

## Communication – bird song



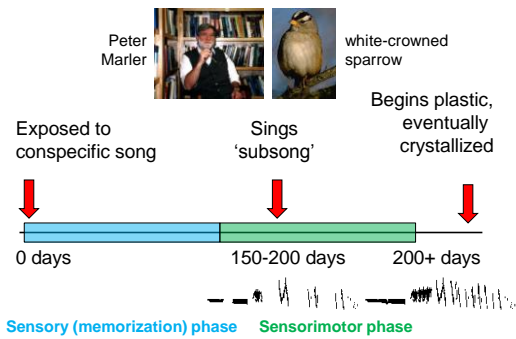
## Ontogeny of communication

Many examples of animal communication are innate

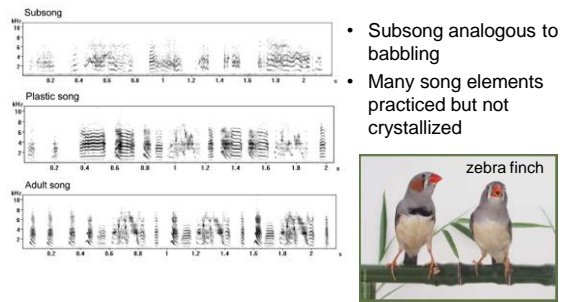


Bird song is a noteworthy exception

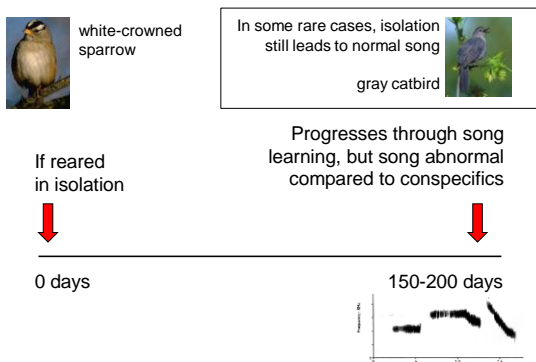
## How do birds learn to sing?



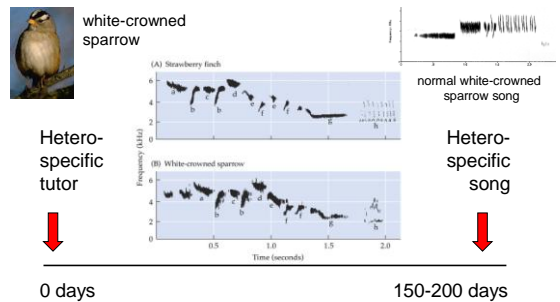
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## Role of auditory feedback



### Role of auditory feedback



white-crowned sparrow

Deafened during early development

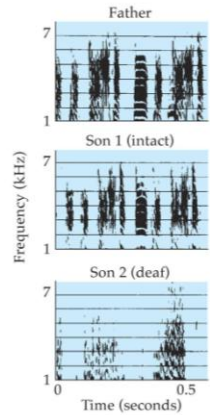
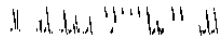


0 days

Never progresses beyond early subsong



150-200 days



### Role of auditory feedback



white-crowned sparrow

Exposed to conspecific song

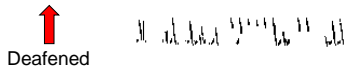


0 days

Never progresses beyond early subsong



150-200 days 150-200 days



### Role of auditory feedback

Subject:	song sparrow	song sparrow
Tutor:	swamp sparrow	swamp sparrow + song sparrow
Song:	swamp sparrow	song sparrow



song sparrow

Normal song develops as long as bird able to hear conspecific song

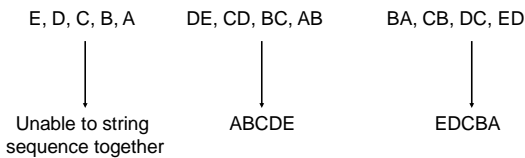


swamp sparrow

### Putting it all together



White-crowned sparrows tutored with tapes of songs divided into five segments



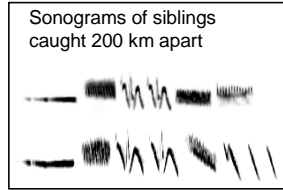
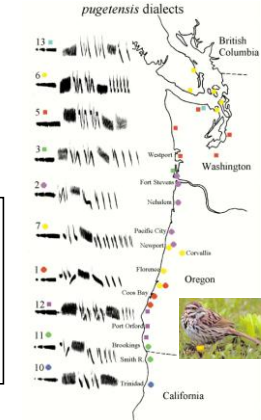
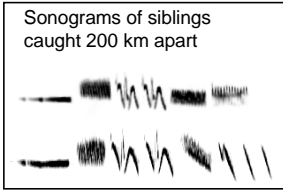
Birds may learn songs by breaking down into phrases

### Putting it all together



## Geographic variation

Considerable evidence of vocal dialects



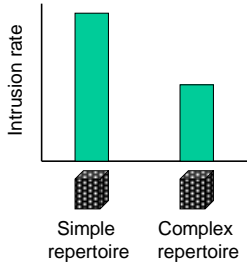
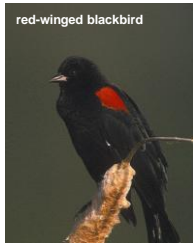
## So when is song learned?

Vocal dialects suggest variation in learning period

Birds now classified as either **open-ended** or **close-ended** learners

## Open-ended learning

Social factors: the advantages of a large repertoire



## Conclusions

- Prerequisites for normal adult song
  - Hear conspecific song during sensory period
  - Able to practice during sensorimotor period
- Acquisition of song elements occurs outside song-learning period

