

**Psych156A/Ling150:
Psychology of Language Learning**

Lecture 17
Language Structure

Quiz 6

25 minutes

Announcements

Course evaluations now available online

Please email me (lpearl@uci.edu) by Thursday if you are going to write a final paper instead of/along with taking the final exam. Make sure to indicate which article(s) you will be doing a review of.

Review questions for this last topic (learning structure with parameters) are now available

Computational Problem:
Figure out the order of words (syntax)



Jareth juggles crystals
Subject Verb Object
Noun Verb Noun

Depends on grammatical categories like Nouns and Verbs, but also on more precise distinctions like Subjects and Objects.

Some Noun Phrase distinctions:
Subject = usually the agent/actor of the action, "doer": Jareth
Object = usually the recipient of the action, "done to": crystals

Computational Problem:
Figure out the order of words (syntax)



Jareth juggles crystals
Subject Verb Object

Important idea: The observable word order speakers produce is the result of a system of unconscious word order rules. (This linguistic system is called "syntax".)

Computational Problem:
Figure out the order of words (syntax)



Jareth juggles crystals
Subject Verb Object

One way to generate Subject Verb Object order:
The linguistic system specifies that order as the general pattern of the language.

English Subject Verb Object

Computational Problem:
Figure out the order of words (syntax)



Jareth juggles crystals
Subject Verb Object

Another way to generate Subject Verb Object order:
The linguistic system specifies Subject Object Verb as the
general pattern, but the Verb in main clauses moves to the
second position and some other phrase (like the Subject)
moves to the first position.

German Subject Object Verb

Computational Problem:
Figure out the order of words (syntax)



Jareth juggles crystals
Subject Verb Object

Another way to generate Subject Verb Object order:
The linguistic system specifies Subject Object Verb as the
general pattern, but the Verb in main clauses moves to the
second position and some other phrase (like the Subject)
moves to the first position.

German Subject Verb *Subject* Object *Verb*

Computational Problem:
Figure out the order of words (syntax)



Jareth juggles crystals
Subject Verb Object

A third way to generate Subject Verb Object order:
The linguistic system specifies Subject Object Verb as the
general pattern, but the Object moves after the Verb in
certain contexts (the Object is unexpected information).

Kannada Subject Object Verb

Computational Problem:
Figure out the order of words (syntax)



Jareth juggles crystals
Subject Verb Object

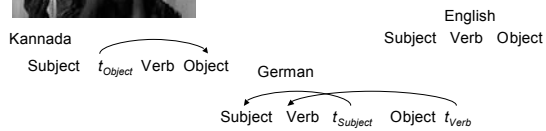
A third way to generate Subject Verb Object order:
The linguistic system specifies Subject Object Verb as the general pattern, but the Object moves after the Verb in certain contexts (the Object is unexpected information).

Kannada Subject t_{Object} Verb Object

Computational Problem:
Figure out the order of words (syntax)



Jareth juggles crystals
Subject Verb Object

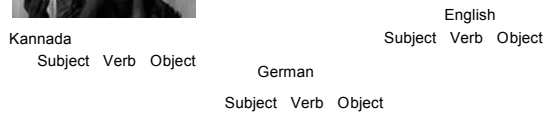


The learning problem: How do children know which system their language uses?

Computational Problem:
Figure out the order of words (syntax)



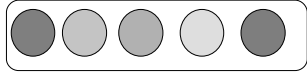
Jareth juggles crystals
Subject Verb Object



This is a hard question!

Children only see the output of the system (observable word order).

About Language & Variation



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 AZ lifestyle couldn't have prepared them for Pacific Island high tech warfare, but translation was still possible.)

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

http://www.worldingo.com/en/products_services/worldingo_translator.html

Translation (Japanese):

昔かでない危険および難可なしあなたが盗んだ子供を取り戻す困難によって私によって小悪魔都市を越えも城に私の方法がここに難った。

Original (English):

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

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

http://www.worldlingo.com/en/products_services/worldlingo_translator.html

<p>Translation (Japanese):</p> <p>前かでない危険および番号なしあなたが盗んだ子供を 取り戻す困難によって私によっては小悪魔都市を越え る城に私の方法がここに驚いた。</p>	<p>Translation (English):</p> <p>My method fought here in the castle which exceeds the small demonic city danger and the number which are not distinct it is not depending upon me with difficulty recovers the child whom you steal.</p>
<p>Original (English):</p> <p>Through dangers untold and hardships unnumbered, I have fought my way here to the castle beyond the goblin city to take back the child you have stolen.</p>	<p>Original (Japanese):</p> <p>前かでない危険および番号なしあなたが盗んだ子供を 取り戻す困難によって私によっては小悪魔都市を越え る城に私の方法がここに驚いた。</p>

Japanese structure is very different from English structure
at this level.

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

http://www.worldlingo.com/en/products_services/worldlingo_translator.html

<p>Translation (Russian):</p> <p>Через untold и hardships опасностей неизмерованные, я воевал мою дорогу здесь к замку за городом goblin принять назад ребенка, котор вы крали.</p>	<p>Original (English):</p> <p>Through dangers untold and hardships unnumbered, I have fought my way here to the castle beyond the goblin city to take back the child you have stolen.</p>
--	--

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

http://www.worldlingo.com/en/products_services/worldlingo_translator.html

<p>Translation (Russian):</p> <p>Через untold и hardships опасностей неизмерованные, я воевал мою дорогу здесь к замку за городом goblin принять назад ребенка, котор вы крали.</p>	<p>Translation (English):</p> <p>Through untold and hardships of dangers unnumbered, I warred my road here to [zamoku] after the city of goblin to accept back child, you was which they stole</p>
<p>Original (English):</p> <p>Through dangers untold and hardships unnumbered, I have fought my way here to the castle beyond the goblin city to take back the child you have stolen.</p>	<p>Original (Russian):</p> <p>Через untold и hardships опасностей неизмерованные, я воевал мою дорогу здесь к замку за городом goblin принять назад ребенка, котор вы крали</p>

Russian structure is not as different from English structure
at this level, though it is still different.

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

http://www.worldlingo.com/en/products_services/worldlingo_translator.html

Translation (Arabic):
من خلال الخطار [المتوعد] وشدات [المتوعد]، قد تراجعنا إلى طريقنا هنا إلى
القصر [إلى ما بعد القرية] مدينة أن ينادي إلى القلب القلعة أن كنت قد سرقت
الطفل الذي قد سرقت.

Original (English):
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.

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

http://www.worldlingo.com/en/products_services/worldlingo_translator.html

Translation (Arabic):
من خلال الخطار [المتوعد] وشدات [المتوعد]، قد تراجعنا إلى طريقنا هنا إلى
القصر [إلى ما بعد القرية] مدينة أن ينادي إلى القلب القلعة أن كنت قد سرقت
الطفل الذي قد سرقت.

Original (English):
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.

Translation (English):
Through dangers [lawitwid] and pulls
[awnwmbnd], already I dispute roads here to
the palace beyond the demon is city to the back
takes to the child that you stole

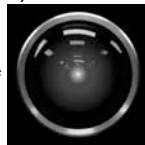
Original (Arabic):
من خلال الخطار [المتوعد] وشدات [المتوعد]، قد تراجعنا إلى طريقنا هنا إلى
القصر [إلى ما بعد القرية] مدينة أن ينادي إلى القلب القلعة أن كنت قد سرقت
الطفل الذي قد سرقت.

Arabic structure is fairly different from English structure at
this level.

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.

Reality in 2008: Still not close to human-like performance.

Contrast: Chess-playing. (This shows that computers' poor
performance on language is not about insufficient
computational power.)

Types of Variation

Vocabulary

English "think": 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": think, know, wonder, suppose, assume, ...

Navajo "carry": multiple types, depending on object carried
aaah (solid round-ish object)



kaah (open container with contents)



lé (flexible object)

Types of Variation

Sounds: Each language uses a particular subset of the sounds used in all languages put together. There's often overlap (ex: "m", "p"), but languages also may make use of the less common sounds.

English: "th", "f", "sh", ...

Navajo "whispered l", "nasalized a", ...

	Labial	Labiodental	Dental	Alveolar	Postalveolar	Retroflex	Palatal	Velar	Uvular	Pharyngeal	Glottal
Plosive	p b		t d		ʈ ɖ	c ɟ	k ɡ	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	ɰ			
Lateral approximant			l		ɭ	ʎ	ʟ	ʟ			

Types of Variation

Morphology (word forms)

English: invariant words

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

Navajo: no invariant forms (ex: 100-200 prefixes for verb stems)

At'ééd yicha. "Girl crying"

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

Ninááhwishdlaad. "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

Ashkii at'ééd yiyiltsá
boy girl saw
"The boy saw the girl"



Ashkii at'ééd biiłstá
boy girl saw
"The girl saw the boy"

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

Ashkii at'ééd **y**iyiltsá
boy girl saw
"The boy saw the girl"



Ashkii at'ééd **b**iiłstá
boy girl saw
"The girl saw the boy"

This one prefix changes the entire meaning of the sentence

Thinking About Syntactic Variation

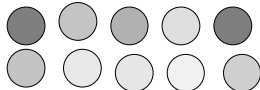


Similarities & Differences: Parameters

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 syntax parameters yields a large number of different languages' syntactic systems.

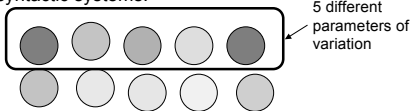


Similarities & Differences: Parameters

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 syntax parameters yields a large number of different languages' syntactic systems.

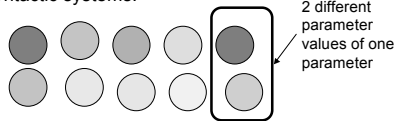


Similarities & Differences: Parameters

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).

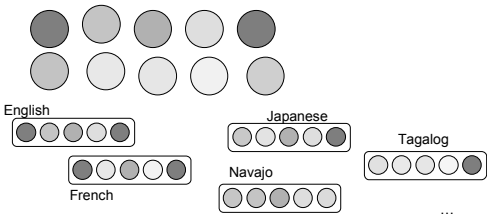


Big Idea: A relatively small number of syntax parameters yields a large number of different languages' syntactic systems.



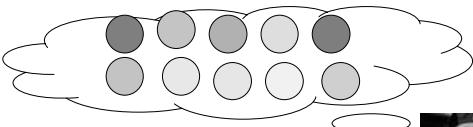
Similarities & Differences: Parameters

Big Idea: A relatively small number of syntax parameters yields a large number of different languages' syntactic systems.



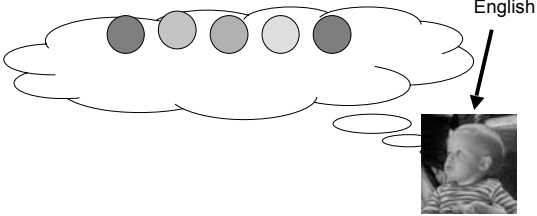
Learning Language Structure

Chomsky: 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.



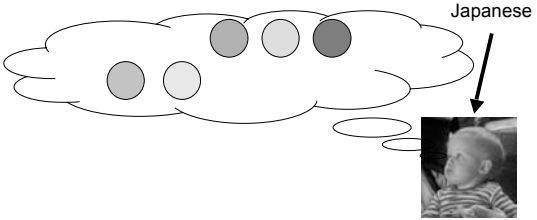
Learning Language Structure

Chomsky: 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.



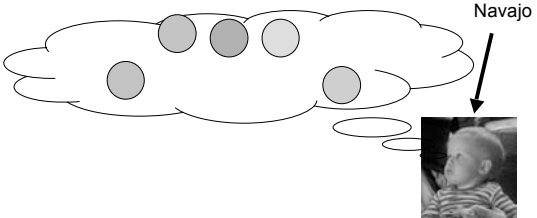
Learning Language Structure

Chomsky: 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.



Learning Language Structure

Chomsky: 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.



Questions?
