

Origins and Evolution of Language

While we are waiting

- Get on Top Hat at <http://app-ca.tophat.com/e/285083>
 - “Log in with school account” if you are registered
 - “Enter as a guest” otherwise
- Go to the classroom tab, answer the question there
 - A. The reading for this lecture took me 0-2 hours
 - B. The reading for this lecture took me 2-3 hours
 - C. The reading for this lecture took me 3-4 hours
 - D. The reading for this lecture took me more than 4 hours

Origins and Evolution of Language

Week 2: Introduction to evolutionary theory

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Strike dates

February: 1st, 9th, 10th, 14th, 15th, 16th, 21st, 22nd, 23rd, 27th, 28th

March: 1st, 2nd, 16th, 17th, 20th, 21st, 22nd

Week 3: [Wednesday](#)

Week 4: [Thursday](#), [Friday](#)

Week 5: [Tuesday](#), [Wednesday](#), [Thursday](#)

(*Flexible learning week: Tuesday, Wednesday, Thursday*)

Week 6: [Monday*](#), [Tuesday](#), [Wednesday](#), [Thursday](#)

Week 7: No strikes

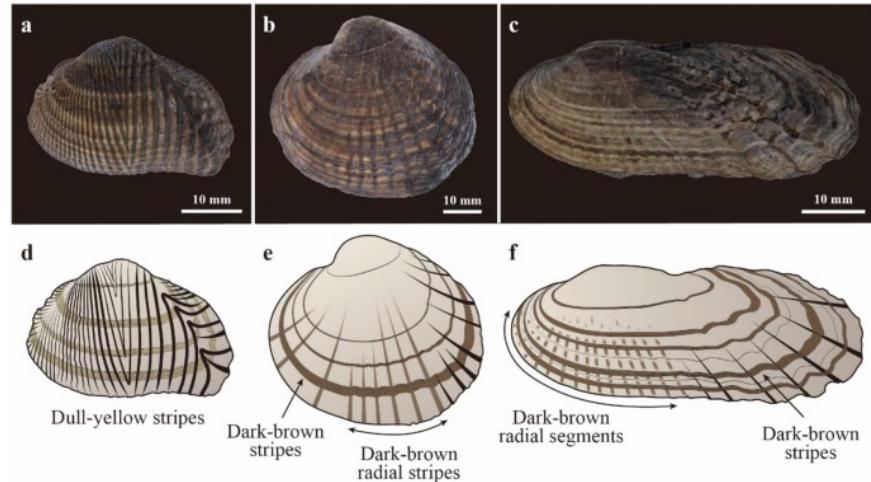
Week 8: [Thursday](#), [Friday](#)

Week 9: [Monday](#), [Tuesday](#), [Wednesday](#)

Week 10: No strikes

[Red](#) = missing lecture [Blue](#) = missing tutorial

From last week: example of spandrels



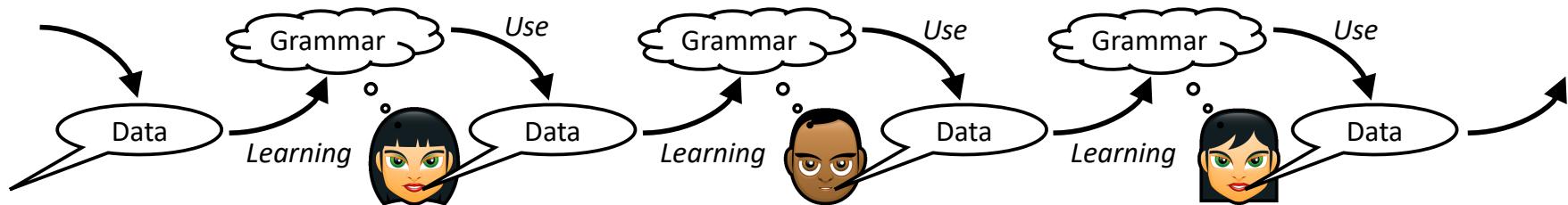
<https://www.smithsonianmag.com/smart-news/chin-stroking-mystery-why-are-humans-only-animals-with-chins-180957997/>

Example from Gould, S. J., & Lewontin, R. C. (1979). The spandrels of San Marco and the Panglossian paradigm: a critique of the adaptationist programme. *Proceedings of the Royal Society of London B*, 205, 581-598.

Plan for today

- Brief summary of Fitch chapter 4
- Spotlight on **intentional** communication in primates
- Spotlight on **structure** in primates and birds
- Spotlight on **learned communication** in primates and birds

Reminder: Learning, use, and language design



- Language is passed from person to person by **learning**
- People learn from language as it is **used in communication**
- Language **evolves** in response to its learning and use
- Structure allows language to be learnable yet communicatively powerful

Rather than us being adapted for language, language has adapted to us

Reminder: What's required for this to happen?

Social learning,
vocal learning



Mitteilungsbedürfnis
and mindreading

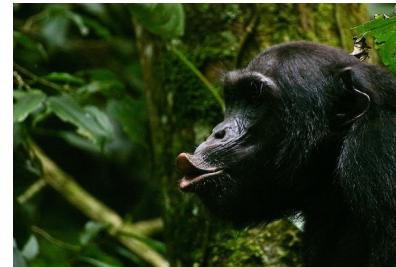


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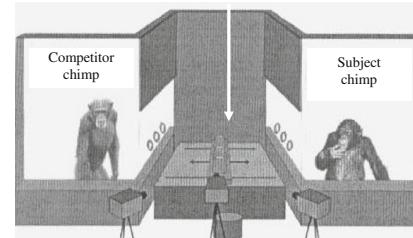
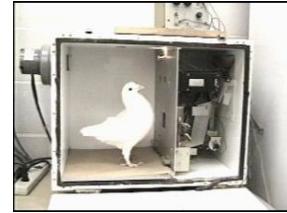
Mitteilungsbedürfnis
and mindreading



Summary of Fitch Chapter 4

Non-humans have rich mental lives...

- Concepts and categories
- Memory and planning
- Hierarchically-structured behaviours
- Tool use
- Knowing what others know
- ...



Alex the parrot



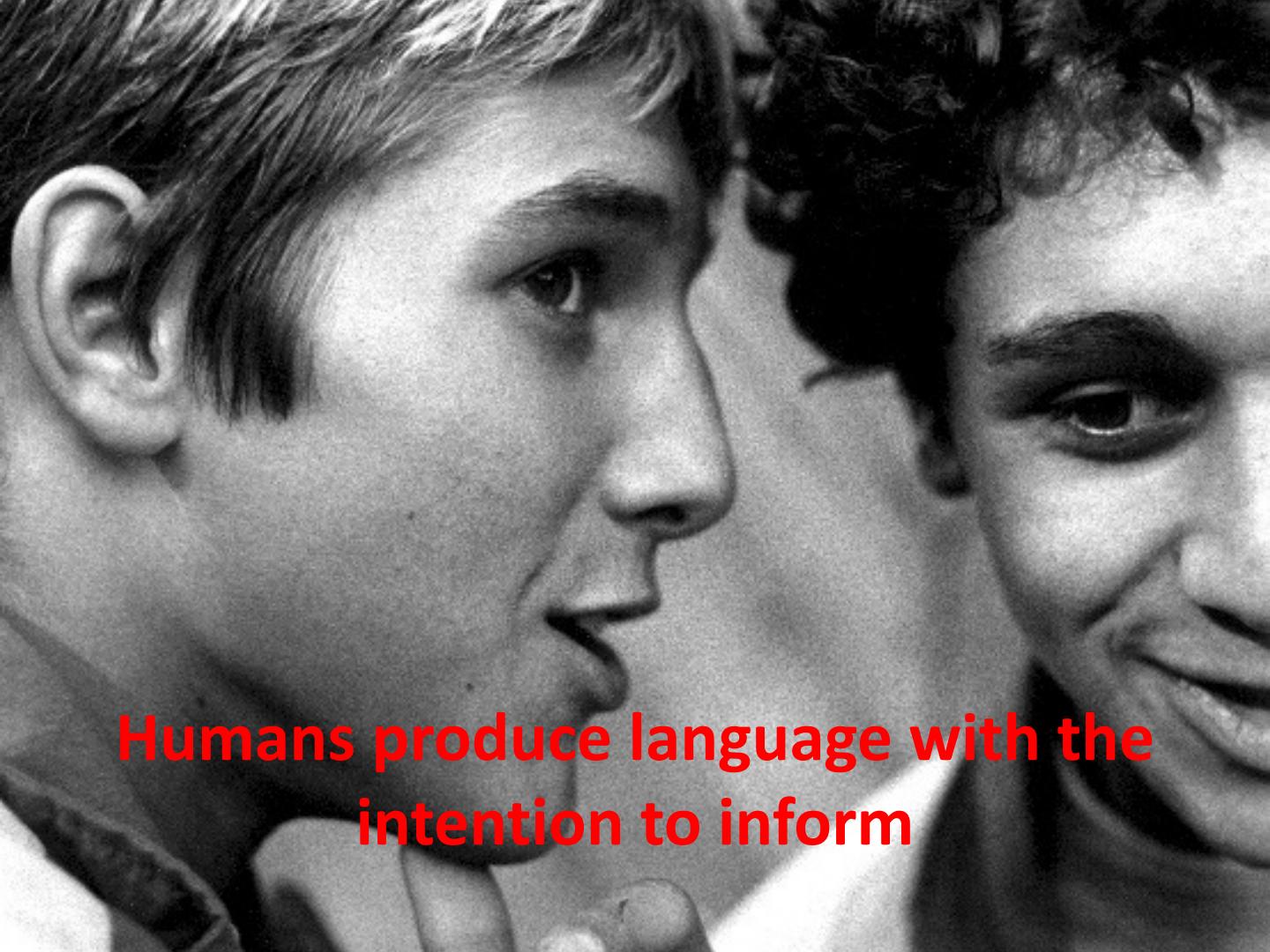
Pepperberg, I. M. (2000). *The Alex Studies: Cognitive and Communicative Abilities of Grey Parrots*. Boston, MA: Harvard University Press

...but their communication systems seem *relatively* restricted

- ‘Innate’ signal repertoires
 - Particularly among primates
 - But see this week’s tutorial
- Functionally referential
 - But not intentional (?)
- Complex vocalisations
 - But not in primates
 - And not subserving meaning



Intentional communication in primates



**Humans produce language with the
intention to inform**

Functionally referential communication in primates

Can Monkeys Talk?

Absence of intentional communication in macaques?

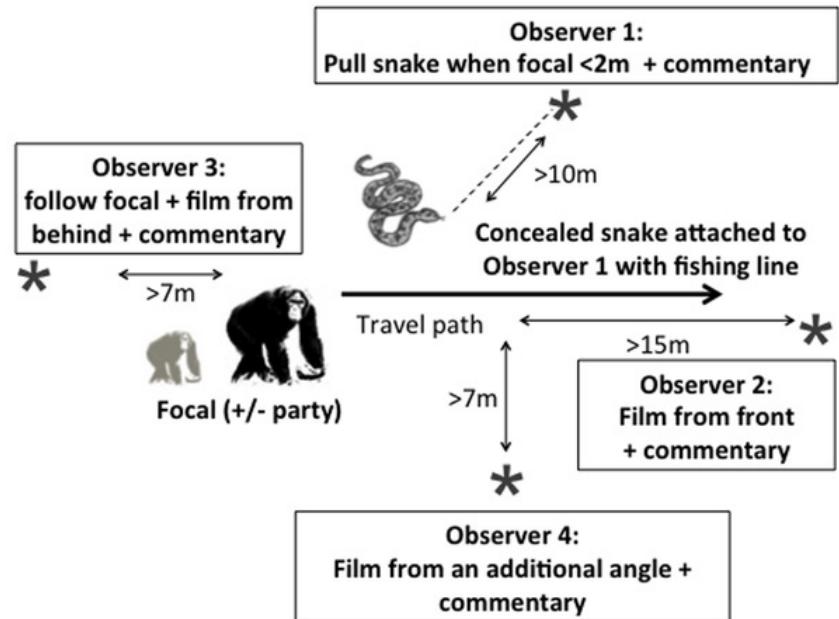
- Mothers and infants
- **Ignorance condition:** Mother knows something, infant doesn't
 - Presence of food, predator
- **Knowledge condition:** They both know it
- **Mothers' vocalizations didn't differ between conditions**



Cheney, D., & Seyfarth, R. (1990). Attending to behaviour versus attending to knowledge: examining monkeys' attribution of mental states. *Animal Behavior*, 40, 742-753.

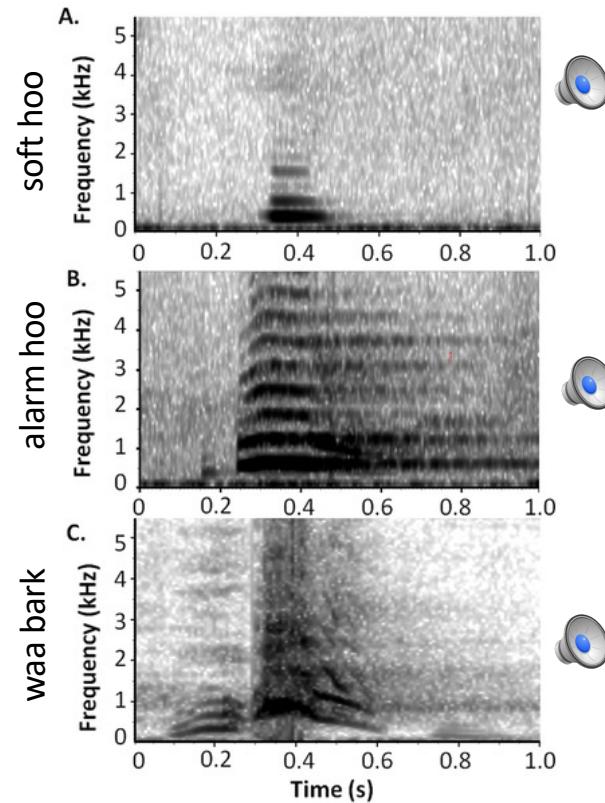
Intentional communication in chimpanzees?

- Wild chimps
- Surprised with snake model, either alone or in part of group
 - Presence of others matters?
 - Gaze-alternation?
 - Persist until others safe?



Intentional communication in chimpanzees?

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Structure in primate and avian
communication

Learning in primate and avian
communication

Reminder: structure in language

Inventory of meaningless units
(10s)



p t d s ð k g ɔ ə a ...

Inventory of meaningful units
(1000s)



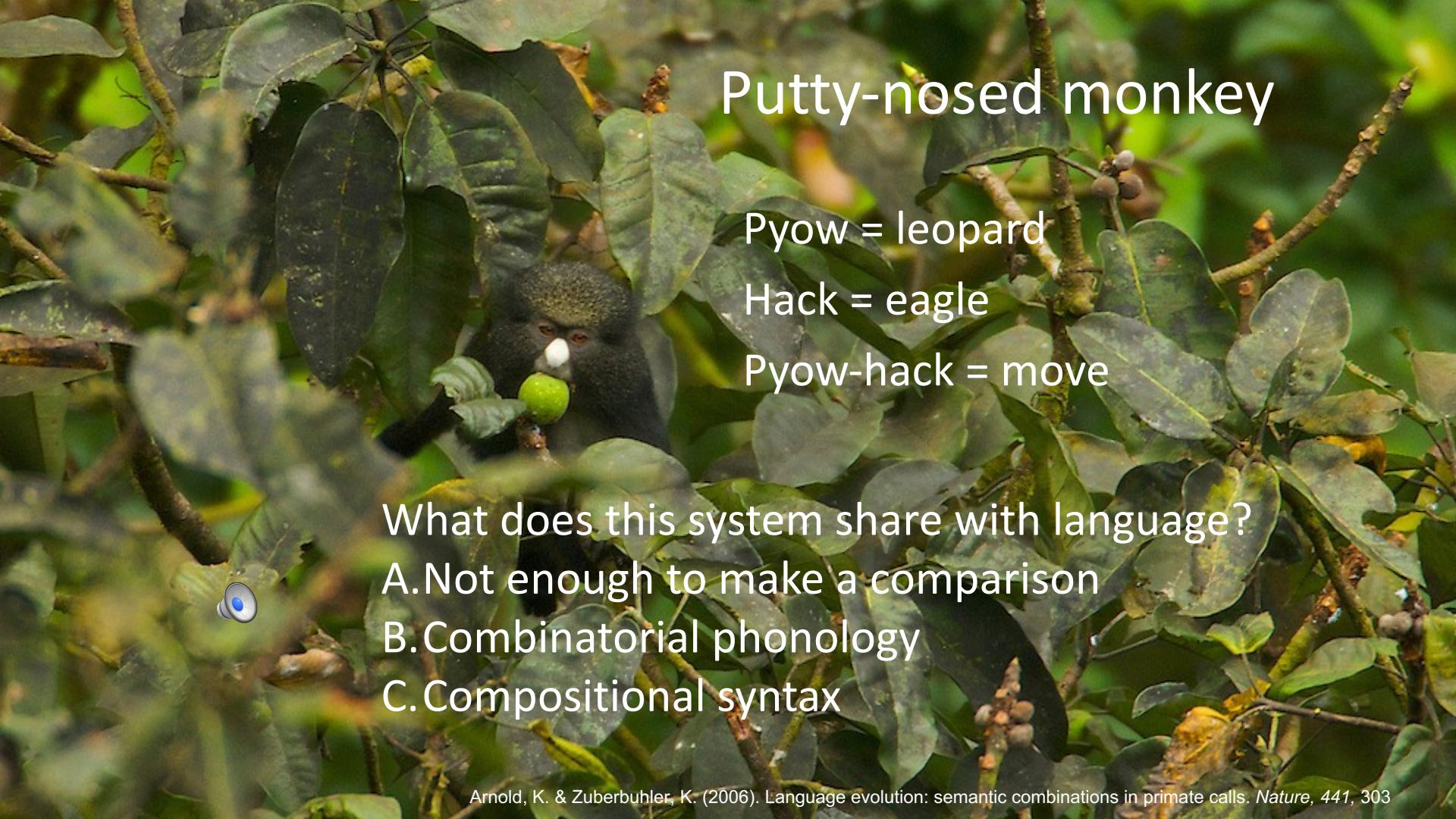
ə ðə -əd dɒg kat ðat spot ...
(a) (the) (past tense) (dog) (cat) (that) (spot) ...

Inventory of meaningful sentences
(∞)

the cat spotted the dog a dog spotted the cat
a cat spotted the dog the dog spotted the cat
the cat spotted the cat that spotted a dog
the dog spotted the cat that spotted the dog ...

Song in gibbons



A photograph of a putty-nosed monkey (Cercocebus albogularis) perched among large green leaves in a tree. A small blue and white speaker icon is visible in the bottom left corner.

Putty-nosed monkey

Pyow = leopard

Hack = eagle

Pyow-hack = move

What does this system share with language?

- A. Not enough to make a comparison
- B. Combinatorial phonology
- C. Compositional syntax



Campbell's monkey

Leopard alarm

Eagle alarm

Boom = not urgent

What does this system share with language?

- A. Not enough to make a comparison
- B. Combinatorial phonology 
- C. Compositional syntax

Southern pied babblers

Alert call

Recruitment call

Alert call + recruitment call = mob predator

A. Combinatorial?
B. Compositional?

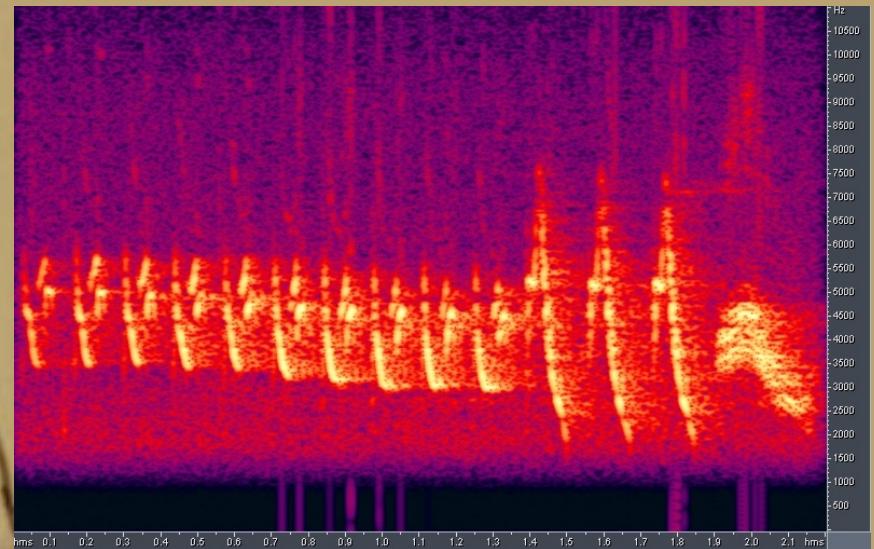
Abundant evidence of structure in avian communication

- Songs consist of sequences of notes
- Constraints on the order of combination
- Structure in the signal doesn't subserve meaning
- **Vocal learning**
 - Absent in primate vocal behaviour (?)
- Ultimate functions
 - Territorial defense
 - Courtship
 - Pair/group bonding (duetting)





Chaffinch song



Structure of chaffinch song (British)

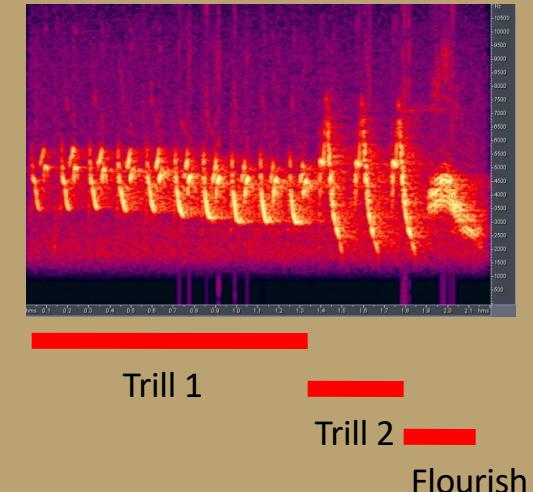
Each bird has 1-6 song types

- Mean 2-3

Order of notes in each song fixed

2-5 trill phrases, followed by a flourish

- Trill: sequence of 2 or more near-identical units
 - Number of repetitions can vary
- Flourish: no repetition
- Transitional notes: single notes between trill phrases
- Re-use of notes
 - Different songs may share, e.g., a flourish



Slater, P. J. B., & Sellar, P. J. (1986). Contrasts in the Songs of Two Sympatric Chaffinch Species . *Behaviour*, 99, 46-64.

Slater, P. J. B., Clements, F. A., & Goodfellow, D. J. (1984). Local and regional variations in chaffinch song and the question of dialects. *Behaviour*, 88, 76-97.

Willow warbler song

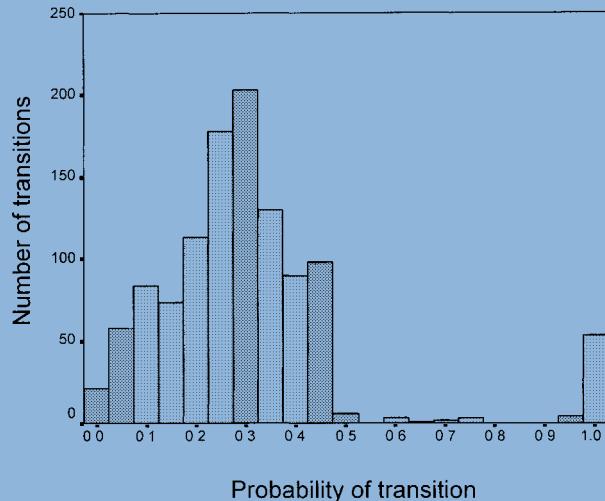


> 100 songs for some birds

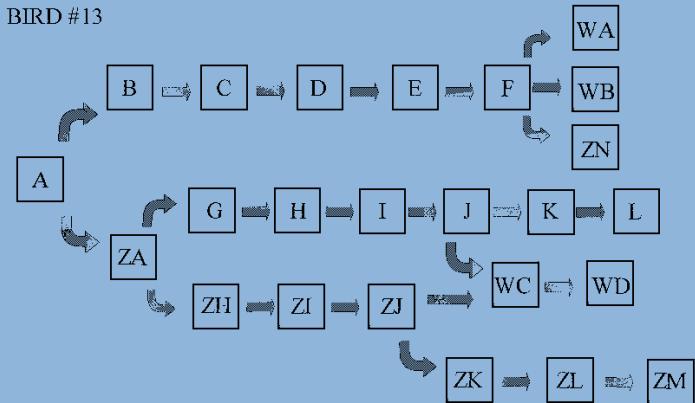
- Repertoire size varies

Mix of predictable and less predictable transitions

- A simple grammar



BIRD #13



Summary of today

- Intentional communication
 - Rare in primates, present in chimpanzees (maybe?)
- Structured communication
 - Rare and limited in primates, common in songbirds
- Learned communication
 - Rare in primates, present in chimpanzees (maybe?), common in songbirds
 - Relationship between vocal learning and structure?

Next up

- Tutorial on comparative psychology of communication (looking ahead to vocal learning)
 - What's the right comparison species?
- Next lecture: human evolution, cumulative non-linguistic culture in humans and other animals