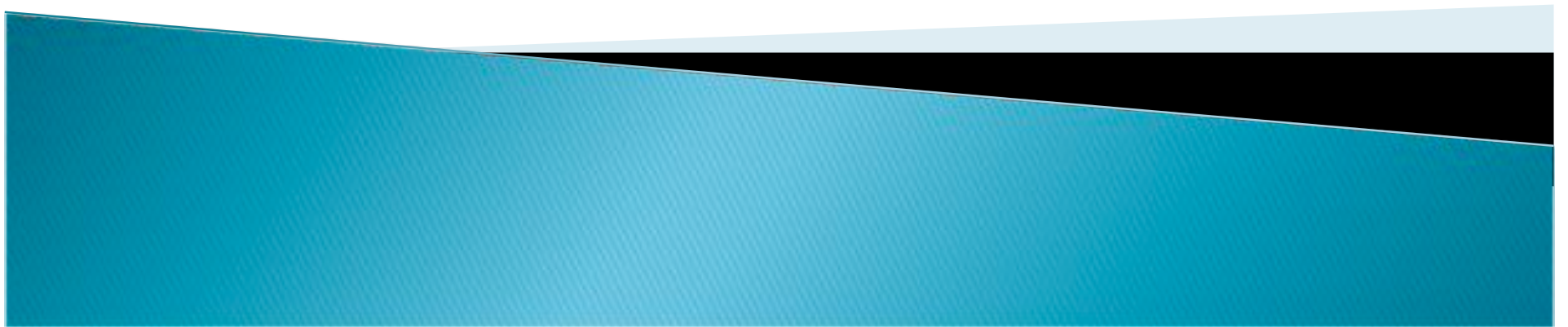


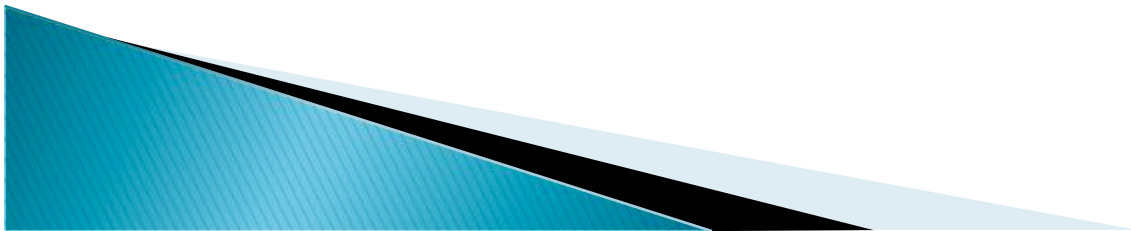
LX245 Language & Mind

Boston University, Fall 2012

Professor Peter Alrenga



What's this course all about?



What's this course all about?

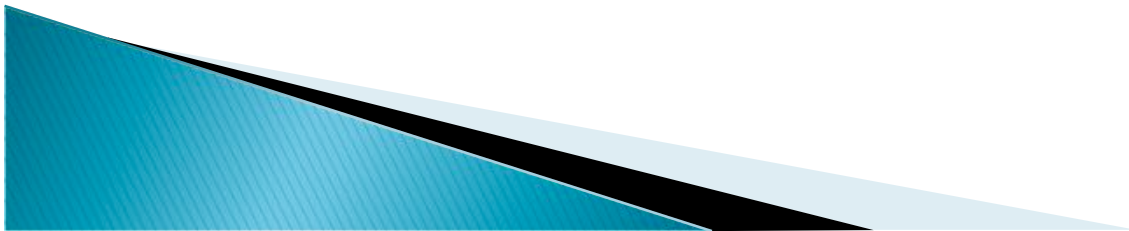
From the syllabus:

“This course surveys the modern foundations of linguistics as a cognitive science.”



The cognitive sciences

Psychology
Neuroscience
Artificial Intelligence
Linguistics
Philosophy
Anthropology



The cognitive sciences

Psychology
Neuroscience
Artificial Intelligence
Linguistics
Philosophy
Anthropology

These fields are united by a common goal:
understanding the inner workings of the
human mind.



Language as a mental faculty

Central questions for our course:

Where does language fit within our overall understanding of the mind and its architecture?

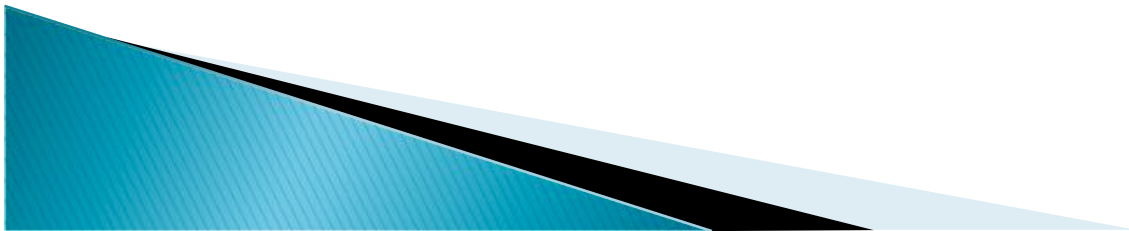


Language as a mental faculty

Central questions for our course:

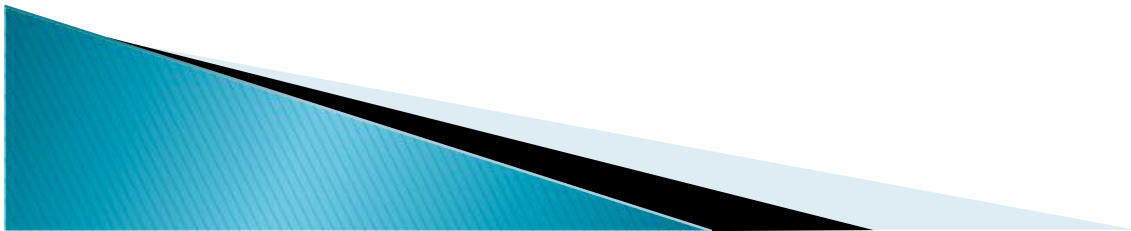
Where does language fit within our overall understanding of the mind and its architecture?

How can the study of language inform the other cognitive sciences? And how can the other cognitive sciences inform the study of language?



A recipe for forming new sentences

Homer ate the donuts.

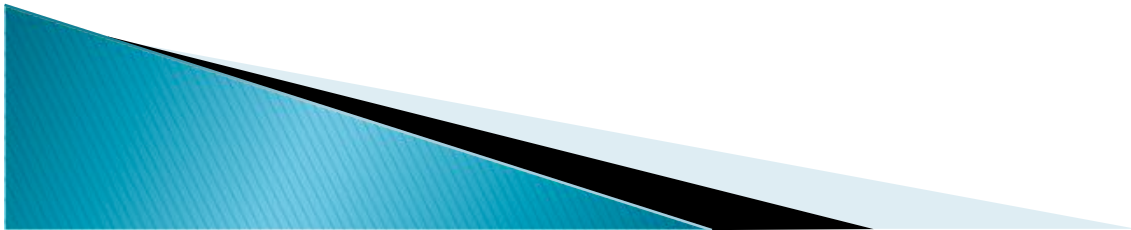


A recipe for forming new sentences

Homer ate the donuts.



The donuts were eaten by Homer.



A recipe for forming new sentences

Homer ate the donuts. (active)



The donuts were eaten by Homer. (passive)



A recipe for forming new sentences

To turn an active sentence into a passive one:

1. Move the subject to the end of the sentence and insert the word *by*.

Homer ate the donuts.



___ ate the donuts by Homer.



A recipe for forming new sentences

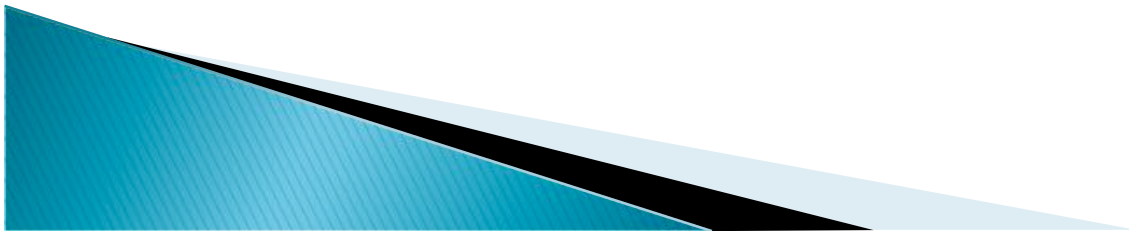
To turn an active sentence into a passive one:

2. Move the first noun phrase after the verb to the beginning of the sentence.

___ ate the donuts by Homer.



The donuts ate by Homer.



A recipe for forming new sentences

To turn an active sentence into a passive one:

3. Add the appropriate form of *be*, and (perhaps) change the form of the main verb.

The donuts ate by Homer.



The donuts were eaten by Homer.



A recipe for forming new sentences

Roger baked those delicious cookies.

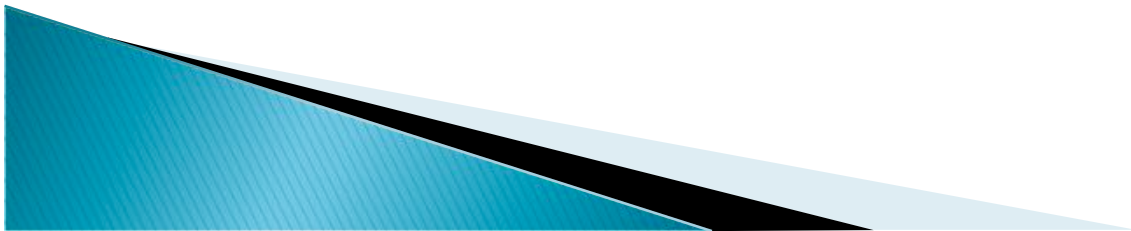


A recipe for forming new sentences

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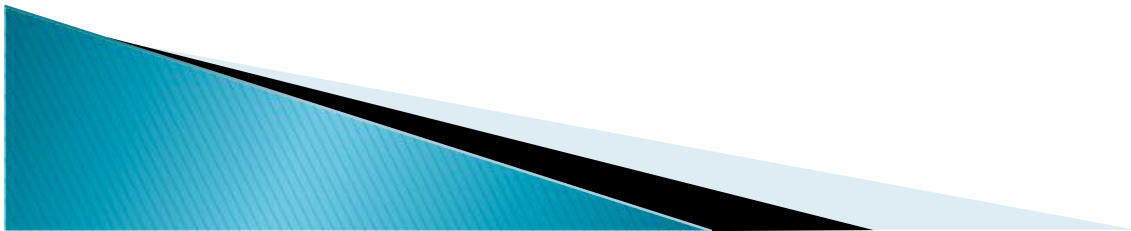


Those delicious cookies were baked by Roger.



A recipe for forming new sentences

*Inspector Hagstrom insisted upon the new
safety regulations.*

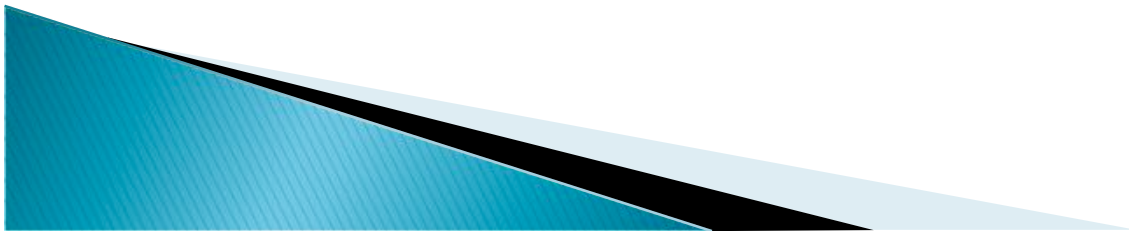


A recipe for forming new sentences

*Inspector Hagstrom insisted upon the new
safety regulations.*



*The new safety regulations were insisted upon
by Inspector Hagstrom.*



A recipe for forming new sentences

Something disgusting has slept in this bed.



A recipe for forming new sentences

Something disgusting has slept in this bed.



*This bed has been slept in by something
disgusting.*



A recipe for forming new sentences

Something disgusting has happened in this bed.



A recipe for forming new sentences

Something disgusting has happened in this bed.



**This bed has been happened in by something disgusting.*

Oops! This time, the result is not an acceptable sentence of English! (indicated with ‘*’)



Our knowledge of English

Two things that native English speakers know about their language:

1. There is a recipe for turning an active sentence into a corresponding passive one.
2. This recipe cannot be applied to just any active sentence—sometimes, it fails to produce an acceptable English sentence.



Our knowledge of English

Where does this knowledge come from?

1. There is a recipe for turning an active sentence into a corresponding passive one.

This recipe can be found in any decent grammar book, and it might have been explicitly taught to you in school...

...but didn't you already "know" the recipe?
(How can we tell?)



Our knowledge of English

Where does this knowledge come from?

2. This recipe cannot be applied to just any active sentence.

Did anyone ever teach you that **This bed has been happened in by something disgusting* is not an acceptable English sentence?

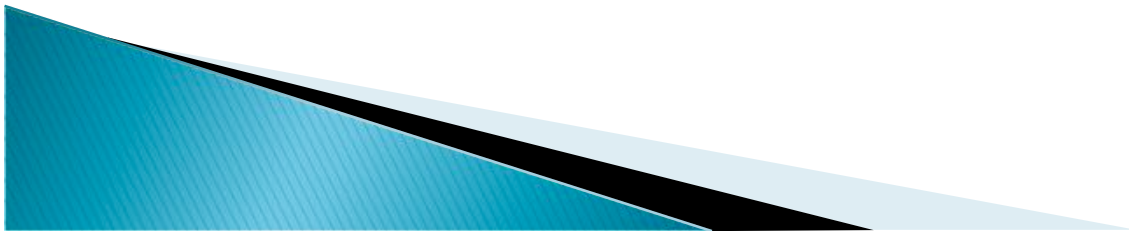


Our knowledge of English

Where does this knowledge come from?

2. This recipe cannot be applied to just any active sentence.

Were you even consciously aware of this fact before just now?



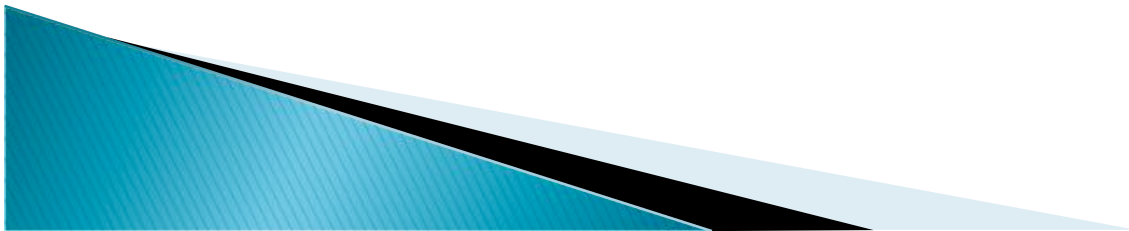
Our knowledge of English

Where does this knowledge come from?

2. This recipe cannot be applied to just any active sentence.

Were you even consciously aware of this fact before just now?

But you were unconsciously aware of it, right?
(How can we tell?)



Our knowledge of English

Where does this knowledge come from?

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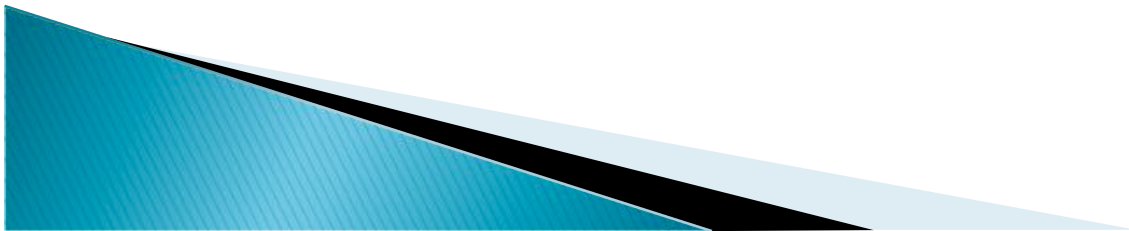
So where did this knowledge come from?



Language as a mental faculty

Linguistics (the scientific study of language)

- what does a speaker know when she knows a language?



Language as a mental faculty

Linguistics (the scientific study of language)

- what does a speaker know when she knows a language?

Linguistics & Developmental Psychology

- how does a child acquire this knowledge when learning her native language?



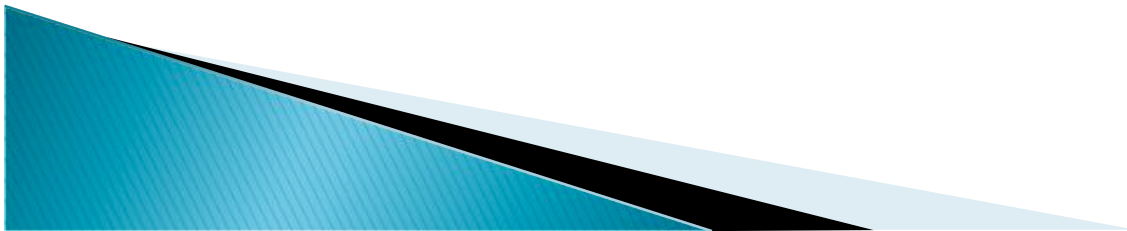
Chomsky on knowledge of language

Noam Chomsky: American linguist who, in the 1950s, articulated the modern, “mentalistic” approach to language.



Chomsky on knowledge of language

“The basic idea is that knowledge of language involves a system of rules and representations, of mental computation [...] and that much of this system is fixed and invariant, [...] determined by our biological endowment.”



Chomsky on knowledge of language

“The basic idea is that knowledge of language involves a system of rules and representations, of mental computation [...]



What is a system of rules and representations?

What is mental computation?

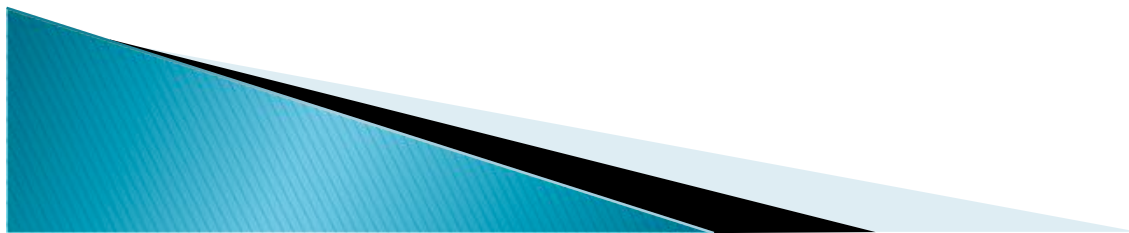


Chomsky on knowledge of language

“[...] and that much of this system is fixed and invariant, [...] determined by our biological endowment.”



If much of our knowledge of language is fixed and invariant, then how can the languages that we speak be so different from each other?



Chomsky on knowledge of language

“[...] and that much of this system is fixed and invariant, [...] determined by our biological endowment.”



Does our knowledge of language really form part of our biological endowment, or “nature”? Or is it “nurtured” through careful instruction?



Another way to form new sentences

I met [the man].



Another way to form new sentences

I met [the man].



I met [the man who directed the movie].

relative clause



Another way to form new sentences

I met the man who directed [the movie].



Another way to form new sentences

I met the man who directed [the movie].

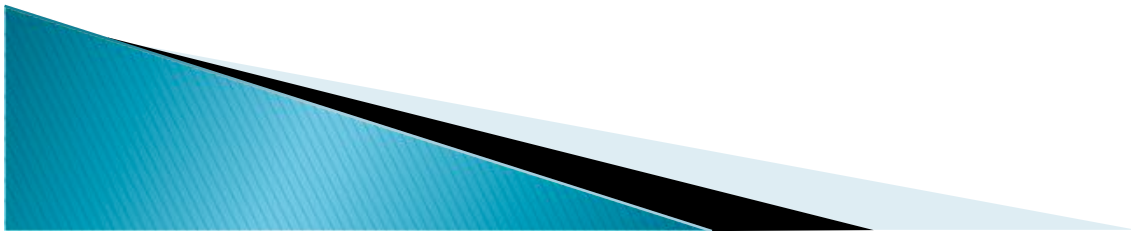


*I met the man who directed
[the movie that was reviewed by that critic].*



Another way to form new sentences

*I met the man who directed
the movie that was reviewed by [that critic].*



Another way to form new sentences

*I met the man who directed
the movie that was reviewed by [that critic].*



*I met the man who directed
the movie that was reviewed by
[that critic whom you so greatly admire].*



Another way to form new sentences

[The boy] smokes.



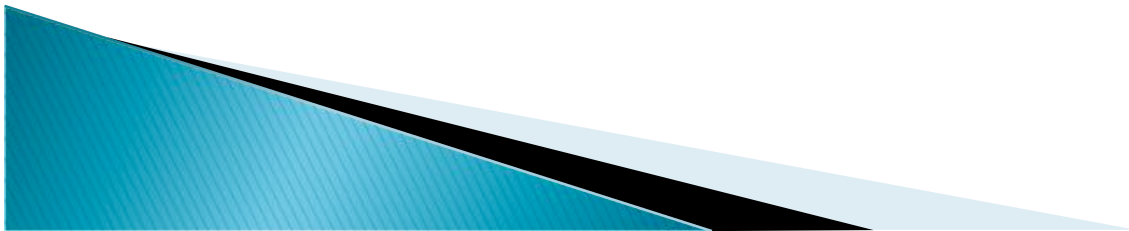
Another way to form new sentences

[The boy] smokes.



[The boy that the woman recognized] smokes.

relative clause



Another way to form new sentences

The boy that [the woman] recognized smokes.



Another way to form new sentences

The boy that [the woman] recognized smokes.



The boy that [the woman that the man loves] recognized smokes.

...could you repeat that, please?



Another way to form new sentences

*The boy that the woman that [the man] loves
recognized smokes.*



Another way to form new sentences

*The boy that the woman that [the man] loves
recognized smokes.*



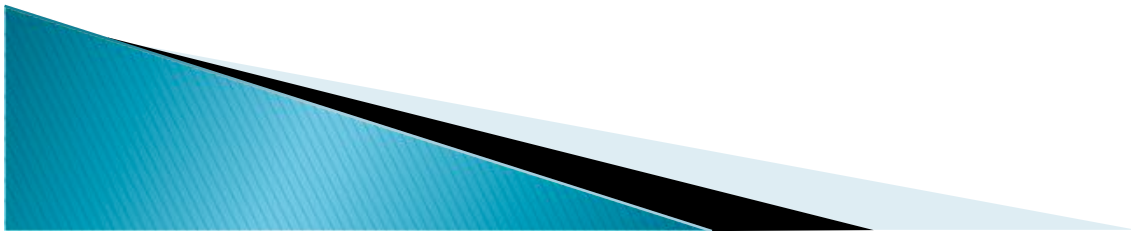
*The boy that the woman that [the man that the
child kicked] loves recognized smokes.*

Word Salad!!!



What's going on?

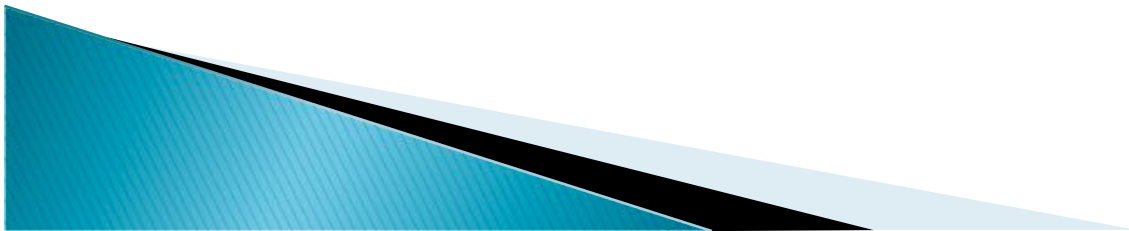
Two Possibilities:



What's going on?

Two Possibilities:

(A) Fact about English sentences: perhaps no more than two relative clauses per sentence are allowed.



What's going on?

But remember:

I met the man who directed

RC#1

the movie that was reviewed by

RC#2

that critic whom you so greatly admire.

RC#3

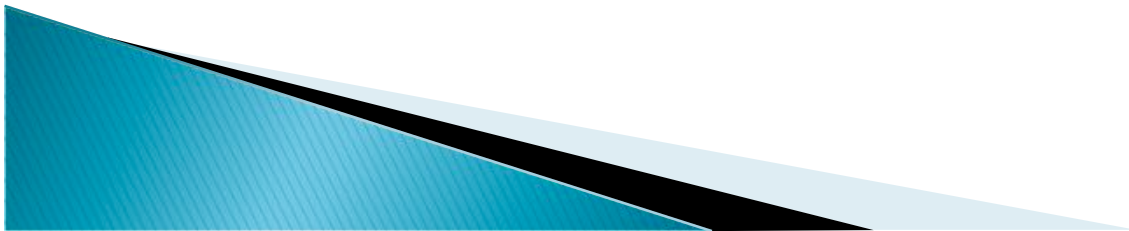
!!!



What's going on?

Two Possibilities:

- (A) Fact about English sentences: perhaps no more than two relative clauses are allowed.
- (B) Fact about how we understand English sentences: the sentences are perfectly well-formed, but our minds “break down” when confronted by them.



What's going on?

Two Possibilities:

- (A) ~~Fact about English sentences: perhaps no more than two relative clauses are allowed.~~
- (B) Fact about how we understand English sentences: the sentences are perfectly well-formed, but our minds “break down” when confronted by them.

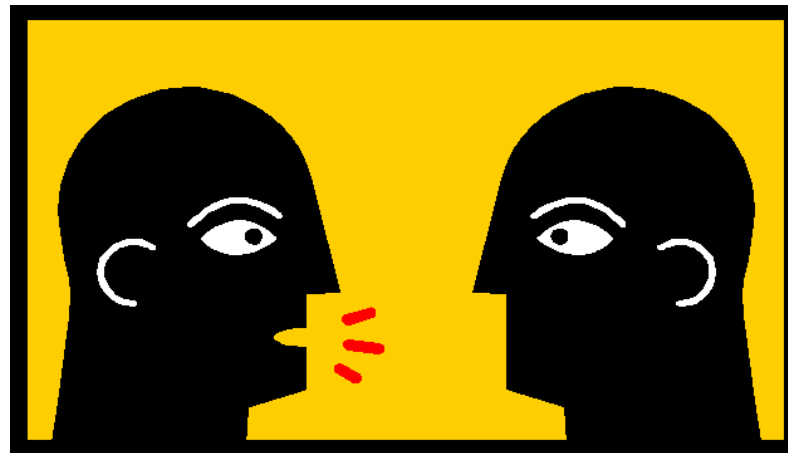
How do we understand sentences?



Language as a mental faculty

Linguistics & Psychology

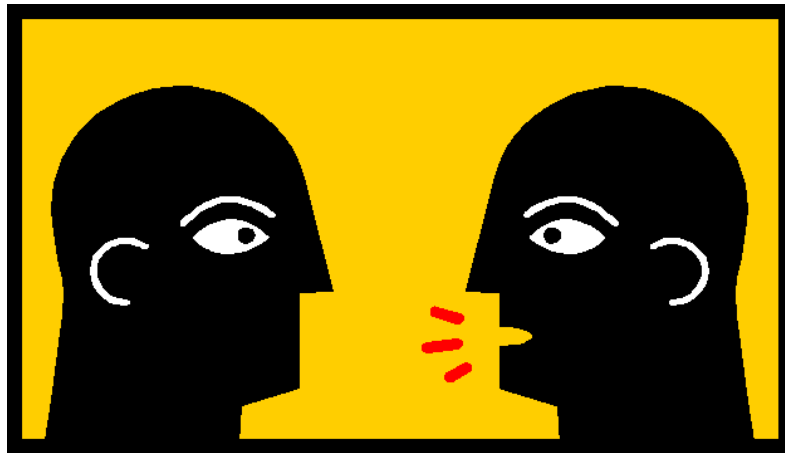
- how do we put our knowledge of language to use in understanding others?



Language as a mental faculty

Linguistics & Psychology

- how do we put our knowledge of language to use in understanding others?
- how do we put this knowledge to use in producing sentences ourselves?



Language as a mental faculty

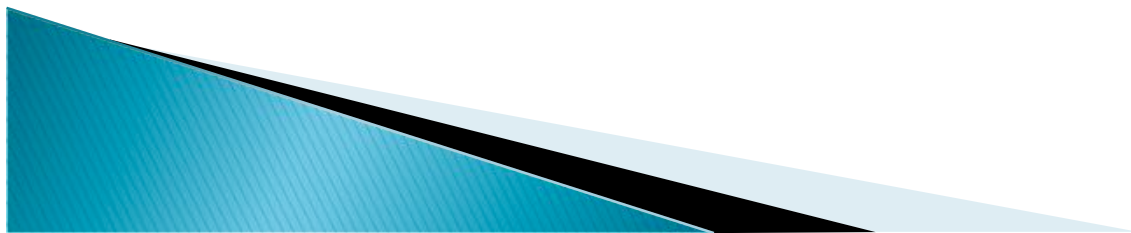
Linguistics & Neuroscience

- where (and how) is our knowledge of language physically realized in the brain?
(neural substrates of language)



Getting computers to “talk”

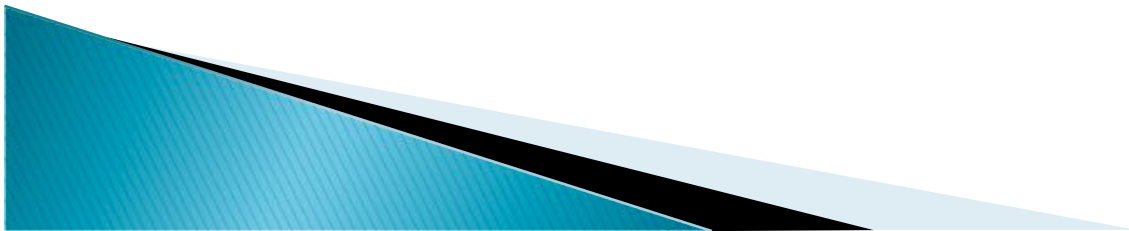
ELIZA the psychotherapist
(created at MIT during 1960s)



Getting computers to “talk”

ELIZA the psychotherapist
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Patient: *I feel sad.*

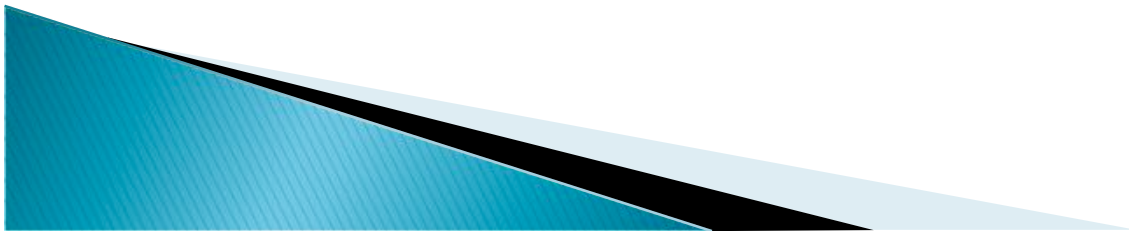


Getting computers to “talk”

ELIZA the psychotherapist
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Patient: *I feel sad.*

ELIZA: *Tell me more about these feelings.*



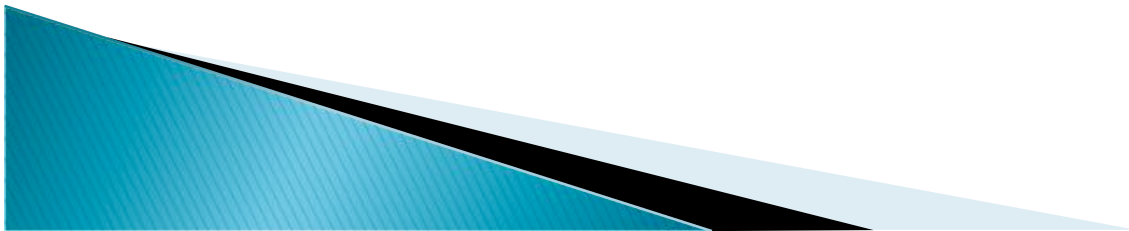
Getting computers to “talk”

ELIZA the psychotherapist
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Patient: *I feel sad.*

ELIZA: *Tell me more about these feelings.*

Patient: *I don't get along with my mother.*



Getting computers to “talk”

ELIZA the psychotherapist
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Patient: *I feel sad.*

ELIZA: *Tell me more about these feelings.*

Patient: *I don't get along with my mother.*

ELIZA: *Why don't you get along with your mother?*



Getting computers to “talk”

ELIZA the psychotherapist
(created at MIT during 1960s)

Patient: *I feel sad.*

ELIZA: *Tell me more about these feelings.*

Patient: *I don't get along with my mother.*

ELIZA: *Why don't you get along with your mother?*

Patient: *She's too pushy.*



Getting computers to “talk”

ELIZA the psychotherapist
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Patient: *I feel sad.*

ELIZA: *Tell me more about these feelings.*

Patient: *I don't get along with my mother.*

ELIZA: *Why don't you get along with your mother?*

Patient: *She's too pushy.*

ELIZA: *Can you elaborate on that?*



Getting computers to “talk”

ELIZA the psychotherapist
(created at MIT during 1960s)

Patient: *I am not awake right now.*



Getting computers to “talk”

ELIZA the psychotherapist
(created at MIT during 1960s)

Patient: *I am not awake right now.*

ELIZA: *How long have you been not awake
right now?*

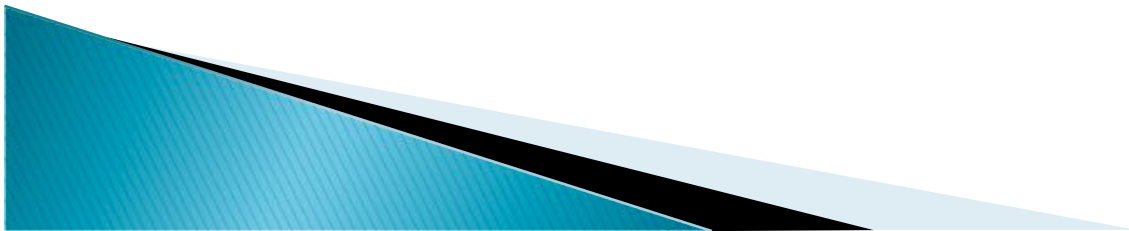
Hmmm...



Getting computers to “talk”

ELIZA the psychotherapist
(created at MIT during 1960s)

Patient: *I am dead.*



Getting computers to “talk”

ELIZA the psychotherapist
(created at MIT during 1960s)

Patient: *I am dead.*

ELIZA: *Do you believe it is normal to be dead?*

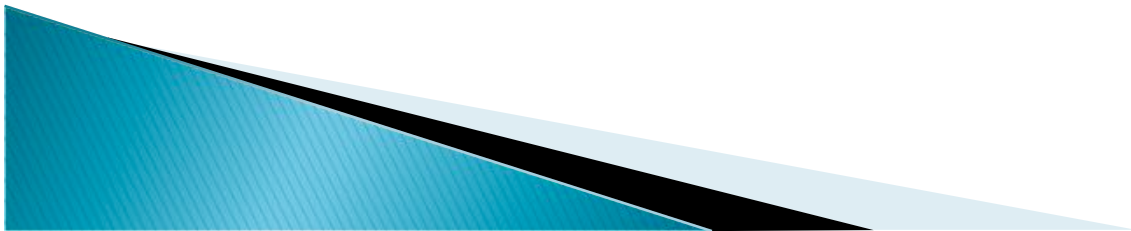
Uh oh...



Language as a mental faculty

Linguistics & Artificial Intelligence

- what must a computer “know” in order to “understand” English?



Language as a mental faculty

Linguistics & Computer Science

- what must a computer “know” in order to “understand” English?
- what can we conclude about the relations between our knowledge of language and other types of knowledge?
(e.g., our commonsense knowledge that dead people don't talk...)



Color terms across languages

Basic color terms in English

(not compound words like *blue-green*,
or derived words like *reddish*,
or specialized words like *vermillion*, *ochre*)



Color terms across languages

Basic color terms in English

black
white



Color terms across languages

Basic color terms in English

black

white

red

blue

green

yellow

brown

orange

purple/violet

pink



Color terms across languages

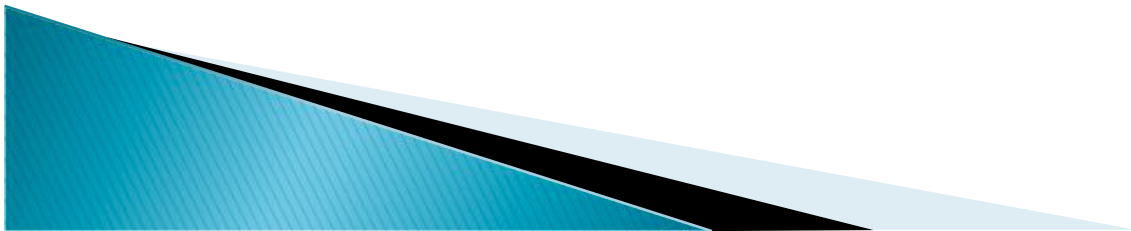
Basic color terms in Dani
(spoken in Papua New Guinea)



Color terms across languages

Basic color terms in Dani
(spoken in Papua New Guinea)

mili 'dark'
wola 'light'

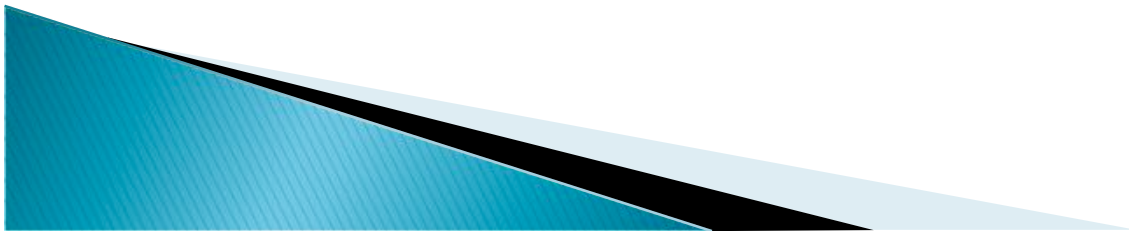


Color terms across languages

Basic color terms in Dani
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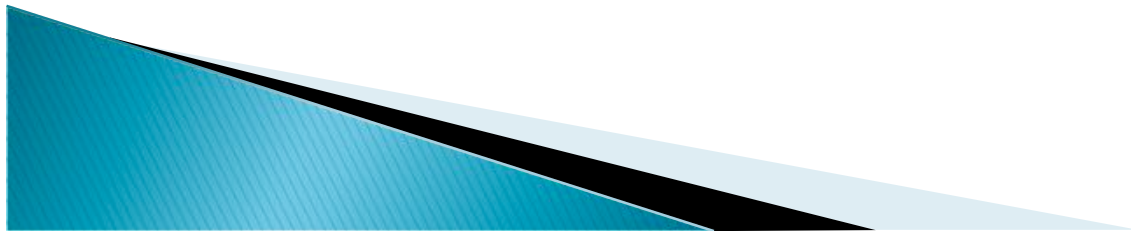
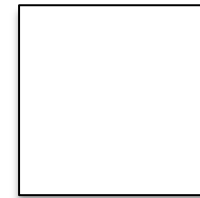
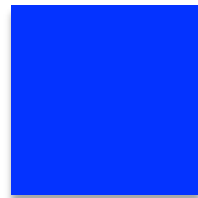
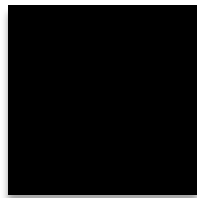
mili 'dark'
wola 'light'

That's it!



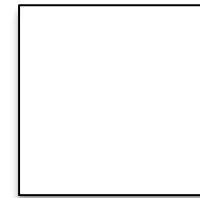
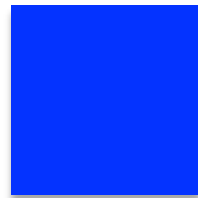
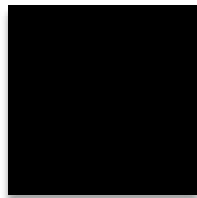
Color terms & color perception

How many different colors does
a Dani speaker recognize?



Color terms & color perception

How many different colors does a Dani speaker recognize?



3

mili

(no name)

wola

3

mili

mili

wola

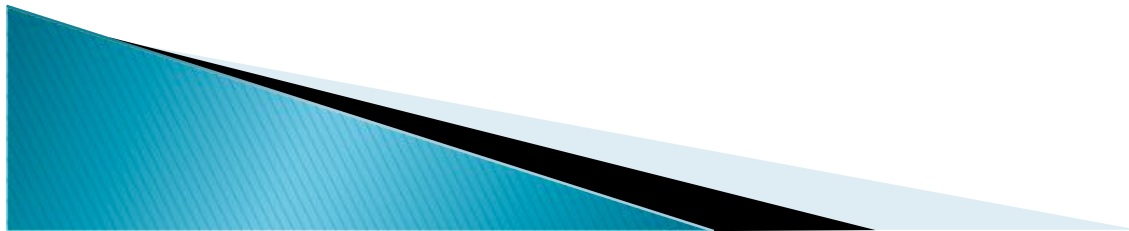
?

2

mili

mili

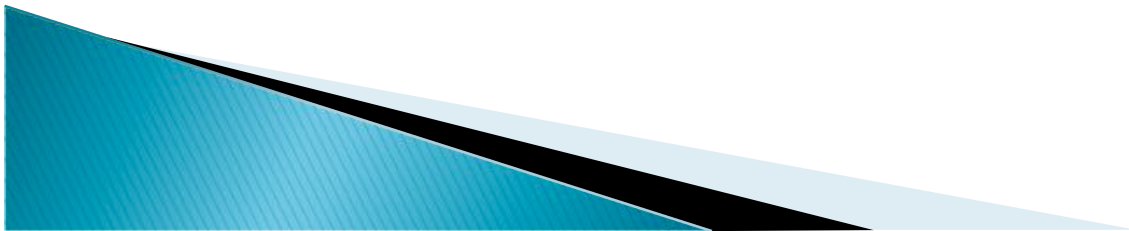
wola



Language as a mental faculty

Linguistics, Psychology & Anthropology

- does the language that we speak determine how we perceive, categorize, and interact with the world?



Language as a mental faculty

Linguistics, Psychology & Anthropology

- does the language that we speak determine how we perceive, categorize, and interact with the world?
- or is this relationship more subtle?



Language as a mental faculty

Linguistics, Psychology & Anthropology

- does the language that we speak determine how we perceive, categorize, and interact with the world?
- or is this relationship more subtle?
- do speakers of different languages have different mental lives?

