

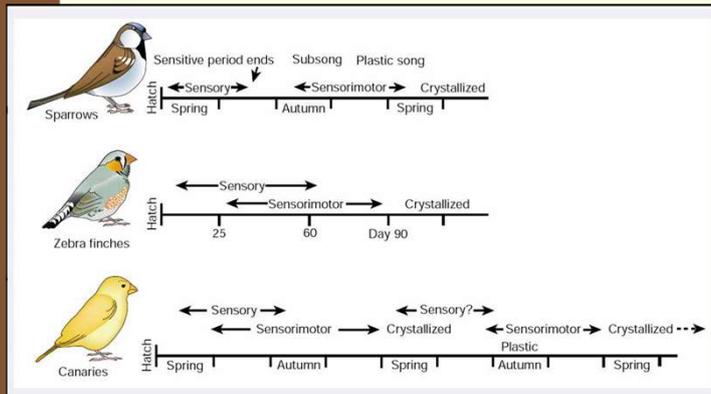


What is “culture”?
Can there be “animal cultures”?



Blue tit opening a milk bottle

Social learning and communication systems

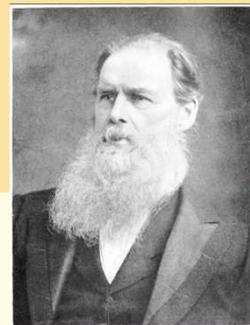


Brainard & Doupe 2002

Birdsong “**dialects**” (Marler, Slater, etc)

Whale songs, dialects, male calls (Rendell & Whitehead 2001)

What is “culture”?



Anthropology

“...that complex whole which includes knowledge, belief, art, morals, law, custom, and any other capabilities and habits acquired by man as a member of society”

Edward Tylor (1871)

Animal “culture”? (Hill 2009)

Human culture:

1. **Socially learned techniques, technology, and environmental information**
(traditions, beliefs)
[NonHumans]
2. **Regulations of individual behavior - enforced by reward and punishment**
(norms, conventions, institutions, laws)
Strong reciprocity > altruistic punishment
Norms: Intragroup conflict resolution
Cooperation in public goods problems.
[Only Humans?]
3. **Symbolic means of reinforcing/ signaling adherence to a rule system**
Ritual, religion, morality, ethnicity
Elderly as conservative “rule abiders”
“Rule abiding displays” and obtainment of partners and mates
[Only Humans?]

Animal “culture”? (Hill 2009)

Animal Culture?

1. **Locally common socially learned techniques/technology, behavioral tendencies**
Mate choice, foraging patterns, predator avoidance tactics, levels of aggression:
... all could be learned individually?
2. **Socially learned “symbolic” mating and territorial displays**
There are no animal rituals designed to reinforce a social rule system
/ to elicit emotional commitment to a particular rule system (morality).

Examples of hunter-gatherer cultural regulations

Ache: norms on cooperation in hunting and sharing the kill

Human-specific psychological mechanisms of culture

- Social learning, imitation
- Teaching, strong conformity bias
- “Moral” sense of “wrong”, fairness [chimps: ultimatum game (...)]
- “Conscience” (X “sociopath” chimps ...)
- Evolution of punishment → psychological mechanisms:
“Shame”, “guilty” and anger over injustice: human universal emotional responses.

“Even Neanderthals may have been only “protocultural”...”

(x Hoffmann et al 2108 etc)

What is “culture”? Can there be “animal cultures”?

Definitions:

- “Proto-”, “pre-”, etc (?)
- Antropocentrism in anthropology definitions
- Necessity of an operational definition
- Broader and restrict definitions:
 - Culture X Social Information Transfer
 - Culture X Behavioral Traditions
 - Culture = Socially learned behaviors/ norms/ symbolism?
- Culture and language...?
- What is unique about human culture?

(features x underlying mechanisms)

What is “culture”?



“Cultures are those group-typical behavior patterns shared by members of a community that rely on socially learned and transmitted information”

(Laland & Hoppitt 2003)

Culture in non-human animals?

Western x Eastern *cultural* views of “culture” ...

Kenji Imanishi (1952):

文化 X カルチャー

(= non-hereditary, socially acquired behavior)

Later (1957), just 文化 ...



Diffusion of new behaviors in Japanese monkeys

Kawamura, S. (1959). The process of **sub-culture** propagation among Japanese macaques. *Primates* 2, 43–60.

Kawai, M. (1965). Newly-acquired **pre-cultural behavior** of the natural troop of Japanese monkeys on Koshima Islet. *Primates* 6, 1–30.

Diffusion of new behaviors in Japanese monkeys (*Macaca fuscata*)

Sweet potato and wheat washing,

fish eating

(criticisms...)

Kawamura 1959
Kawai 1965
Itani & Nishimura 1973

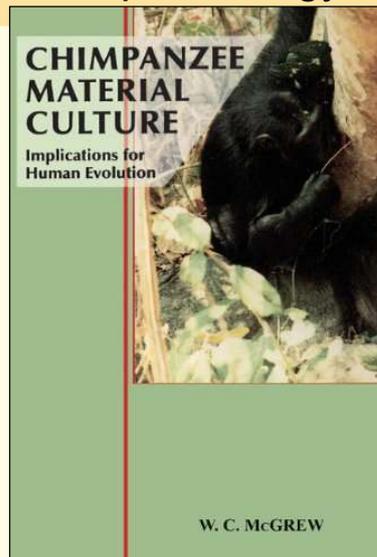


Stone handling by Japanese monkeys

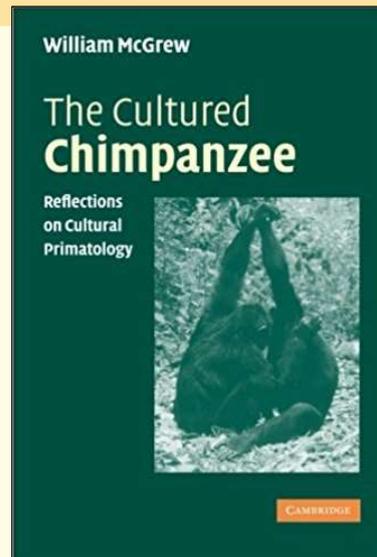


Huffman 1984

Cultural primatology



McGrew 1992

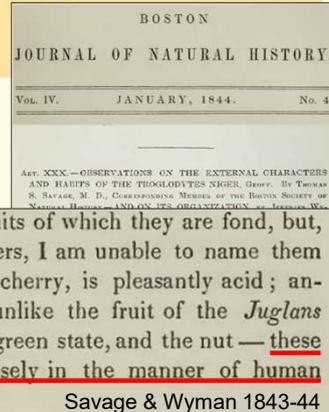


McGrew 2015

Cultural primatology

The cultured chimpanzee
(McGrew 2015)

Three stages:



scribed. There are other fruits of which they are fond, but, not having obtained the flowers, I am unable to name them botanically ;— one, called a cherry, is pleasantly acid ; another, called a walnut, is not unlike the fruit of the *Juglans nigra*, both in the husk, in its green state, and the nut — these they crack with stones precisely in the manner of human beings.

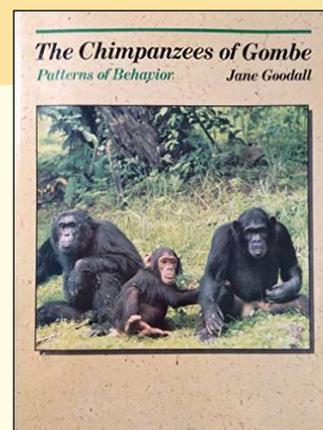
Savage & Wyman 1843-44

1. Natural history: qualitative reports, anecdotes;
2. Ethnography: careful descriptions, ethograms, categories;
3. Ethnology: theory-driven, hypothesis testing, modelling.

Cultural primatology

The cultured chimpanzee
(McGrew 2015)

Three stages:



1. Natural history: qualitative reports, anecdotes;
2. Ethnography: careful descriptions, ethograms, categories;
3. Ethnology: theory-driven: hypothesis testing, modelling.

Cultural primatology

Pioneering studies on wild chimpanzees' behavior

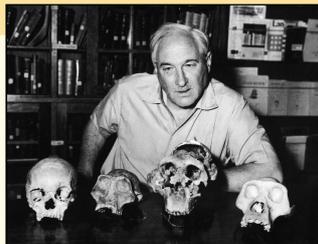


Toshisada Nishida (1941- 2011) **Mahale**

Jane Goodall (1934 -) **Gombe**



Louis Leakey & the "Trimates"



Louis Leakey



Dian Fossey

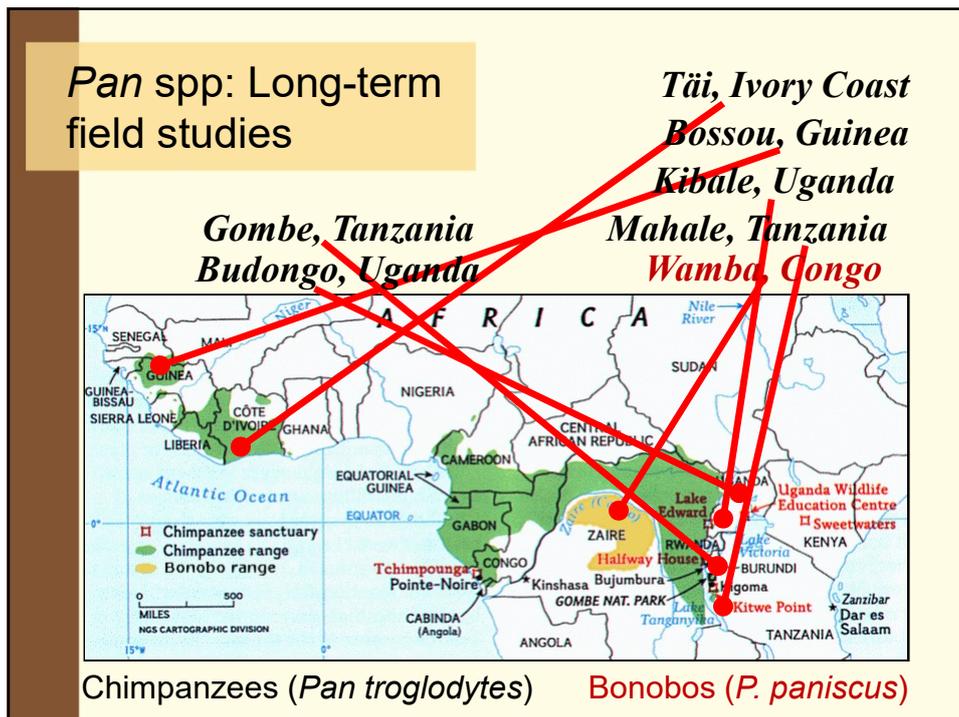


Jane Goodall



Biruté Galdikas





Cultural primatology

Chimpanzees (McGrew 1992, after Kroeber 1928)

Kroeber (on Köhler's "dancing" chimpanzees):

"If one ape **devised or learnt a new dance step**, or a particular posture, or an attitude toward the object about which the dance revolved; and **if these new acts were taken up by other chimpanzees**, and **became more or less standardized**; especially if they **survived beyond the influence of the inventor**, were **taken up by other communities**, or **passed on to generations after him**, in that case, we would legitimately feel that we were on solid ground of an ape culture. (Kroeber 1928)"

Table 4.1. Conditions of criteria for recognising cultural acts in other species (from Kroeber, 1928; McGrew & Tuin, 1978)

Innovation	New pattern is invented or modified
Dissemination	Pattern acquired by another from innovator
Standardisation	Form of pattern is consistent and stylised
Durability	Pattern performed outwith presence of demonstrator
Diffusion	Pattern spreads from one group to another
Tradition	Pattern persists from innovator's generation to next one

McGrew 1992

Cultural primatology

Chimpanzees (McGrew 1992, after Kroeber 1928)

- Innovation
 - Sticks to open boxes in Gombe
 - "Fads" in nest-building
- Dissemination
 - Mother-infant transmission; termite-fishing: all 2+ yo
- Standardization
 - Sticks to collect army ants X sticks for termite-fishing
- Durability
 - Gombe: all continue to use probe tools after ceasing to follow mothers
- Diffusion
 - Kasohe: immigrants carry the use of bark tools to capture termites
- Non-subsistence
 - *Handclasp grooming*: Kasohe x Gombe
 - *Leaf-clipping*: Kasohe (male courtship)
- Naturalness
 - All behaviors observed in Gombe before the provisioning
 - Nutcracking in Western Africa

(None of the examples fulfill ALL requisites...)

Cultural primatology

Ten dispatches from the chimpanzee "culture wars"
(McGrew 2003-2009)

Culture is by definition

Ethnology: Chimpanzee culture? Absurd!

Ethology: Chimpanzee culture? Of course!

Culture without language

Culture is not behavioral diversity

Culture is beyond social learning

Culture is collective

Tradition is not enough

Culture has escaped from anthropology

Anthropology: "what" questions about culture (c. as phenomenology)

Psychology: "how" questions about mechanisms (c. as info transmission)

Zoology: "why" questions about fitness (culture as adaptation)

“Culture” X “Behavioral Traditions”

Perry (2011):

Culture involves more than behavioral characteristics geographically variable or even social learning : *group identity* (symbolic linked to socially learned behaviors) and *social norms*.



McGrew (2003/2009):

Traditions suggest vertical transmission and durability – but *culture* may include horizontal transmission and short-living “fads”.



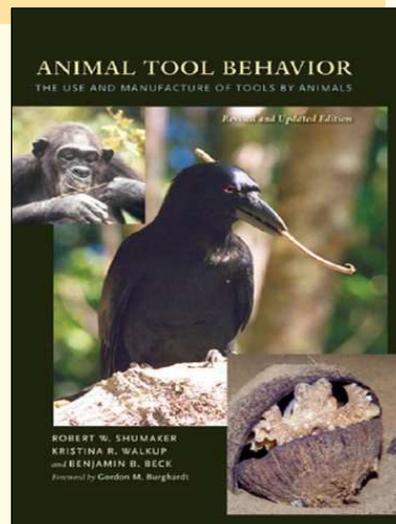
“Material culture” & Tool use in nonhuman animals

DEFINITION:

“the external employment of an unattached environmental object to alter more efficiently the form, position, or condition of another object, another organism, or the user itself”

(Beck 1980)

Schumaker, Walkup & Beck 2011

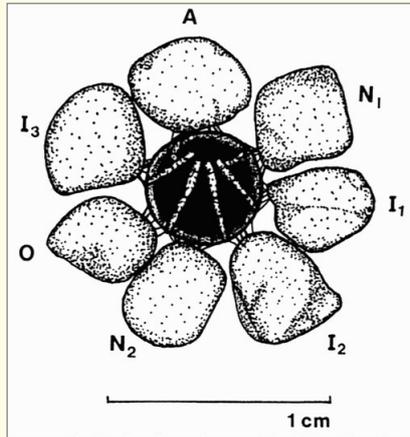


Tools and behavioral plasticity

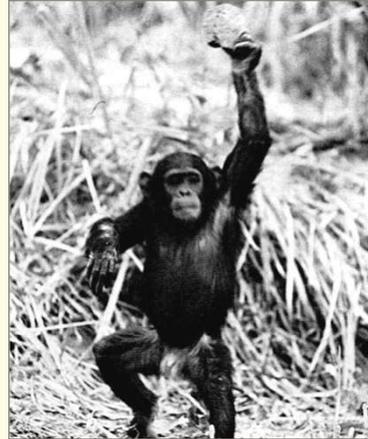
“Species-specific”
behaviors

X

Local traditions and
cultural variation?



Ariadna spider (Henschel 1995)



Chimpanzee

(Learned/flexible) tool use in invertebrates



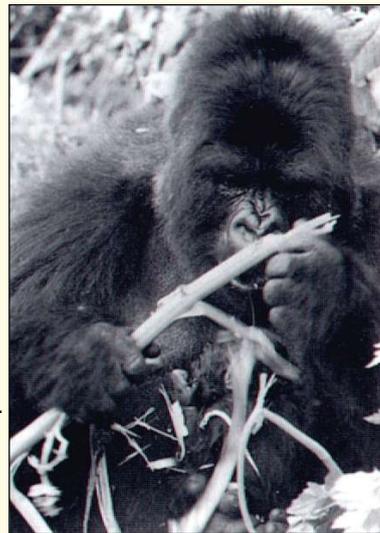
Octopus (*Amphioctopus marginatus*) with coconut shell

Finn & al 2009

Tool use in nonhuman primates

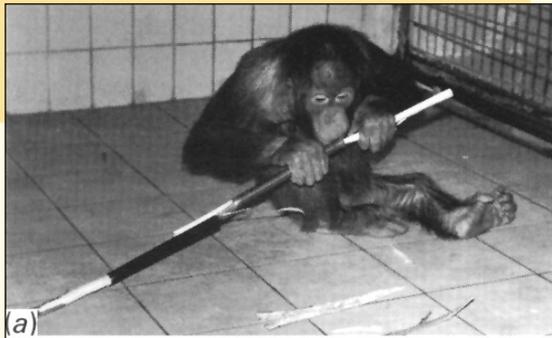


Tool use in hominids: nature X captivity

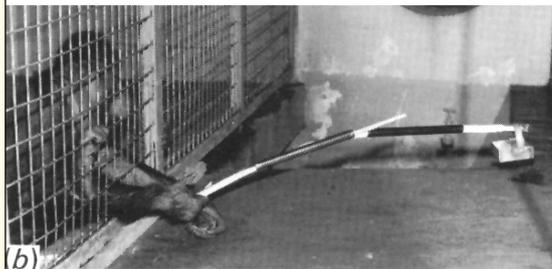


Chimpanzees (*Pan troglodytes*) +++
 Orangutans (*Pongo pygmaeus*) ++
 Gorillas (*Gorilla gorilla*) +
 Bonobos (*Pan paniscus*) -

Tool use in the lab



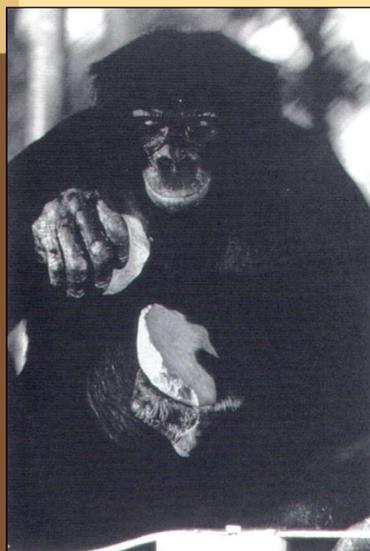
(a)



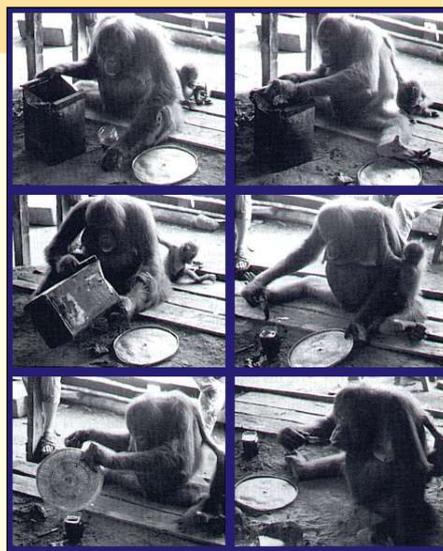
(b)

Orangutan
(*Pongo pygmaeus*)
reaching object with
composite tool

Tool use in the lab / captivity (rehabilitation)

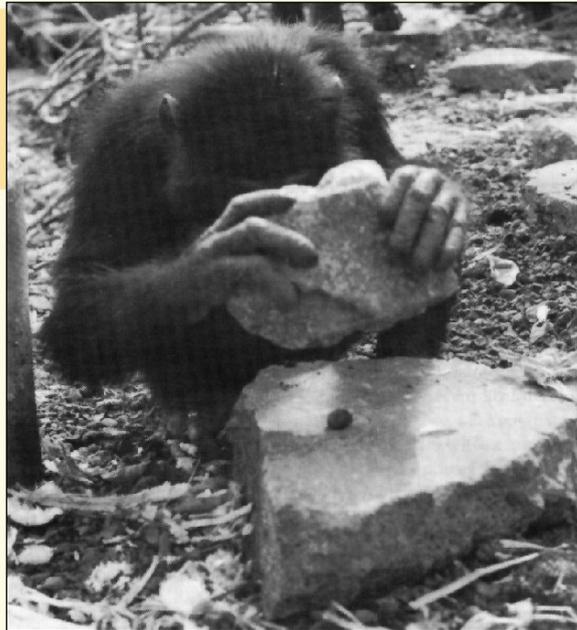


Kanzi (bonobo): flaking stone



Supinah (orangutan) lighting a fire

Tool use by wild chimps



Stone-aided nutcracking

Pan troglodytes

Chimpanzees: tool use in the wild



也看得出来
工具的发明和使用

Chimpanzees: tool use in the wild



Female “fishing” termites (with infant)
Sticks to dig and “fish” termites



Tool use by wild gorillas

Western gorilla (*Gorilla gorilla*)



walking stick & stabilizer
Breuer et al 2005

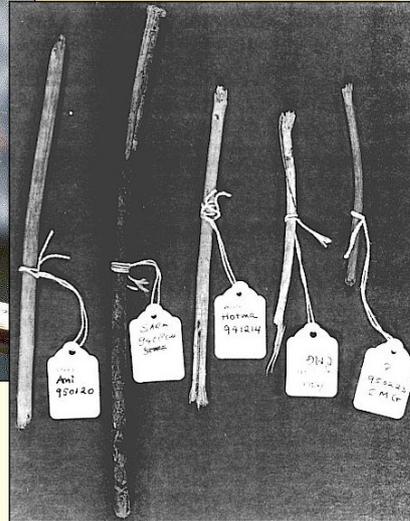


Orangutans: tool use in the wild



Sumatran orangutan
(*Pongo [pygmaeus] abelii*)

Tools to extract honey and seeds
(Van Schaik, Fox & Sitompul 1996)



Orangutans: tool use in the wild

Orangutan making
and using tool with
Neesia fruit
Recorded at Suaq Balimbing
June 1999

Videography by Nuzuar S. Hut
© 1999 Michele Y. Merrill

Orangutans: tools and social gregarity



van Schaik, Fox & Sitompul 1996

van Schaik, Fox & Fechtman
2003:
Tool use and female party size



Conditions for tool use in primates

van Schaik, Deaner & Merrill 1999

- **Adequate ecological context**

Ex.: extractive foraging

- **High cognitive capabilities**

Encefalization, manipulative dexterity

Innovation and Observational Learning

- **Social conditions favoring information transfer**

Tolerance in a gregarious context

Social proximity & Socially Biased Learning

Coussi-Korbel & Fragaszy 1995

“It is theoretically possible (...) that a socially tolerant monkey population will be found in which routine use of feeding tools occurs, especially if the skills used are close to naturally occurring operants, and if opportunities for would-be learners are abundant”.

van Schaik *et al* 1999

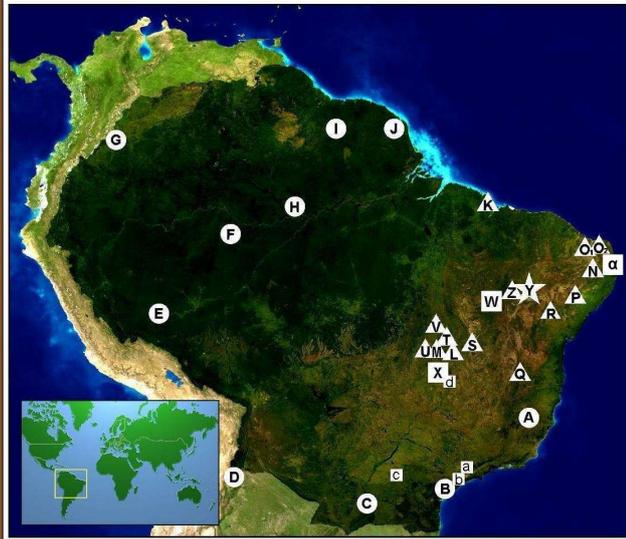


Use of tools by tufted capuchin monkeys (*Sapajus* spp)



Ottoni & Mannu 1996, 2001

Spontaneous use of tools by tufted capuchin monkeys (*Sapajus* spp): overview



Ottoni & Izar (2008), updated

Spontaneous use of tools by tufted capuchin monkeys: semi-free groups in urban parks



Tietê Ecological Park, SP
Ottoni & Mannu (2001)

Ottoni & Izar (2008), updated

Spontaneous use of tools by tufted capuchin monkeys (*Sapajus* spp)



negative reports from forest populations (long-term studies)

Ottoni & Izar (2008), updated

Spontaneous use of tools by tufted capuchin monkeys: pounding tools to open encapsulated food



nutcracking site

Terrestriality? (Visalberghi et al 2005)

Mendes et al (2015)
Ottoni & Izar (2008), updated

Spontaneous use of tools by bearded capuchin monkeys (*Sapajus libidinosus*): long-term studies



Serra da Capivara
 Moura & Lee & al (2004)
 Mannu & Ottoni (2009)
 Falótico & Ottoni (2009)
Sapajus libidinosus

Ottoni & Izar (2008), updated

Spontaneous use of tools by bearded capuchin monkeys (*Sapajus libidinosus*): long-term studies



Fazenda Boa Vista
 Fragaszy et al (2004)

Ottoni & Izar (2008), updated

Tool use by Fazenda Boa Vista capuchin monkeys: nut cracking



Fragaszy et al 2004

Spontaneous use of tools by capuchin monkeys: an enhanced toolkit in Serra da Capivara population

Jatobá fruit cracking
Moura & Lee (2004)
Mannu & Ottoni (2009)

Stone “hammers” for
encapsulated fruit/seed cracking

+



- Digging stones to access roots, tubers or insect nests
- Stick probes to access insect nests or dislodge lizards from rock crevices
- Tool-aided courtship: aimed stone-throwing as a female communicative gesture (Falótico & Ottoni 2013)
- Sequential use of tools and secondary tools...

Tool use by Serra da Capivara capuchin
monkey populations: fruit and seed cracking



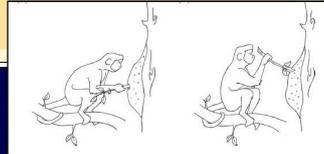
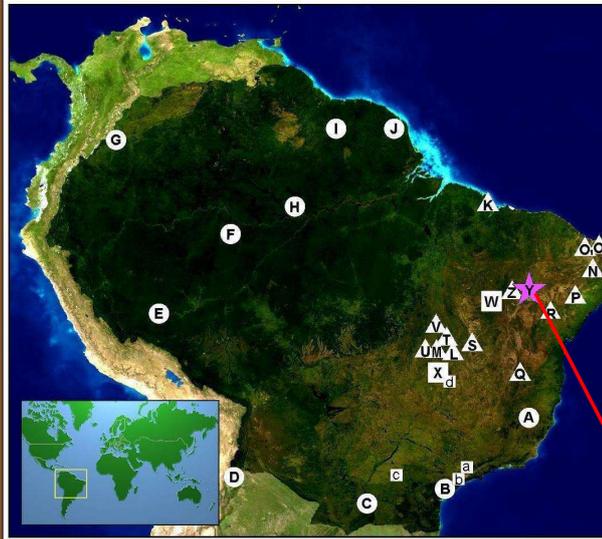
Falótico & Ottoni (2009, 2016)

Tool use by Serra da Capivara capuchin
monkey populations: digging stones



Falótico & Ottoni (2009, 2016)

Spontaneous use of tools by tufted capuchin monkeys: stick probes



Souto & al (2011)
Sapajus flavius

Moura & Lee & al (2004)
Mannu & Ottoni (2009)
Falótico & Ottoni (2009)
Sapajus libidinosus



Tool use by Serra da Capivara capuchin monkey populations: stick probes



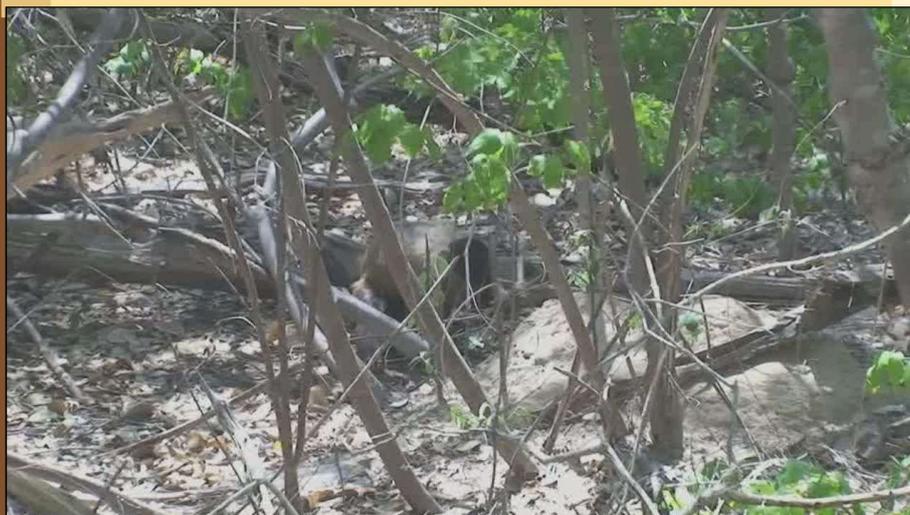
Mannu & Ottoni (2009), Falotico & Ottoni (2009)

Stick probes: contexts of use



Hunting for lizards in rock crevices

Stick probes: contexts of use



Probing a wasp's nest (inside a termite mound)

Modifying tools: preparation of stick probes



Modifying tools: preparation of stick probes



Tool use by Serra da Capivara populations:
Sequential use (stick + stone), secondary tools



Pebbles used to dislodge other pebbles
(subsequently used as tools)

Stone hammer & stick probe, alternated
(searching for insects in a rotten trunk)

Mannu & Ottoni (2009)

Fazenda Boa Vista x Serra da Capivara: *cultural* differences?



Fragaszy et al 2004



Moura & Lee 2004
Mannu & Ottoni 2005/2009

Tool use in wild *Cebus*?

Cebus albifrons

Leaves as cups leaves as cups (*C. a. trinitatis*, Phillips 1998)
 Urban semi-free (Equador)?

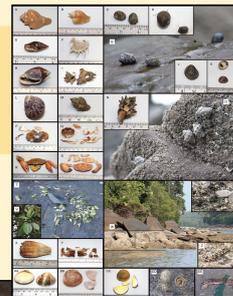
Cebus capucinus

No spontaneous tool use in the wild (Panger 1998)
 No success in probing field experiment (Garber 2004)
 Coiba Island, Panama?



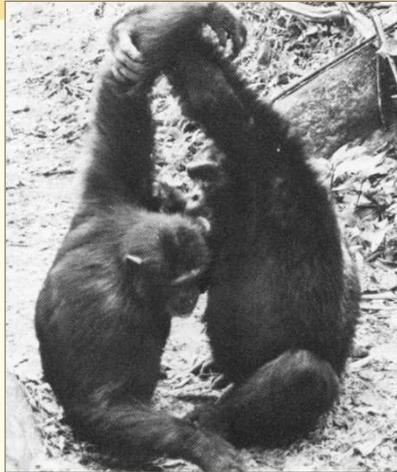
Tool use in an Old World primate: Long-tailed macaques

Burmese Long-tailed macaques
 (*Macaca fascicularis aurea*)
 Thailand, Myanmar



Malaivijitnond et al 2007
 Gumert & Malaivijitnond 2012

Traditions in primates' social behavior?
 Communicative gestures: *hand-clasp grooming*



- Learned
(rather than instinctive)
- Social
(rather than solitary)
- Normative
(rather than plastic)
- Collective
(rather than idiosyncratic)

Mahale: intergroup variation in form
 McGrew & Tutin (1978),
 McGrew et al (2001)

[Also "leaf-clipping" in Mahale]

Traditions in social behavior?
 "Games" and affiliative behavior in *Cebus capucinus*

Perry et al 2003



"eyeball poking"



"hand sniffing"



"sucking of body parts"

"Games": "finger-in-mouth", "hair-in-mouth", "toy game"

	Hand-sniffing	Sucking	Finger Game	Hair Game	Toy Game
Santa Rosa					
Sendero	C	?	?	?	?
Cerco de Piedras	C	X	X	X	X
Los Valles	R	R	X	X	X
Nancite	X	X	X	X	X
Cafetal	?	C	?	?	?
Cuajiriquil	C	C	?	?	?
Bosque Humido	X	R	X	X	X
Lomas Barbudal					
Abby's	C	C	C	C	C
Rambo's	R	C	X	X	X
Palo Verde					
Station Troop	C	R	X	X	X
Curú					
Bette's group	X	R	X	X	C

C = common behavior at this site (observed at least once per hundred hours)

R = behavior only rarely observed

X = this behavior has not been observed in >250 hours of observation

? = this behavior has not been observed, though there are not enough observation hours to solidly confirm its absence from the repertoire of this group

A pacific culture among wild baboons?

Sapolsky & Share 2004

Olive baboons (*Papio anubis*): more violent animals competing for refuse in a garbage dump. Bovine tuberculosis outbreak (from garbage): only less aggressive males survived. Fewer adult males than females.

10 years later, no males remained that resided in the group at that time, but atypically unaggressive behavior remained: culturally transmitted?



PF Group: Stone throwing as part of females' sexual display: A new tradition spreading?



Falótico & Ottoni (2013)

Culture, beyond primates?



Culture in fish?

More evidence (for practical/ethical reasons) than for apes?

Migration routes, mating sites: experiments (see Lecture 6)



Haemulon flavolineatum

(individuals moved to other populations or locations where populations have been removed) Helfman & Schultz (1984)



Thalassoma bifasciatum

(translocated individuals do not adopt mating sites used by removed population) Warner (1988)

Social learning and culture in birds

Song (dialects) and partner choice



Coturnix japonica

(laboratory: socially transmitted preferences for males)

Kirkpatrick (1987)



Molothrus ater

(adult males: female preference for local courtship styles X "modelling" of young males' behavior)

Freeberg (1996), West (2000)

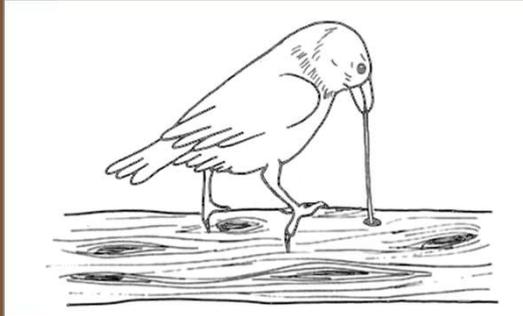
Tool use in non-primate vertebrates

Sea otter cracking oyster with stone



Usually, only ONE species-typical behavior ...

Tool use in birds



Galapagos woodpecker finch
(*Camarhynchus pallidus*)



Egyptian vulture cracking an ostrich egg

Bowerbirds (Ptilonorhynchidae)



Satin bowerbird
(*Ptilonorhynchus violaceus*)

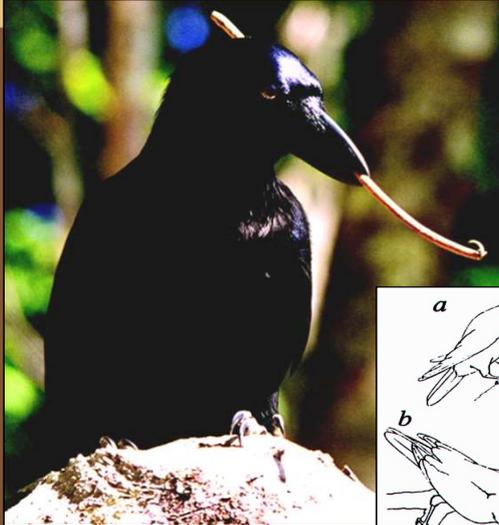


McGregor bowerbirds
(*Amblyornis macgregoriae*):
Young males visit older,
experienced males'
bowers (Borgia 1995)



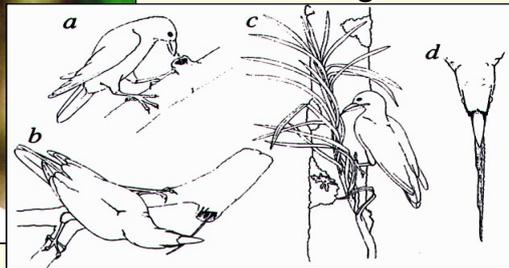
Tool use in New Caledonian crows

Corvus moneduloides



Hunt 1996

Twig "hooks"



Tool use in New Caledonian crows

Corvus moneduloides



"Stepped" Pandanus tools
Hunt, Rutledge & Gray 2006



Tool use in New Caledonian crows

Corvus moneduloides



Probes and “vice-anvils” (Hunt 2013)

Tool use in New Caledonian crows (in the lab)

Corvus moneduloides



A. Kacelnik

Tool use in birds and innate predispositions



Hyacinth macaws
(*Anodorhynchus hyacinthinus*)

Borsari & Ottoni 2005

Kenward *et al* 2005, 2006 (NC crows):

“inherited species-typical action patterns have a greater role than has been recognized”

Culture in cetaceans?

Communication, foraging techniques

Rendell & Whitehead (2001)



Orcinus orca

(foraging specializations, migration patterns, vocal dialects)



Megaptera novaeangliae

(fast-changing common male song during reproductive season)

Culture in cetaceans?

Bottlenose dolphin (*Tursiops truncatus*)



"Vocal signature" (Janik 2000)

Tool use in cetaceans

Bottlenose dolphins (Krützen et al 2005)



B. Sherwin*

Department of Biology and
International University,
Halifax, NS, Canada B3H 4J1

North Miami, FL 33181; *Department of Biology, University of Massachusetts, North Dartmouth, MA 02748; and †Department of Biology, Dalhousie University, Halifax, NS, Canada B3H 4J1

Edited by Peter Marler, University of California, Davis, CA, and approved April 29, 2005 (received for review January 12, 2005)

In Shark Bay, wild bottlenose dolphins (*Tursiops* sp.) apparently use marine sponges as foraging tools. We demonstrate that genetic and ecological explanations for this behavior are inadequate; thus, "sponging" classifies as the first case of an existing material culture in a marine mammal species. Using mitochondrial DNA analyses, we show that sponging shows an almost exclusive vertical social transmission within a single matriline from mother to female offspring. Moreover, significant genetic relatedness among all adult spongers at the nuclear level indicates very recent coancestry, suggesting that all spongers are descendants of one recent "Sponging Eve." Unlike in apes, tool use in this population

In wild populations, it is difficult to identify the transmission of a behavior based on social or observational learning. In cetaceans, this problem is exacerbated because of the habitat they live in and the limited observational opportunities. Therefore, we chose to adopt the approach suggested by Whiten *et al.* (1), which hinges on dismissing alternative explanations for the observed behavior, in particular ecological and genetic ones (3, 11).

In Shark Bay, Western Australia (113°45' E, 25°48' S), a longitudinal study of bottlenose dolphins has been conducted since 1984. Previous genetic studies using both nuclear and mitochondrial markers have shown that all animals in our study area, comprising the Eastern Gulf of Shark Bay, are part of the same

Culture in elephants?



Bradshaw
et al (2005)

essay concepts

Elephant breakdown

Social trauma: early disruption of attachment can affect the physiology, behaviour and culture of animals and humans over generations.

G. A. Bradshaw, Allan N. Schore, Janine L. Brown, Joyce H. Poole and Cynthia J. Moss

The air explodes with the sound of high-powered rifles and the startled infant watches his family fall to the ground, the image seared into his memory. He and other orphans are then transported to distant locales to start new lives. Ten years later, the teenaged orphans begin a killing rampage, leaving more than a hundred victims.

A scene describing post-traumatic stress disorder (PTSD) in Kosovo or Rwanda? The similarities are striking — but here, the teenagers are young elephants and the victims, rhinoceroses. In the past, animal studies have been used to make inferences about human behaviour. Now, studies of human PTSD can be instructive in understanding how violence also affects elephant culture.



Social bonds guide an elephant's development.

decimated by mass deaths and social breakdown from poaching, culls and habitat loss. From an estimated ten million elephants in the early 1900s, there are only half a million left today. Wild elephants are displaying symptoms associated with human PTSD: abnormal startle response, depression, unpredictable asocial behaviour and hyperaggression.

was clearly demonstrated when researchers re-introduced older bulls to quell the young males' violence. Hyperaggression and abnormally early musth cycles (periods of sexual activity and hormonal shifts) both ceased.

Elephant hyperaggression is not an isolated event. At another heavily affected African park, intraspecific mortality among male elephants accounts for nearly 90% of all male deaths, compared with 6% in relatively untroubled communities. Elsewhere, including Asia, there are reports of poor mothering skills, infant rejection, increased 'problem animals' and elevated stress-hormone levels.

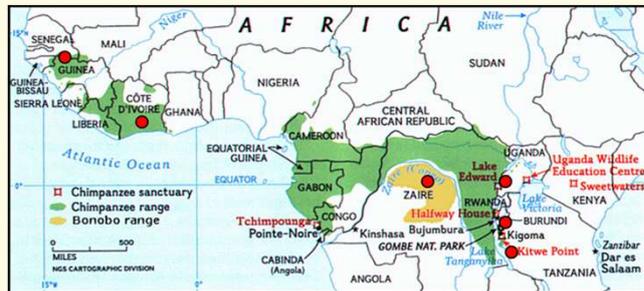
Elephant sociality is both a strength and a weakness. As with humans, an intact, functioning social order helps buffer trauma. But as human populations increase, more elephants are likely to live in environments characterized by severe anthropogenic disturbance. Current methods for conserving both wild and captive elephant populations fail to preserve elephant social systems. Even successful rehabilitation centres, such as The David Sheldrick Wildlife Trust, can only partially restore social processes because there are not

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Cultural primatology

The cultured chimpanzee
(McGrew 2015)

Three stages:



1. Natural history: qualitative reports, anecdotes;
2. Ethnography: careful descriptions, ethograms, categories;
3. Ethnology: theory-driven: hypothesis testing, modelling.

Culture and interpopulational behavioral variation



“Chimpanzee Material Culture” (McGrew 1992)

“Chimpanzee Cultures” (Wrangham et al [eds.] 1994)

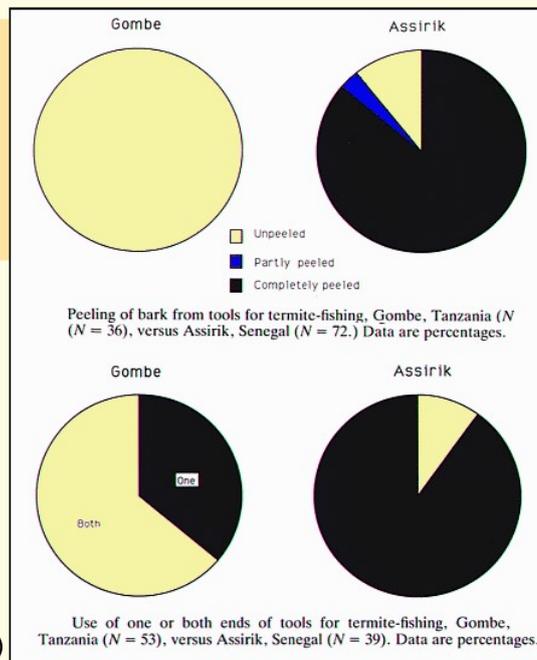
“Cultures in Chimpanzees” (Whiten et al 1999)

Regional variations in the techniques of tool use

Termite “fishing”

Gombe x Assirik

McGrew (1992)



Culture in non-human primates?

The Group Comparative approach (based in Galef 1996)
(A.K.A. the “Exclusion Method”)

- Genetic differences X
- Different interactions with the environment X
- Social transmission of traditions ↓
✓

Culture in non-human primates?

The Group Comparative approach

A variant is considered **cultural** if it is **customary** (shown by most or all relevant individuals) or **habitual** (shown by at least several relevant individuals) **in at least one site but is absent in at least one other ecologically similar site**. Intraspecific **genetic variation** is almost certainly not responsible for these patterns.

van Schaik et al 2003

Cultural variations in chimpanzees?

Colobus hunting: Gombe (individual hunting) X
 Tãï (cooperative hunting with task division)
 → Effects on social structure

BUT:
 ecological
 determinants
 Savanna x
 forest
 (differences in
 vegetation:
 monkeys'
 escape routes)



Cultures in chimpanzees

39 distinct behavioral patterns, including the use of tools, foraging, grooming and courtship behaviors, are customary or habitual in some communities but absent in others, discounted the cases that allowed for ecological explanations.

Whiten, Goodall, McGrew,
 Nishida, Reynolds,
 Sugiyama, Tutin,
 Wrangham & Boesch 1999



A Guide to the Cultures of Chimpanzees

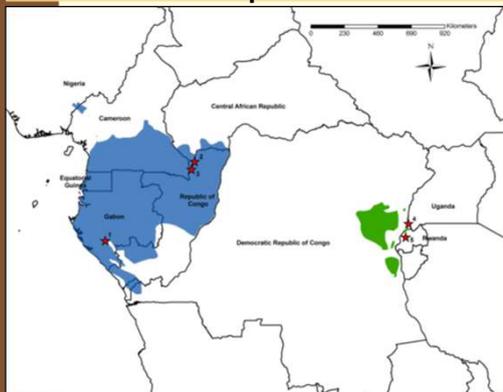
In an effort to catalogue variations among chimpanzees, we asked researchers working at six sites across central Africa to classify chimpanzee behaviors in terms of occurrence or absence in seven communities. (There are two communities at Mahale.) They key categories were customary behavior, which occurs in most or all members of one age or sex class; habitual, which is less common but which still occurs repeatedly; present; absent; and unknown. Certain behaviors are absent for ecological reasons (eco); for example, chimpanzees do not use hammers to open coula nuts at Budongo, because the nuts are not available. The survey turned up 39 chimpanzee rituals that are labeled as cultural variations, 19 are illustrated below. -A.W. and C.B.

- Hammering nuts**
To crack open nutritious coula nuts, chimpanzees use stones as rudimentary hammers and anvils.
- Pounding with pestle**
With stalks of palm trees acting as makeshift pestles, chimpanzees can pound and deepen holes in trees.
- Flashing for termites**
Chimpanzees insert thin, flexible strips of bark into termite mounds to extract the in-sects, which they then eat.
- Wiping ants off stick manually**
Once the ants have swarmed almost half-way up sticks dipped into the insects' nests, chimpanzees pull the sticks through their fists and sweep the ants into their mouths.
- Eating ants directly off stick**
After a few ants climb onto sticks inserted into the nests, chimpanzees bring the sticks directly to their mouths and eat the ants.
- Removing bone marrow**
With the help of small sticks, chimpanzees eat the marrow found inside the long bones of monkeys they have killed and eaten.
- Sitting on leaves**
A few large leaves apparently serve as protection when chimpanzees sit on wet ground.
- Fanning flies**
To keep flies away, chimpanzees utilize leafy twigs as a kind of fan.
- Tickling self**
A large stone or stick can be used to probe especially itchy areas on a chimpanzee's own body.



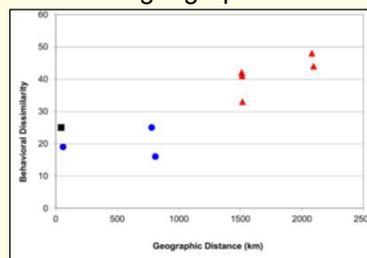
BOSSOU	TAI FOREST	GOMBE	MAHALE M-GROUP	MAHALE K-GROUP	KIBALE	BUDONGO
customary	customary	absent	absent	absent	absent (eco?)	absent (eco?)
customary	absent	absent	absent (eco?)	absent (eco?)	absent (eco?)	absent (eco?)
absent	absent (eco?)	customary	absent	customary	absent (eco?)	absent (eco?)
present	absent	customary	absent	absent	absent	absent
customary	customary	present	absent	absent	absent	absent
absent	customary	absent	absent	absent	absent	absent
present	habitual	absent	absent	absent	present	absent
absent	habitual	present	absent	absent	absent	habitual
absent	absent	habitual	absent	absent	absent	absent

Robbins et al (2016)
Behavioral variation in gorillas:
evidence of potential cultural traits



- 2 species, 5 study sites
- 41 behaviors,
- 23 potential cultural traits
- 1 foraging related
- 9 environment related
- 7 social interactions
- 5 gestures
- 1 communication-related

Behavioral dissimilarity X geographic distance



Half of all variation in potential cultural traits was intraspecific differences (...). Further research is needed to investigate if the occurrence of these traits is influenced by social learning.

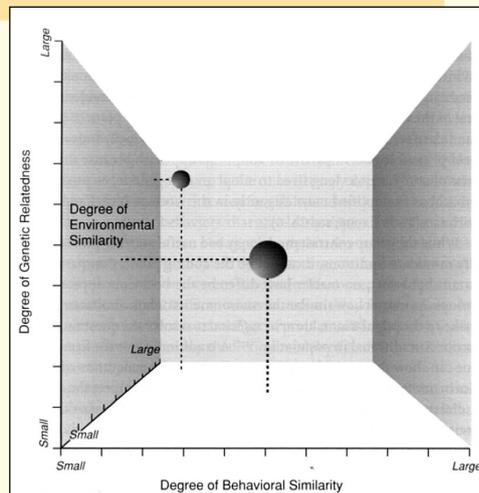
Criticism of the “Group Comparison” method

Fragaszy & Perry 2003 Behavioral traditions defined by Socially Biased Learning

(comparisons between
populations DO NOT
show mechanisms)

“False positives”
e “false negatives”:

Ex: sticks for army ants dipping
(Humle & Matsuzawa 2002)



Cultural differences in chimpanzees?

Sticks in army ants dipping

Differences in sticks' length and capture techniques:

Gombe: “pull-through” X Tai: “direct mouthing”

BUT: Humle & Matsuzawa 2002:

Bossou:

Both techniques:

Length varies as
a function of
ants' behavior
(different species)



Cultural differences in chimpanzees?

Sticks in army ants dipping

Differences in sticks' length and capture techniques

BUT:

Möbius, Boesch, Koops, Matsuzawa & Humle (2008)

Cultural differences in army ant predation by West African chimpanzees?

A comparative study of microecological variables. *An Beh* 76:37-45.

Contrary to the cultural hypothesis, the tool length and associated harvesting technique used by chimpanzees in different populations is to a large extent influenced by characteristics of the ants themselves.

However, in line with the cultural hypothesis, chimpanzees at two long-term study sites in West Africa (Bossou, Guinea, and Taï National Park, Côte d'Ivoire) prey on the same five army ant species but adopt different strategies to do so.

Controlled human simulations of ant dipping and an ant survey:

Ant speed explained differences in tool length within Bossou but not between Bossou and Taï.

Results do not support an ecological basis underlying the lack of dipping at ant trails in Taï chimpanzees. Neither ant aggressiveness nor yield when using tools could explain why, unlike Bossou chimpanzees, Taï chimpanzees do not use tools to harvest epigeic species

We conclude that **an interaction of cultural and ecological factors** shapes the differences in army ant predation between Taï and Bossou chimpanzees.

Criticism of the "Group Comparison" method

Replies & Refinements: Lecture 7

Cultures in non-human animals

Implications for conservation

Beyond the direct impact on populations, the destruction of the forest isolates groups and interrupts cultural flow



Emprisoned orphan chimp

Next lecture:

Socially Biased Learning



Next-of-next lecture:

Animal social learning in the laboratory
and in the wild: improving methodologies

