

Psych 156A/ Ling 150:
Acquisition of Language II

Lecture 1
Introduction to Language Acquisition

Administrivia

Instructor:

Lisa Pearl

Department of Cognitive Sciences

lpearl@uci.edu

<http://www.socsci.uci.edu/~lpearl>

Office Hours: T, 10:00-11:30am in SBSG 2314



Administrivia

Teaching Assistant:

Lawrence Phillips

Department of Cognitive Sciences

lawphill@uci.edu

Office Hours: TBD in SBSG 2221

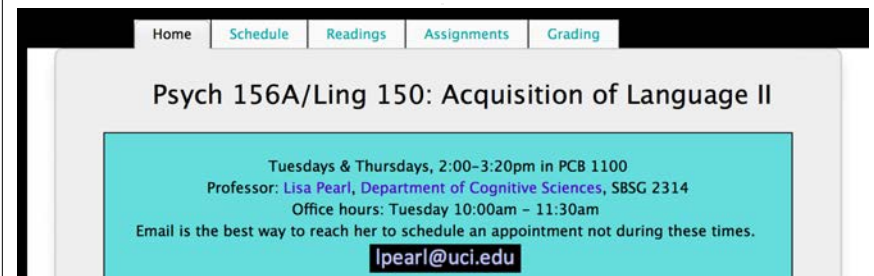


Administrivia

Class web page:

http://www.socsci.uci.edu/~lpearl/courses/psych156A_2014spring/index.html

Accessible from EEE, as well. Contains overview, office hours, schedule, readings, assignment descriptions, and grading policies.



Home | Schedule | Readings | Assignments | Grading

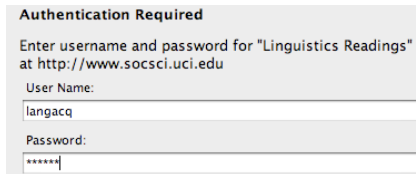
Psych 156A/Ling 150: Acquisition of Language II

Tuesdays & Thursdays, 2:00-3:20pm in PCB 1100
Professor: Lisa Pearl, Department of Cognitive Sciences, SBSG 2314
Office hours: Tuesday 10:00am - 11:30am
Email is the best way to reach her to schedule an appointment not during these times.
lpearl@uci.edu

Administrivia

Some readings & reference material will require a username and password to access.

User Name = langacq
Password = models



Authentication Required
Enter username and password for "Linguistics Readings" at <http://www.socsci.uci.edu>
User Name:
langacq
Password:

Lecture notes do not require a password

Administrivia

Assignments

Homework:

Three throughout the quarter. Collaboration is allowed and **highly encouraged**. In fact, take a minute to introduce yourself to some people around you who might **form a homework/study group** with. **You may turn in one assignment per group of collaborators** – just make sure the names and student IDs of all the collaborators are included in it.

Administrivia

Assignments

Homework Advice:

Homework assignments are usually available as soon as we begin discussing the relevant topics. **HW1 is already available on the website**. The optimal strategy is to be working on the relevant homework problems as we discuss the topics in class.

Review questions are also available for each topic, but you are not required to do them. They are just there to help you review the material (and are a great way to study for exams).

Administrivia

Assignments

Homework:

Late homework will be accepted according to the late policy listed in the assignments section on the class webpage. If you cannot turn in the homework on time, **take advantage of the policy to get some credit for your assignment. Seriously.**

Late policy: Late assignments will be accepted, but will lose 10% of the total score possible on the assignment for **every class session late (not every day late)**. This is to encourage you to do the assignments, as it is far preferable to work through the material late rather than never. Moreover, homework comprises a hefty portion of your grade, so please do it – even if it's late. Late assignments can be submitted through EEE.

If you submit a late assignment, please email both the instructor and the TA so

Administrivia

Exams

Midterm exam:

There will be an [online midterm exam on 5/6/14, available through EEE](#). It will cover the material in weeks 1-5. There will be a midterm review in class 5/1/14. Being able to answer the review questions for the relevant topics is the best way to prepare for the exam.

The midterm exam will be open-note, but non-collaborative.

If you are found collaborating with other classmates during the midterm exam, you will receive a 0.

For details of the online exam policy and procedure, see the course webpage. We will also go over these during the midterm review.

Administrivia

Exams

Final exam:

There will be an [online final exam on 6/12/14, available through EEE](#). It will cover the material in weeks 1-10, with a strong focus on the material in weeks 6 - 10. Review questions will be available for each topic covered in class, and there will be a final exam review in class on 6/5/14. Exam questions will come from the homeworks and the review questions.

The final exam will be open-note, but non-collaborative.

If you are found collaborating with other classmates during the final exam, you will receive a 0.

For details of the online exam policy and procedure, see the course webpage. We will also go over these during the final review.

Administrivia

Grades

Homework: 50%

Midterm: 20%

Final Exam: 30%

Your grades will be determined by approximately this scale (available on the webpage):

96-100: A+	84-88: B+	72-76: C+	...
92-96: A	80-84: B	68-72: C	
88-92: A-	76-80: B-	64-68: C-	

Administrivia

Extra Credit

You can earn up to 3 percentage points of extra credit two ways. (See the class web page under the "assignments" tab for more details.)

- (1) Participate as a human subject in a language science experiment game.
- (2) Participate as a human subject in social science experiments for up to 3 hours (half an hour = half a percentage point).

Administrivia

Schedule

“This is our wonderfully ambitious schedule. We’ll attempt to keep with it, but it is subject to modification.”

Topics:

Introduction	(4/1/14 – 4/3/14)	[2]
Sounds & Sounds of Words	(4/8/14 – 4/15/14)	[3]
Words	(4/17/14 – 4/29/14)	[4]
Midterm Review & Midterm	(5/1/14 – 5/6/14)	
Grammatical Categories	(5/8/14 – 5/13/14)	[2]
Poverty of the Stimulus	(5/15/14 – 5/22/14)	[3]
Language Structure	(5/27/14 – 6/3/14)	[3]
Final Review & Final	(6/5/14 – 6/12/14)	

What is language?



A **language** is a **system of signals**, such as voice sounds, gestures or written **symbols**, that encode or decode information.

Human languages are usually referred to as natural languages, and the science of studying them is linguistics.

The term "**animal languages**" is often used for non-human languages. Most researchers agree that these are not as complex or expressive as human language; they may better be described as **animal communication**. Some researchers argue that there are significant differences separating human language from the communication of other animals, and that the underlying principles are unrelated.

Language is special



René Descartes

“It is a very remarkable fact that there are none ... without even excepting idiots, that they cannot arrange different words together, forming of them a statement by which they make known their thoughts; while on the other hand, there is no other animal, however perfect and fortunately circumstanced it may be, which can do the same.”

Knowledge of Language

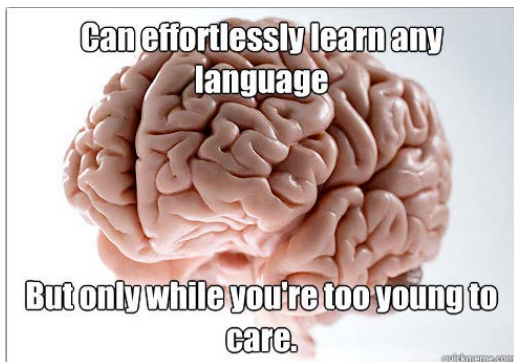
It’s so natural for us to produce and comprehend language that we often don’t think about what an accomplishment this is.

Or how we learned language in the first place.



The mystery of language acquisition

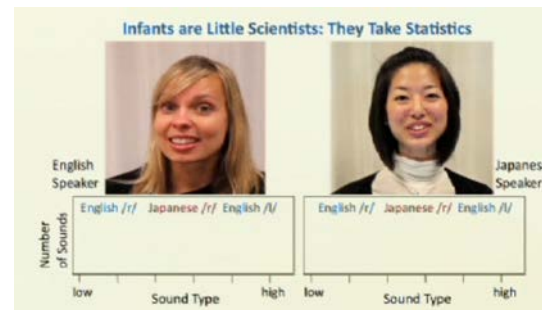
<http://www.quickmeme.com/meme/36f39x/>



“The Linguistic Genius of Babies”

http://www.ted.com/talks/patricia_kuhl_the_linguistic_genius_of_babies.html

(up through 10:07)



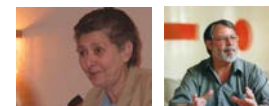
Language is special

“For the moment, the main thing is to appreciate how hard a problem this is. The fact that we can talk (and cats can’t) seems so obvious that it hardly bears mention. **But just because it’s obvious doesn’t mean it’s easy to explain.** Think of another perfectly obvious, well-known phenomenon: the fact that metals turn red when you heat them. Why does this happen? It could be otherwise - they might just as well turn green or not change color at all. It’s a simple phenomenon, easily observable, but the explanation isn’t simple at all. It turns out to involve at the very least the theories of electromagnetic radiation and quantum mechanics, two of the more amazing intellectual advances in the past century. So it is, I want to suggest, with the human ability to use language.” - Ray Jackendoff, 1994



Language is special

“What is so special about language? Maybe nothing if you are a snail or a camphor tree. But language is paramount among the capacities that characterize humans, setting us off from even the most perfectly formed and functioning of the other beasts on earth; so, as a matter of species pride – if nothing else – we would hold up language as a marker of our humanity and thus a focus of our scientific interest.” (Gleitman & Liberman 1991: xix)



About language

Language is a complex system of knowledge that all children learn by listening to native speakers in their surrounding environment.



It includes sound structure, word structure, word meaning, sentence structure, mapping from sentence structure to meaning, unspoken rules of conversation...

About language

Language is a complex system of knowledge that all children learn by listening to native speakers in their surrounding environment.



It includes **sound structure**, word structure, word meaning, sentence structure, mapping from sentence structure to meaning, unspoken rules of conversation...

Stress pattern

gob lins

Individual sounds (in IPA)

g a b l i n z

About language

Language is a complex system of knowledge that all children learn by listening to native speakers in their surrounding environment.



It includes sound structure, **word structure**, word meaning, sentence structure, mapping from sentence structure to meaning, unspoken rules of conversation...

goblin (plural) = goblin + s

gob lins

g a b l i n z

About language

Language is a complex system of knowledge that all children learn by listening to native speakers in their surrounding environment.



It includes sound structure, word structure, **word meaning**, sentence structure, mapping from sentence structure to meaning, unspoken rules of conversation...

goblins

goblin (plural) = goblin + s

gob lins

g a b l i n z

About language

Language is a complex system of knowledge that all children learn by listening to native speakers in their surrounding environment.

Goblins like children.



goblins

It includes sound structure, word structure, word meaning, sentence structure, mapping from sentence structure to meaning, unspoken rules of conversation...

goblin (plural) = goblin + s

gob lins

g a b l i n z

About language

Language is a complex system of knowledge that all children learn by listening to native speakers in their surrounding environment.

Don't goblins like children?

Goblins like children.



goblins

It includes sound structure, word structure, word meaning, sentence structure, mapping from sentence structure to meaning, unspoken rules of conversation...

goblin (plural) = goblin + s

gob lins

g a b l i n z

Some terminology

Phonology: sounds and sound system of the language

g a b l i n z

gob lins

Lexicon & Lexical semantics:

Words and associated knowledge (word forms, word meanings, etc.)

goblins =

(not koblins)



Morphology: system for combining units of meaning together

(goblin + [plural] = goblins)

Some terminology

Syntax: system for combining words into sentences

Goblins like children.

Pragmatics: knowledge of language use



Don't goblins like children? = surprise if the answer is 'no'
(expectation is that the answer is 'yes')
Use this question format to show expectation of a 'yes' answer.

A little more about pragmatics

http://www.ted.com/talks/steven_pinker_on_language_and_thought.html

10:34-11:38 = indirect speech acts

14:14-15:22 = unspoken rules about literal vs. inferred meaning

A Puzzle: Indirect Speech Acts



Kids do amazing things

Much of the linguistic system is already known by age 3.



...when kids can't tie their own shoes
or reliably recognize "4".

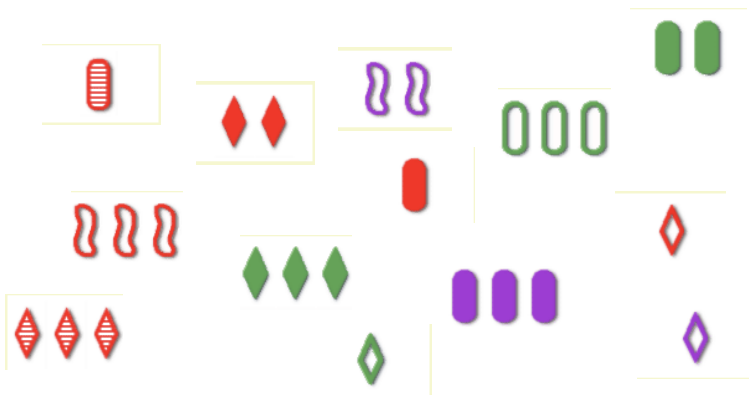
What kids are doing: extracting patterns and making generalizations
from the surrounding data **mostly without explicit instruction**.

Terminology: Patterns or "rules" of language = **grammar**

A learning analogy: Set



Here are some cards - they have some salient properties associated with them: number of items, shape of items, color of items, fill of items.

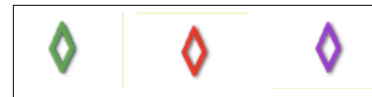


A learning analogy: Set



Task: Find Sets.

Here's one:



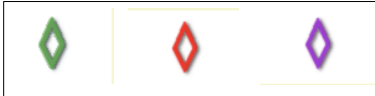
What generalizations might you make about Sets?

A learning analogy: Set



Task: Find Sets.

Here's one:



What generalizations might you make about Sets?

Set = all shapes, fills, and number of items the same?

A learning analogy: Set



Task: Find Sets.

Here's another one:



Does this fit the generalization?

Set = all shapes, fills, and number of items the same?

A learning analogy: Set



Task: Find Sets.

Here's another one:



Does this fit the generalization?

~~Set = all shapes, fills, and number of items the same?~~

Set = all shapes and fills the same?

A learning analogy: Set



Task: Find Sets.

Here's another one:



What about this one?

~~Set = all shapes, fills, and number of items the same?~~

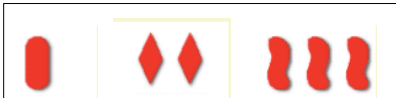
Set = all shapes and fills the same?

A learning analogy: Set



Task: Find Sets.

Here's another one:



What about this one?

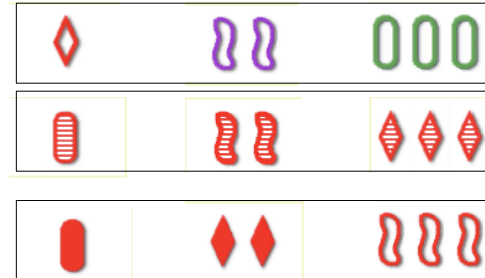
- ~~Set = all shapes, fills, and number of items the same?~~
- ~~Set = all shapes and fills the same?~~
- Set = all fills the same?

A learning analogy: Set



Task: Find Sets.

Are these Sets?

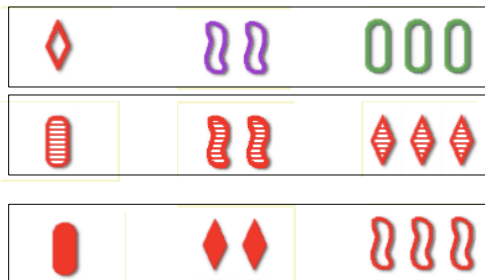


A learning analogy: Set



Task: Find Sets.

Are these Sets?



Set = all fills the same?

Yes

Yes

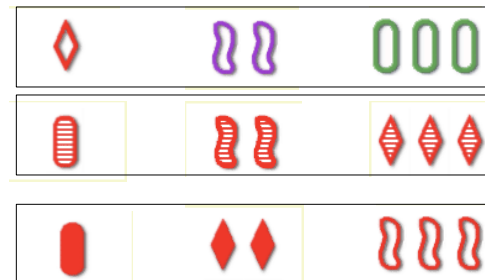
No

A learning analogy: Set



Task: Find Sets.

Are these Sets?



Set = all fills the same?

Yes

Yes

No

Reality

Yes ✓

Yes ✓

No ✓

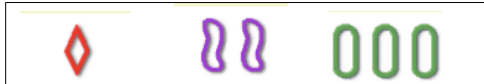
A learning analogy: Set



Task: Verifying Sets.

Here are some more examples of sets:

Set = all fills the same?



Yes



Yes



No

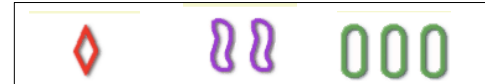
A learning analogy: Set



Task: Verifying Sets.

Here are some more examples of sets:

Set = all fills the same?



Yes



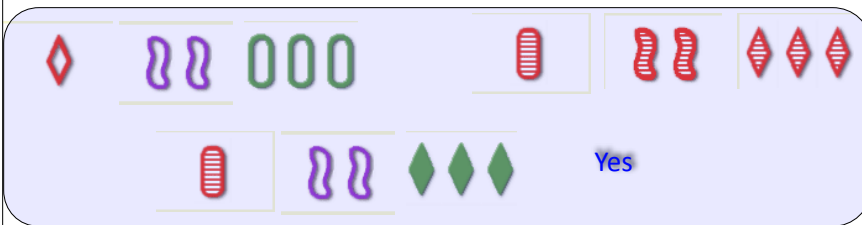
Yes



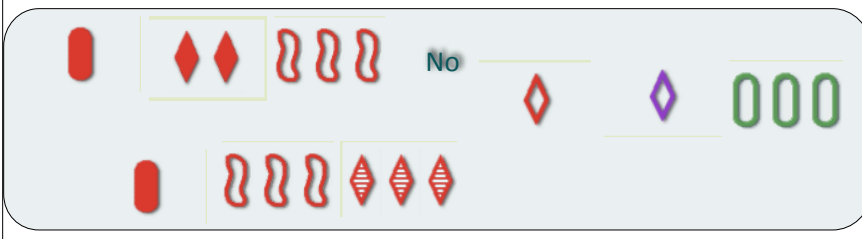
No

Uh oh – we need a different generalization...

The grammar of Set



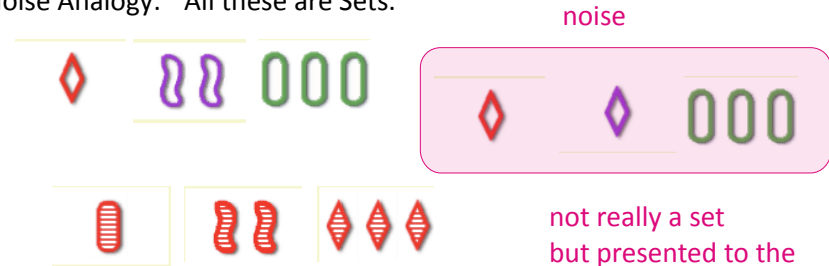
A 'Set' is three cards in which each individual feature is either all the SAME on each card or all DIFFERENT on each card.



Back to kids & language

Children infer rules with this amount of complexity (and more!) from examples of language. And sometimes, even when there's **noise** (misleading examples in the input).

Noise Analogy: "All these are Sets."



not really a set but presented to the child as if it were

How do we know they're not only imitating or being taught?

Imitation certainly *is* useful for learning some aspects of language, such as learning that the sequence of sounds “*cat*” refers to a furry, purring pet.



However, children can't learn how to understand and produce full sentences by imitating what they hear and repeating it word for word.

Why not?

One reason: Most sentences are novel – you understand and produce them on the fly, and may never have heard them before.

How do we know they're not only imitating or being taught?

Also, it turns out that children are bad at imitating sentences where they don't know some of the words (so how could they learn those words by imitating them?):

“*The cat is hungry*” becomes “*Cat hungry*.”

In addition, children don't often repeat word-for-word what adults around them say.

How do we know they're not only imitating or being taught?

(From Martin Braine)

Child: Want other one spoon, Daddy.

Father: You mean, you want the other spoon.

Child: Yes, I want other one spoon, please Daddy.

Father: Can you say “the other spoon”?

Child: Other...one...spoon.

Father: Say “other”.

Child: Other.

Father: “Spoon.”

Child: Spoon.

Father: “Other spoon.”

Child: Other...spoon. Now give me other one spoon?



Knowledge of language & hidden rules

Some examples from language:

You know that...

...*strop* is a possible word of English, while *stvop* isn't.

Knowledge of language & hidden rules

Some examples from language:

You know that...

...to ask about “someone” in the sentence
“You think that someone did it”,
you can’t ask it this way:

“Who do you think that did it?”



(Instead: “Who do you think did it?”)



Knowledge of language & hidden rules

Some examples from language:

You know that...

...In “She ate the peach while Sarah was reading”, *she ≠ Sarah*

but *she* can be *Sarah* in all of these:

Sarah ate the peach while *she* was reading.
While *she* was reading, *Sarah* ate the peach.
While *Sarah* was reading, *she* ate the peach.



Knowledge of language & hidden rules

Some examples from language:

You know that...

...the ‘s’ in ‘cats’ sounds different from the ‘s’ in *goblins*

cats: ‘s’ = /s/

goblins: ‘s’ = /z/



Knowledge of language & hidden rules

Some examples from language:

You know that...

... contracted forms like “*wanna*” and “*gonna*” can’t always replace their respective full forms “*want to*” and “*going to*”.

You get to choose who you will rescue.

“Who do you *want to* rescue?”

“Who do you *wanna* rescue?”



Knowledge of language & hidden rules

Some examples from language:

You know that...

... contracted forms like “**wanna**” and “**gonna**” can’t always replace their respective full forms “**want to**” and “**going to**”.

You get to choose who you will rescue.

“Who do you **want to** rescue?”

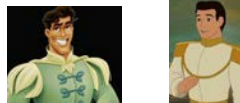
“Who do you **wanna** rescue?”



You get to choose who will do the rescuing.

“Who do you **want to** do the rescuing?”

* “Who do you **wanna** do the rescuing?”



Knowledge of language & hidden rules

Some examples from language:

You know that...

... contracted forms like “**wanna**” and “**gonna**” can’t always replace their respective full forms “**want to**” and “**going to**”.

You get to choose who you will rescue.

“Who are you **going to** rescue?”

“Who are you **gonna** rescue?”



Knowledge of language & hidden rules

Some examples from language:

You know that...

... contracted forms like “**wanna**” and “**gonna**” can’t always replace their respective full forms “**want to**” and “**going to**”.

You get to choose who you will rescue.

“Who are you **going to** rescue?”

“Who are you **gonna** rescue?”



“I’m **going to** the witch’s lair to rescue her.”

* “I’m **gonna** the witch’s lair to rescue her.”



Linguistic productivity means we need rules

“The **expressive variety of language use** implies that a language user’s brain contains unconscious grammatical principles” - Jackendoff (1994)

Example: Most sentences we have never seen or used before, but we can still understand them.

Question: Can speakers simply memorize all the possible sentences of a language the way they learn the vocabulary of their language? **Not if there are an infinite number of them...**



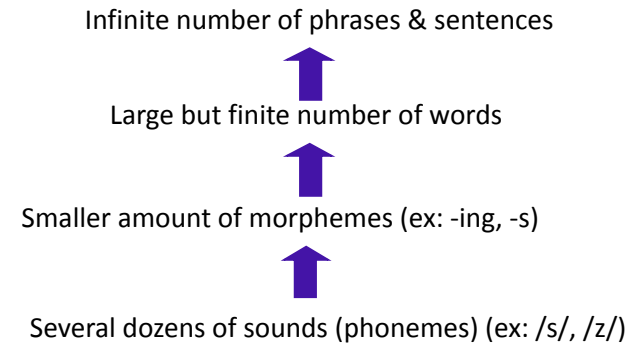


Linguistic infinity

Hoggle has two jewels.
Hoggle has three jewels.
Hoggle has four jewels.
...
Hoggle has forty-three million and five jewels.
...

One (dumb) way to get infinity

Linguistic productivity means we need rules



Phonemes

Basic perceptual units of which speech is composed: /b/, /p/, ...
(Liberman 1970)

Units that are used to build morphemes: /b/ + /ɪ/ + /g/ = 'big'

Languages have a finite inventory of these units.

They are not units of meaning.

They are **contrastive**: changing a phoneme can change meaning
(pig vs big).

Structure permits creativity

We are capable of combining existing **phonemes** to form new words

- "email", "IM", "xerox"
- Also, usernames!



Morphemes

Morphemes are the smallest meaningful units of language

Free morphemes may stand alone

mail, movie, sensation, mother, gift

Bound (usually grammatical) morphemes cannot

-ing, -s, -ed, -er, re-

Morphemes combine to form the words of a language.

Ex: He's a regifter! (re + gift +er)

Combination is rule-governed: "Regifter" is okay but not

*Reergift, *Erregift, *Ergiftre, *Gifterre, *giftreer.

Structure permits creativity

We are capable of combining existing morphemes using different processes.



Compounding

mother

grandmother

great-grandmother

great-great-grandmother

great-great-great-grandmother

...



Derivational morphemes

sensation = noun

sensational = adjective

sensationalize = verb

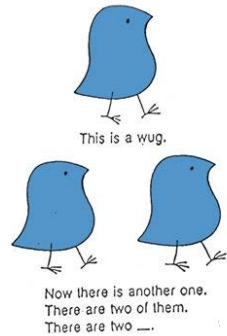
sensationalization = noun

sensationalizational = adjective

sensationalizationalize = verb

Inflectional morphemes

The Wug Test



-s = plural

-s = present tense, 3rd sg
(he sings)

-ing = ongoing action
(he's singing)

Structure permits creativity

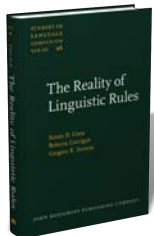
We are capable of combining existing
morphemes/words into new sentences

*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, for my will is as strong as
yours and my kingdom is as great.*



Linguistic rules

The point: our minds store words and meanings and the
patterns into which they can be placed.



The mental grammar

“In short, in order for us to be able to speak and understand novel sentences, we have to store in our heads not just the words of our language but also the patterns of sentences possible in our language. These patterns, in turn, describe not just patterns of *words* but also patterns of **patterns**. Linguists refer to these patterns as the **rules** of language stored in memory; they refer to the rules as the **mental grammar** of the language, or **grammar** for short.” - Jackendoff (1994)



Recap

Children learn (hard) things about language that are not easy to explain.

Children don't just imitate what they've heard - they're trying to figure out the patterns of their native language. Also, they may not notice or respond to explicit correction.

The creativity and expressivity of language suggests that there is an underlying structured system that produces language as its output.

Questions?



You should be able to do up through question 4 on the introduction review questions.