

The Cooperative Primate



Cogs 184 * Modeling Cognitive Evolution

Evolving Motivation

- Some cognitive developments in hominids concerned motivation/affect
 - vs. Tool use, reasoning, symbols, etc.

- These changes effect types of behavior seen
AND types of reasoning possible

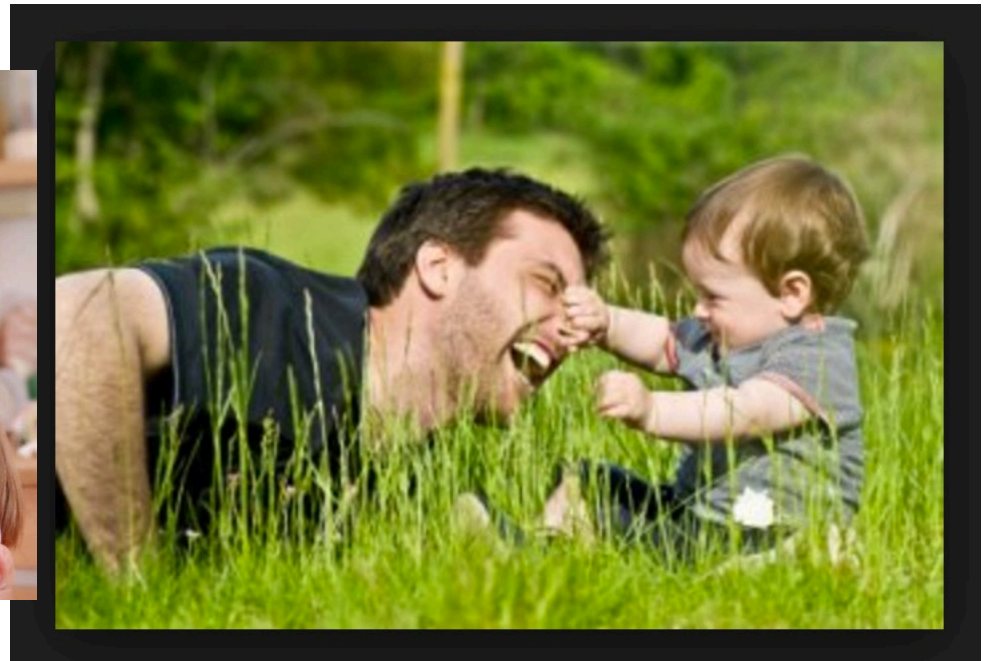


- In particular, humans show far greater tendency to cooperate than any other primate

Cooperative Breeding



Alloparenting
by kin or non-kin



Cooperative Foraging



Hunter/Gatherers

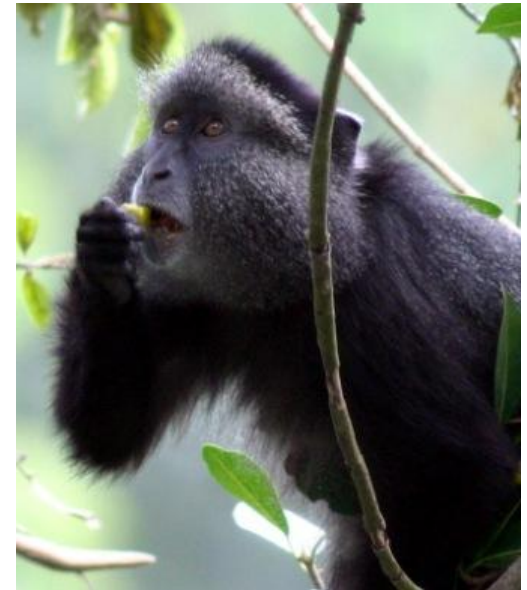
Forage in groups

Share resources with all



Nonhuman Primates Forage Independently

Even in a group, collect and process food
INDIVIDUALLY



Altho infants
learn from
Mom

RARE – Collaborative hunting in some chimpanzees

Flankers & Catcher
quietly move
into position



Only collaborators
share meat

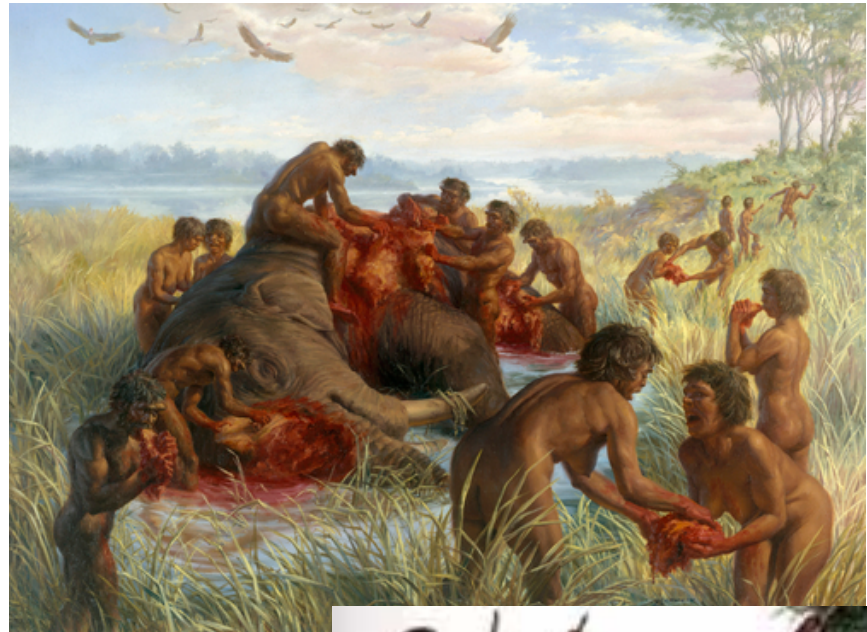


Driver noisily
chases monkey
toward Catcher

Cooperative Hunting in Hominids



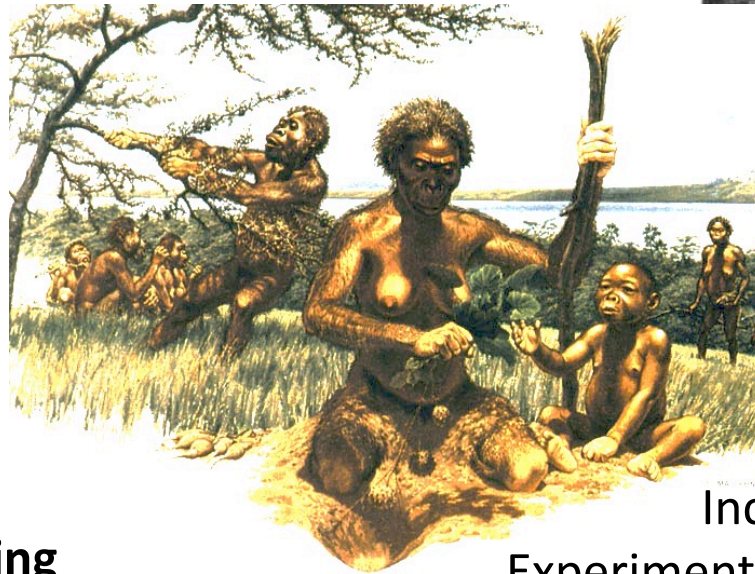
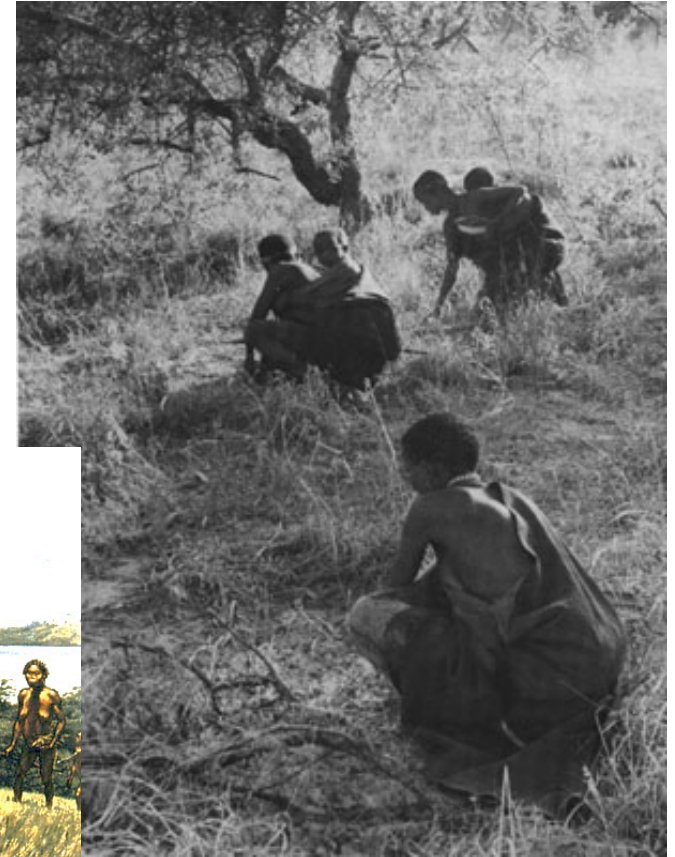
Becomes obligatory in hominids



Working together, the group is more effective than the individual



Gathering



Gathering
Find, Procure, Prepare, Share

Include **medicine**?
Experimentation, Tradition required.
Although note – other animals show medicinal
shifts in diet when sick.

Base Camps

- First evidence in *Homo erectus*, with control of fire
- Established as place where collected resources are **SHARED**



Food Sharing



All humans share food



NHPs rarely share food



NHPs tolerate scrounging, & moms may give to infants,
but young never give...

Giving – Only Humans!

- From ~ 7 months, humans **give to others**
 - Especially food, but also other objects



Humans Help



Hominids Help



"Old Man of Chapelle aux Saints"
Buried Neanderthal deformed from birth, lived to old age.
Apparently supported by his community

Helping



Helping

Human infants will pick up objects another appeared to drop “accidentally”,
but not if dropped “deliberately”



Tomasello et al, 2006

Helping



It feels good to help

Proximate mechanism
(giving help is reinforcing)
suggests evolutionary payoffs

Helping



Humans empathize with,
and aid, not only other humans
(even if unrelated)...

...but even other species!



Helping

Why do we help strangers?

- Hominids mostly interact w/kin, cohorts,
- So pays off often enough to be basic MO?



Helping

Why do we help strangers?



See self as predominantly good,
increases likelihood you will do good



See discussion of evolutionary advantages
of self-deception!
(Von Hippel & Trivers, 2011)



Helping

Reputation

Why do we help strangers?



If help, even without reciprocation,
seen by others as a good choice
to invest in as a potential collaborator

We find Helpers attractive

Helping

Reputation

Eventually, with the emergence of language,
can use speech (gossip, truth/lies)
to make/break another's reputation...



...or (via boasting, confessing) impact your own

Helping

Why do we help strangers?



It *feels* good to help !



But reputation-building alone seems insufficient to account for human inclination to help...

Proximate mechanism of helping >> positive reinforcement, suggests helping may have OVERALL tended to pay off...

Helping

- Can also recognize, use helping by others to **third parties** to guide own behavior



- e.g. 6 mo olds shown “friendly/unfriendly” shapes help or hinder a circle to roll to top of hill
- Then show preference to interact with helping shape (Kuhlmeier et al 2003; Hamlin et al 2007)

Helping



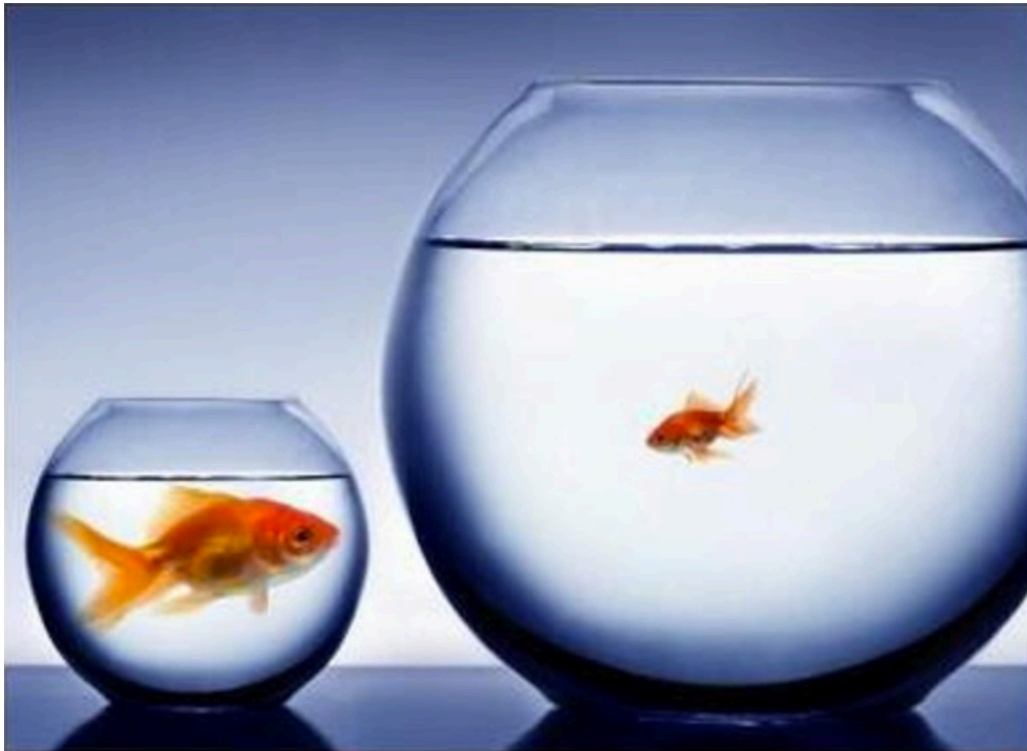
Helping

- Plus, help to LEARN = **TEACHING**
 - Intervene in other's process for their benefit
 - Much more on this to come!



Fairness

- Humans track fairness
 - Although may then promote or exploit it!



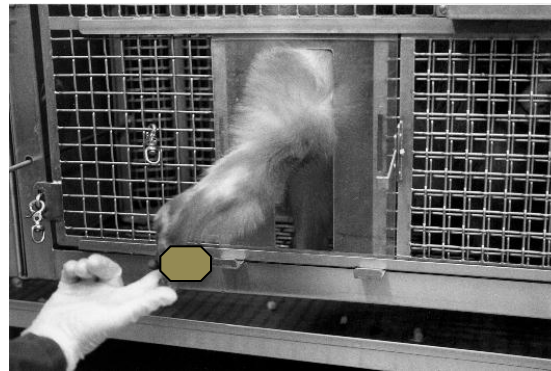
- Even some NHPs show some evidence of assuring they get “my fair share”

Fairness

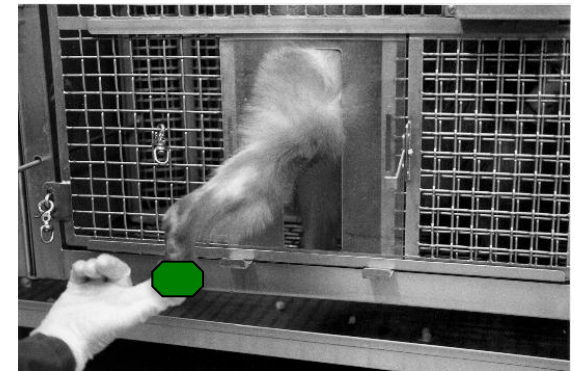
- Cebus monkeys trained to give rock (from in cage) to human for cucumber



Give rock



Get cucumber



Other watches,
awaits own turn

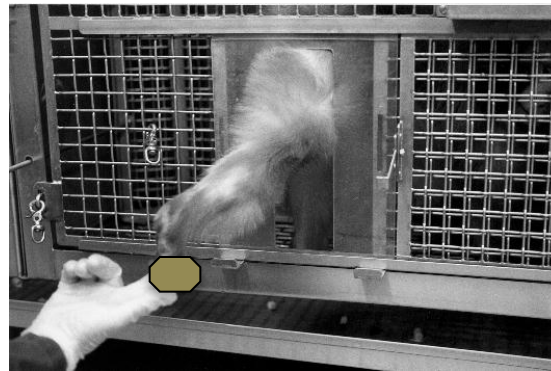
(Brosnan 2006)

Fairness

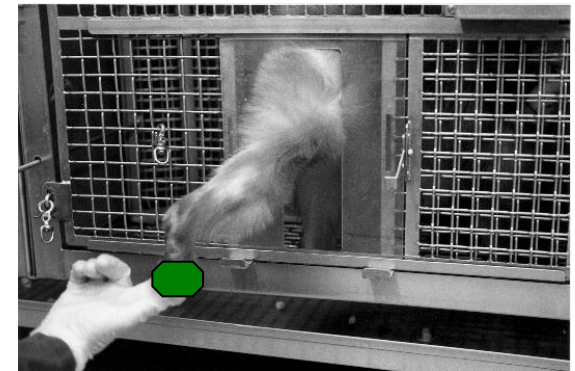
- Each monkey learns same task, and watches other



Give rock



Get cucumber



Previous watches,
awaits own turn

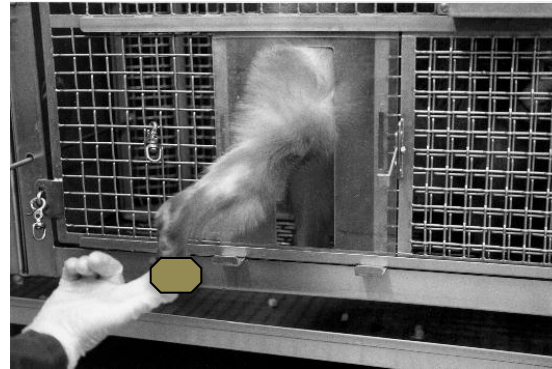
(Brosnan 2006)

Fairness: Brosnan (2006) on *Cebus*

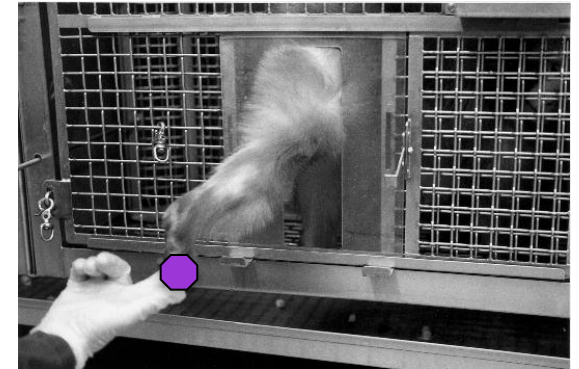
- Then one monkey receives (more desirable) *grape* as other watches



Give rock



Get *grape*!



Other watches,
awaits own turn

(Brosnan 2006)

Fairness: Brosnan on *Cebus*

- Watching monkey will now REFUSE to work any longer for (unfair!) cucumber



Both Cebus monkeys, & the apes (Chimps) tested showed such a sensitivity to fairness...

(Brosnan 2006)

Fairness

- Unlike NHPs, humans also exercise **third party** evaluation/enforcement
- i.e. Police others' behavior
 - Develop elaborate cultural conventions (laws, sanctions) to regulate



- Caching corvids also harass 3rd parties for stealing from others

ETHICS: Fairness



Note
how often depends on
“Intention”

One reason we need to
get a grip on this
slippery topic!



Reciprocal Altruism



Between
unrelated
individuals

Track debt, pay back
in variable currency, etc



Reciprocal Altruism

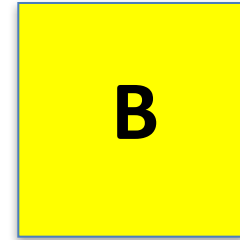
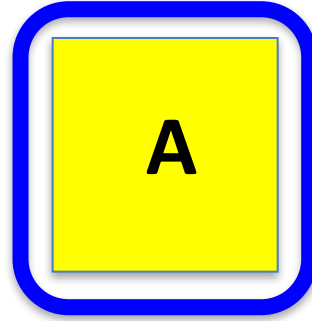
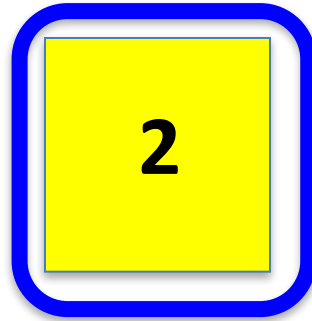


Only stable if can detect & punish
“cheaters”



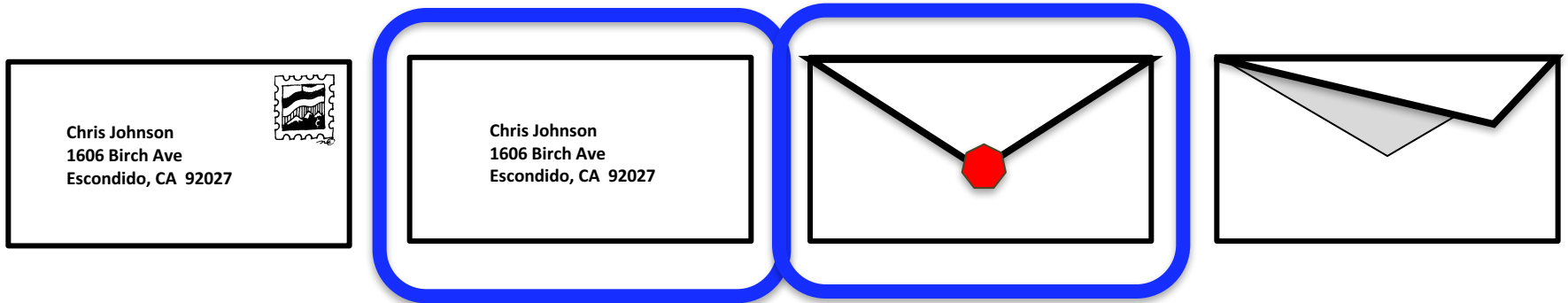
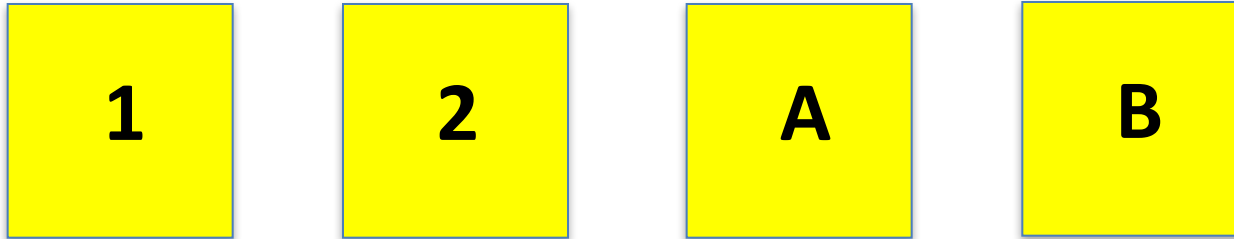
Wason Selection Task

Most
common
error



- Cards have letter on one side, number on the other
- RULE: If Vowel on one side, then must be Odd on other
- Which card(s) are necessary to turn over to confirm?
- Subjects find this difficult, do not always pick correct card(s)!

Wason Selection Task



- But, if provide context of obligation (social contract), easier!
- i.e. You work for the postal Service, make sure mailers comply with rules
 - RULE: If letter Sealed, then must have Stamp

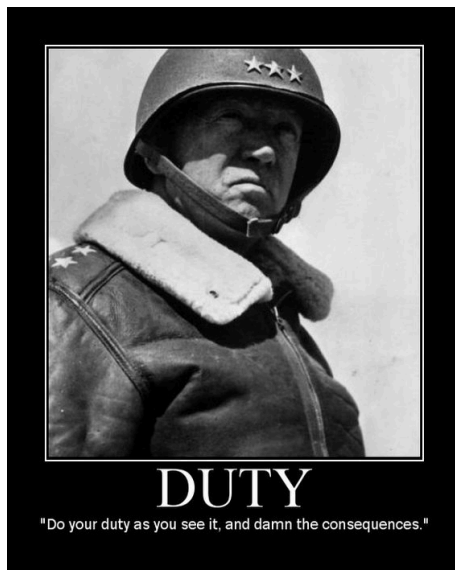
Same "logic" involved as above, but much ***Easier!***

Check for Cheaters!

ETHICS

Cultural norms of proper behavior

Learn by observation, imitation & reinforcement,
AND via sanctioning by others and internalized dis/approval



"Good"/"Bad"
varies with culture,
but typical examples
relate to above...



Do your share. Do no harm. Serve the common good.

- But, Cooperation also often entails Competition
- As a result, can lead to In Group / Out Group Distinctions



- i.e. Humans much more likely to help members of In Group

In Group / Out Group

- Cultural norms often involve marking
In-Group-Out Group distinctions



In Group / Out Group

- Cultural norms often involve marking In-Group-Out Group distinctions



In Group / Out Group

Language, especially, supports these distinctions



If we cannot communicate,
very difficult to COOPERATE!

In Group / Out Group



Did *Homo sapiens*
eliminate
Homo neanderthalensis
due to such distinctions???



Let us consider other aspects of Behavior & Cognition
that are associated with being
Cooperative...

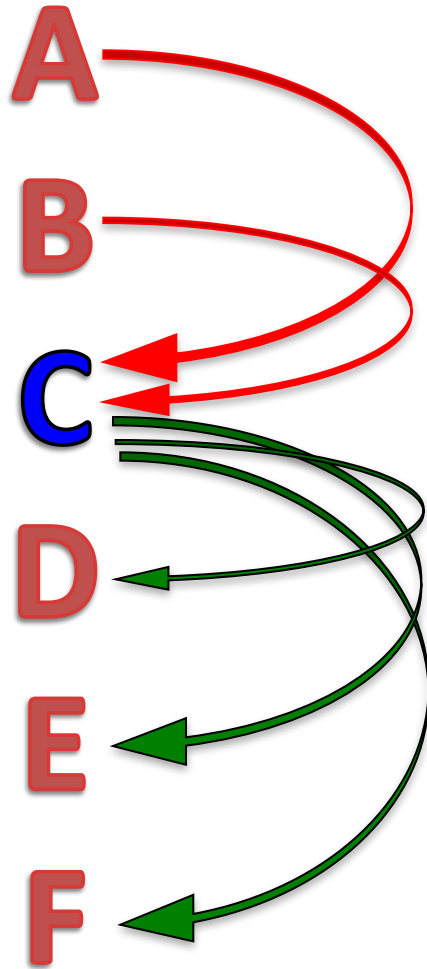
Social Complexity

Social domain is probably the most cognitively demanding...



Social Complexity

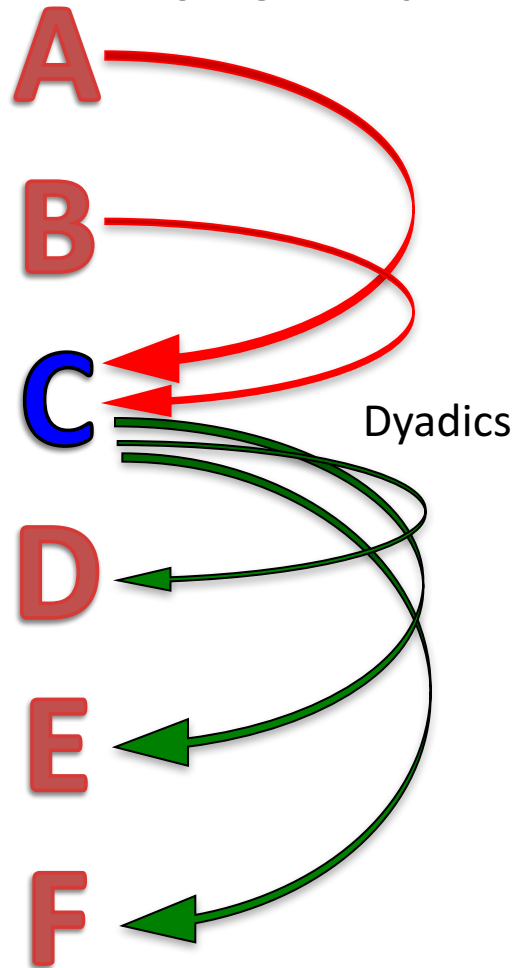
Power = Rank



In a “simple” hierarchical society,
C only needs to track its
own DYADIC relationships.

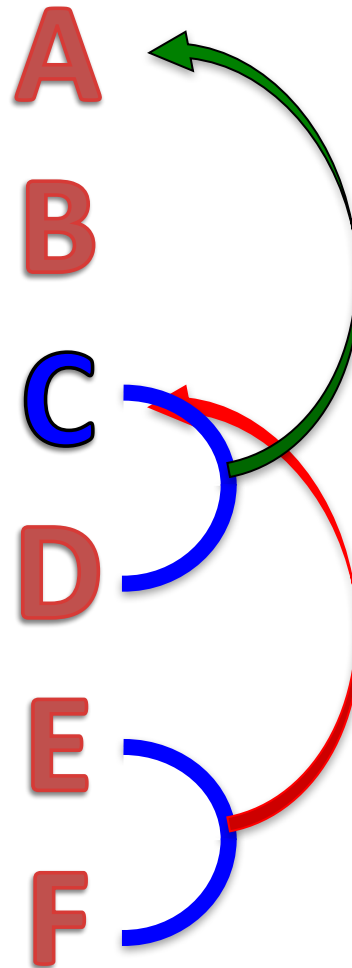
Social Complexity

Power = Rank



Power not = Rank

(de Waal, 1986)



COALITIONS

between lower ranking individuals can out-compete higher ranking individuals

So, C must track not just its own dyadic relations, but also the relations between others.

Much more cognitively demanding!

Social Complexity demands Cognitive Complexity

- Thus, in above examples, when see “NEW” behaviors like policing, or recognizing 3rd party help/hinder . . .



- May NOT be that we evolved the ability to do these behaviors *per se*
- Instead, arise when add new “Helping Matters” to a system already atuned to Third Party Relations

Hunter/Gatherer Society

MEAT

- Gradually increasing in hominid diet
- w/Assorted other gathered foods, helped to fueled brain bloom
- Even in *Homo habilis*, (most likely a scavenger) stone tools used to access marrow & meat, without “power-jaw”



Hunter/Gatherer Society

FIRE for COOKING

“Predigest” meat, plant foods, using controlled fire

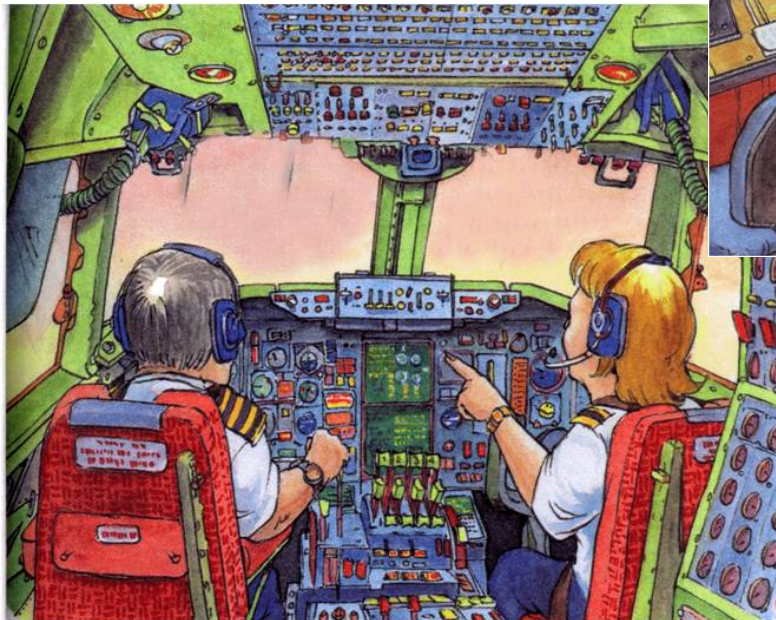
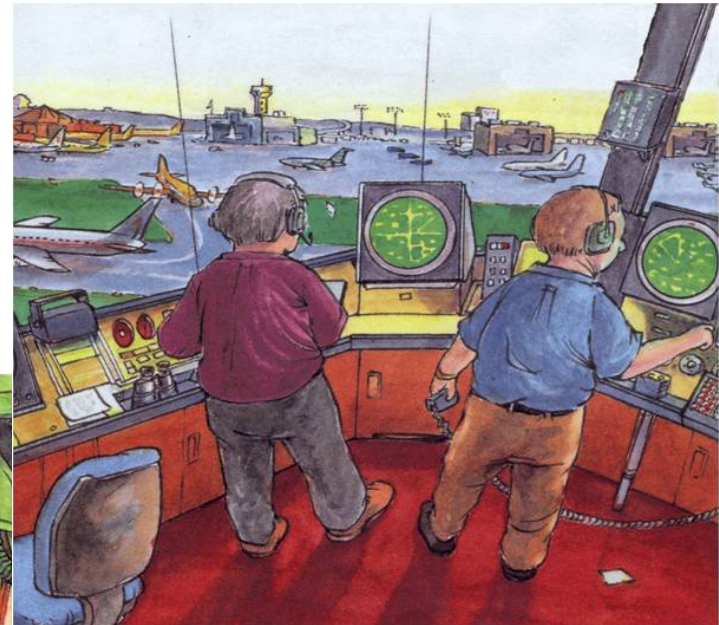
More nutritionally accessible, less time chewing, digesting



COOKING >> Larger brain, shorter gut, change in teeth

Collaboration

Accomplish together what cannot
(as easily or at all) be accomplished alone



Do your part,
coordinated with others
in space & time

Roles

- Above depends on a

Division of Labor

- Both within & between Hunters and Gatherers



- e.g. *H. erectus* especially may have run-down prey
 - A very different contribution from gathering!
- e.g. Hunting - Flankers, Drivers & Catchers;
- e.g. Tool maker, Thrower, Processors of carcass, etc.
- e.g. Gathering – Young collect obvious nuts, older extract roots, more discriminant collect herbs
- Note many tools probably for gathering;
 - May have been made, used mainly by females(?)
 - Note in chimpanzees, females are primary tool users

Traditional Roles

Possibly per age, gender, status, etc.



Cultural conventions, as well as talent, play a role in assigning roles!

Roles

Plus,
Status may accrue to various roles



Roles

- May also help select for the abstract categorization of behavior, since “role” can be filled by various individuals



Who will play . . . Role X

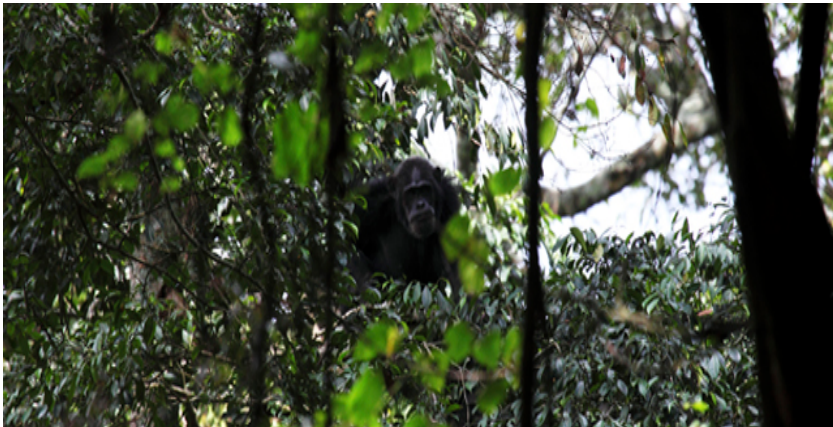
Role Y



Self Control

Hunting

Suppress noise to stalk,
Postpone action until others in place,
etc.



Self Control

Carry

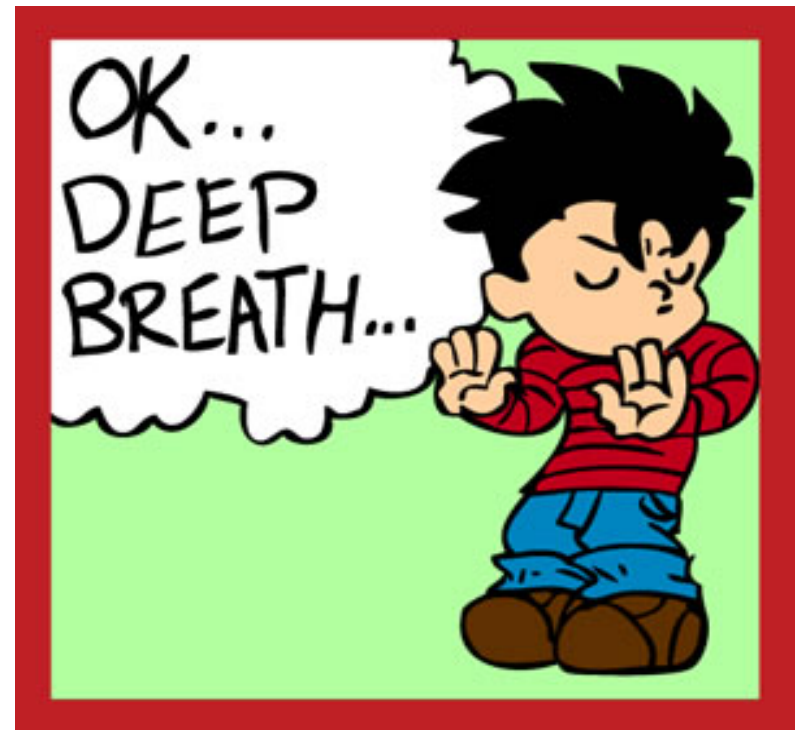
When objects are valuable
(require time to make, are necessary to forage)
then keeping/transporting them becomes an issue

- Requires we suppress use of object-in-hand



- Delay gratification (see Discussion of “time-travel”).

Many cooperative situations require **Self Control**



Self Control



We are not the only species that can exercise self control,
but we do it more & better than most.

Self Control: Promote Group Harmony



Resist selfish impulses,
Do not exploit partners even if profitable



Self Control: Living in Close Quarters

Suppress tempers – need to get along, esp in tight quarters



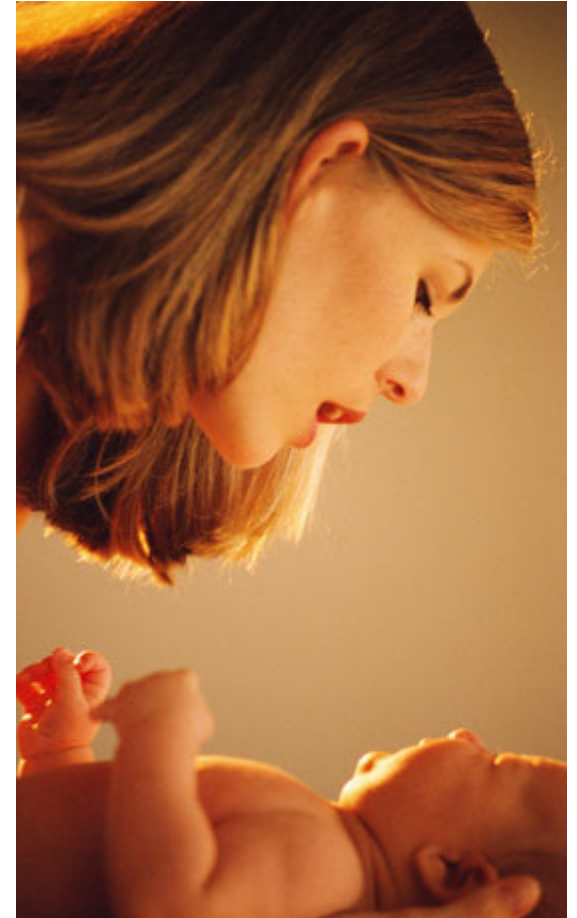
Respect the privacy of others

Self Control

“Motherese”

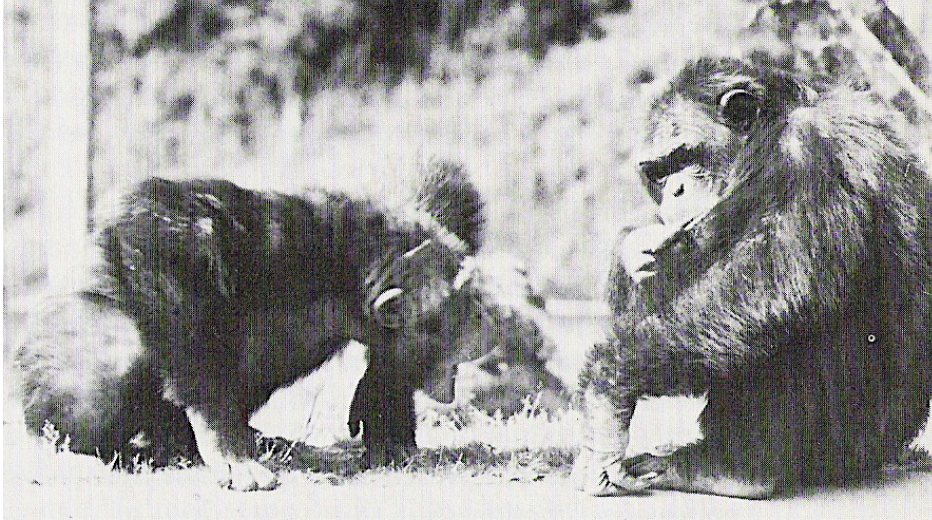


Adopt emotional state you want to promote in others



See upcoming reading
Falk 2004

Self Control



Deception

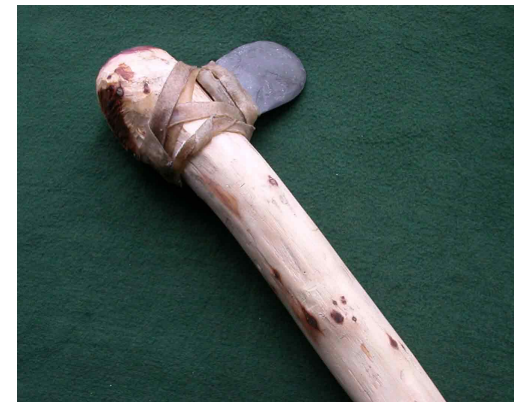
Conceal emotion,
control gaze direction,
postpone activity until hidden, etc.



MORE TO COME!

Planning

- Much of above behavior may be base on long-term plans
 - “Action in advance of need”
 - (Consider *Suddendorf & Corballis* reading)
- Could be argued for all tool-making and hunting/gathering that serves beyond *personal* requirements



Planning

We are the **CACHING** primate

When did we start caching food?

Tools?



Etc?



Consider primate-atypical
memory requirements involved
for what, where, how much stored

Teaching / Apprenticeship

(See upcoming Developmental lecture)

Most human practices
require teaching



Teaching / Apprenticeship



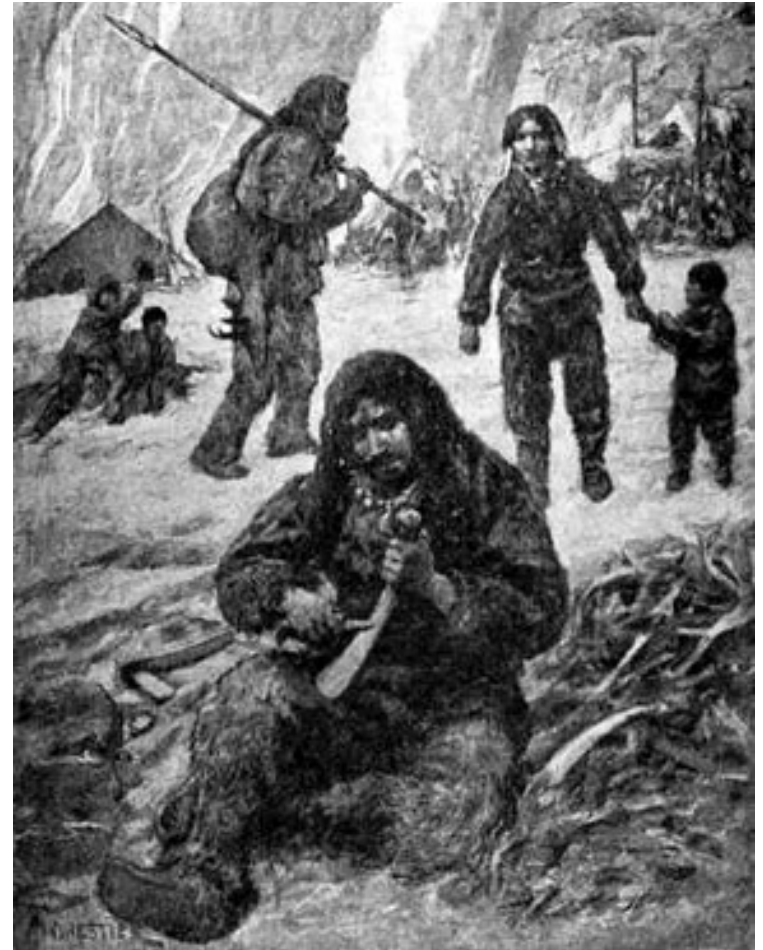
Even when taught,
refined skill requires
Practice

Motivation to practice
from cultural expectations



Teaching / Apprenticeship

- Requires **provisioning** by others, if you are to survive while investing time in making, training tools for the good of self & others



Teaching / Apprenticeship



Theory of Mind required
for teaching?

Expert takes into account
what Novice
knows / does not know



MORE TO COME!