

Poultry in behaviour research.

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Applied research

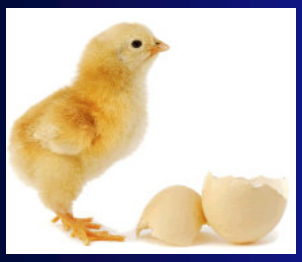
- Industry & Economic
  - Bird health & productivity
    - Stress, stocking density, growth rate
    - Salmonella, *Campylobacter jejuni*, *Clostridium perfringens*
  - Environmental impact of farming types

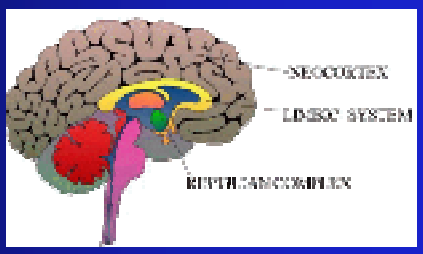
(intensive ◆ free-range)




Basic research

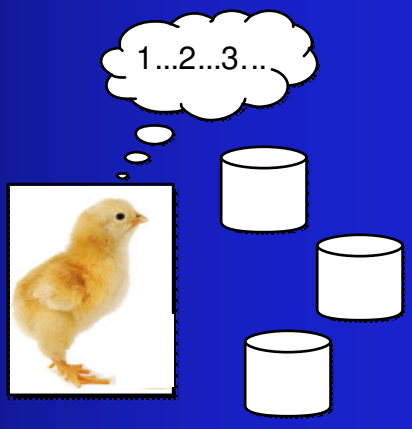
- Developmental & behavioural research
  - Brain development/specialization
    mammals' neocortex = birds' neopallium?
  - Lateralization of function

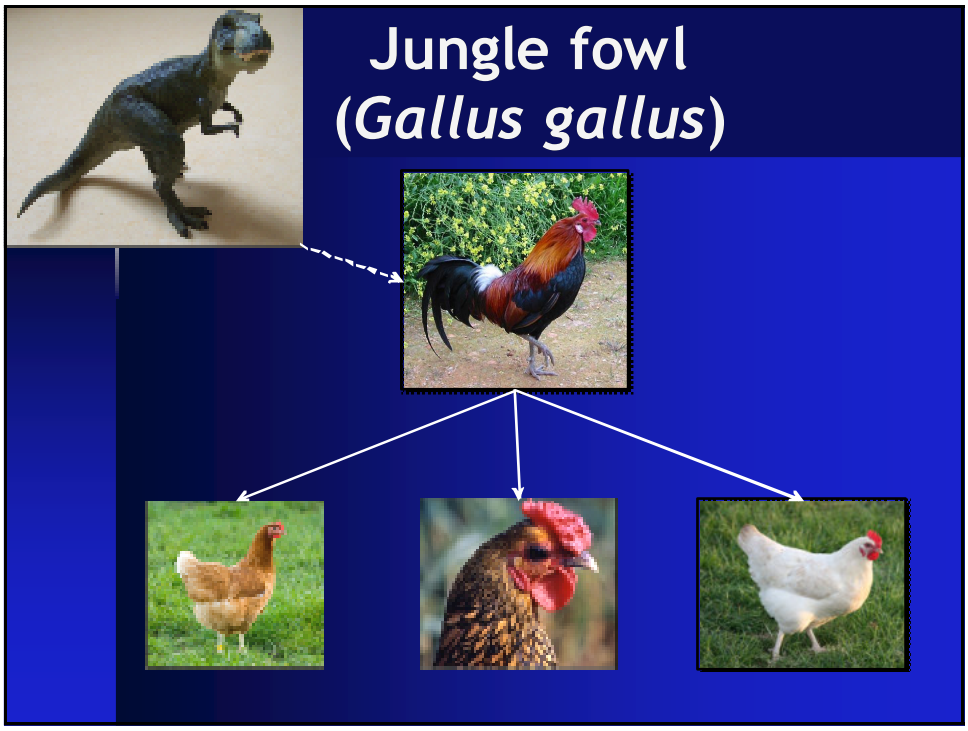


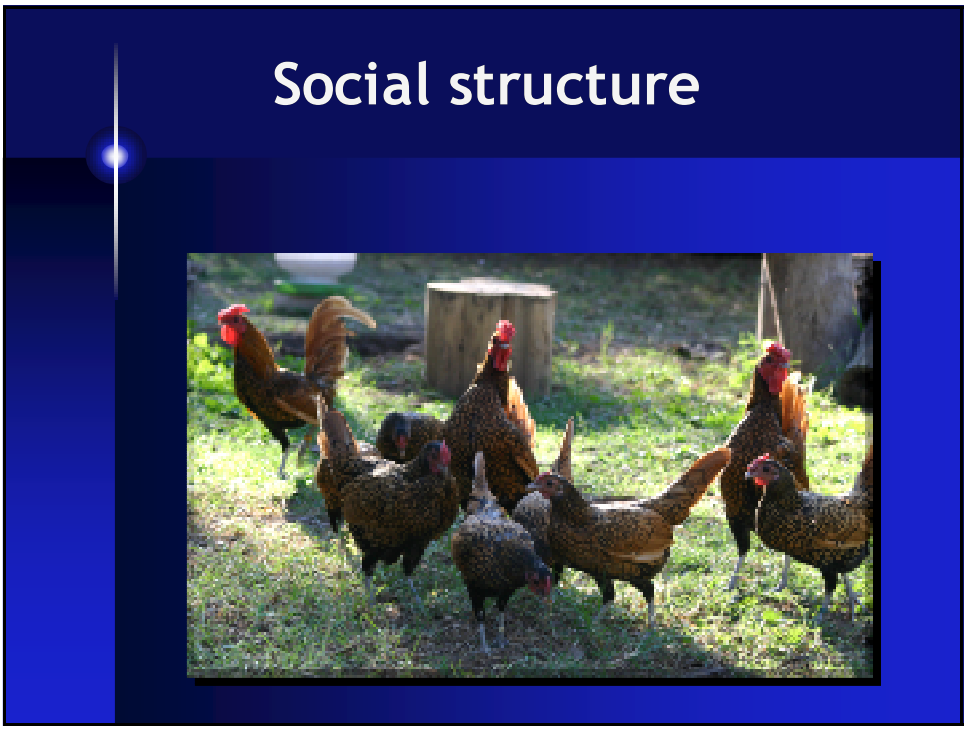


Basic research

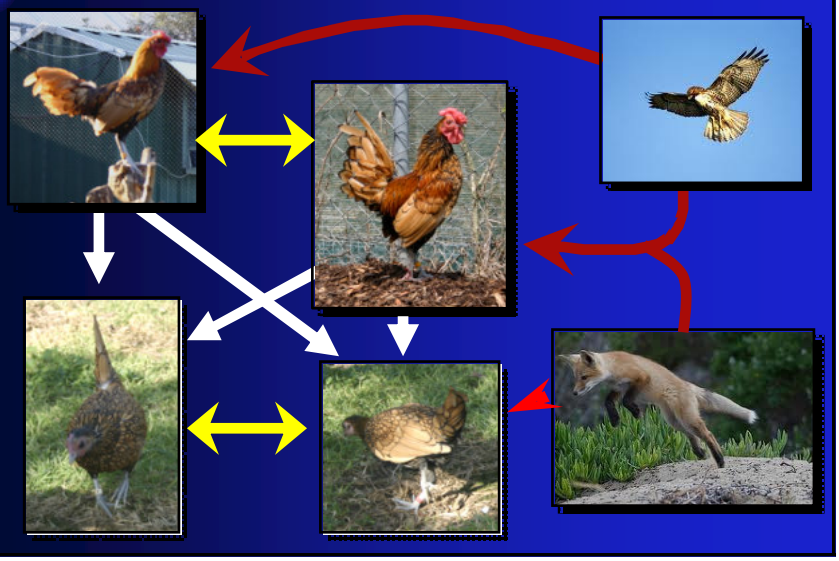
- Cognition
  - Arithmetic skills
  - Empathy, emotion
- Communication
  - Language
  - Origins of signals




Jungle fowl
(*Gallus gallus*)

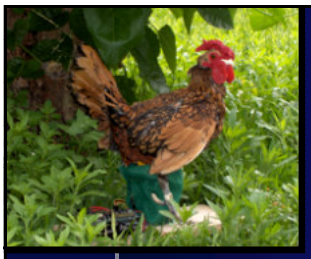

Social structure

Interaction matrix



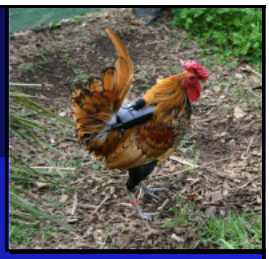
Communication

- 27 different vocalization types
  - Group cohesion (contact calls)
  - Food (tidbitting)
  - Predators (alarm calls)
    - Ground
    - Aerial



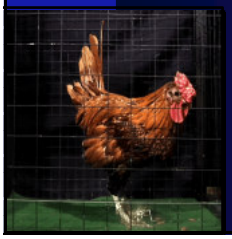
Robotics

HD video recording



Backpack microphones

Research tools



High-definition playbacks

3D animation

Aviary layout

Microphones (4)

Feeders (4)

HD cameras (2)

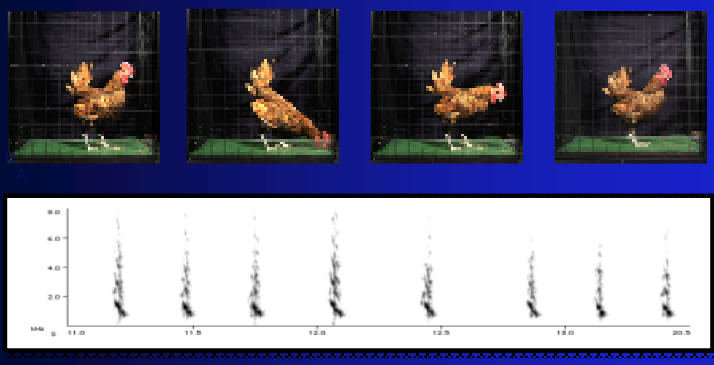
Overhead camera

Recording studio

Recording studio

Tidbitting

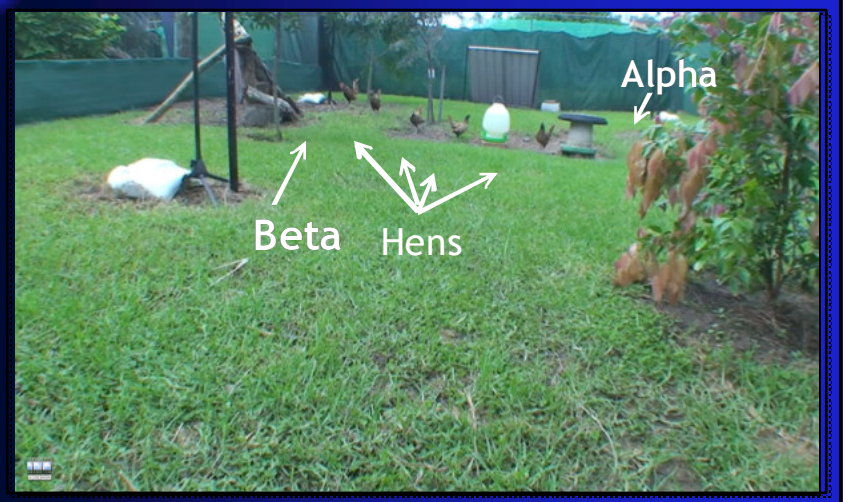
Multimodal referential signal



Tidbitting (Vocal and visual)

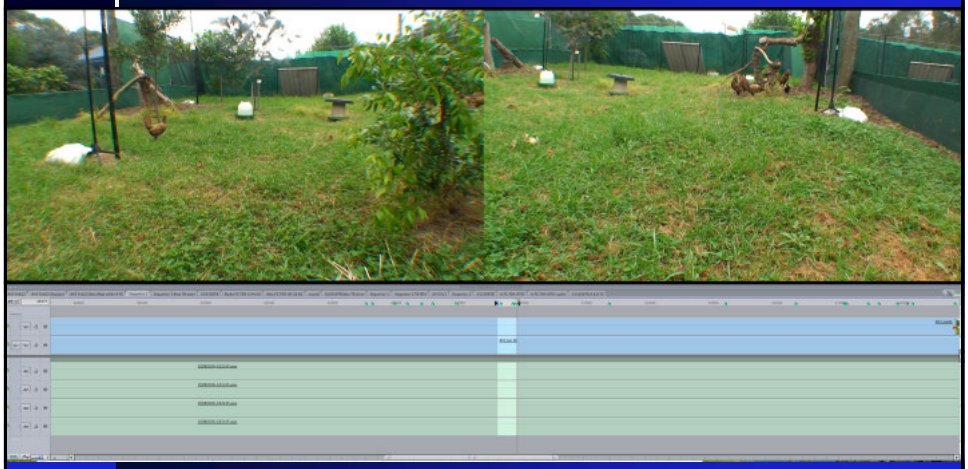
Tidbitting (vocal and visual)

Silent tidbitting (visual only)



Silent tidbitting (visual only display)

Video analysis



Scoring

Behaviors:

- Status
- Success
- Distance to hens

If Beta signals:

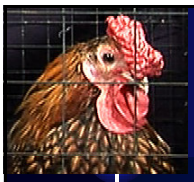
- Alpha's -
  - Distance
  - Behavior

Tactical signaling

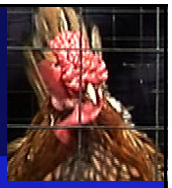
- Rate of silent vs multimodal tidbitting?
- Efficacy of silent tidbitting?
- What determines structure (visual only or combined)?

Findings

- 30% of beta signaling is silent
- Equally effective
- Betas monitor alpha behaviour
- Betas less likely to be seriously attacked after visual only display



Tidbitting



Why do roosters have wattles?

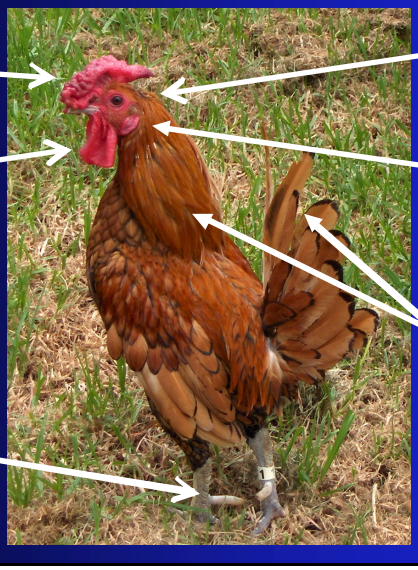
Secondary sex characteristics

Why multiple ornaments?

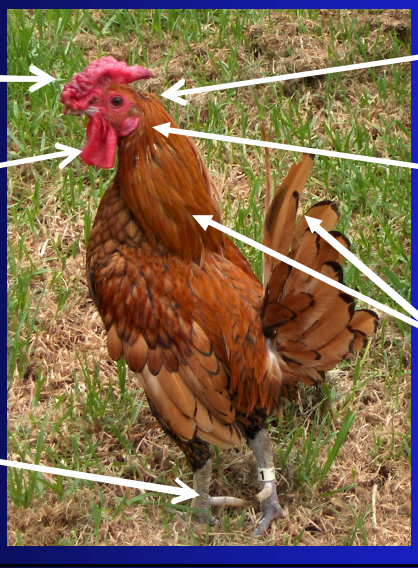
Because ...

1. Multiple messages:
   (current and developmental conditions)
2. Redundant signals:
   (same information)
3. Unreliable signals:
   (initially functioned in mate choice but no longer reflects condition)

Ornaments



Ornaments



Tidbitting

- Rate of movements increases with highly preferred food
- Competition:

female - female

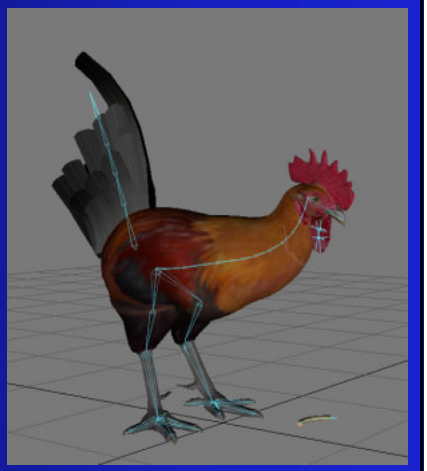
male - male

Wattles …

1. enhance signal conspicuousness
   - Faster orientation
2. enhance signal recognition
   - Rapid onset of food searching
3. alter information content
   - Increased motion = higher quality food ∴ greater food searching effort

Animation

- ‘bones’ determine movement of bird and wattle
- Precisely match exemplar movements
- Only alter characteristics of wattle



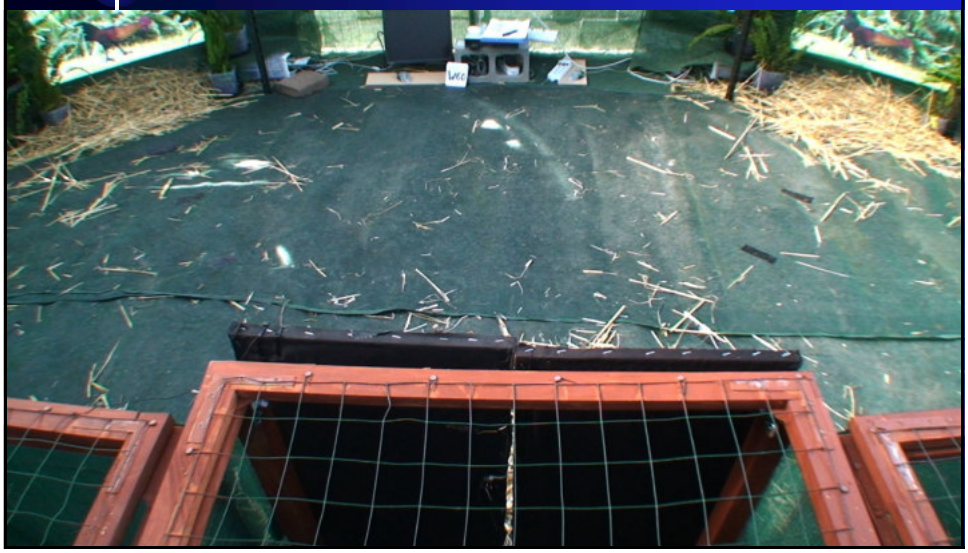
Treatments

- Normal: matched to natural movement
- Wattleless: removed completely
- Blade-like: rigid, movement with head
- Extrafloppy: 2.5x more movement than normal

Normal wattles

Wattleless

Experimental setup



Response measures

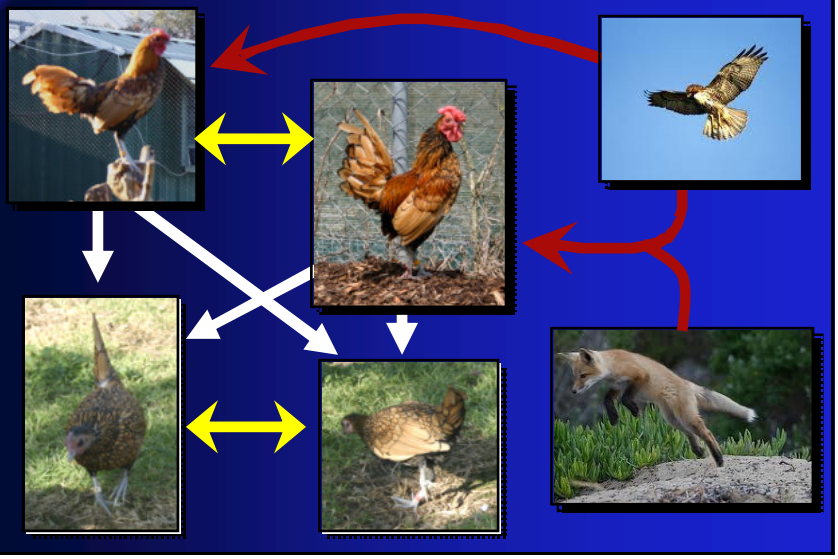
Findings

1. Wattles increase conspicuousness of tidbitting display
2. Apparent size matters
3. Signal easily recognizable regardless of wattles
4. Faster movement ≠ more information

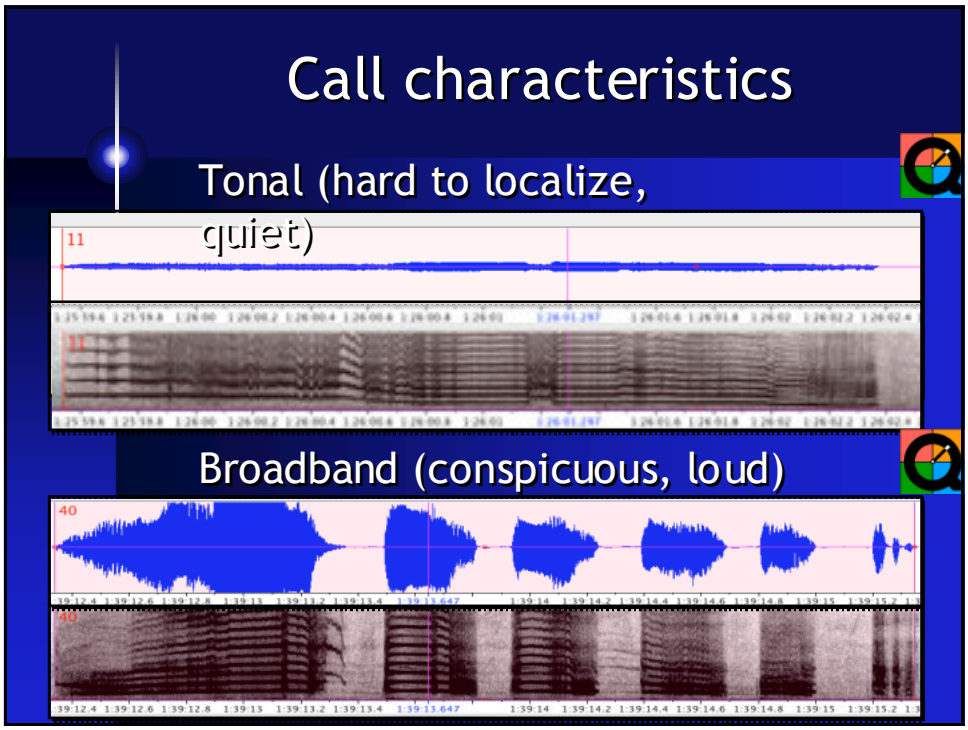
Findings

5. Wattles are an unreliable signal of male quality
6. Wattles are conserved because they enhance signal efficacy of a sexually selected display.

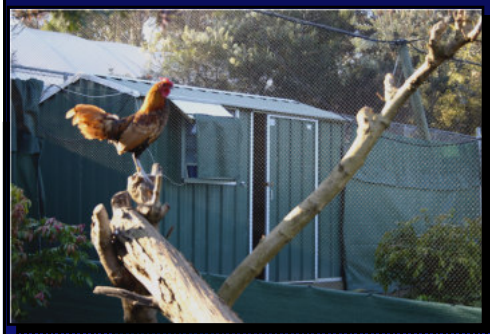
Communication matrix




Alarm signals & risk management


Call characteristics
Tonal (hard to localize, quiet)
Broadband (conspicuous, loud)

Wireless microphones



Findings

- Alpha males take more risk
  - Call more often & longer
  - More at stake (offspring)
- Situation affects call characteristics
  - Call type lessen risk
  - Places to hide
  - Somebody else to take the fall

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Questions?