Lessons from the Comparative Language Studies

Cogs 143 * UCSD

Sociological Issues

Language is sacred.

John 1:1

Sociological Issues

Language is what separates us from the beasts…

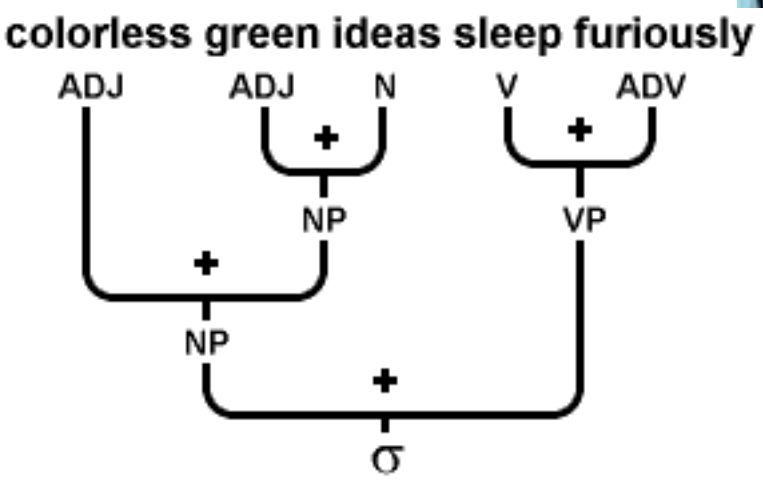
Sociological Issues

Animals are just animals…

Soiological Issues

"The proper study
of Man is Man"

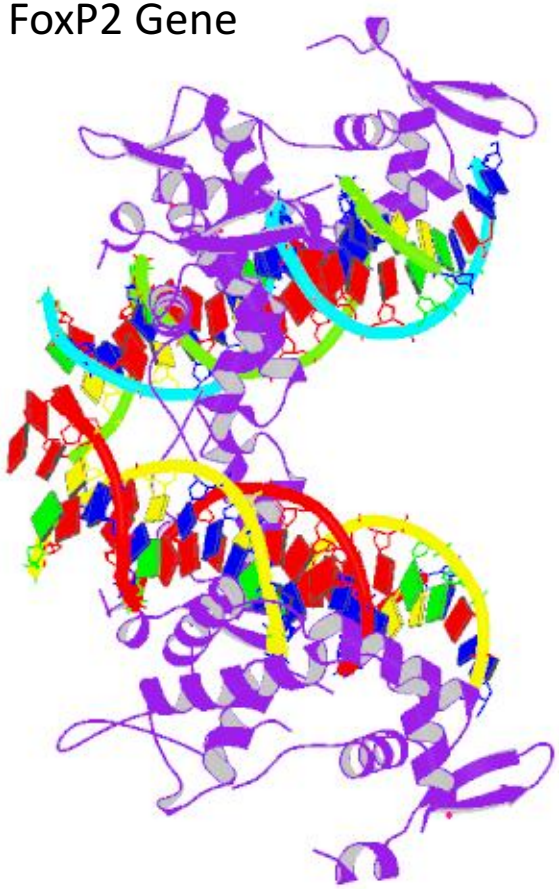
Sociological Issues

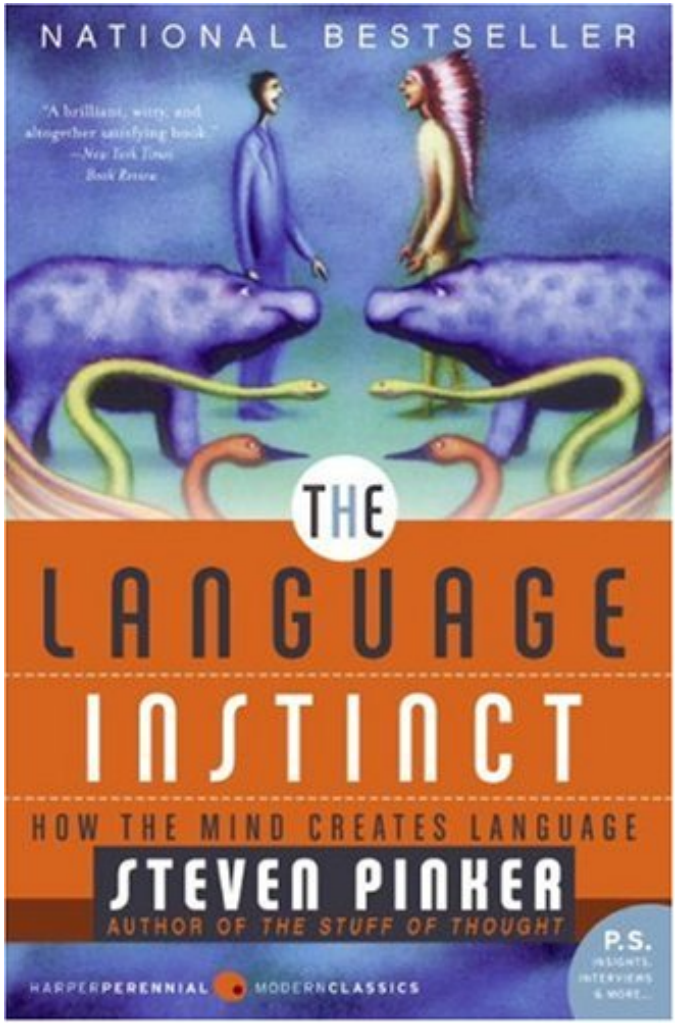


Noam Chomksy's innate
"**Universal Grammar**"
Is the product of an evolved
"**Language Acquisition Device**" ("LAD")

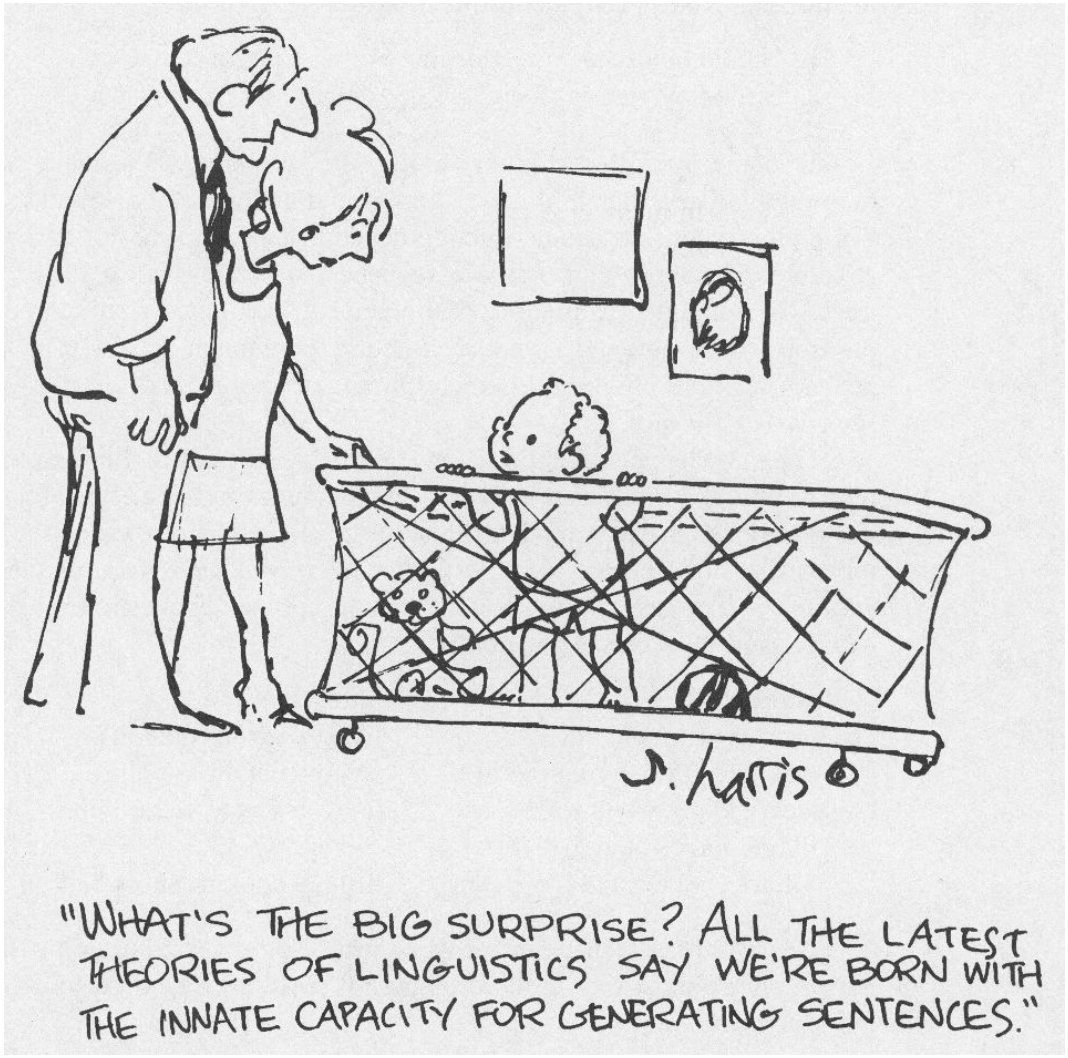
Sociological Issues

The FoxP2 Gene





Sociological Issues



Language as an enculturated,
AND enculturating practice…

Species Appropriate Design

The Kelloggs & Gua:
Tried to teach
Chimp to **speak**

Failed!

Sign Language

~1960s, ASL (American Sign Language) began to be recognized,
by linguists, as “a language”

The Gardners & Washoe

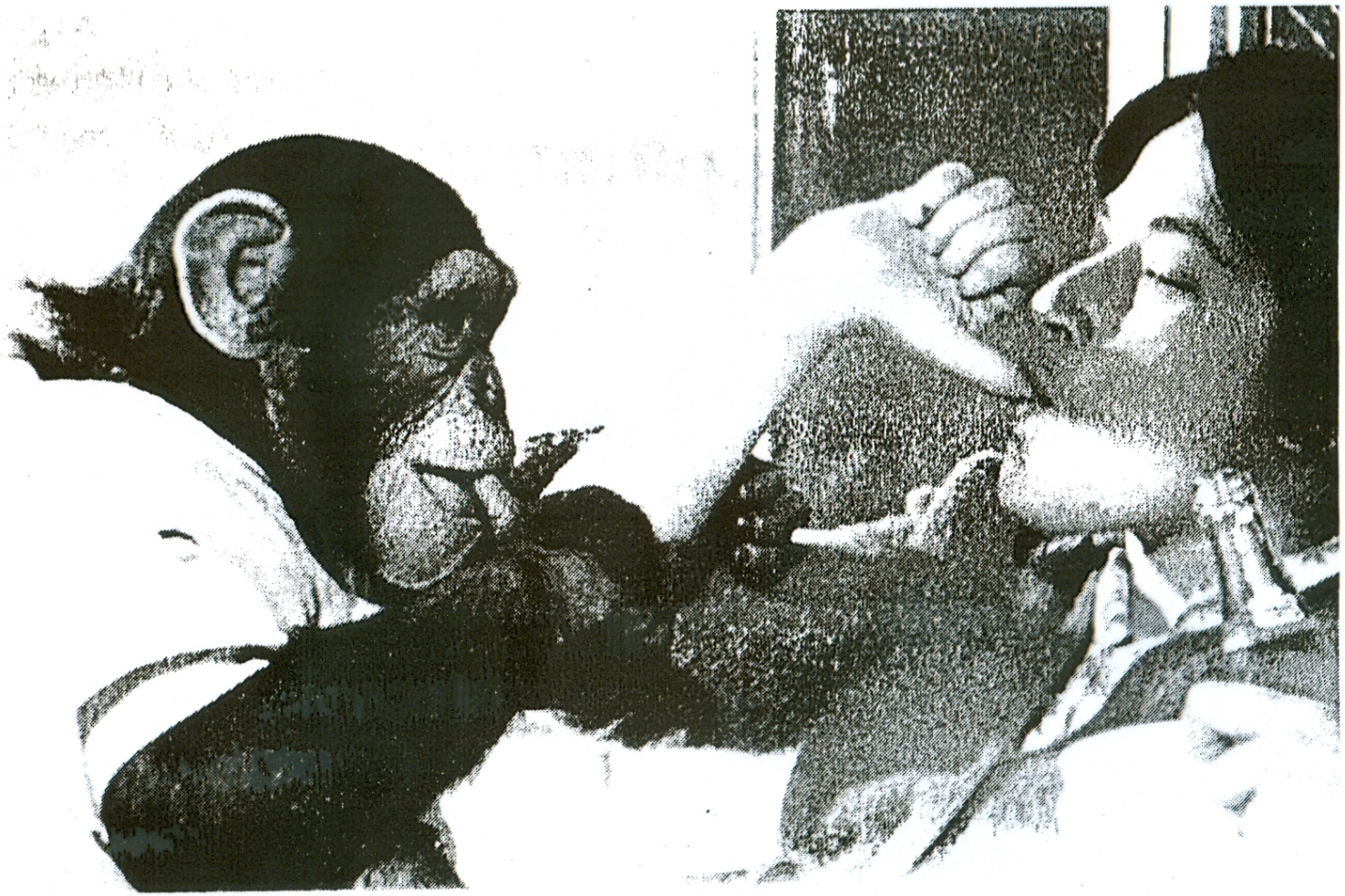
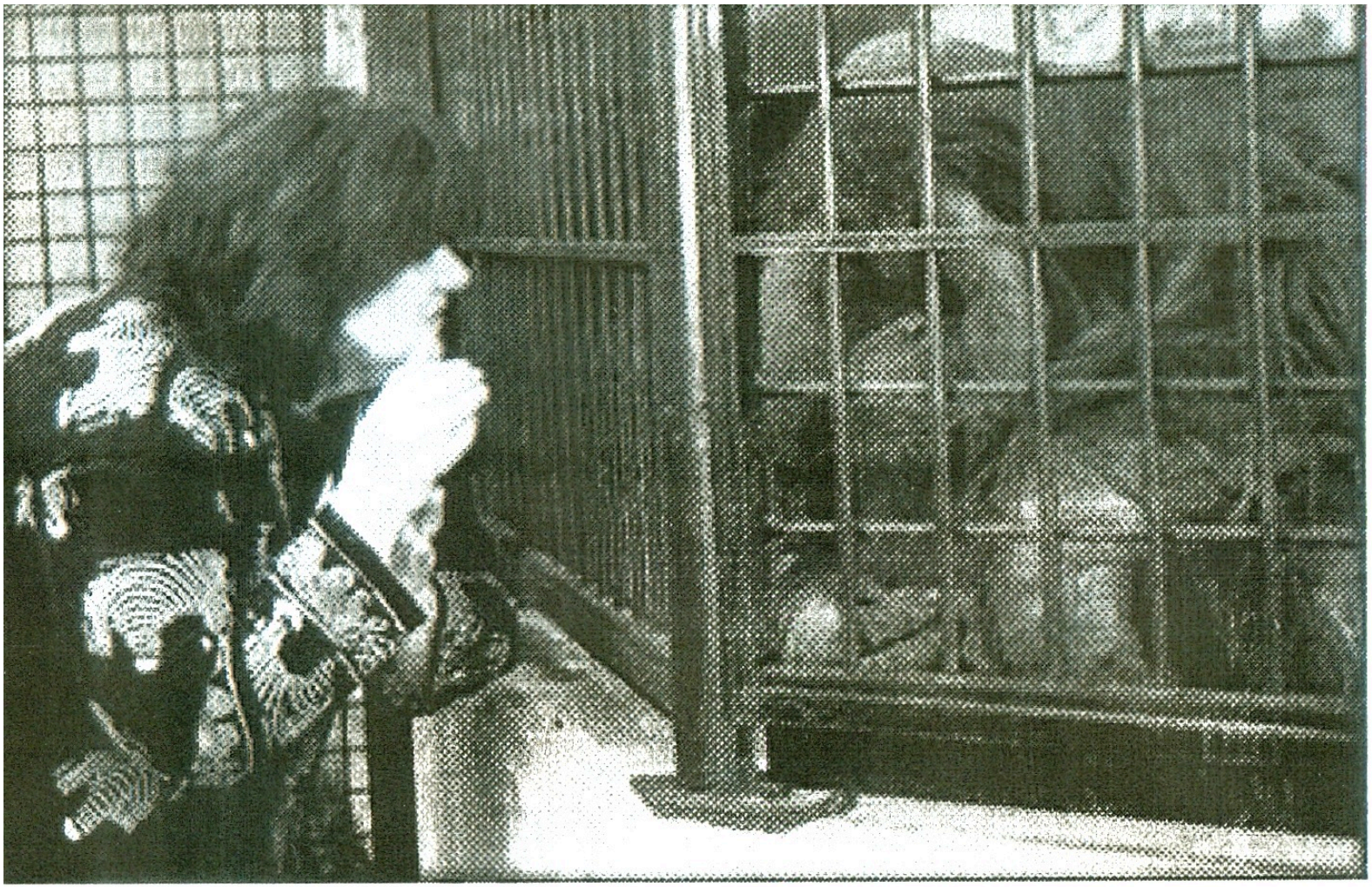


Fig. 3.1 Similarity between chimpanzee and human signers: Washoe (27months) a B.T. Gardner sign DRINK.

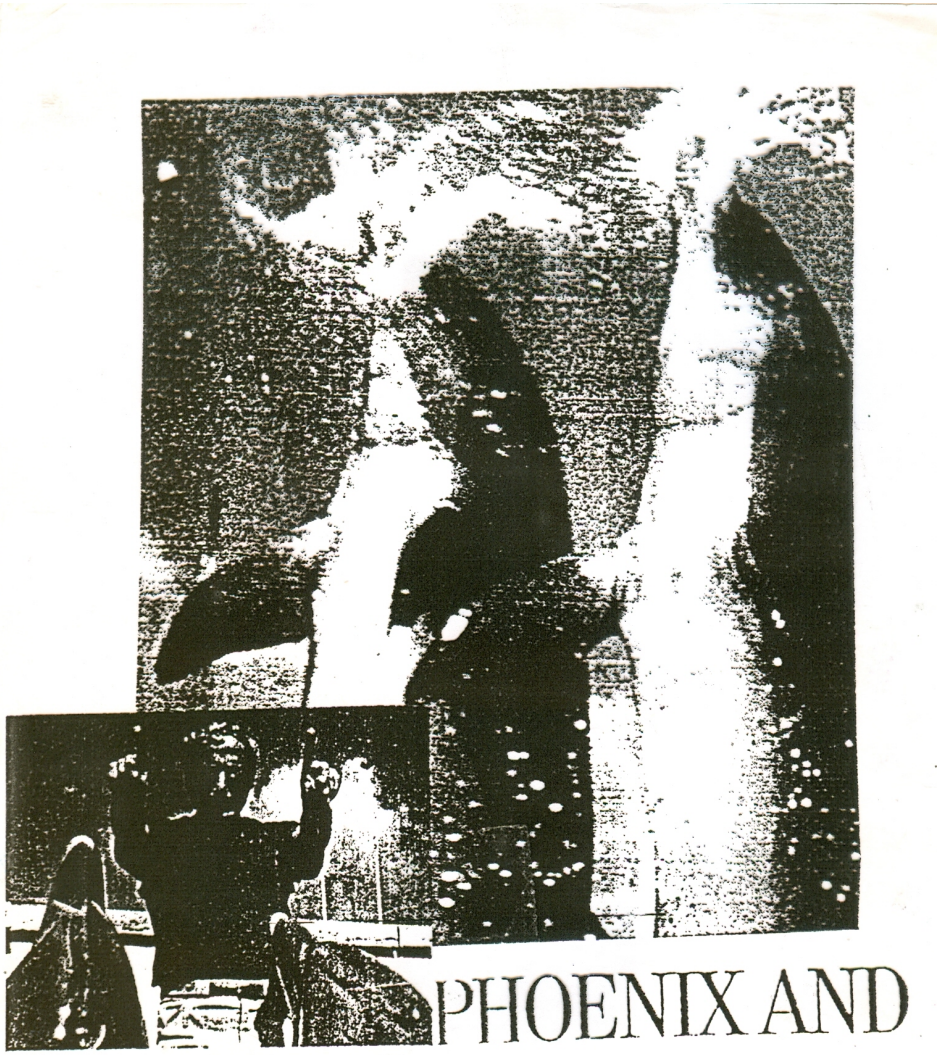
Terrace & Nim Chimsky

Patterson & Koko

Miles & Chantek



Herman and Phoenix & Ake



PHOENIX AND AKEAKAMAI

To jump and spit water in perfect tandem, the two dolphins must somehow communicate; inset, Herman tells his pupils to pay attention.

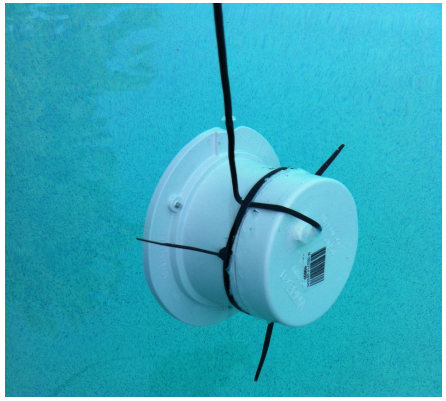
Dolphins – "Language" *Comprehension*

Present sequence of hand gestures
to provoke specific actions to specific objects

Without hands,
dolphins can obviously not imitate,
so studied only language comprehension,
not production

Computer-Generated Acoustic Signals

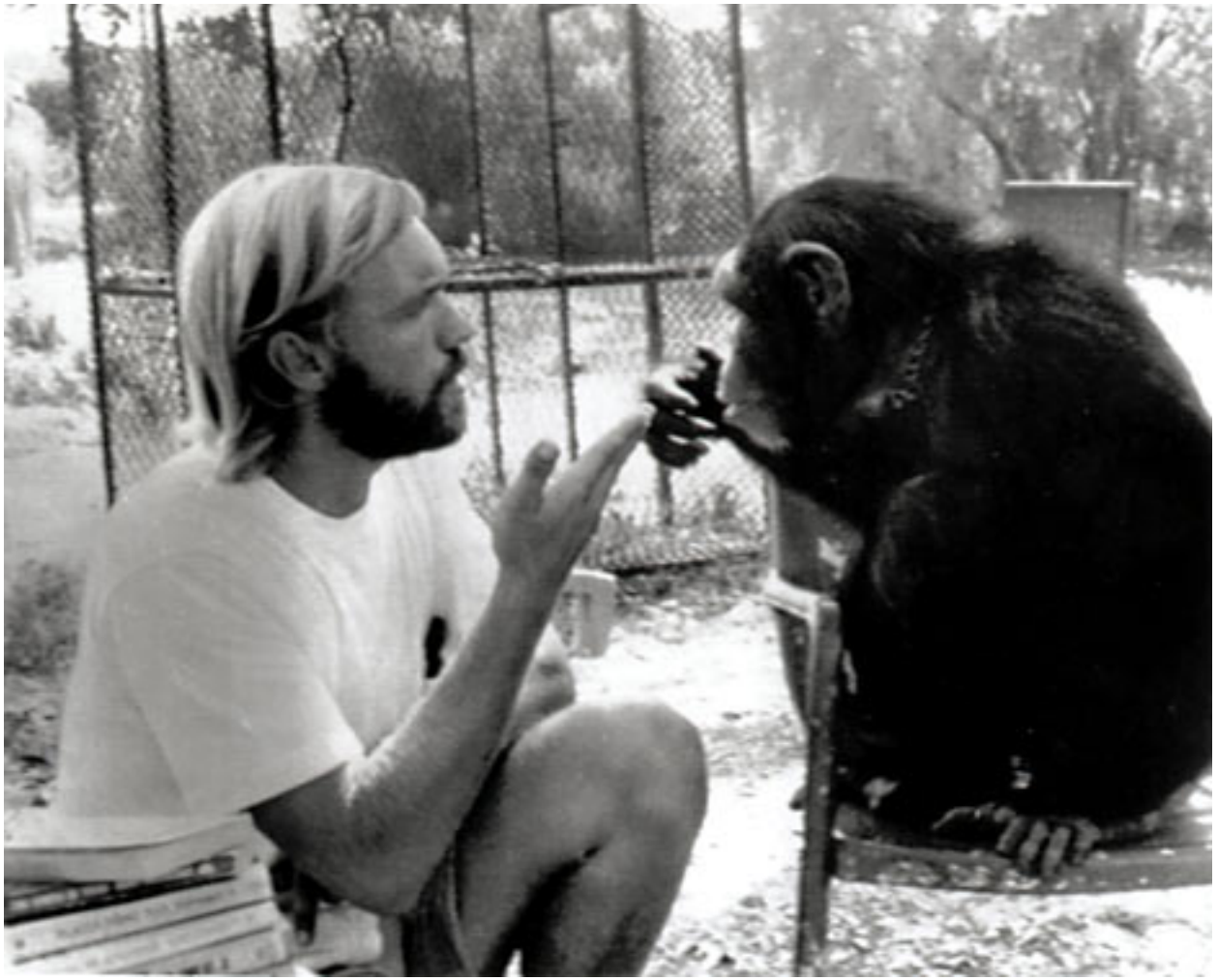
One animal (Phoenix) presented with auditory commands,
requiring same sorts of actions with objects.



Also asked to <u>imitate</u> sounds –
some success, but somehow stalled – abandoned.

Critiques

Critiques



Poor Data Recording –

Daily naturalistic interactions not well documented.

ies

Unjustly scolded for breaking a doll that Michael had actually half-destroyed, Koko retaliates by signing: *You...*

dirty...

bad...

toilet.

Lack of controls –
e.g. Inadvertent cueing

Critiques

Poor Data Reporting –

Seldom details on how trained,
or on how often/when fail

Critiques

Chatting with herself, Koko signs *eye* while looking at a picture of a big-eyed frog.

Biased Reporting

Critiques


WTFACTS.ORG
KOKO, THE GORILLA WHO WAS TAUGHT SIGN LANGUAGE, ONCE LIED TO HER TRAINERS, BLAMING HER KITTEN FOR TEARING A SINK OUT OF THE WALL
Trending Pictures On Internet Today
TopOnDay.com

Revisions –Computer Keyboard

Generates a record of linguistic interaction.

Sue Savage-Rumbaugh
and bonobo Kanzi

Revisions – Magnetic Tokens

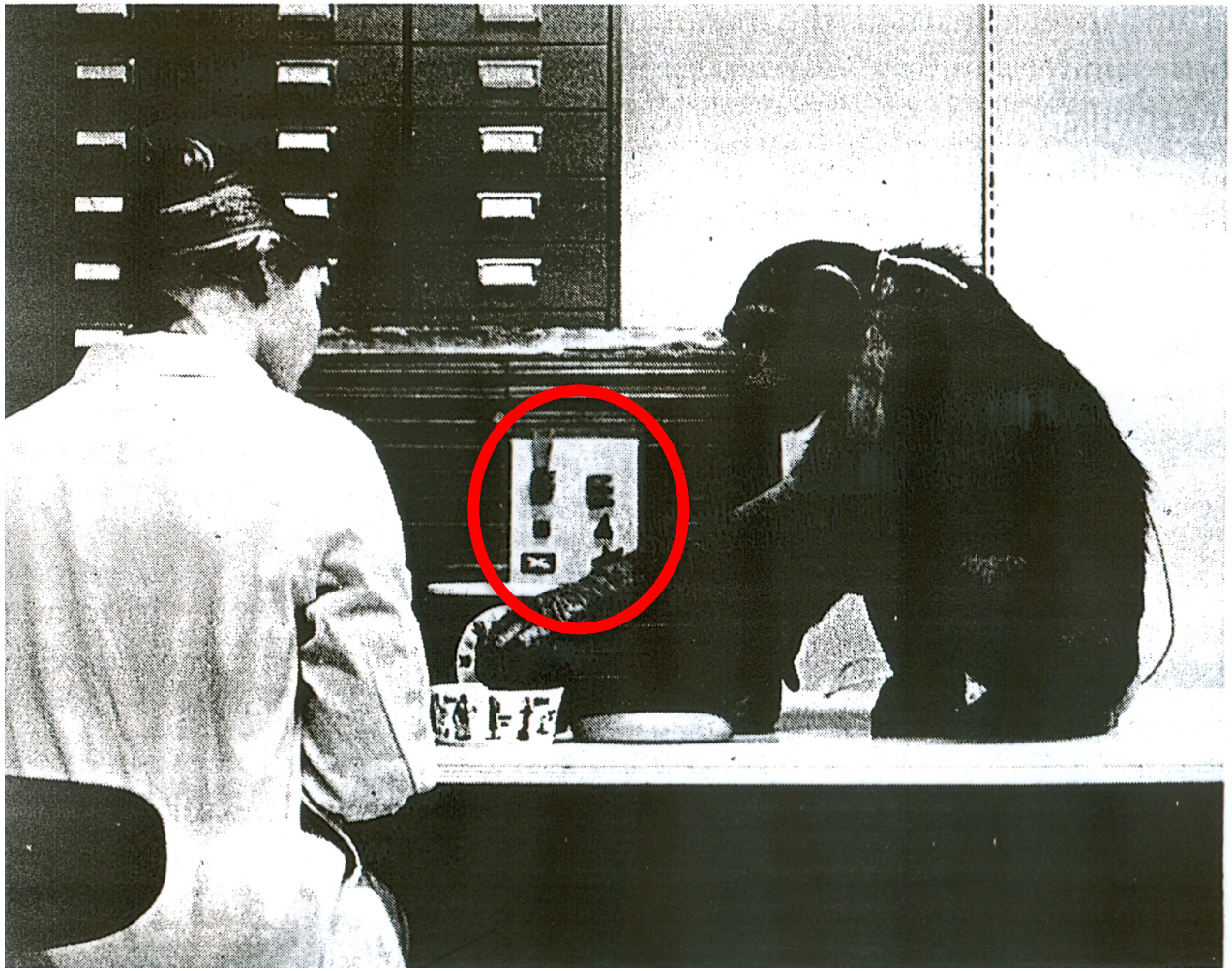


Figure 5.11
One of the Premacks' chimps, Elizabeth, reacts to colored plastic chips that read "Not Elizabeth banana insert— Elizabeth apple wash." (Photo courtesy of Ann Premack.)

Premack and chimpanzees – especially Sarah

Revisions – Systematic Testing

Kanzi using symbols to communicate

From Georgia State University's Language Research Center, operated with the Yerkes Primate Center of Emory. Photo courtesy of Duane Rumbaugh.

So, what did we learn...?

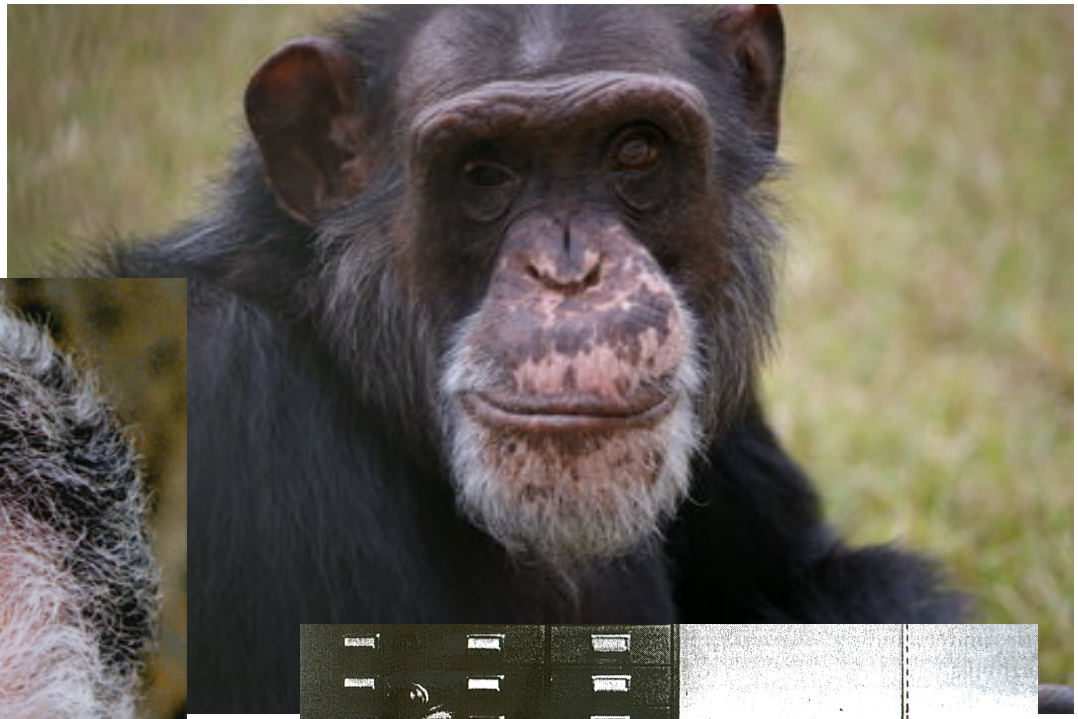
About the nature of “language”?

About primate/cetacean cognition?

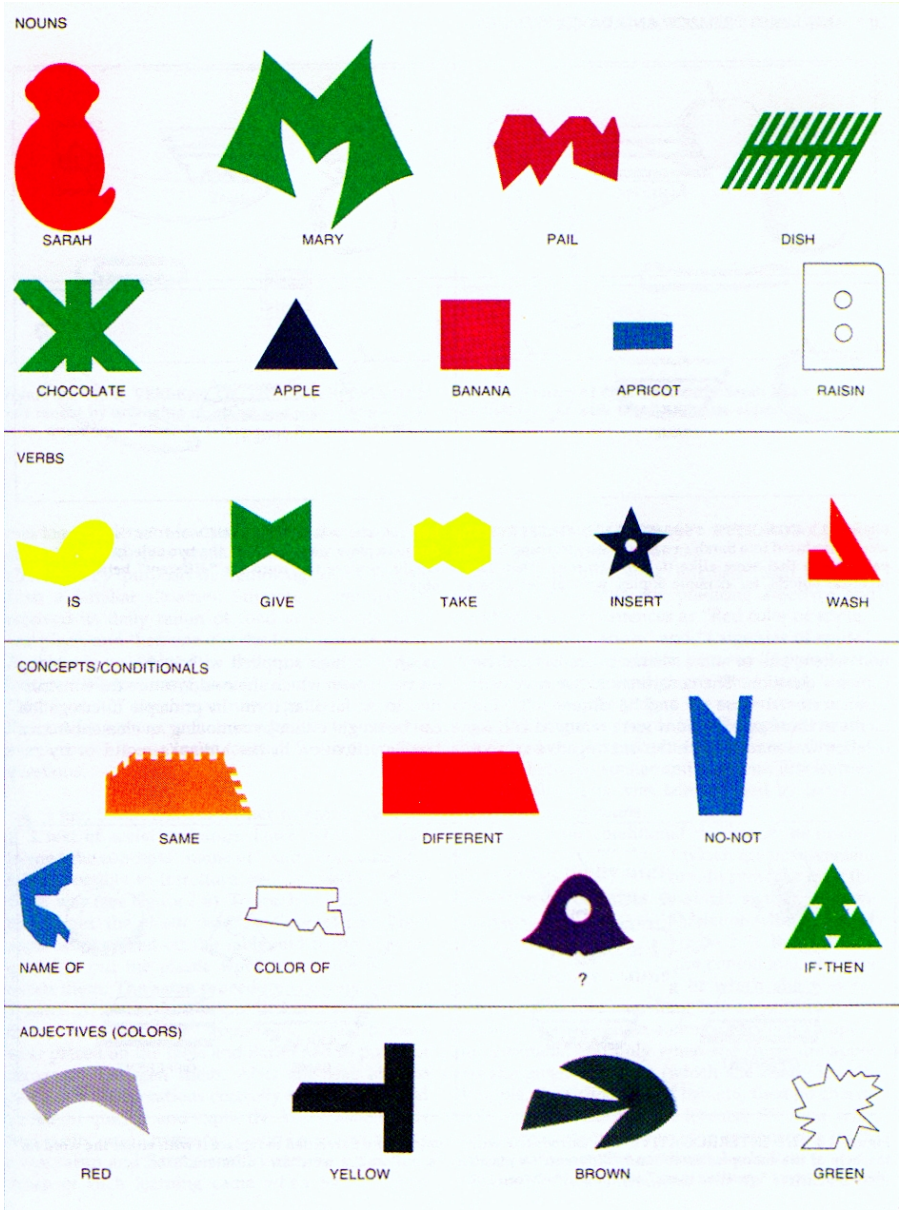
Semantics – Use & Comprehension of SYMBOLS

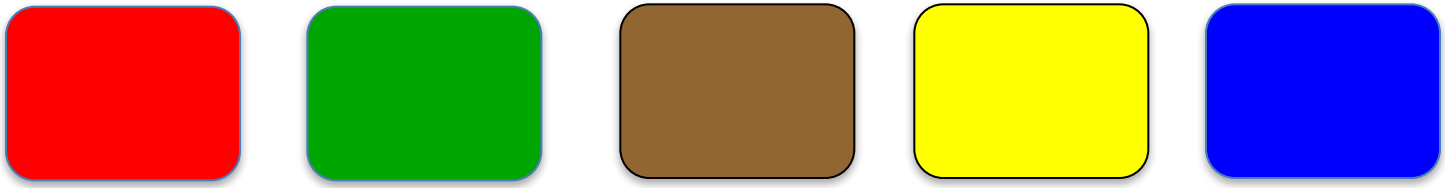
Semantics – Use & Comprehension of SYMBOLS

Premack & Sarah
Tokens



Semantics – Use & Comprehension of SYMBOLS



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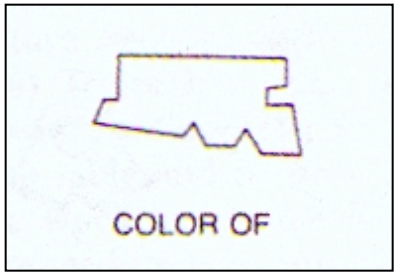
COLOR OF


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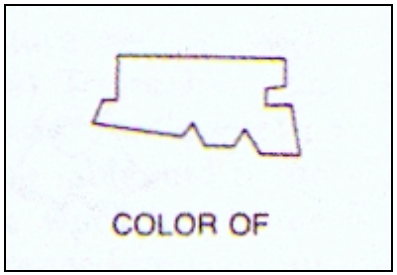
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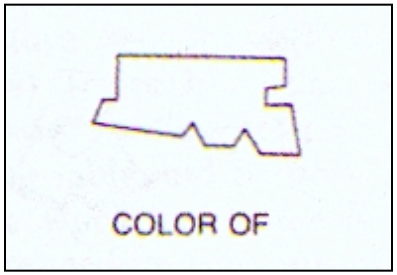
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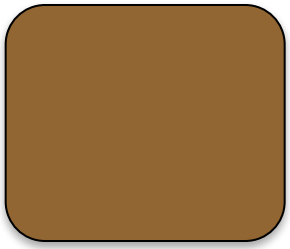
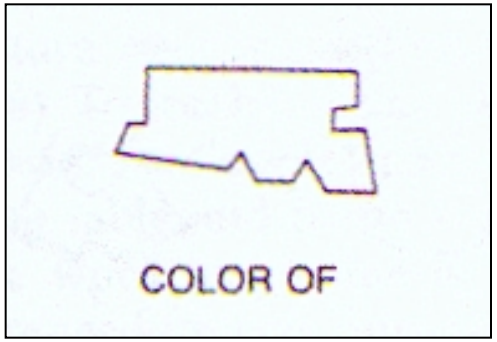
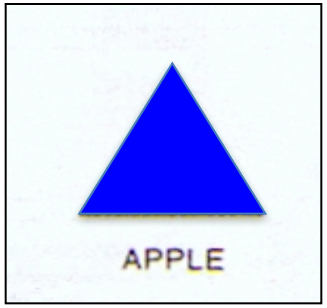
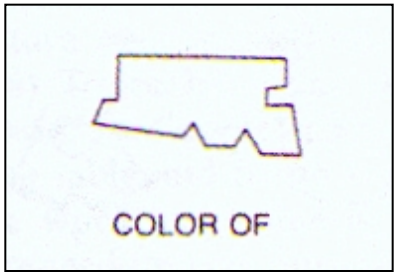


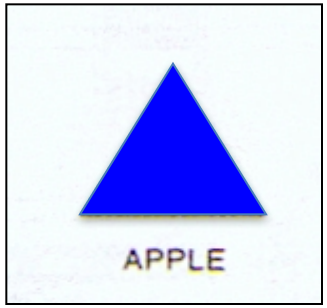

COLOR OF


?

“Name Of”







Symbols !

Semantics – Use & Comprehension of SYMBOLS

Transfer of symbol to novel context

Semantics – Use & Comprehension of SYMBOLS

Create novel combinations

Washoe: “ Water Bird”

Koko: “White Tiger”

BUT . . . Not always successful

<u>Terrace & NIM</u>

Systematic well-documented training = Endless drills

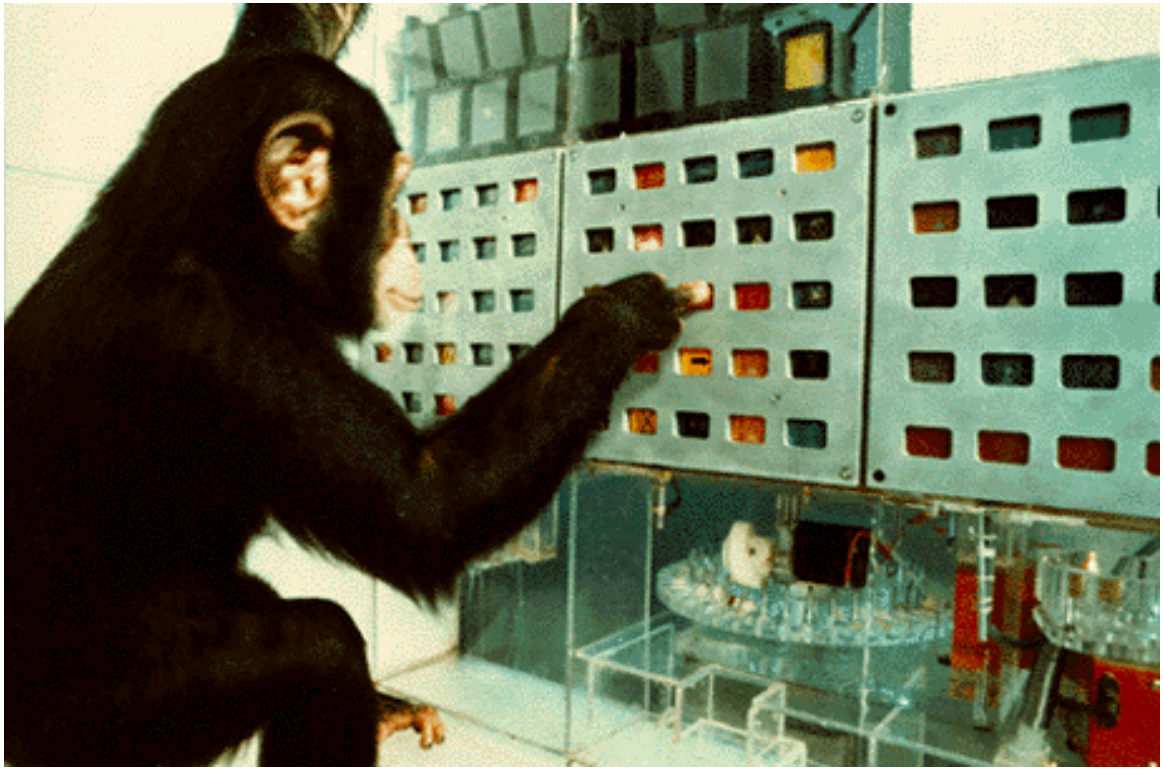
Variable trainers

Some regularity of use (especially repetitive) but no transfer to novel

Terrace concluded apes **<u>not</u>** capable of “sentences”

Terrace et al. (1979) Can an ape create a sentence? *SCIENCE 206*, 891-902.

BUT . . . Not always successful



Rumbaugh & LANA

First keyboard study

1600 training trials

Learned many sequences
to produce reward

But could not then use
object “name” in novel context.

Syntax

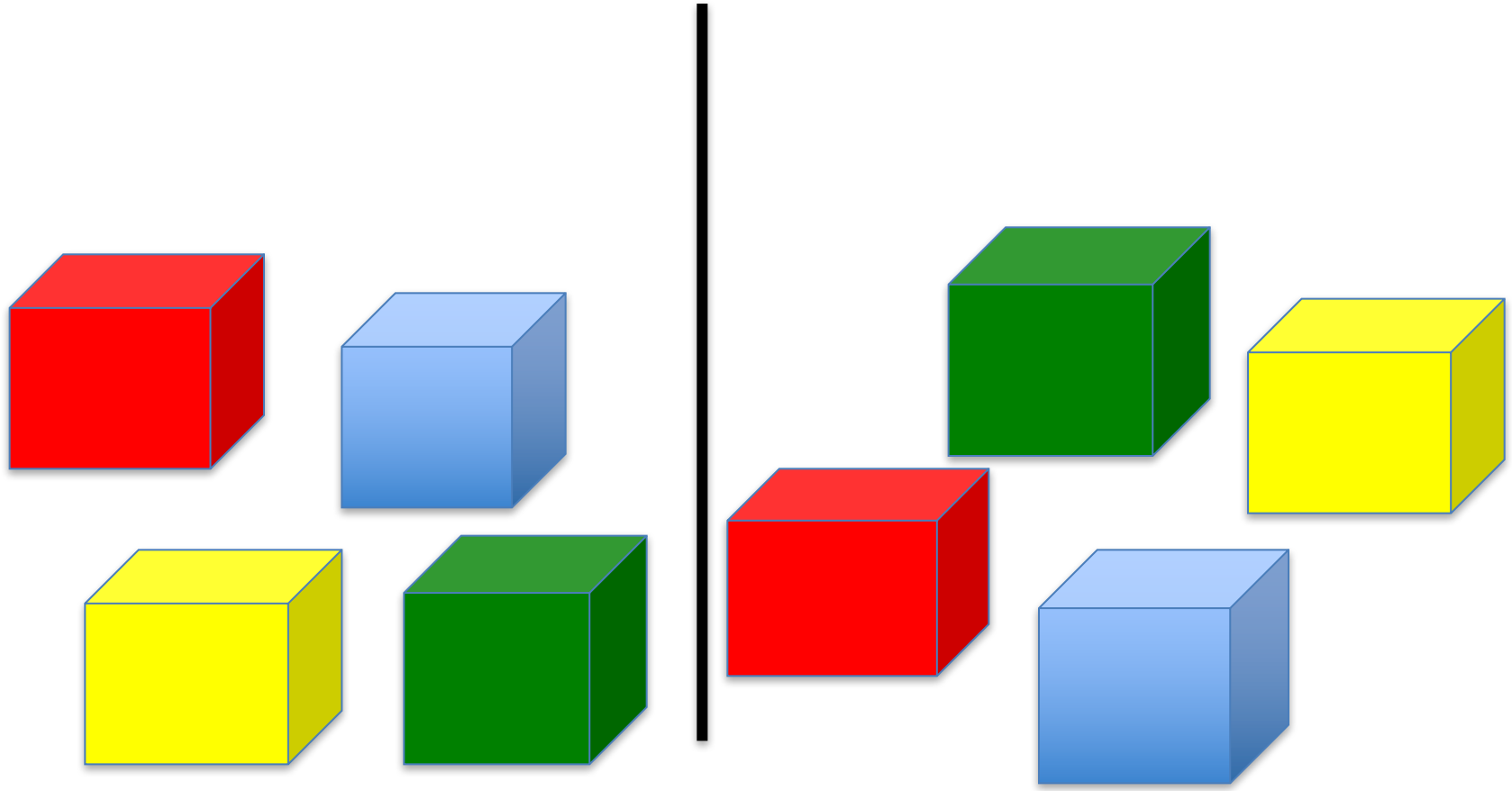
Order Effects

“Washoe tickle Roger” not = “Roger tickle Washoe”

Syntax

Order Effects

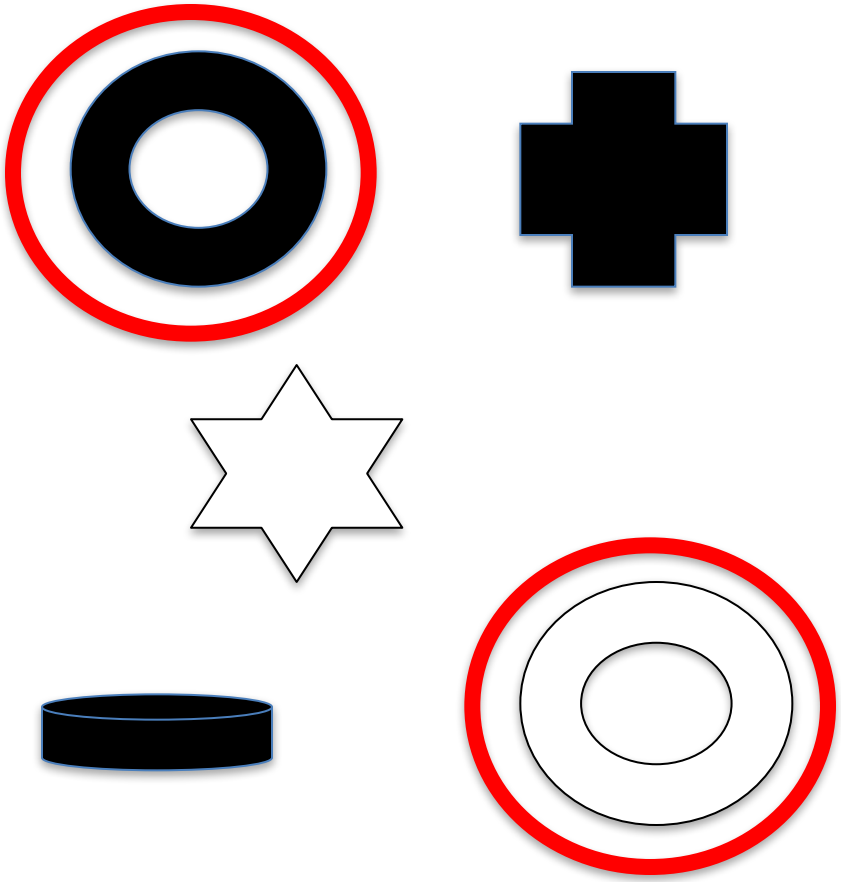
“Put Green on Red” not = “Put Red on Green”



Syntax

Slot-in-Frame Grammar = SCHEMA

Trained: "Black Hoop Fetch" "White Hoop Fetch"

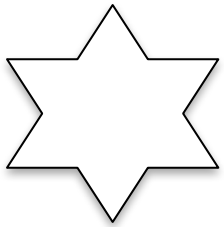


Syntax

Slot-in-Frame Grammar = SCHEMA

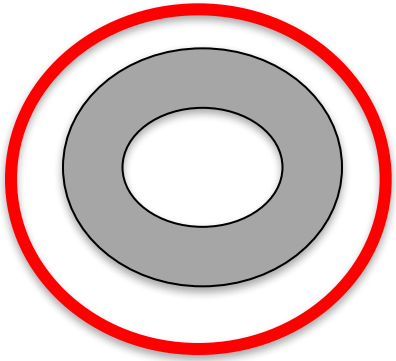
Introduce NOVEL signal in presence of novel color: "Grey Hoop Fetch"

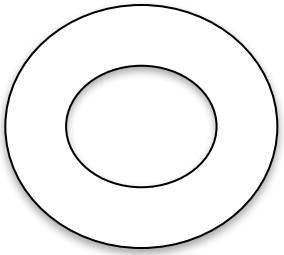
SO, learned new term from its POSITION in sentence.



Note:
Did NOT pick
novel shape

First Trial Success

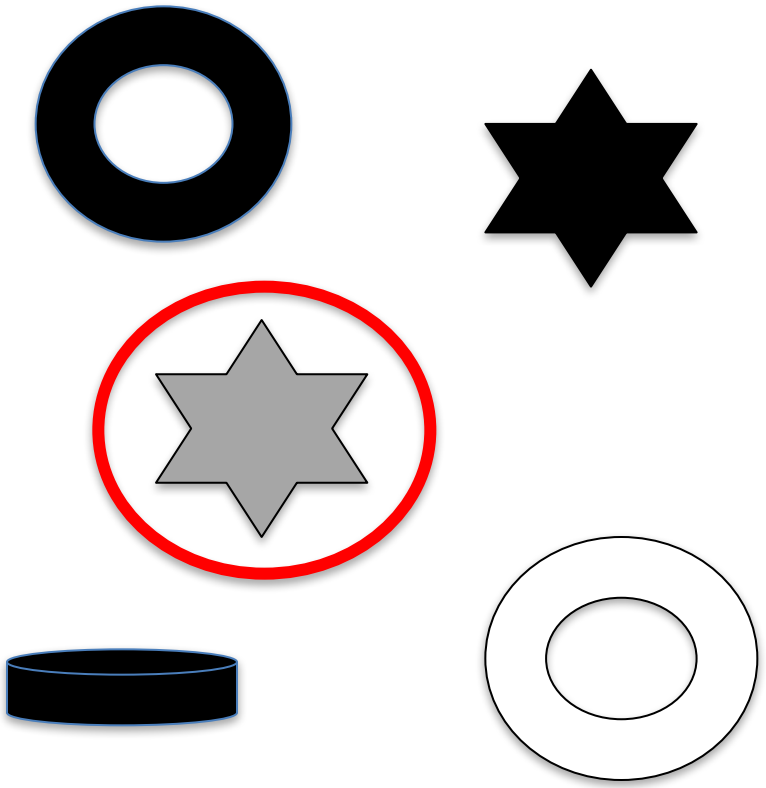




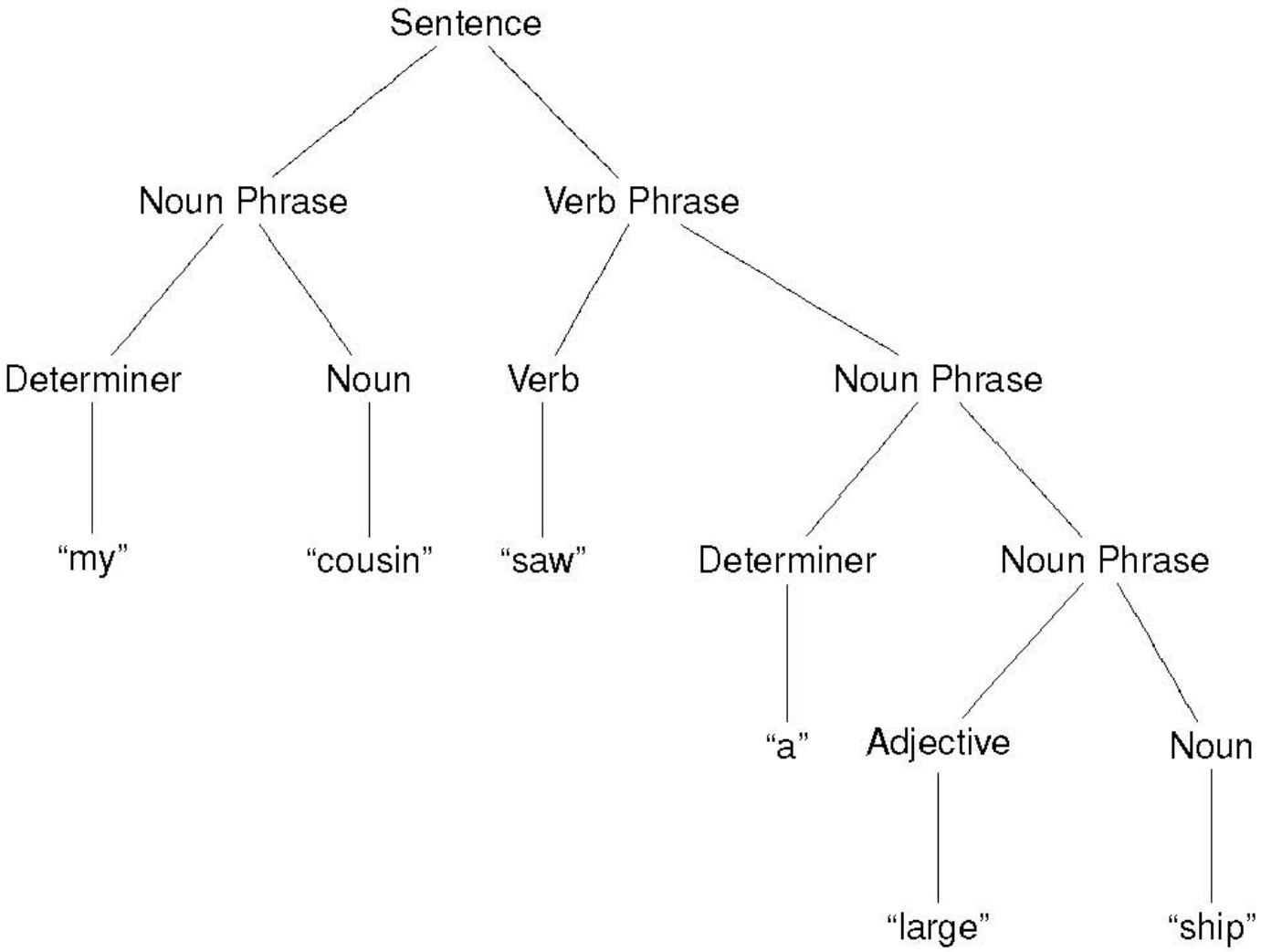
Syntax

Slot-in-Frame Grammar = SCHEMA

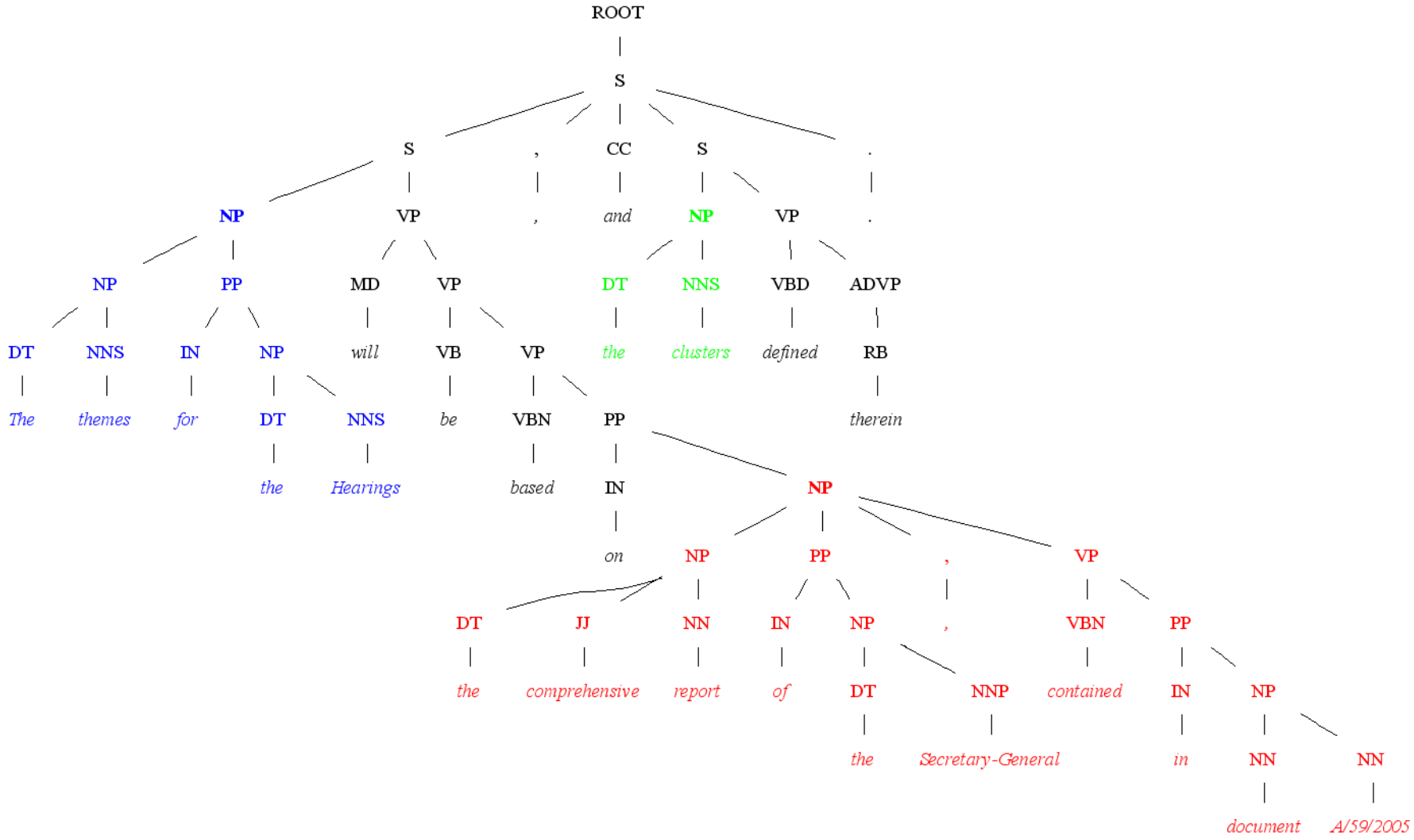
Plus, could immediate transfer new signal to other appropriate cases – “Grey Star Fetch”



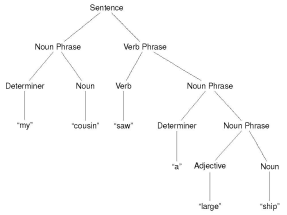
Syntactical Embedding



Syntactical Embedding

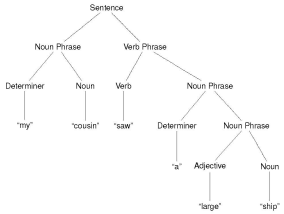


Syntactical Embedding



Herman &
Phoenix & Ake

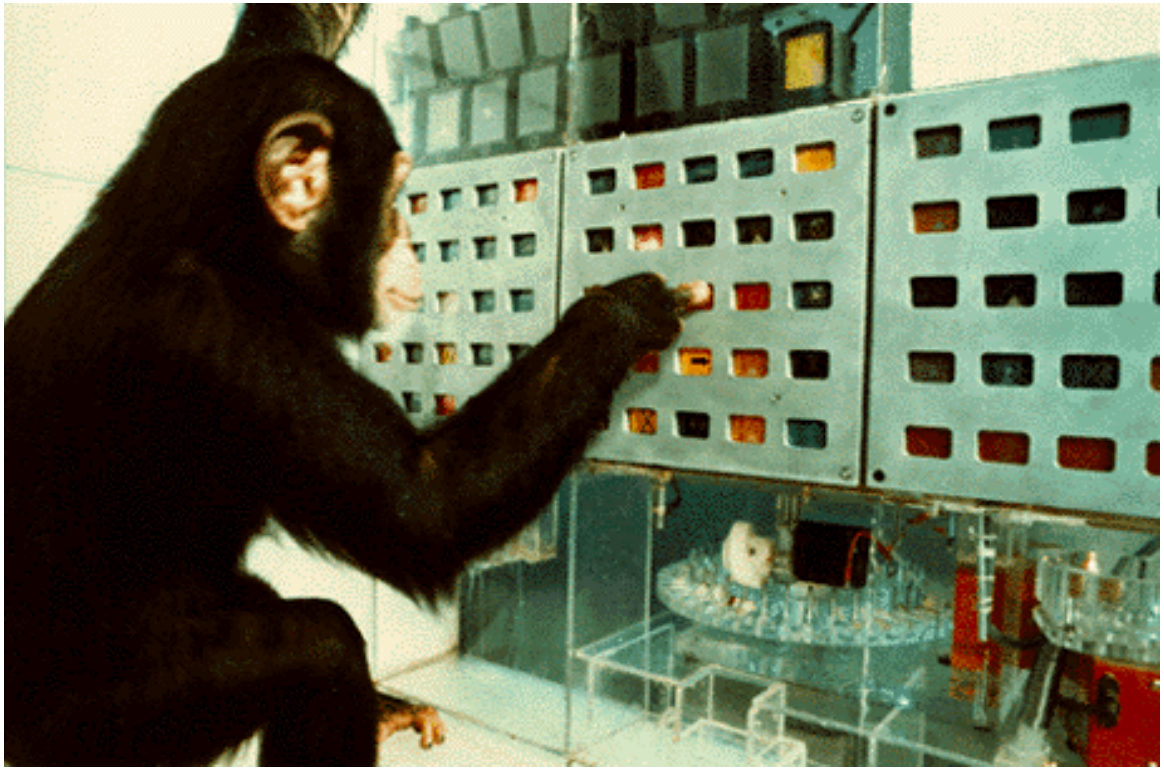
Syntactical Embedding



	Indirect Object	Modifier	Direct Object	Verb
2 Word			Hoop	Fetch
3 Word Modifier		Left	Hoop	Fetch
3 Word Indirect Object	Frisbee		Hoop	Fetch
Multi-Embedded	Frisbee	Left	Hoop	Fetch

Pragmatics

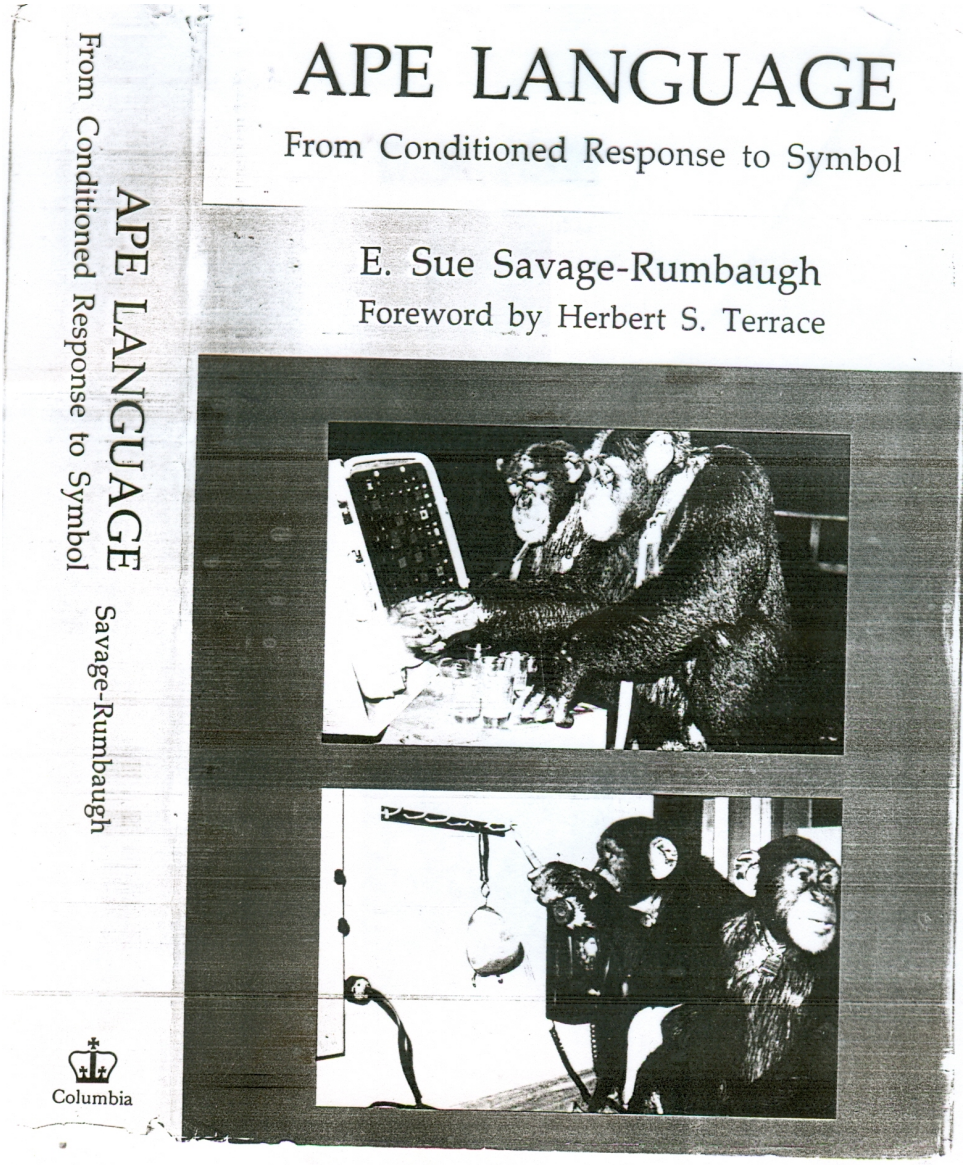
Pragmatics



Savage-Rumbaugh

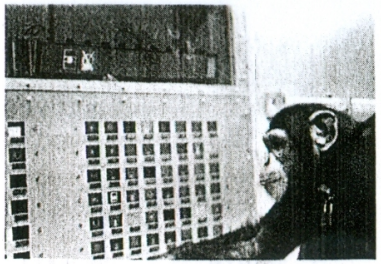
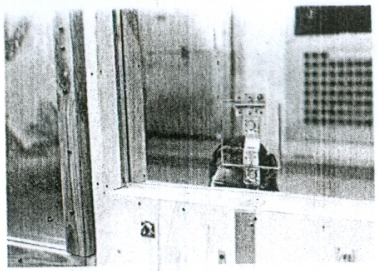
Recognized critical issue w/LANA keyboard study – NOT SOCIAL!!

Pragmatics



Savage-Rumbaugh

Revised keyboard studies to involve **CONVERSATION**





Sherman & Austin

Used keyboard in a collaborative task

Unlike Lana, Subjects DID show transfer of symbols to novel contexts

1

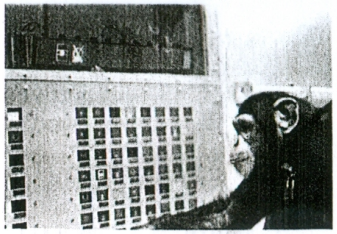


Figure 9.3. Sherman says "Give Key."

2

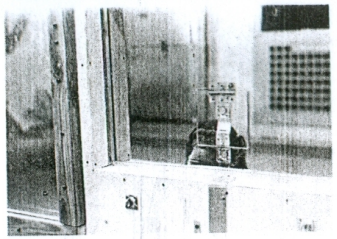
Figure 9.4. Austin, observing Sherman's request through the window, reaches for the key.

3

Figure 9.5. Sherman approaches the window and Austin gives him the key.

4

Figure 9.6. Sherman takes the key to the padlocked food site and, holding the small padlock between the index and middle fingers of his left hand, starts to insert the key.



5

Figure 9.7. Austin watches while Sherman attempts to open the key site.

6

Figure 9.8. Turning himself, as well as his arm, Sherman manages to unlock the padlock.

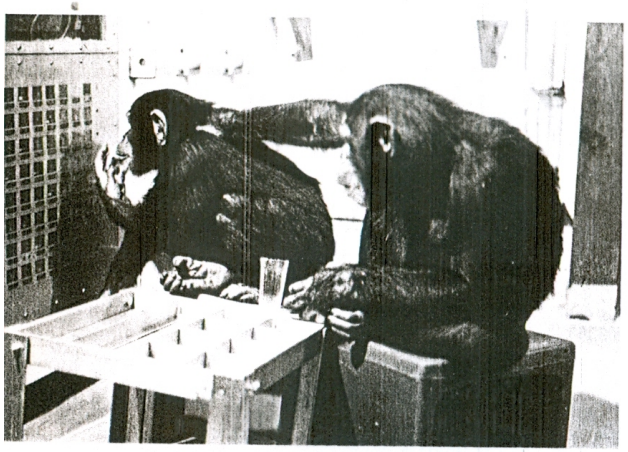
7

Figure 9.9. Sherman brings a container of the pudding (which he found in the food site) back to Austin, sampling Austin's share along the way.

8

Figure 9.10. Sherman hands the container of pudding to Austin.

Sherman & Austin



igure 10.2. Sherman (giver) wants to eat and is directing Austin's attention
› the keyboard, encouraging Austin to ask for another food to share.

gure 10.3. After studying the keyboard, Austin asks for bananas.

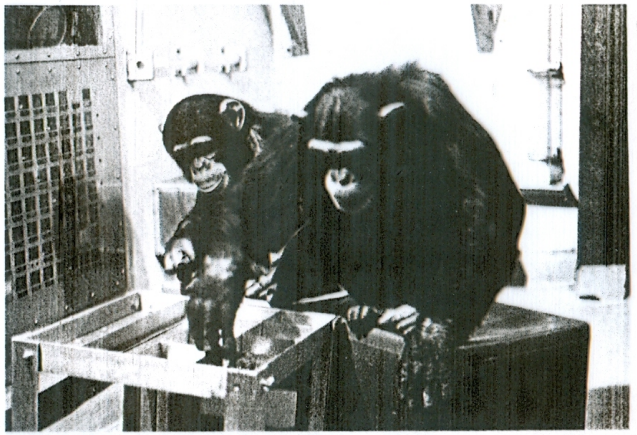


Figure 10.4. Sherman selects a slice of banana for Austin.

Figure 10.5. As Austin eats, so does Sherman.

Also used keyboard informally --

CONVERSATION!

Limitations

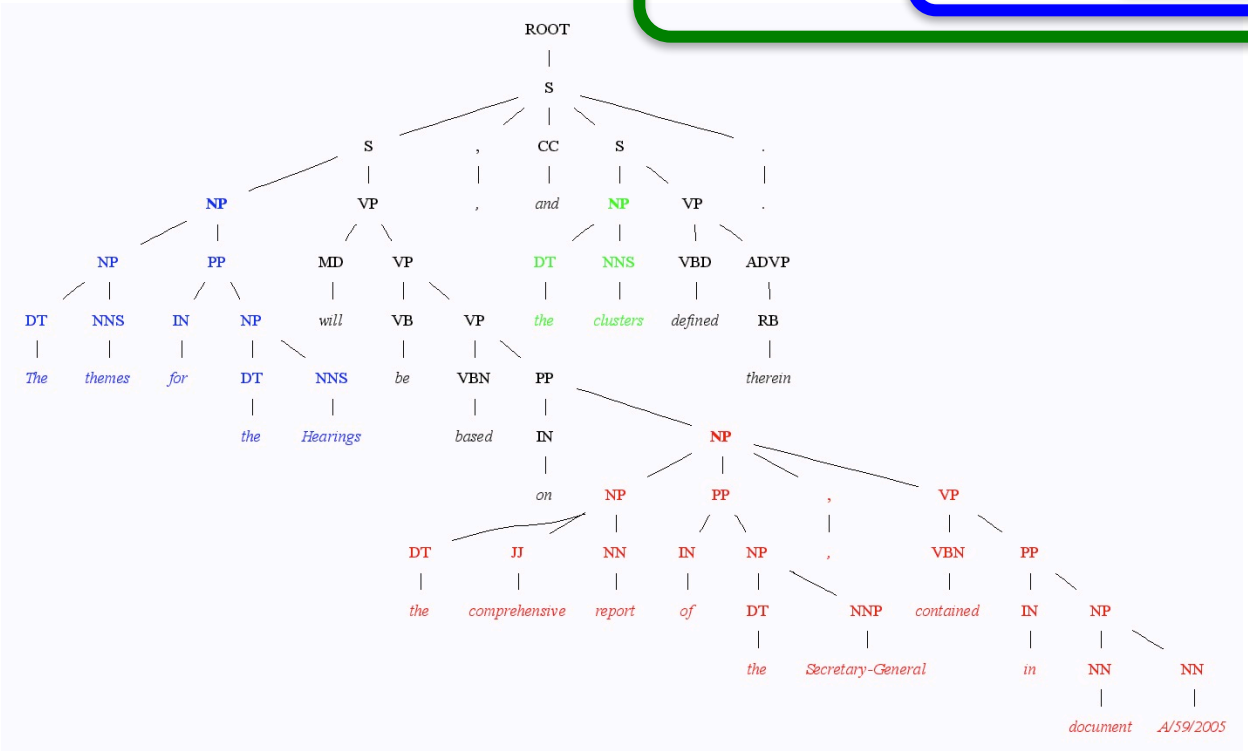
Limitations

Nonhuman Symbol Set =250

Human = ~50,000

Limitations

Depth of embedding is shallow



Limitations

Almost all <u>nonhuman</u> communication
Is "**Imperative**"

Tell someone what to do…

Limitations

Unlike in humans,
almost none of nonhuman "language" use
is "**Declarative**"

Tell About

Direct Attention

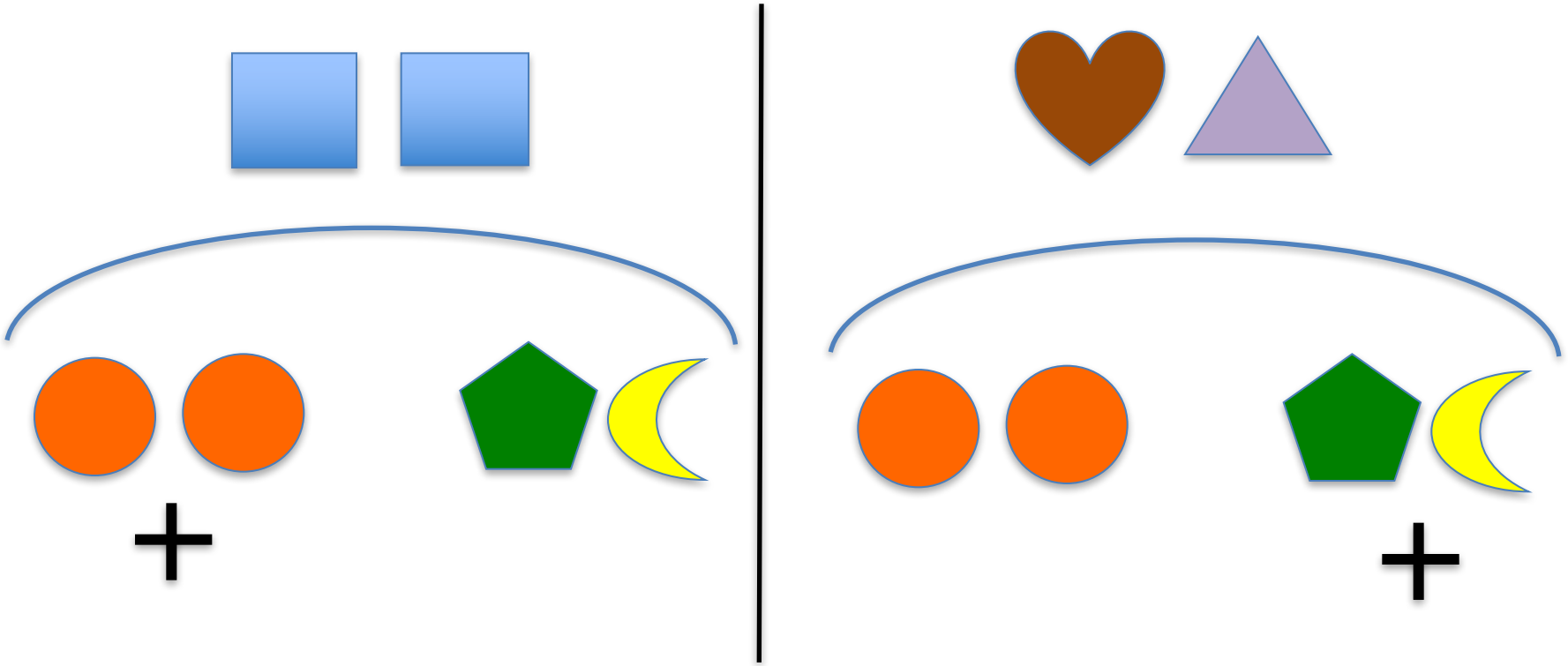
Note:
Declarative interactions
are **Tertiary**
(You-Me-It or You-Me-Him)

Cognitive Upgrade ???

Cognitive Upgrade ???

ANALOGIES

AKA "Conceptual MTS"



Only "language-trained" apes
(with experience with symbols for "SAME" and "DIFFERENT")
succeed.

Cognitive Upgrade??

“Greedy Giveaway Task”

If replace piles with associated numbers . . .

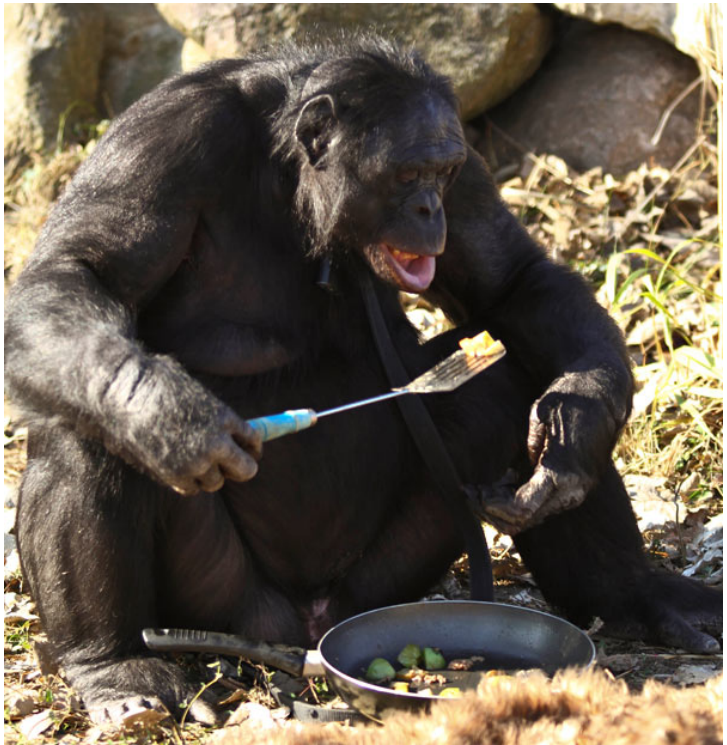
Chimp 1 will reach for smaller number!

i.e. respond “rationally”, and gain larger reward

Cognitive Upgrade ???

Only Language-trained TEACH (e.g. Washoe teaching Loulis, her son).

Enculturation as Cognitive Upgrade…



Enculturation as Cognitive Upgrade…

Occurs in HUMANS as well!

What about conspecific enculturation…?

More to come…