

# LING 001

# Introduction to Linguistics

Lecture #6

## **Animal Communication 2**

02/05/2020

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# Announcements

- Exam 1 is next class (Monday)!
- Remember there are no make-up exams (but your lowest exam score will be dropped)

# How to do well on the exam

- Review the study guides
- Make sure you can answer the practice problems
- Come on time (exam is 50 minutes)
  - We MUST leave the room for the next class

# First two questions are easy

## LING001 - Exam 1 - Spring 2020

Read each question carefully

- (1) **Your name and recitation section (5 points).** Enter your name and recitation section below
  - (a) Student name:
  - (b) Recitation section:
  
- (2) **Exam Honor Code (5 points).** Please write out the exam's honor code in the space below and sign your name on the Signature line.

*"I affirm that I will not give or receive any unauthorized help on this exam, and that all work will be my own."*

Signature \_\_\_\_\_

# Last time

- Communication is everywhere in the animal kingdom!
- Human language is
  - An **unbounded discrete combinatorial system**
- Many animals have elements of this:
  - Honeybees, songbirds, primates
- But none quite have language

# Case Study #4: Can Apes learn Language?

# Ape Projects

- Viki (oral production)
- **Sign Language:**
  - Washoe (Gardiner) (chimp)
  - Nim Chimpsky (Terrace) (chimp)
  - Koko (Patterson) (gorilla)
  - Kanzi (Savage-Rumbaugh) (bonobo)

# Viki's 'speech'

- Raised by psychologists
- Tried to teach her oral language, but didn't get far...





# Later Attempts

- Later attempts used **non-oral languages** —
  - either **symbols** (Sarah, Kanzi) or
  - **ASL** (Washoe, Koko, Nim).
- Extensive direct **instruction** by humans.
- Many **problems of interpretation and evaluation.**

**Main one:** is this a

- miniature/incipient unbounded discrete combinatorial system, or
- is it just rote learning+randomness?

# Washoe and Koko Video



# Washoe



- A chimp who was extensively trained to use ASL by the Gardners
- Knew 132 signs by age 5, and over 250 by the end of her life.
- Showed some productive use ('water bird')
- And even taught her adopted son Loulis some signs

# But the only deaf, native signer on the team

- 'Every time the chimp made a sign, we were supposed to write it down in the log... They were always complaining because my log didn't show enough signs. All the hearing people turned in logs with long lists of signs. They always saw more signs than I did....'
- 'I watched really carefully. The chimps's hands were moving constantly. Maybe I missed something, but I don't think so. I just wasn't seeing any signs.'
- 'Every time the chimp put his finger in his mouth, they'd say "Oh, he's making the sign for drink," and they'd give him some milk... When the chimp scratched itself, they'd record it as the sign for scratch... When [the chimps] want something, they reach. Sometimes [the trainers would] say, "Oh, amazing, look at that, it's exactly like the ASL sign for give!" It wasn't.'

# Koko



- Gorilla (Patterson)
- “the ape who “really” learned language, and who uses it the way humans do--swearing, using metaphors, telling jokes, making puns”
- However, Patterson has produced **no data for anyone to look** at to prove this; only lists of signs
- **on less stringent criteria** for counting as having learned a sign, **learned 250** by age 5
- **on double-blind tests**, gets 60% correct

# Koko transcript

- Here's a transcript:

Koko: YOU KOKO LOVE DO KNEE YOU

Patterson: KOKO LOVE WHAT?

Koko: LOVE THERE CHASE KNEE DO

Observer: The tree, she wants to play in it!

Patterson: No, the girl behind the tree!

- Not very encouraging...



# Project Nim



# Nim Chimpsky



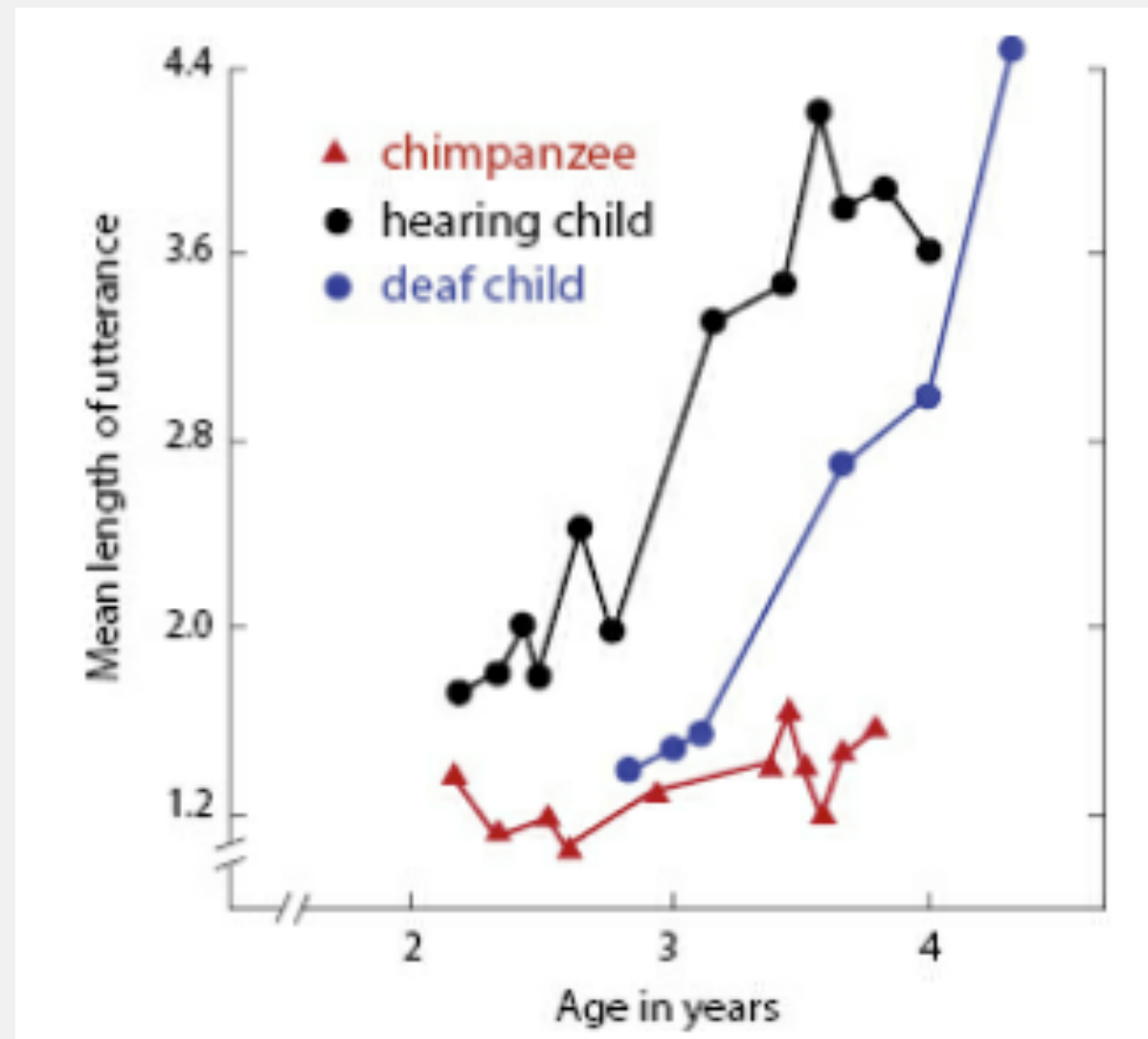
- **Herbert Terrace's plan:**  
teach chimp language to find out how chimps think;  
use him as interpreter with wild chimps
- Nim Chimpsky started at 2wks old  
by just being signed to
- At 9 months extensive language training began, 5  
hours/day; recorded and video taped
- These data were made available, and are really only  
production data from primate projects available
- After 3 years, had learned 125 signs



# Nim Chimpsky - Complexity?

- Some **multi-sign combinations**, but of two types:
  - **Repetitions** of the same signs
    - "GIVE ORANGE ME GIVE EAT ORANGE ME EAT ORANGE GIVE ME EAT ORANGE GIVE ME YOU"
  - Or repetitions of signs made by the trainer immediately prior
- **Note:** unlike human children, Nim's **Mean Length of Utterance did not rise**
  - Only 12% of utterances were **spontaneous**; and always related to eating, drinking, and playing.
  - 40% were **imitations** of trainer
  - No morphology, no syntax, etc.

# MLU at toddler level



# Nim Chimpsky - Conclusions

- According to an **ASL expert linguist** who worked with Nim for 8 months,

Nim knows **lots of words**, but no grammar

- Nim has discrete elements, but not combinatorial system.
- **Remember Genie**: vocabulary but no rules.
- Terrace concluded that there was **no evidence for syntactic abilities** in chimp research
- Jane Goodall visited the project and said Nim's signs were familiar to her from observing chimps in the wild.

# Kanzi



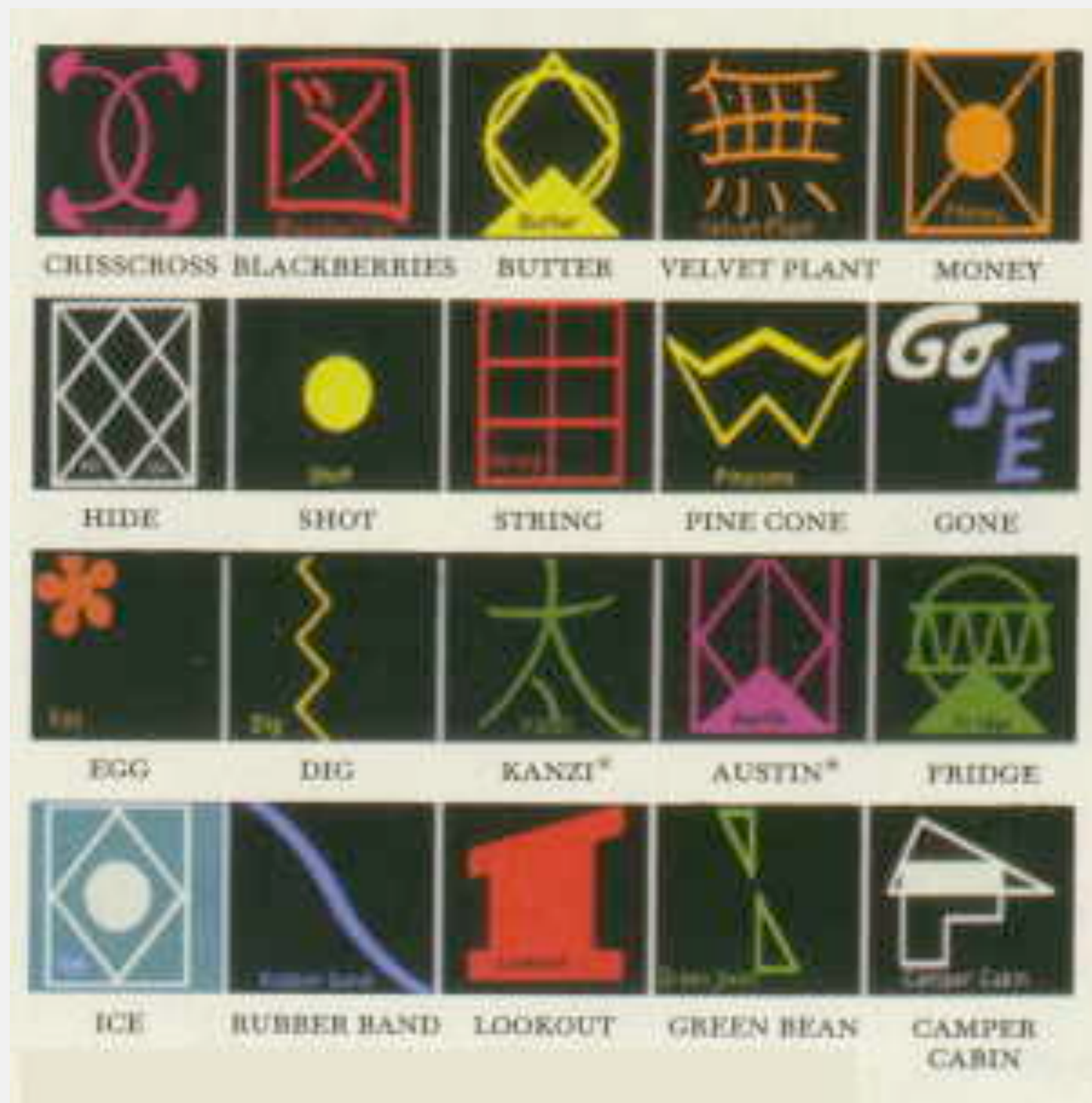


# Kanzi



- **Bonobo** (Savage-Rumbaugh)
- learned associations between **meanings** and arbitrary **graphic designs** "lexigrams" on a keyboard
- Bonobos: rare in nature, intelligent, elaborate social organization, males and females share food and child-rearing responsibilities
- Tried to teach **Kanzi's mother**, Matata, but she couldn't learn
- Kanzi was around during Matata's training b/c too young to be separated, and **learned lexigrams**
- **Example:** natural hand-clapping gesture to evoke chasing followed by pressing "chase" lexigram

# Kanzi's keyboard



# Kanzi - methods

- No formal communication drills
- Instead, trainers carried around keyboard and pressed lexigrams as they spoke English about what they were doing (e.g., LIZ TICKLE KANZI)
- Kanzi used keyboard to express what he wanted
- by 4 years,
  - 40 lexigrams
  - comprehension of corresponding English words
  - almost 100% on double-blind tests
- He would play by himself with the keyboard, but stop whenever people approached, so no data

# Kanzi - Structure?

- Linguistic **structure**?
- doesn't really produce **multi-lexigram sequences**
- does **combine** natural, iconic **gestures** ("come", "go", "chase") with **lexigrams**
- Links two actions "grammatically": **chase hide, tickle slap, grab slap**.  
(Invitation to play + type of play requested.)
- Sometimes has word-order right:  
**grab Matata** (object) vs. **Matata bite** (subject).
- but generally, word order is not based on syntax, but rather first lexigram then gesture



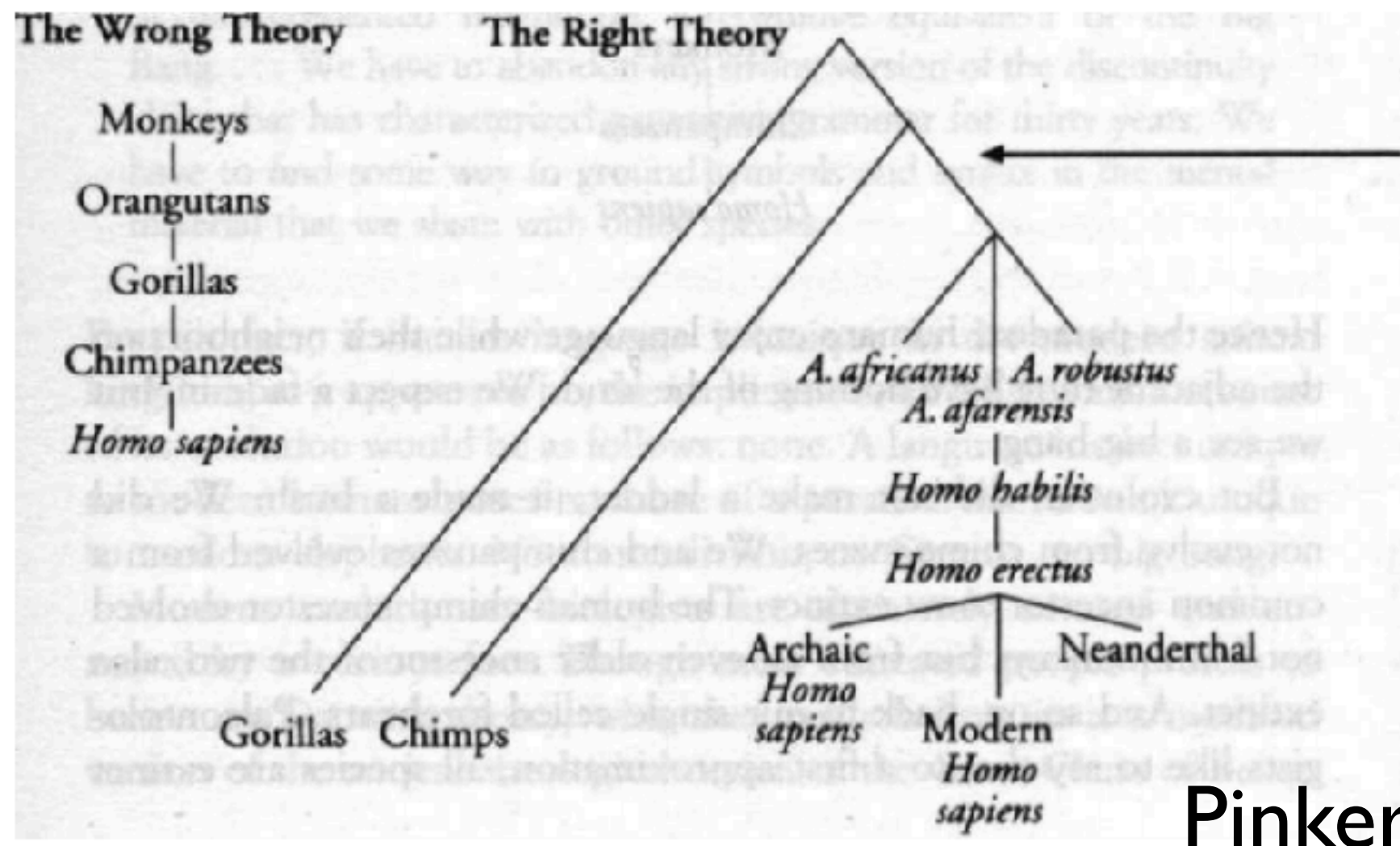
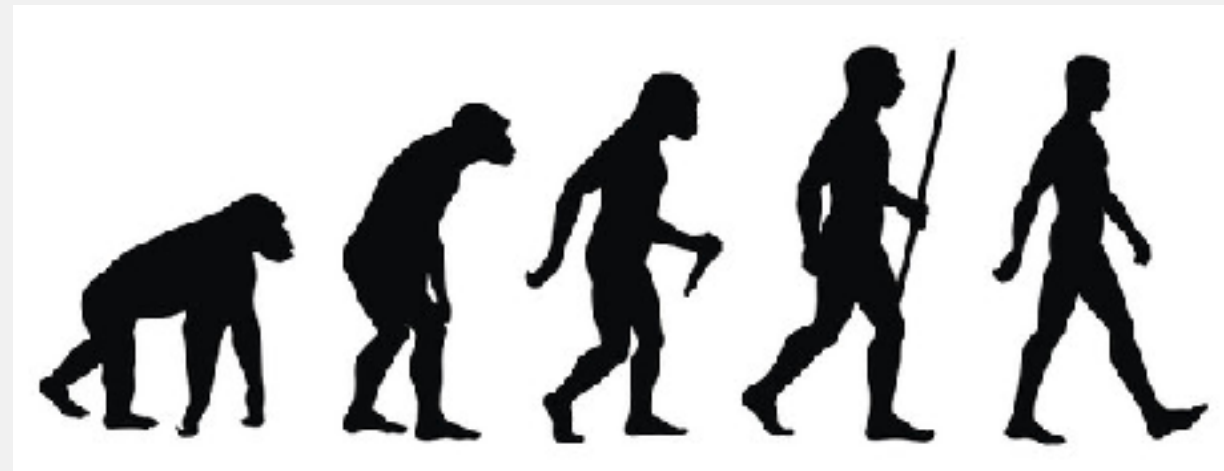
# Kanzi - Bottom Line

- Kanzi has a method for associating the symbols he knows (when he hears them) with parts of complex concepts in his mind,
- but this method does not involve genuinely grammatical structure

# Summing up

- Nonhuman primates are apparently cognitively incapable of learning language
  - No evidence for **phonology**
  - No evidence for **morphology**
  - No evidence for **syntax**
- However, they do have some **remarkable abilities** not previously suspected
  - **learn** many **symbolic**, referential signs
  - can learn to **understand linear ordering** to some extent

# Final comments



Pinker

# Final Comments

- “Humans can ‘fly’ about 30 feet – that’s what they do in the Olympics. Is that flying? The question is totally meaningless.”

(Noam Chomsky)

# Time for questions

- Questions about today's lecture or the exam welcome!