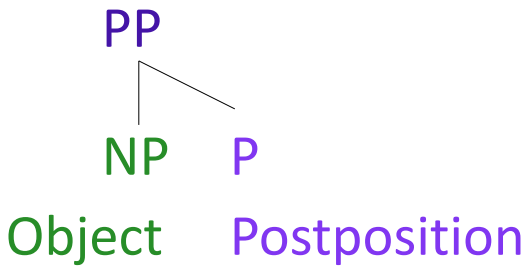
Edo/English: Head-first

Japanese/Navajo: Head-final

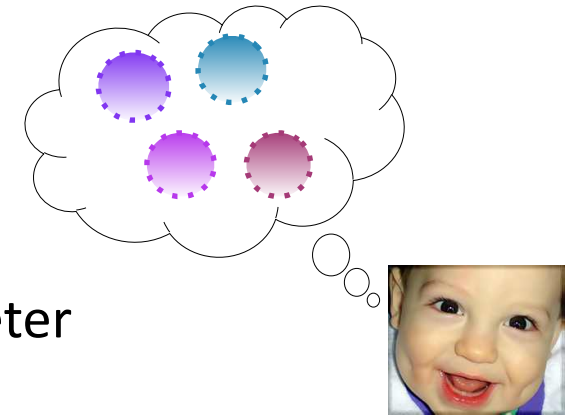
Basic word order:
Subject Object Verb [SOV]



Postpositions:
Noun Phrase Postposition



Another proposed parameter



the Head Directionality parameter

Edo/English: Head-first

Japanese/Navajo: Head-final

subject parameter

Italian: subject not so important

English: subject is important

At this level of structural analysis (parameters), languages differ vary minimally from each other. This makes language structure much easier for children to learn. All they need to do is set the right parameter values for their language, based on the data that are easy to observe.

Recap

While languages can seem to vary tremendously, when we look more deeply at their structure, they seem to have a lot of constrained variation. This makes languages with no shared cultural or historical background appear very similar structurally.

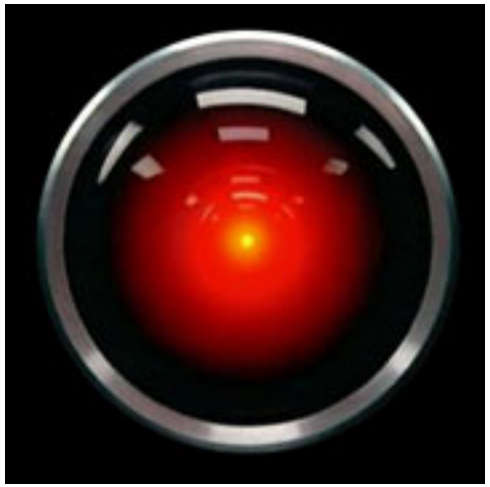
Linguistic parameters are one way to encode this constrained structural variation.

Linguistic nativists believe linguistic parameters are part of the Universal Grammar that children are born with, which helps them learn their native language so (relatively) quickly.

Questions?

You should be able to do up through question 6 on the structure review questions and up through 2 on HW8.

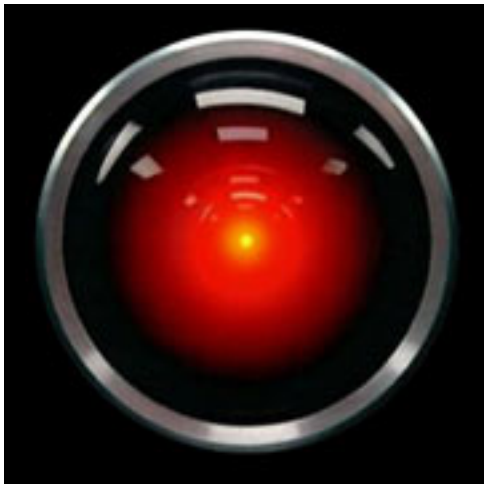
Extra Material



Syntax: One reason why natural language comprehension is so hard for computers

Solving the Language Problem (Artificial Intelligence)

HAL 9000 from 2001: A Space Odyssey (1968)



Perfect production and comprehension of English.

1960s: Language not considered one of the “hard” problems of artificial intelligence.

2010: Getting better but still not perfect.

http://www.research.att.com/~ttsweb/tts/demo.php

Solving the Language Problem (Artificial Intelligence)

2012: Apple's Siri is getting closer, though still has problems …

http://bits.blogs.nytimes.com/2012/07/15/with-apple's-siri-a-romance-gone-sour/?_php=true&_type=blogs&_r=0

Late last summer, I was introduced to a new special someone. I wasn't looking to meet this new muse; it all just kind of happened.

We met at an Apple product announcement in Cupertino, Calif. She was helpful, smart and even funny, cracking sarcastic jokes and making me laugh. What more could a guy ask for?

Since then, we have had some major communication issues. She frequently misunderstands what I'm saying. Sometimes she is just unavailable. Often, she responds with the same, repetitive statement.

Her name is Siri.

Solving the Language Problem (Artificial Intelligence)

Contrast: Chess-playing.

In 1997, a program named Deep Blue beat the reigning world champion in chess. It did this by having enough computational resources to investigate every move option before it actually made the chess move. This shows that computers' poor performance on language is not about insufficient computational power, since there is enough computational power to solve the chess-playing problem (which some people might consider a very difficult problem).

Solving the Language Problem (Artificial Intelligence)

Update for 2011 on a machine's abilities to do what humans do:

Man vs. Machine (Watson) in Jeopardy
& how hard a problem language comprehension and production is

http://www.youtube.com/watch?v=dr7IxQeXr7g
(approximately 9 min video)

Watson vs. all humanity
https://www.youtube.com/watch?v=WFR3lOm_xhE
(approximately 4 min video)

Solving the Language Problem (Artificial Intelligence)

2013: True on-the-fly language comprehension is still pretty hard, as well as determining the answer to “commonsense” questions that are phrased naturally.

http://www.sciencedaily.com/releases/2013/07/130715151059.htm

“One of the hardest problems in building an artificial intelligence, Sloan said, is devising a computer program that can make sound and prudent judgment based on a simple perception of the situation or facts-the dictionary definition of commonsense.

Commonsense has eluded AI engineers because it requires both a very large collection of facts and what Sloan calls implicit facts — things so obvious that we don't know we know them. A computer may know the temperature at which water freezes, but we know that ice is cold.” - Jeanne Galatzer-Levy

“We're still very far from programs with commonsense-AI that can answer comprehension questions with the skill of a child of 8," said Sloan. He and his colleagues hope the study will help to focus attention on the "hard spots" in AI research.

Types of variation

Sounds: Each language uses a particular subset of the sounds in the International Phonetic Alphabet, which represents all the sounds used in all human languages. There's often overlap (ex: "m", "p" are used in many languages), but languages also may make use of the less common sounds.

less common English sounds: "th" [θ], "th" [ð]

less common Navajo sounds: "whispered l", "nasalized a", …

	Bilabial	Labiodental	Dental	Alveolar	Postalveolar	Retroflex	Palatal	Velar	Uvular	Pharyngeal	Glottal
Plosive	p b			t d		ʈ ɖ	c ɟ	k g	q ɢ		ʔ
Nasal	m	ɱ		n		ɳ	ɲ	ŋ	ɴ		
Trill	ʙ			r					ʀ		
Tap or Flap				ɾ		ɽ					
Fricative	ɸ β	f v	θ ð	s z	ʃ ʒ	ʂ ʐ	ç ʝ	x ɣ	χ ʁ	ħ ʕ	h ɦ
Lateral fricative				ɬ ɮ							
Approximant		ʋ		ɹ		ɻ	j	ɰ			
Lateral approximant				l		ɭ	ʎ	ʟ			