


UNIVERSITY of GREENWICH PSYC-1031 & PSYC-1036 (INTRODUCTION TO PSYCHOLOGY)

Understanding and Producing Language (Part 2)

Dr. Anna Samara

Lecture 13, 22/1/2021



1

Q & A ON THE PRE-RECODED LECTURE

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2

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Learning outcomes

- Present an overview of scientists' attempts in 1930s-1970s to teach primates human language
- Outline the difference between the nativist and empiricist account of language acquisition
- Evaluate the claim that language is unique to humans

3

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Human language: Recap from lecture 1

- A ubiquitous **human** behaviour that is part of our biological heritage, learned surprisingly 'easy' (no explicit teaching)
- Seven features that make language unique (semanticity, arbitrariness, discreteness, duality of patterning productivity, displacement and cultural transmission)
- But is human communication really fundamentally different from animal communication?

4

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Animal communication systems

- Many animals communicate with each other using "signals"
 - e.g. vocalizations, smells, sounds, tactile signals, gestures
- Debate about whether signals are truly intended as "communication"

Communicative vs. informative signals

5

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1. Comparisons of human vs. nonhuman communication systems More on this in the first seminar

- Does any animal communication system have any of the 7 universal features of human language?

- Can we teach language to animals?
 - One view: Maybe some animals (primates) have the cognitive apparatus necessary to learn language but haven't needed to do so in their evolutionary niche
 - Or maybe these structures are built into our species

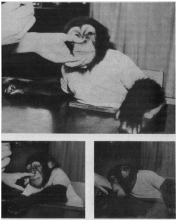
6

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Can we teach language to animals?

Early "Talking" chimps

- 1930s-50s
- Raised as children. Trained to use English including moulding mouths to produce speech
- ❖ "Gua" (Kellog & Kellog, 1933)
- ❖ "Vikki" (Hayes, 1951): trainers reported good comprehension but not well documented



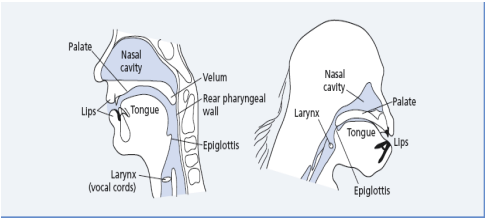
Teaching this to say "Mama" is described in the text. The first time that appeared in the text was on the 10th day of the experiment. It was reported that the chimpanzee had learned to say "Mama" and that it was understood by the trainers. It was also reported that the chimpanzee had learned to say "Mama" and that it was understood by the trainers. It was also reported that the chimpanzee had learned to say "Mama" and that it was understood by the trainers.

7

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Can we teach language to animals?

▪ **Early "Talking" chimps (30's-50's)**




8

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Signing chimps (1970s)

e.g. **Washoe** (Gardener & Gardner)

- lived in family from 1 year and trained in ASL
- claimed to learn few hundred signs
- claimed to have some syntax
 - strung some signs together ("out me")
 - sensitivity to word order ("me tickle you" v "You tickle me")
 - claimed to show productivity ("water bird" for duck)

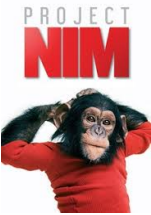


9

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Signing chimps (1970s)

- e.g., Nim Chimpsky
- Large vocabulary + combined signs with some word
- Terrace (1983) reviewed his language
- Terrace concluded much of the structure was due to direct imitation
- lots of long repetitive strings ("banana me eat banana eat")
- vocab increased but not utterance length (average 1.5 signs)



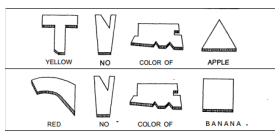
10

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Symbol manipulating chimps (1970's)

e.g. Sarah (Premak) manipulated plastic tokens

- trained to string into sentences
- followed instructions "put banana in bowl"
- early on researchers claimed had some syntax
- came to decide that learned some labels for objects and ways to manipulate tokens could get a reward (could substitute in words into slots e.g. "Randy give Sarah banana" → "Randy give Sarah apple" but no real understanding of structure)
- **Output of very intensive training (cf. child language learning)**



11

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Kanzi (1980's)

- studied by Savage-Rumbaugh
- bonobo chimpanzee (rather than common chimpanzee)
- learned from watching his mother's (unsuccessful) training at a young age
- produced with portable keyboard ("YERKISH")
- understands English
- trainers strove to overcome many of the methodological criticisms of earlier work



12


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Kanzi (1980's)

- By 46 months, trainers argue language comparable to that of a small child (2 years)
 - 50 symbols, 800 combinations, 80% of utterances spontaneous, some evidence of syntax (word order), could understand references to objects not present
- BUT
 - Syntactic** (grammar) abilities lacks complexity- utterances generally about 2 words long
 - Semantic** (meaning) abilities with BUTs: E.g. uses "strawberry" for 'piece of fruit', 'let's eat strawberries', let's go to the strawberry field'

13


A SUPERSTAR?



- Most of Kanzi's utterances are requests— i.e. **instrumental** (used to get something) rather than **informational** (sharing knowledge to enlighten others)


14

A SUPERSTAR?



Kanzi's 2 Item Combinations	Nim's 2 Item Combinations	Kanzi's 3 Item Combinations	Nim's 3 Item Combinations
1. chase person	play me	chase person1	play me Nim
2. person1 person2	me Nim	person2 person1	eat me Nim
3. chase1 person1	tickle me	person2 person1	eat Nim eat
4. person1 person2	eat Nim	person2 person1	chase tickle me Nim
5. chase1 person1	more eat	person2 person1	grab grape eat Nim
6. chase Kanzi	me eat	person2 person1	banana Nim eat
7. person1 person2	Nim eat	person2 person1	Nim me eat
8. tickle ball	finish hug	Kanzi chase person2	banana eat Nim
9. bite person1	drink Nim	chase bite person2	eat me eat
10. person1 person2	more tickle	person1 person2	chase me Nim eat
11. ball tickle	sorry hug	Kanzi person1	hug me Nim
12. chase sue	tickle Nim	person1 person2	grab me Nim
13. Kanzi chase	hug Nim	chase grab person2	Yogurt Nim eat
14. surprise money	more drink	person1 person2	chase me more eat
		Kanzi person1	more eat Nim
		person2 bite	

15


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Teaching primates human language: Summary

- some "design" features present to some extent - at least in Kanzi
- reveal some impressive conceptual abilities
- *But:* much debate about the interpretation of the data
- no good evidence other primates can learn same types of semantic representations as humans
- don't learn grammars with anything approaching the complexity of human grammars

→ ability to learn and use language seems to be a species specific behaviour


16

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The broader question

- Something is different about the human species which allows us - and only us - to acquire and use language
 1. Language is part of our biological heritage
 2. Language rests on more general cognitive abilities
- Some primates may be capable of acquiring *some* aspects of human language using more general cognitive abilities. Somehow our more complex cognitive abilities give us full human language behaviour in all of its complexity
- or perhaps there is some more specific cognitive difference, e.g. chimps differ in Social Cognition (e.g. don't point, don't teach their young, (e.g. Tomasello et al. 2010)


17

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The broader question

- Something is different about the human species which allows us - and only us - to acquire and use language
 1. **Language is part of our biological heritage**
 - strong "**nativist**" hypothesis: Language specific cognitive structures are built into our species
 - Genetically pre-programmed with knowledge of linguistic rules that enable us to learn ("Universal Grammar" approach) (Chomsky, Pinker etc.)

18

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The broader question

- Something is different about the human species which allows us - and only us - to acquire and use language

2. Language rests on more general cognitive abilities

- Some primates may be capable of acquiring *some* aspects of human language using more general cognitive abilities. Somehow our more complex cognitive abilities give us full human language behaviour in all of its complexity
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19

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Summing it up

- Our nearest neighbour species don't have/can't learn language of the structural complexity of human language
- Something in our genetic endowment allows us to acquire and use our language
 - Cannot be genetic knowledge of a particular language
 - Whether language is innate or learned from input using general purpose processes is a central question in language research
- Whatever mechanisms we use to learn language, they must be sufficient to acquire human language in all of its complexity

20

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Core & recommended reading

- Holt, N. A., Bremner, A., Sutherland, E., Vlieg, M., Passer, M., & Smith, R. (2018). Psychology: The Science of Mind and Behaviour Fourth edition, Berkshire: McGraw-Hill (Chapter 9, pp 652-734).
- Additional reading:
 - Tomasello, M. & Herrmann, E. (2010). Ape and human cognition: What's the difference? Current Directions in Psychological Research, 19, 3-8.
 - Seyfarth, R. M., & Cheney, D. L. (2003). Signallers and receivers in animal communication. Annual Review of Psychology, 54, 145-173.

21

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