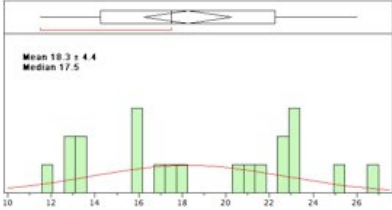


ANBI 159: Biological and cultural perspectives on intelligence

Lecture 13: Module III: what's it made of?



<http://weber.ucsd.edu/~jmoore/courses/>

- 2. Play/flexibility
- 11. My error - chap. 5 & 6 not assigned (read for final). Touched in lecture, but ...
- 16. 5% of  $p < 0.05$  is chance; correlation  $\neq$  causation (but do need explanation); policy nil for individuals

Problems for males

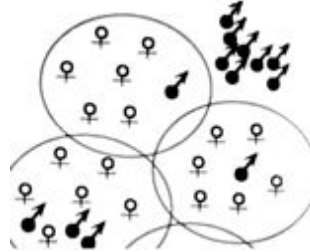
OK, have coalitions. When don't they work?

How does single troop male hold off 5 or more band males?

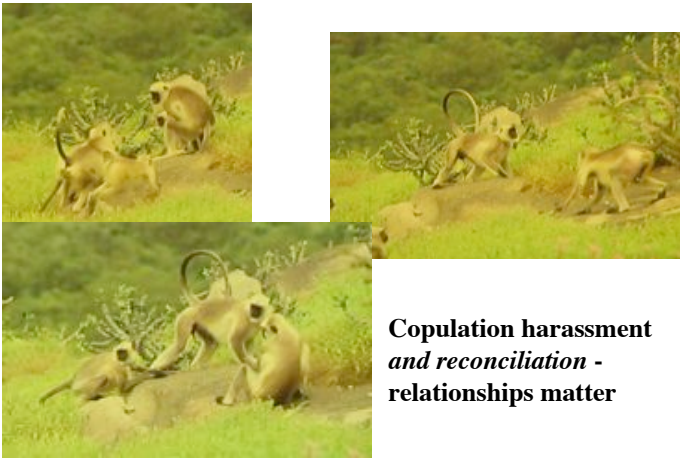
Key -- expected payoff. With 8 males in the band, the odds are 7 of them will end up kicked out if they succeed.

So the decision is, "for a 1/8 chance, do I want to be first in line to fight this guy?" Usually, they behave as if answer is "no".

In what sense "decision"?



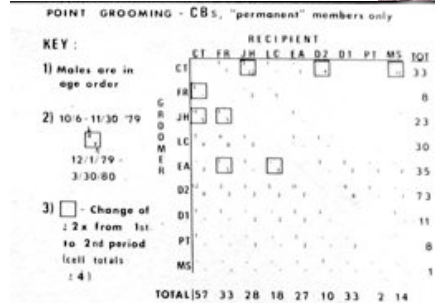
Problems for males



Copulation harassment and reconciliation - relationships matter

Forming coalitions

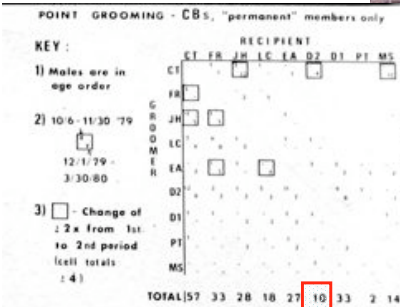
Grooming: the ultimate investment



Forming coalitions

Grooming: the ultimate investment

& it's tactical [?]



Problems for males

Brings back to original question:

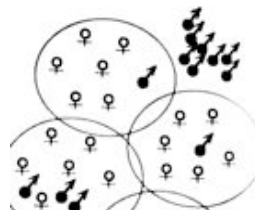
How does single troop male hold off 5 or more band males?

Not just "more of us so we win".

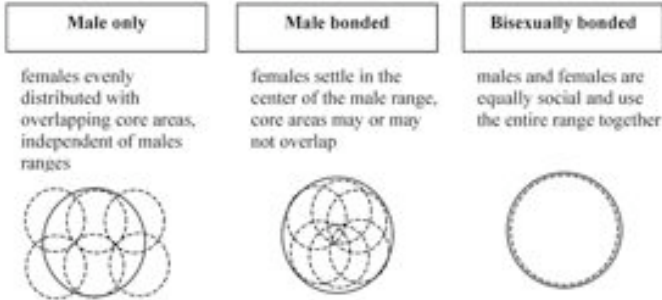
"Expected" payoffs.

Each band member should "evaluate" likely payoffs, & act accordingly.

Many factors potentially involved and might -- should -- influence each male's decision.



## Chimpanzee social structure



**Differs with ecological factors...  
but in all cases, males territorial.**

Lehmann J, Boesch C. (2005) Bisexually bonded ranging in chimpanzees (*Pan troglodytes verus*)  
*Beh. Ecol Sociobiol.* 57: 525-535

## Chimpanzee territoriality

### Coalitions and patrols



## Chimpanzees: **relationships matter**

### Coalitions and patrols

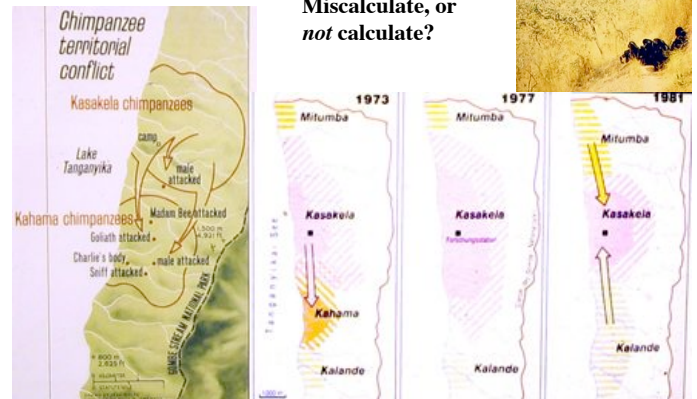
Relationships potentially life-and-death; *reconciliation*



## Chimpanzee territoriality: **whoops**

### Coalitions and patrols

Miscalculate, or not calculate?



## When do you throw in towel?

**Huge** potential complexity, appears complex behavior, but do they *really* work all this out???

Is there middle ground between flipping a coin & working it all out to 4 decimal places?

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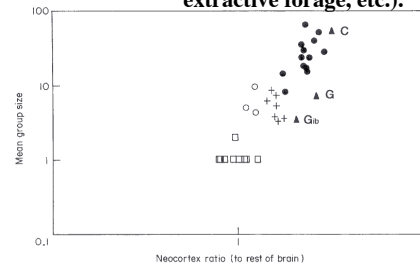
Is there middle ground between flipping a coin & working it all out to 4 decimal places? **ROT** (e.g., **TFT**)

These should show up as complex but biased decision-making (v. purely logical).

Hold that thought.

## OK, complexity there; brain size?

Recall, neocortex ratio ( $\approx$  EQ) pattern across primates didn't really support ecological (fruit vs. leaves, extractive forage, etc.).



Dunbar's analysis suggests group size (proxy for social complexity) *is* related to brain size.

Figure 1. Mean group size for individual genera plotted against neocortex ratio (relative to rest of brain; i.e., total brain volume less neocortex). (●) Polygamous anthropoids; (+) monogamous anthropoids; (○) diurnal prosimians; (□) nocturnal prosimians; (△) hominoids. Source: Table 1. Dunbar, 1992 (J. Hum. Evol. 20: 469)

## Module II: What's it for? -- summary

### *Social hypothesis for intelligence*

Langurs (low EQ, "thought" less intelligent) and chimpanzees both faced with -- and deal with -- complex life-or-death social problems.

The built-in complexity of the social makes it the dominant theory for overall patterns; ? ecological in particular species (e.g. extractive foragers).

Can argue langurs & chimps similarly "intelligent", each in own way, but ... chimps are *different*. For example ...

Chimpanzee Congo paints. Is it "art"? Film says no, because not imitative nor embedded in any [obvious] "cultural context".



{Not everyone would agree with definition...}

**Langurs [probably] don't do this** (circularity: since don't expect, nobody's tried...)  
"Art"  $\neq$  "intelligence" (?), but something *is* different...

What Makes Us Human (2006) 3m 30s

## *The intelligence organ*

The brain is an organ that does physical things that result in behavior;

## MODULE III: What's it made of?

the structure of this physical thing results from the interaction of genetic and environmental factors during development (epigenesis);

*inseparable.*

