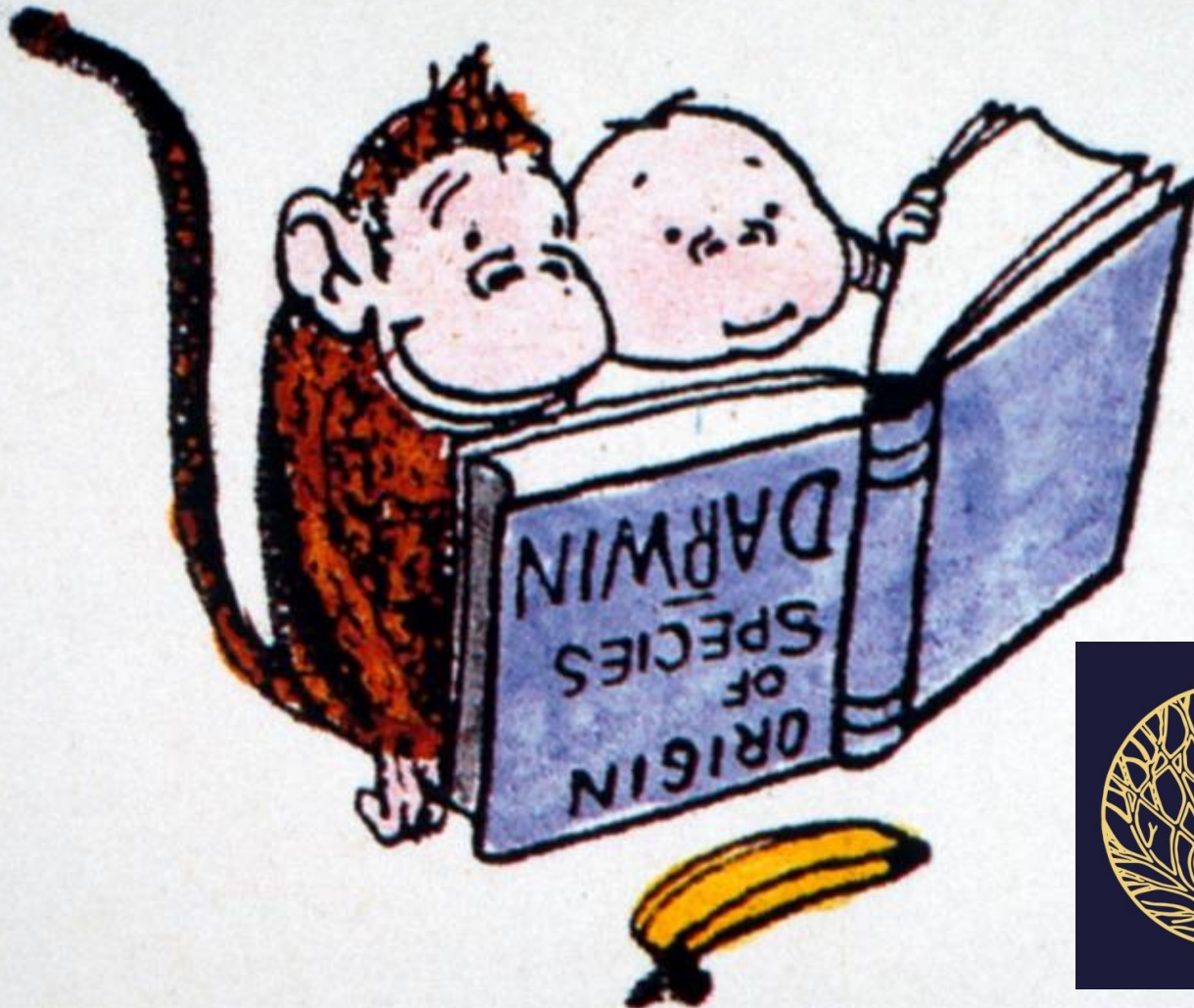


Animal Cultures - Core Discoveries and New Horizons
INTRODUCTORY OVERVIEW

Andrew Whiten ~ Centre for Social Learning and Cognitive Evolution



Cultural
Evolution
Society

Animal Cultures - Core Discoveries and New Horizons

INTRODUCTORY OVERVIEW



culture

tradition



KEY CONCEPTS

social learning

social information transfer



HISTORY METHODS



THE REACH OF ANIMAL CULTURE



COMPARING ANIMAL CULTURES



culture

tradition



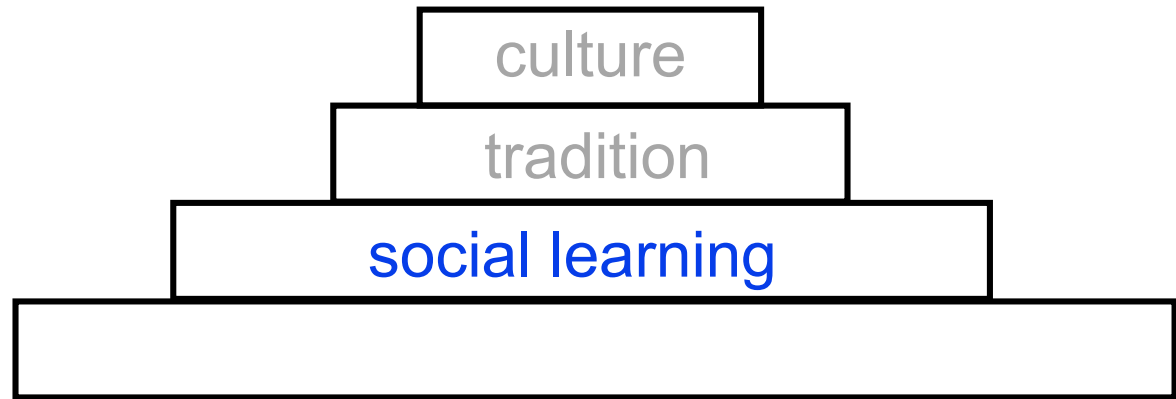
KEY CONCEPTS

social learning

social information transfer



KEY CONCEPTS

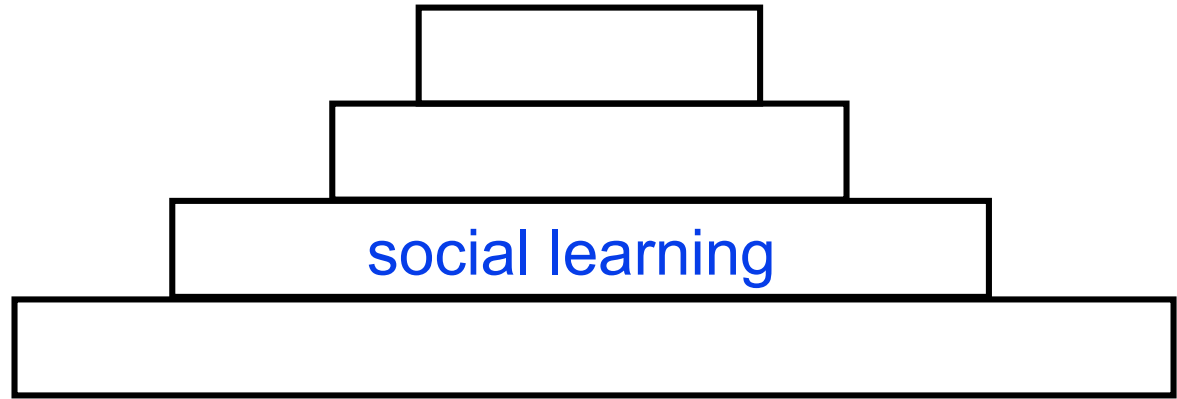


“learning from others”

“learning that is influenced by observation of, or interaction with, another animal (typically a conspecific) or its products”

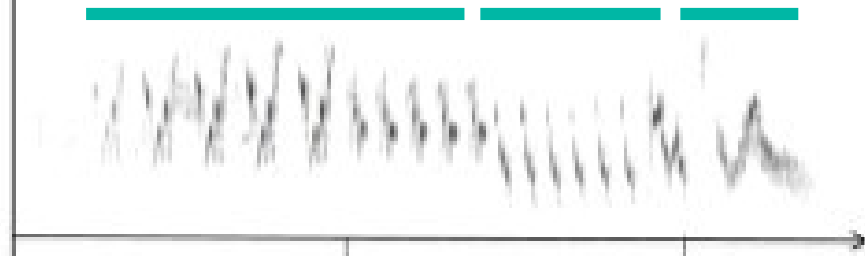
C. Heyes, Biological Reviews, 1994.

N.B. “observation of” must include “listening to” !



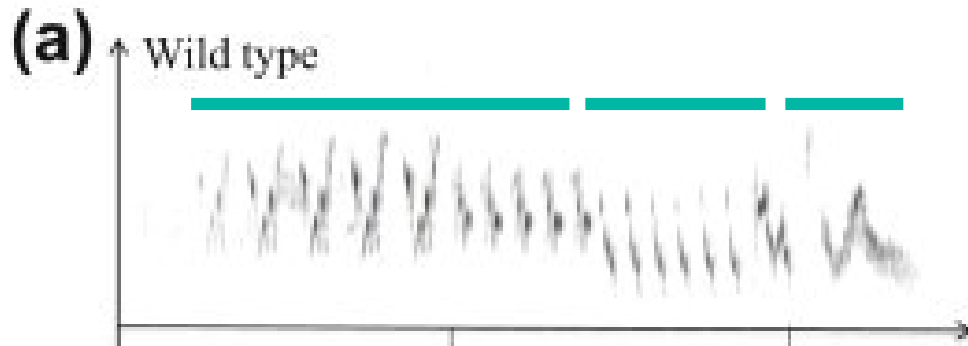
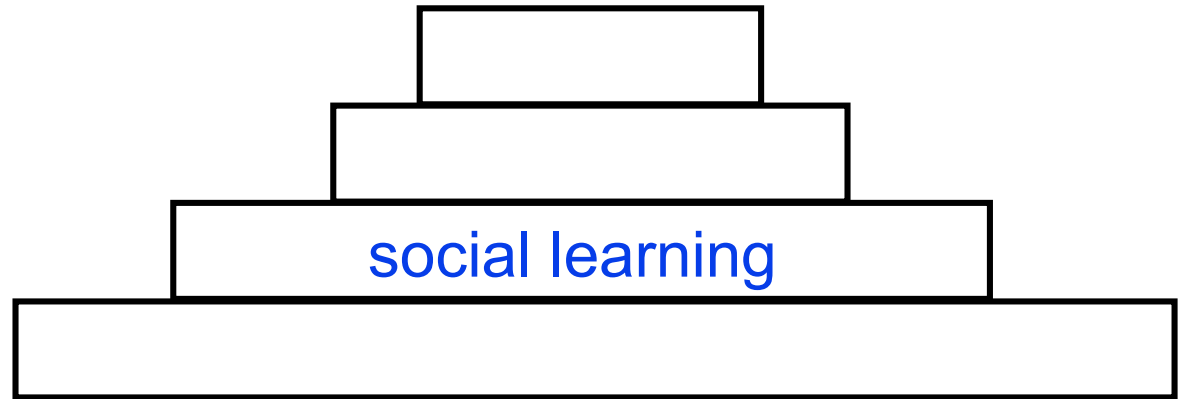
(a)

↑ Wild type

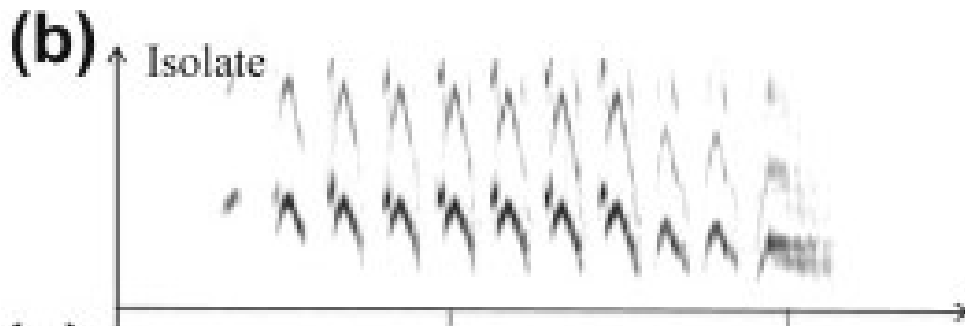


W. H. Thorpe, Nature, 1954, 1958.

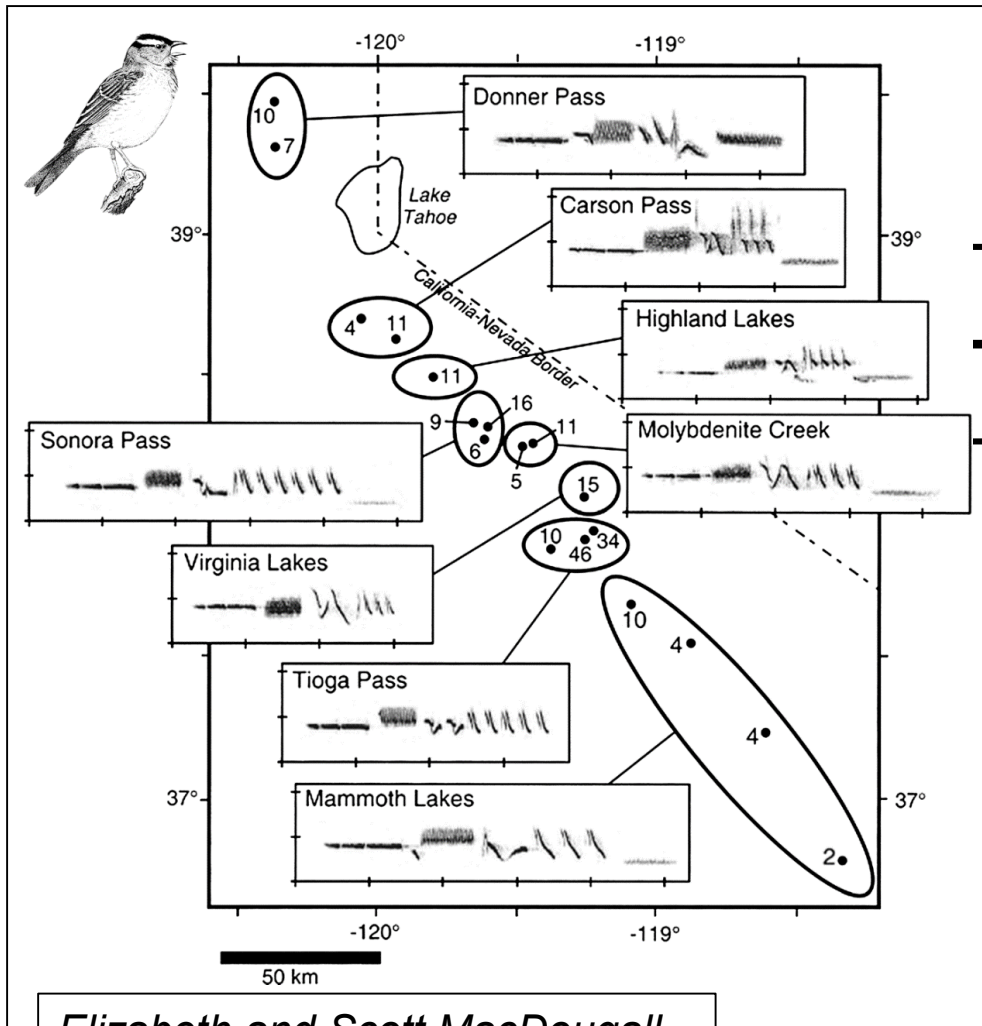




W. H. Thorpe, Nature, 1954, 1958.



Peter Marler and M Tamura, “Song dialect in three populations of white-crowned sparrows”, *Science*, 1964



Elizabeth and Scott MacDougall-Shackelton, *Evolution*, 2001

tradition

social learning

“tradition”:

“a distinctive behaviour pattern shared by two or more individuals in a social unit, which persists over time and that new practitioners acquire in part through socially-aided learning”

Dorothy Fragaszy and S Perry, ‘The Biology of Traditions’, 2003.

British Birds, 1949

THE OPENING OF MILK BOTTLES BY BIRDS.*

BY

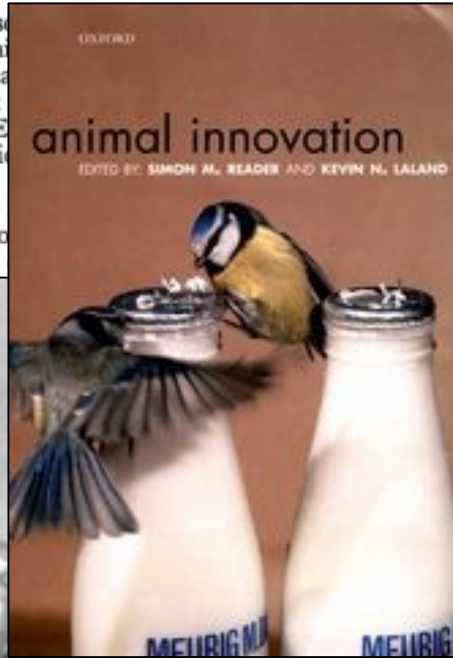
JAMES FISHER AND R. A. HINDE.

In 1921 birds descended on the board tops of milk bottles in Stoneham, South Hampshire, setting a record of an act in many parts of England, Ireland, and white species of birds.

The spread of this behaviour involved the habit from each

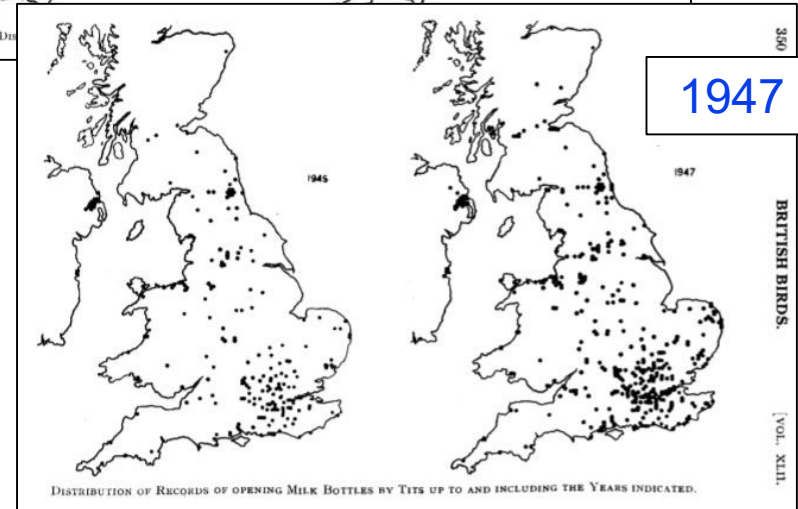
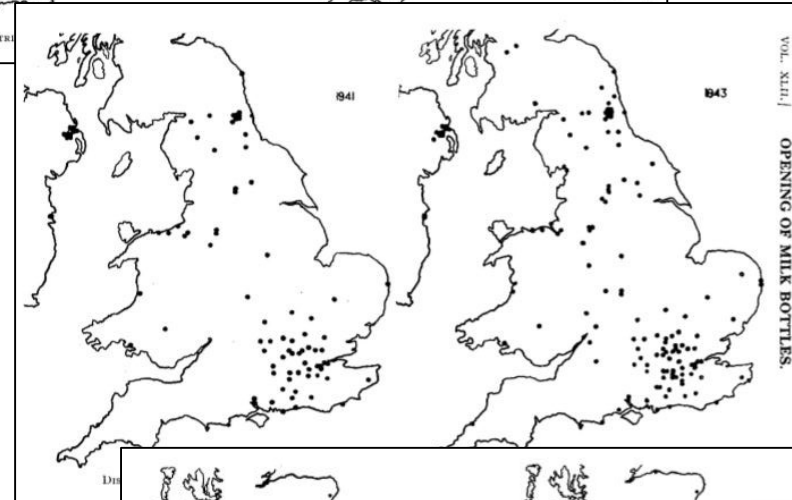
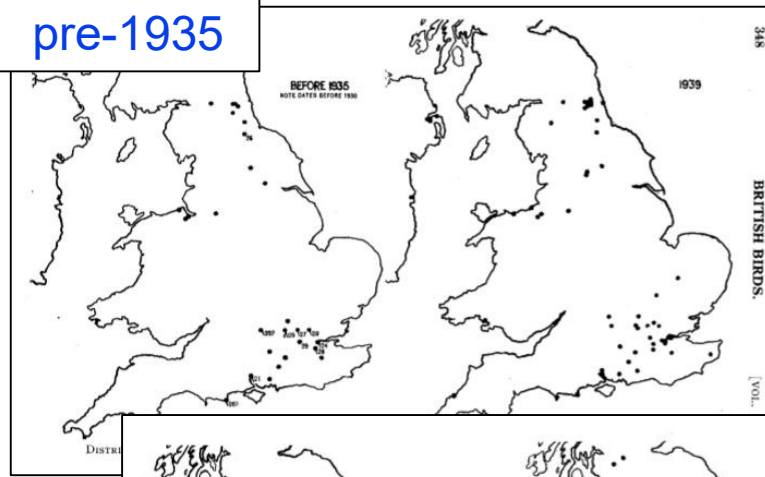
the waxing, near first known habit in land, and last eleven

problems learn the most of



STUDIES ILLUSTRATING THE OPENING OF MILK-BOTTLES BY BLUE AND GREAT TITS.
(Photographed by V. L. Breeze).

pre-1935



1947

BRITISH BIRDS

NUMBER 12, VOL. XLIV, DECEMBER, 1951.

FURTHER OBSERVATIONS ON THE OPENING OF MILK BOTTLES BY BIRDS.

BY

R. A. HINDE AND JAMES FISHER.



**Abstracts of the Papers Read in the Seventh Annual
Meeting of the Society for Primate Researches**

(November 22–24, 1962, Japan Monkey Centre, Inuyama)

continued

On the Newly-acquired Behaviors of the Natural Troop of
Japanese Monkeys on Koshima Island

MASAO KAWAI
Japan Monkey Centre

see also *Primates*, 1963

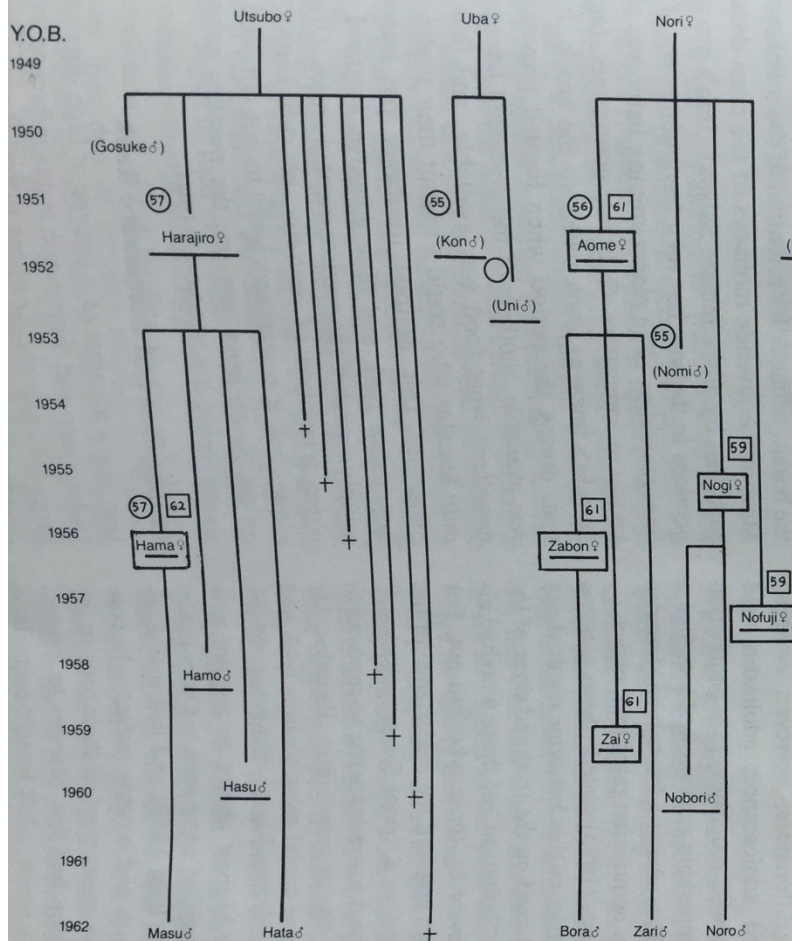


FIGURE 38-5. The lineage of the Koshima troop, and the propagation of sweet-potato washing and placer-mining behavior. The lineage is illustrated as of August 1982. Individuals are arranged (reading down) according to their year of birth, except for females born before 1949. Solitary monkeys are enclosed in parentheses. Imo, the originator of both behaviors (see fig. 38-3) can be found at

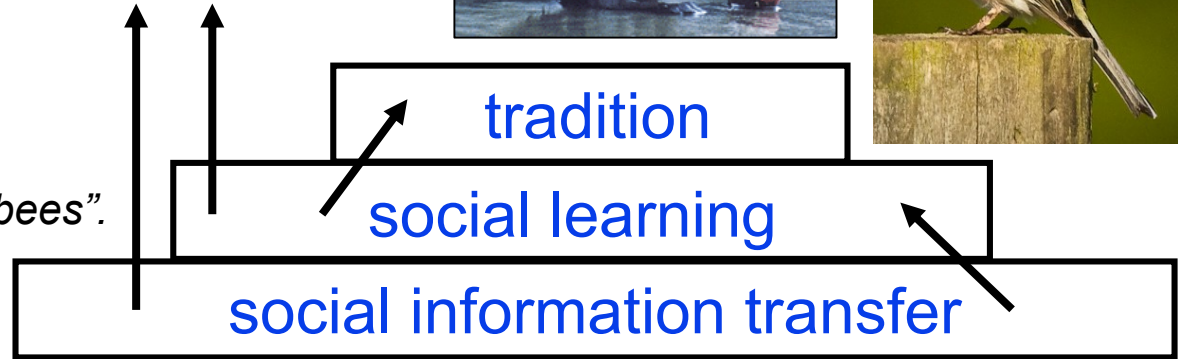
the right, in the upper portion of Eba's lineage. Animals who learned sweet-potato washing are enclosed in boxes, with the year shown in a circle to the upper left of each individual's name. Animals who learned placer-mining are underlined, with the year shown in a square to the upper right of their name. SOURCE: Kawai 1965a

BD Worden & DR Papaj

"Flower choice copying in bumble bees".

Biology Letters 2005.

Transient effects





BD Worden & DR Papaj

"Flower choice copying in bumble bees".

Biology Letters 2005.

tradition

social learning

social information transfer





Bennett G ('Jeff') Galef

'The question of animal culture' - *Human Nature*, 1992

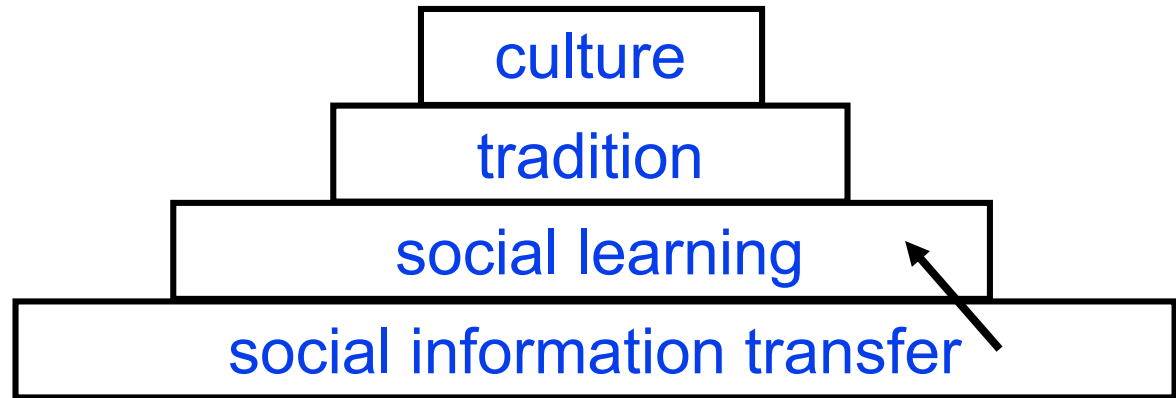
'Culture' should involve complex, human-like social learning

Albert Kroeber and Clive Kluckhohn

'Culture – A critical review of concepts and definitions'

Peabody Museum 1952

Distinguished 168 definitions of culture!



A Whiten and Carel van Schaik

'Phil Trans R Soc B 2007

'Culture' could be a term for multiple-tradition cultures



*A Whiten and Carel van
Schaik*

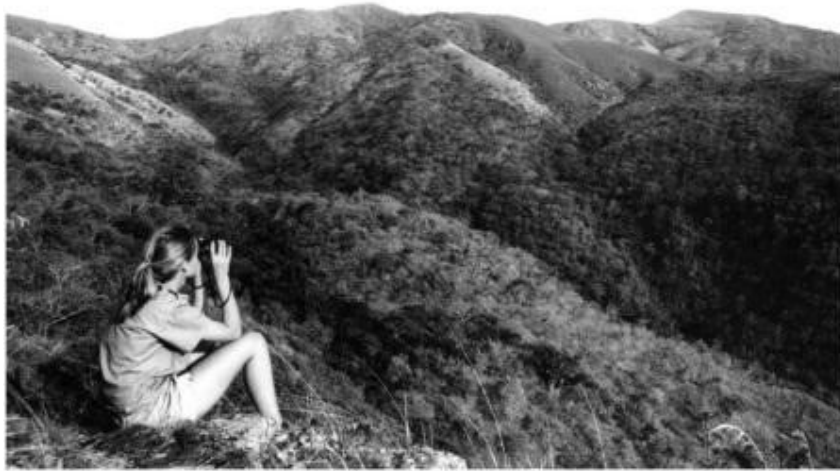
'Phil Trans R Soc B 2007

*'Culture' could be a term
for multiple-tradition
cultures*



苗
夕
Dream





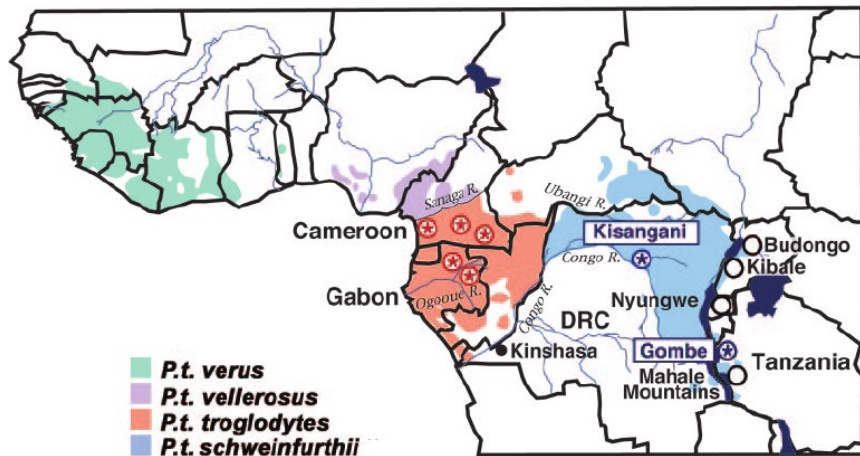
1960s

1999

Cultures in chimpanzees

A. Whiten*, J. Goodall†, W. C. McGrew‡, T. Nishida§,
V. Reynolds||, Y. Sugiyama¶, C. E. G. Tutin#☆,
R. W. Wrangham** & C. Boesch††





1999

Cultures in chimpanzees

A. Whiten*, J. Goodall†, W. C. McGrew‡, T. Nishida§,
 V. Reynolds||, Y. Sugiyama¶, C. E. G. Tutin#☆,
 R. W. Wrangham** & C. Boesch††



from Alison Jolly, "The Evolution of Primate Behaviour" 1972

Chimpanzees display at least 39 'cultural variants' or traditions across Africa

~ customary or habitual at one site, absent without apparent environmental or genetic explanation in at least one other

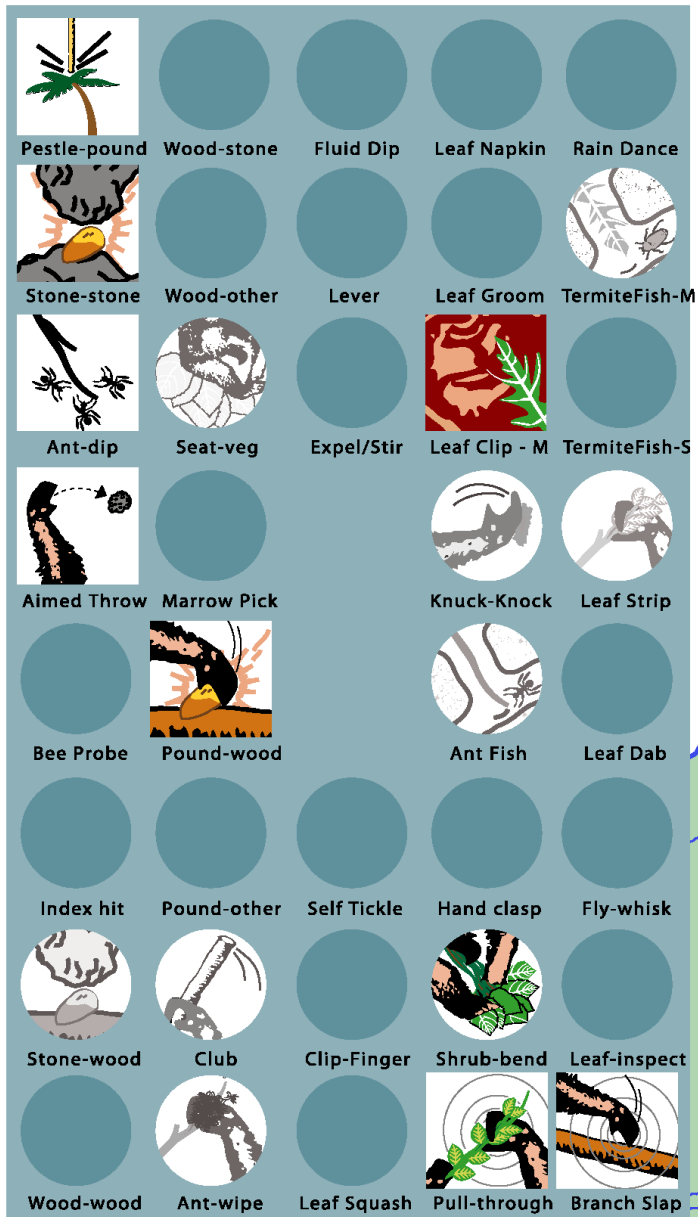
Scope includes

- Food processing
- Tool use
- Social behaviour
- Grooming techniques
- Courtship

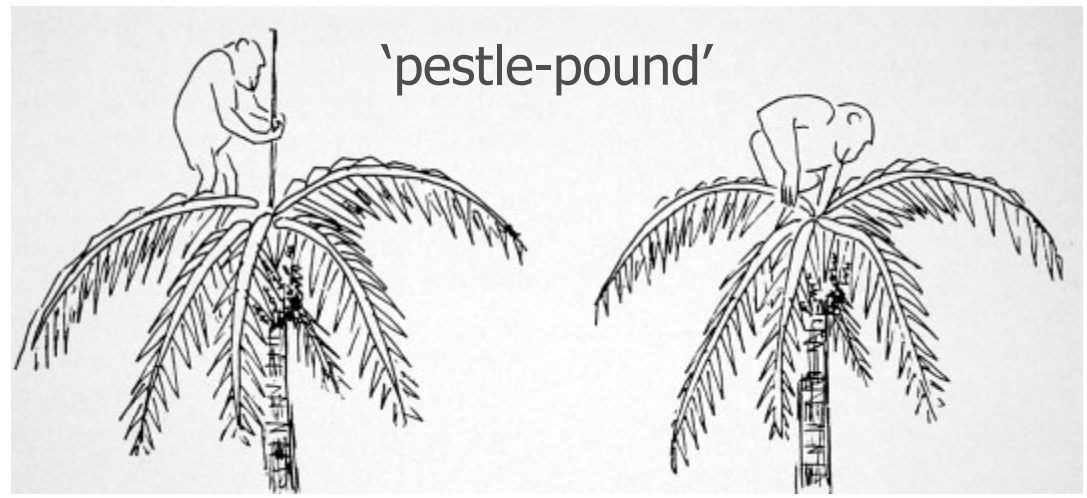
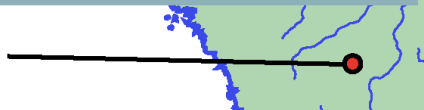


Tai Forest
Ivory Coast





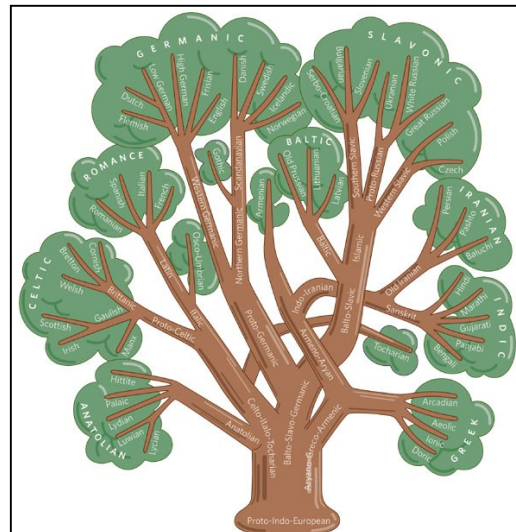
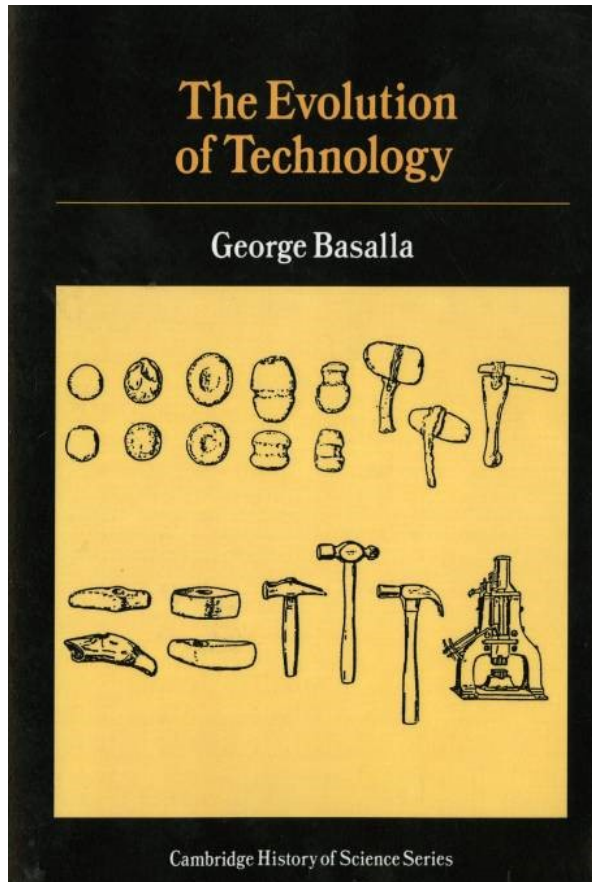
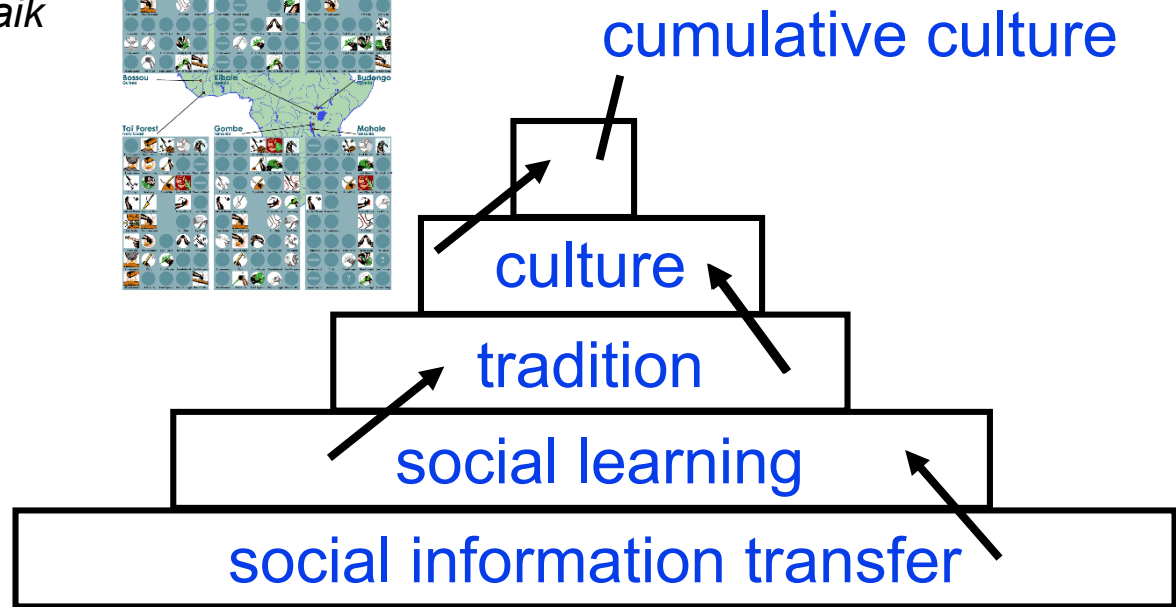
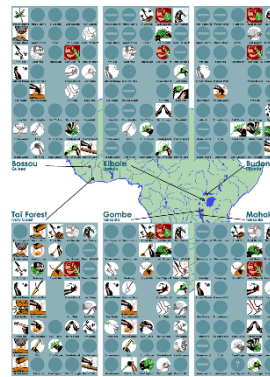
Bossou
Guinea



Observations by T Matsuzawa, Y Sugiyama and colleagues



A Whiten & Carel van Schaik
Phil Trans R Soc B 2007





cumulative culture

culture

tradition

social learning

social information transfer



KEY CONCEPTS



**HISTORY
METHODS**



THE REACH OF ANIMAL CULTURE





1. Phylogenetic reach

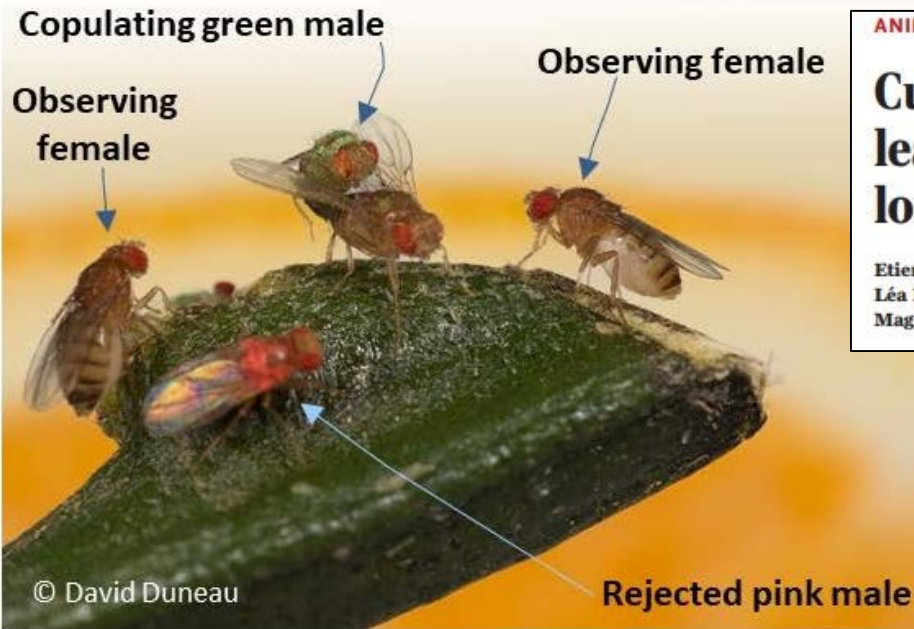


THE REACH OF ANIMAL CULTURE



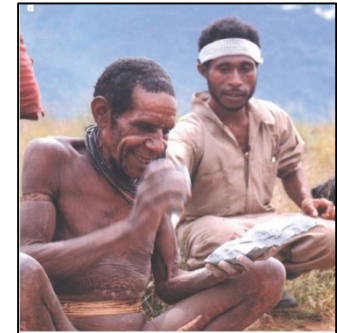
Cultural flies: Conformist social learning in fruitflies predicts long-lasting mate-choice traditions

Etienne Danchin^{1,*,†}, Sabine Nöbel^{1,2,*}, Arnaud Pocheville^{3,*}, Anne-Cecile Dagaëff¹, Léa Demay¹, Mathilde Alphand¹, Sarah Ranty-Roby¹, Lara van Renssen^{1,4}, Magdalena Monier¹, Eva Gazagne⁵, Mélanie Allain^{1,6}, Guillaume Isabel⁶





1. Phylogenetic reach
2. Pervasiveness within species



THE REACH OF ANIMAL CULTURE





The pervasive role of social learning in primate lifetime development

Evolutionary Human Sciences (2019), 1, e2, page 1 of 13
doi:10.1017/ehs.2019.1

REVIEW

Animal cultures: how we've only seen the tip of the iceberg

Caroline Schuppli* and Carel P. van Schaik

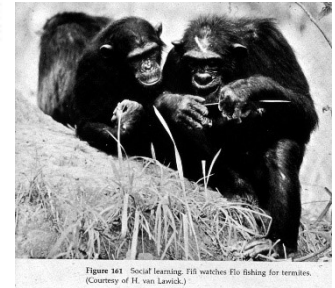


Figure 861 Social learning: Titi watches Flo fishing for termites.
(Courtesy of H. van Lierck.)

Phase 1

2. Pervasiveness within species



Phase 2

THE REACH OF ANIMAL CULTURE



The pervasive role of social learning in primate lifetime development

Andrew Whiten¹ · Erica van de Waal²

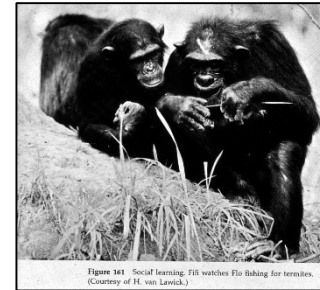


Figure 144 Social learning: Flo watches Flo fishing for termites.
 (Courtesy of H. van Lawick.)



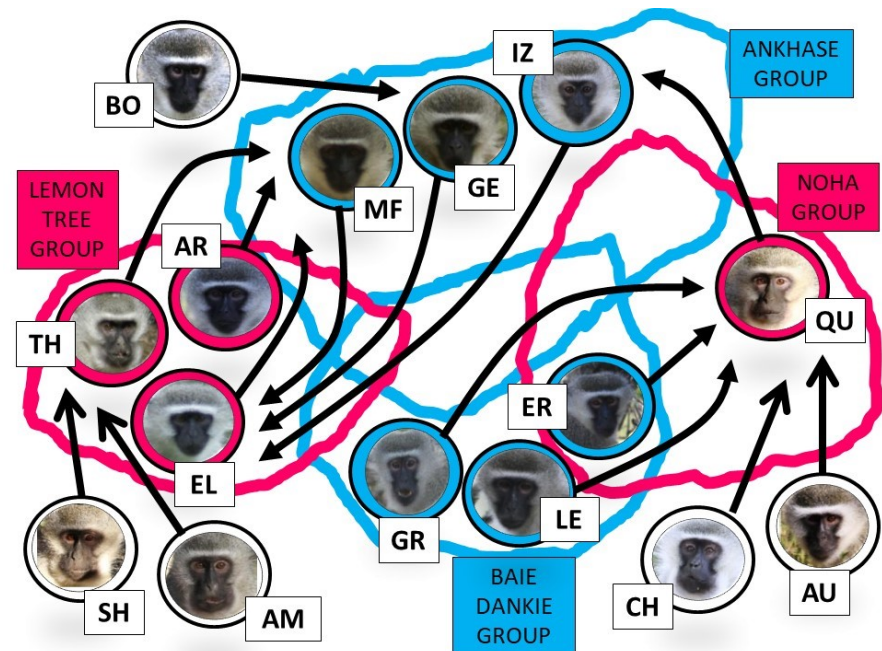
2. Pervasiveness within species

Potent Social Learning and Conformity Shape a Wild Primate's Foraging Decisions

Erica van de Waal,^{1,2} Christèle Borgeaud,^{2,3} Andrew Whiten^{1,2,4}



Phase 3

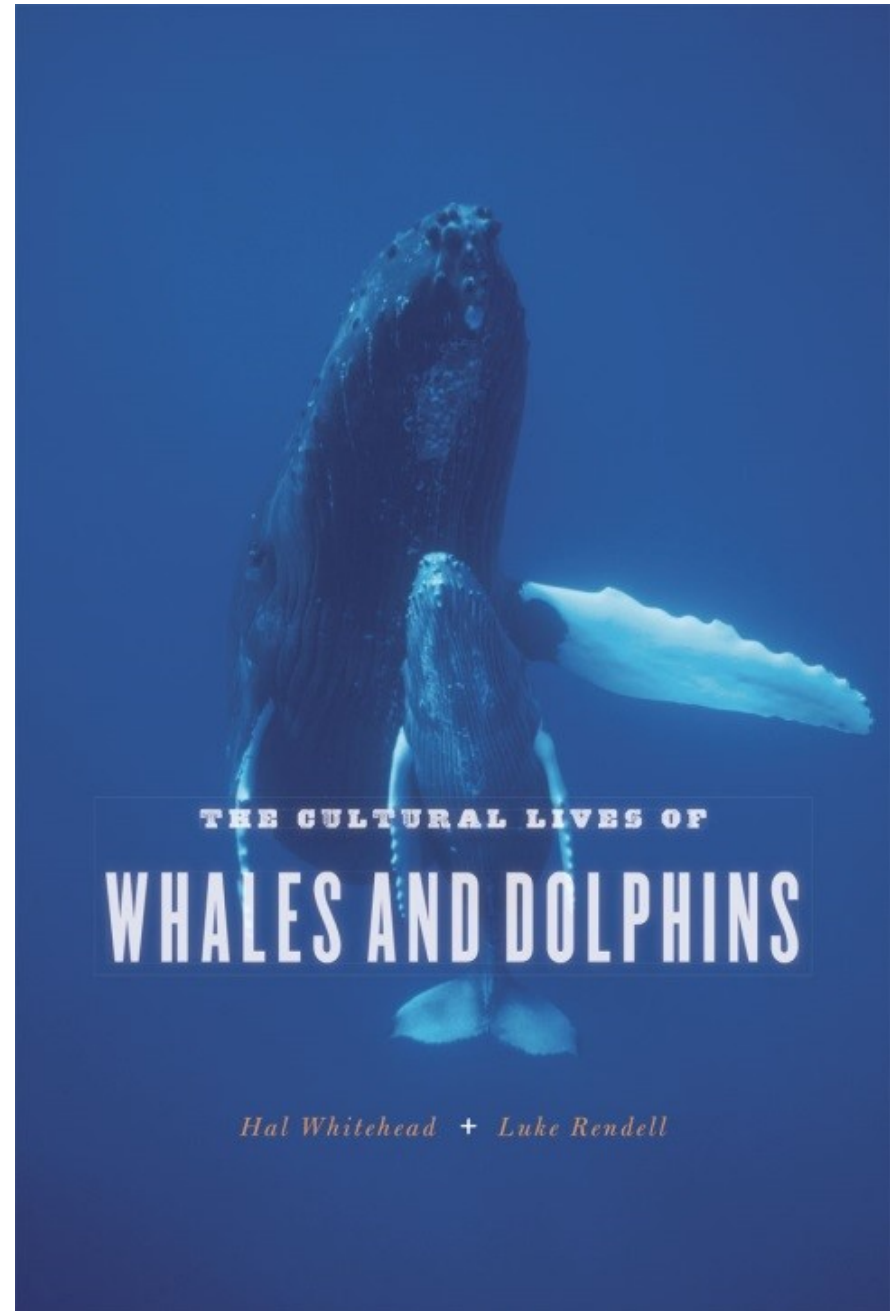


Science, 2013

**“Culture, we
believe, is a major
part of what the
whales are”**

Whitehead and Rendell
2015

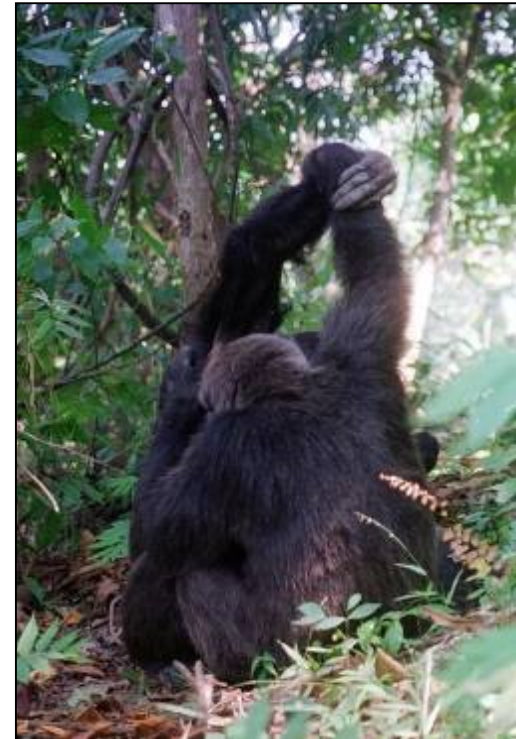
*cites 70 articles on
‘cultural transmission’
or ‘social learning’ in
cetaceans*

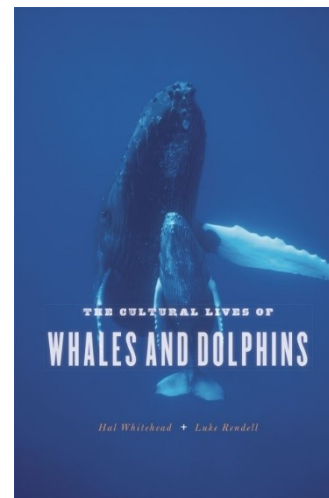


Contents and Context of Animal Culture



***dietary profiles
feeding techniques
predator avoidance
mate choice
courtship behaviour
vocal communication
migration routes
tool use
social customs
circadian rhythms
locomotion styles***





1. Phylogenetic reach
2. Pervasiveness within species
3. Implications for Evolutionary Biology



THE REACH OF ANIMAL CULTURE



INTERFACE FOCUS

rsfs.royalsocietypublishing.org

Review

Cite this article: Whiten A. 2017 A second inheritance system: the extension of biology through culture. *Interface Focus* 7: 20160142. <http://dx.doi.org/10.1098/rsfs.2016.0142>



A second inheritance system: the extension of biology through culture

Andrew Whiten

Centre for Social Learning and Cognitive Evolution, School of Psychology and Neuroscience, University of St Andrews, St Andrews KY16 9JP, UK

AW, 0000-0003-2426-5890

By the mid-twentieth century (thus following the 'Modern Synthesis' in evolutionary biology), the behavioural sciences offered only the sketchy beginnings of a scientific literature documenting evidence for cultural inheritance in animals—the transmission of traditional behaviours via learning from others (social learning). By contrast, recent decades have seen a massive growth in the documentation of such cultural phenomena, driven by long-term field studies and complementary laboratory experiments. Here, I

2017

ISSN 2042-8898 | Volume 7 | Issue 5 | 6 October 2017

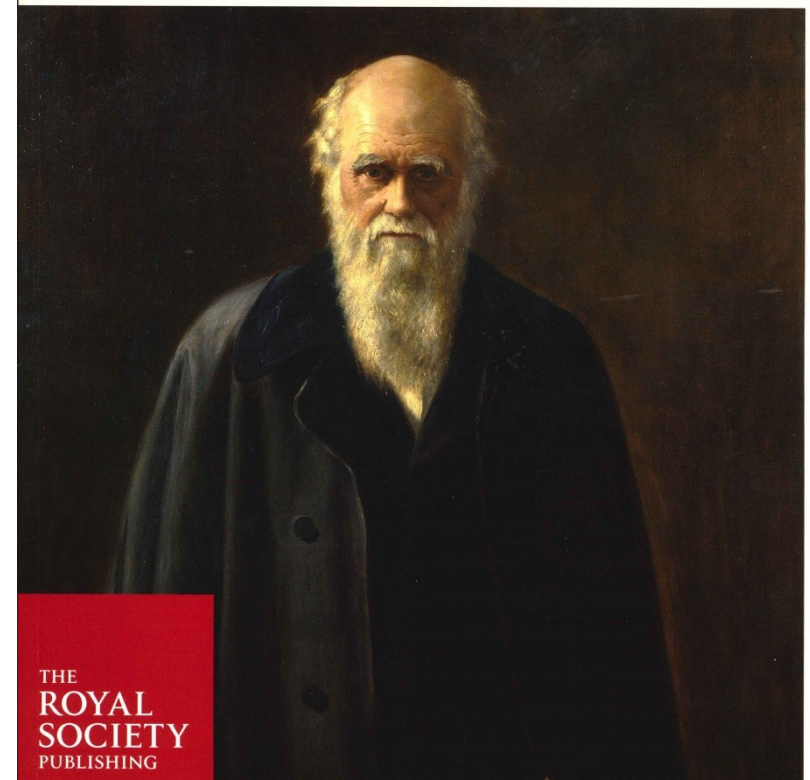
INTERFACE FOCUS

New trends in evolutionary biology: biological, philosophical and social science perspectives

Theme issue organized by Denis Noble, Nancy Cartwright, Patrick Bateson, John Dupré and Kevin Laland



2017



INTERFACE FOCUS

rsfs.royalsocietypublishing.org

Review

Cite this article: Whiten A. 2017 A second inheritance system: the extension of biology through culture. *Interface Focus* 7: 20160142. <http://dx.doi.org/10.1098/rsfs.2016.0142>



A second inheritance system: the extension of biology through culture

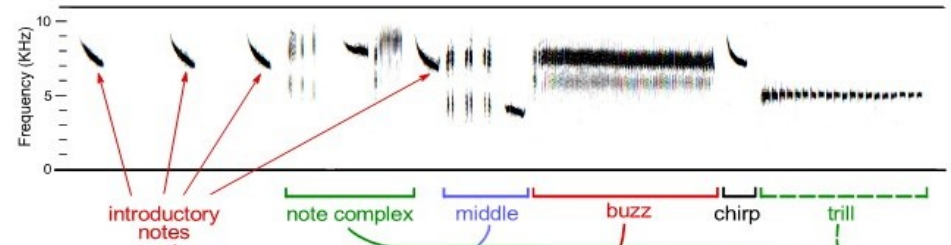
Andrew Whiten

Centre for Social Learning and Cognitive Evolution, School of Psychology & Neuroscience, St Andrews KY16 9JP, UK

ORCID iD: AW, 0000-0003-2426-5890

By the mid-twentieth century (thus following the evolutionary biology), the behavioural sciences of beginnings of a scientific literature documenting evidence in animals—the transmission of traditional knowledge from others (social learning). By contrast, recent decades have seen a growth in the documentation of such cultural phenomena in field studies and complementary laboratory

1982



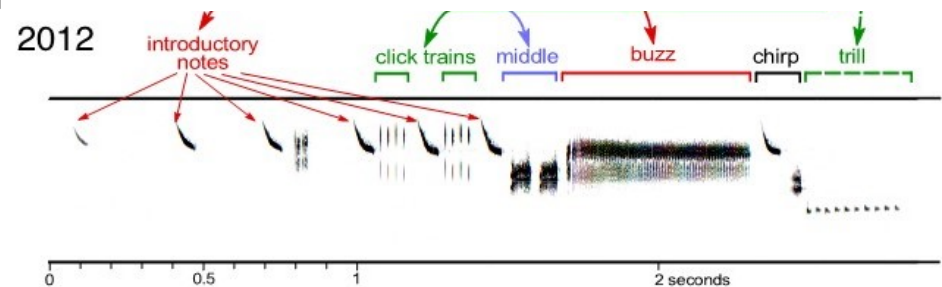
Annual Review of Ecology, Evolution, and Systematics

Cultural Evolution in Animals

Andrew Whiten

2019

2012



Contents lists available at SciVerse ScienceDirect

Animal Behaviour

journal homepage: www.elsevier.com/locate/anbehav

Three decades of cultural evolution in Savannah sparrow songs

Heather Williams^{a,*}, Iris I. Levin^{b,c}, D. Ryan Norris^d, Amy E. M. Newman^d, Nathaniel T. Wheelwright^b

^a Biology Department, Williams College, Williamstown, MA, U.S.A.

^b Department of Biology, Bowdoin College, Brunswick, ME, U.S.A.

^c Department of Biology, University of Missouri—St Louis, St Louis, MO, U.S.A.

^d Department of Integrative Biology, University of Guelph, Guelph, ON, Canada

Gene–culture coevolution in whales and dolphins

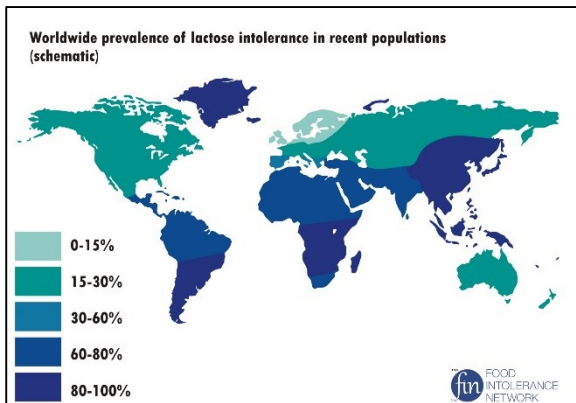
Hal Whitehead^{3,1}

¹Department of Biology, Dalhousie University, Halifax, NS, Canada B3H 4R2

Edited by Marcus W. Feldman, Stanford University, Stanford, CA, and approved May 1, 2017 (received for review January 14, 2017)

Whales and dolphins (Cetacea) have excellent social learning skills as well as a long and strong mother–calf bond. These features produce stable cultures, and, in some species, sympatric groups with different cultures. There is evidence and speculation that this cultural transmission of behavior has affected gene distributions.

places major constraints on the other modes of inheritance. Circumstances in which other inheritance mechanisms control the inheritance of genes are much less obvious but can have great evolutionary significance (10). Thus, there has been particular interest in gene–culture coevolution (11–13).



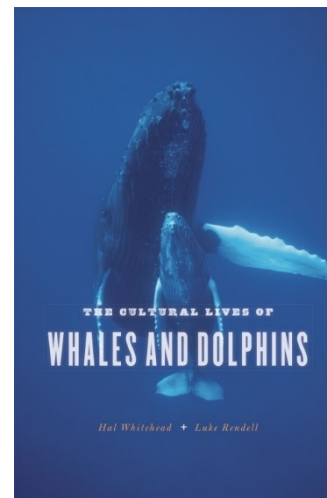
nature COMMUNICATIONS

REVIEW ARTICLE

<https://doi.org/10.1038/s41467-017-10293-y> OPEN

The reach of gene–culture coevolution in animals

Hal Whitehead¹, Kevin N. Laland², Luke Rendell², Rose Thorogood^{3,4,5} & Andrew Whiten⁶

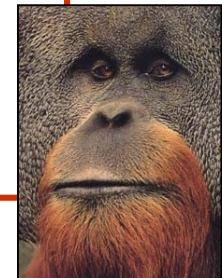
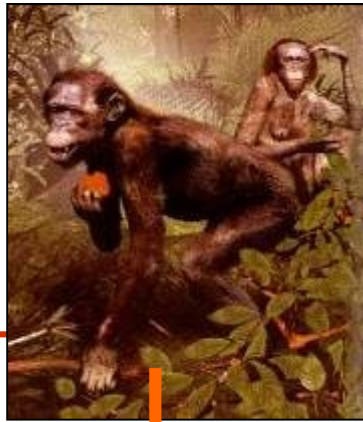


1. Phylogenetic reach
2. Pervasiveness within species
3. Implications for Evolutionary Biology
4. Implications for Human Evolution

THE REACH OF ANIMAL CULTURE



Dawkins 2004



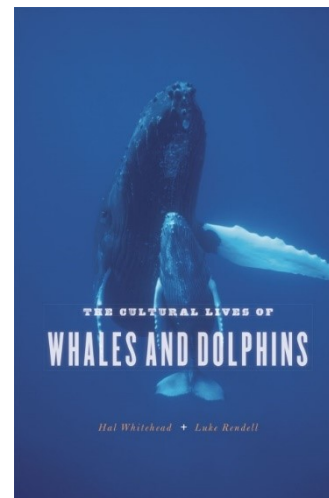
Social Learning and Culture in Child and Chimpanzee

Andrew Whiten

Annu. Rev. Psychol. 2017. 68:129–54

The *Annual Review of Psychology* is online at
psych.annualreviews.org

This article's doi:
[10.1146/annurev-psych-010416-044108](https://doi.org/10.1146/annurev-psych-010416-044108)



1. Phylogenetic reach
2. Pervasiveness within species
3. Implications for Evolutionary Biology
4. Implications for Human Evolution
5. Implications for Conservation

THE REACH OF ANIMAL CULTURE



1ST CMS WORKSHOP ON CONSERVATION IMPLICATIONS OF ANIMAL CULTURE AND SOCIAL COMPLEXITY

Parma, Italy, 12-14 April 2018



INSIGHTS

Science

510 8 MARCH 2019
www.sciencemag.org

POLICY FORUM

www.sciencemag.org on March 7, 2019

CONSERVATION

Animal cultures matter for conservation

Understanding the rich social lives of animals benefits international conservation efforts

By Philippa Brakes, Sasha R. X. Dall, Lucy M. Aplin, Stuart Bearhop, Emma L. Carroll, Paolo Cuccu, Vicki Fishlock, John K. B. Ford, Ellen C. Garland, Sally A. Keith, Peter K. McGregor, Sarah E. Mennick, Michael J. Noad, Giuseppe Notarbartolo di Sciara, Martha M. Robbins, Mark P. Simmonds, Fernando Spina, Alex Thornton, Paul R. Wade, Martin J. Whiting, James Williams, Luke Rendell, Hal Whitehead, Andrew Whiten, Christian Rutz

Science

510 23 MARCH 2019
www.sciencemag.org

RESEARCH

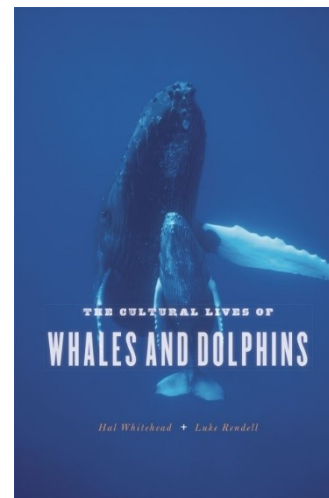
CONSERVATION

Human impact erodes chimpanzee behavioral diversity

Hjalmar S. Kühl^{1,2*}, Christophe Boesch^{1,3}, Lars Kulik¹, Fabian Haas¹, Mimi Arandjelovic¹, Paula Dieguez¹, Gaëlle Bocksberger¹, Mary Brooke McElreath¹, Anthony Agbor¹, Samuel Angedakin¹, Emmanuel Ayuk Ayimisin¹, Emma Bailey¹, Donatienne Barubiyo¹, Mattia Bessone¹, Gregory Brazzola¹, Rebecca Chancellor⁴, Heather Cohen¹, Charlotte Coupland¹, Emmanuel Danquah⁵, Tobias Deschner¹, Dervla Dowd¹, Andrew Dunn⁷, Villard Ebot Egbé¹, Henk Eshuis¹, Annemarie Goedmakers⁸, Anne-Cécile Granjon¹, Josephine Head¹, Daniela Hedwig^{9,10}, Veerle Hermans¹¹, Inaoyom Imong⁷, Kathryn J. Jeffery^{12,13,14}, Sorrel Jones^{1,15,16}, Jessica Junker¹, Parag Kadam¹⁷, Mbangi Kambere¹, Mohamed Kambi¹, Ivonne Kienast¹, Deo Kujirakwinja⁷, Kevin E. Langergraber¹⁸, Juan Lapuente¹, Bradley Larson¹, Kevin Lee^{1,18}, Vera Leinert², Manuel Llana¹⁹, Giovanna Maretta¹, Sergio Marrocoli¹, Rumen Martin¹, Tanyi Julius Mbi¹, Amelia C. Meier¹, Bethan Morgan^{20,21}, David Morgan²², Felix Mulindahabi⁷, Mizuki Murali¹, Emily Neill¹, Protais Niyigaba⁷, Lucy Jayne Ormsby¹, Robinson Orume⁶, Liliana Pacheco¹⁹, Alex Piel²³, Jodie Preece¹, Sebastien Regnaut³, Aaron Rundus²⁴, Crickette Sanz²⁵, Joost van Schijndel^{1,6}, Volker Sommer²⁶, Fiona Stewart²³, Nikki Tagg¹¹, Eleni Vondras^{1,27}, Virginie Vergnes¹, Adam Welsh¹, Erin G. Wessling^{1,2}, Jacob Willie^{11,28}, Roman M. Wittig^{1,29}, Yisa Ginath Yuh¹, Kyle Yurkiw¹, Klaus Zuberbühler^{30,31}, Aimmie K. Kalan¹

Chimpanzees possess a large number of behavioral and cultural traits among nonhuman species. The “disturbance hypothesis” predicts that human impact depletes resources and disrupts social learning processes necessary for behavioral and cultural transmission. We used a dataset of 144 chimpanzee communities, with information on 31 behaviors, to show that chimpanzees inhabiting areas with high human impact have a mean probability of occurrence reduced by 88%, across all behaviors, compared to low-impact areas. This behavioral diversity loss was evident irrespective of the grouping or categorization of behaviors. Therefore, human impact may not only be associated with the loss of populations and genetic diversity, but also affects how animals behave. Our results support the view that “culturally significant units” should be integrated into wildlife conservation.

Science, 2019



1. Phylogenetic reach
2. Pervasiveness within species
3. Implications for Evolutionary Biology
4. Culture and Conservation
5. Implications for Conservation

THE REACH OF ANIMAL CULTURE



Animal Cultures - Core Discoveries and New Horizons

INTRODUCTORY OVERVIEW



culture

tradition



KEY CONCEPTS

social learning

social information transfer



HISTORY METHODS

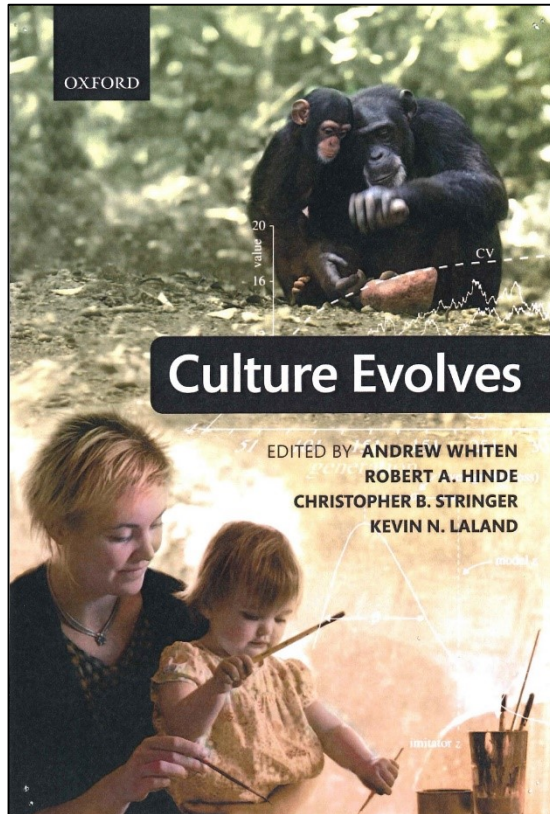


THE REACH OF ANIMAL CULTURE



COMPARING ANIMAL CULTURES

COMPARING ANIMAL CULTURES



Transmission
processes



Cultural contents

Population level
patterning



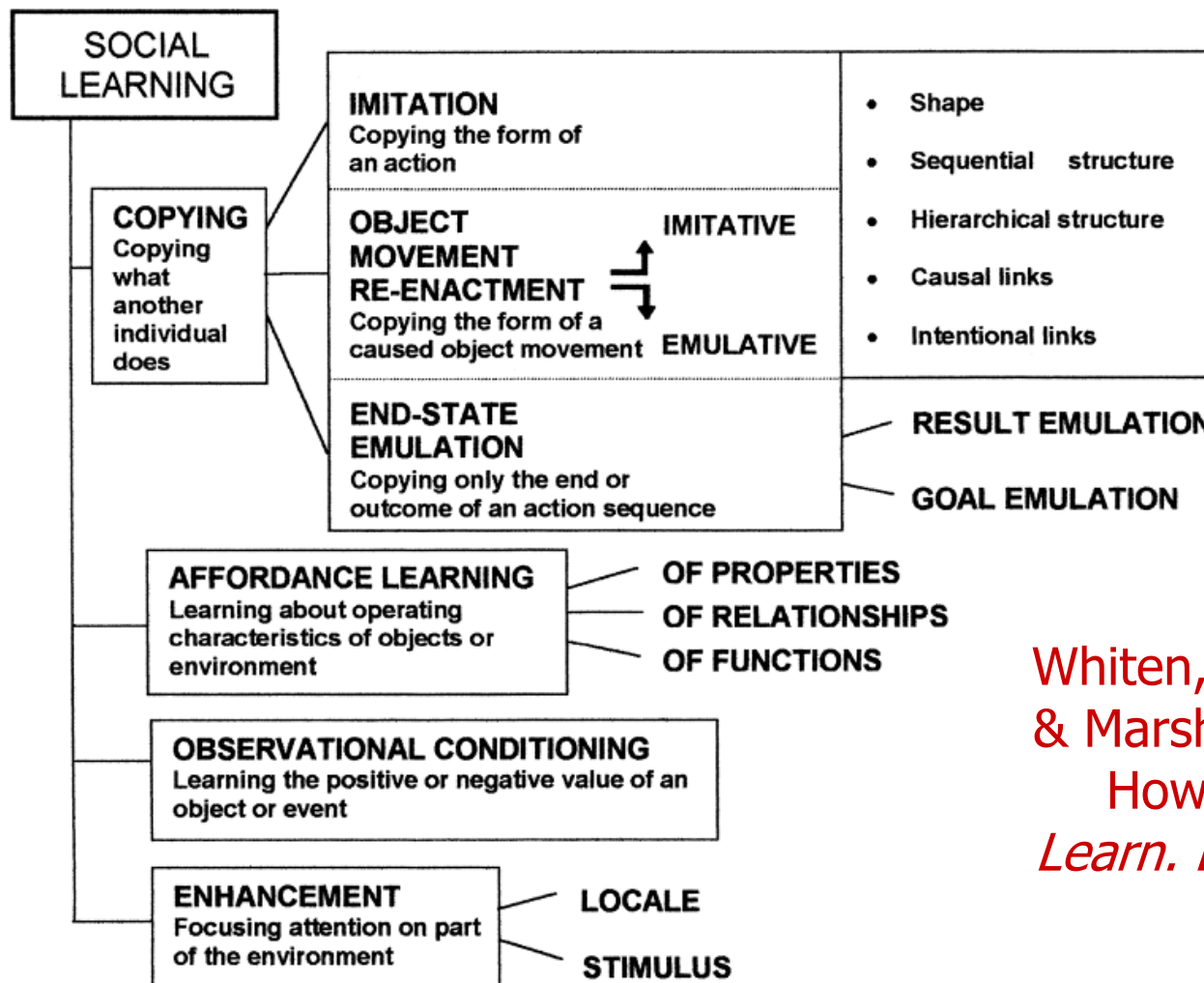
- A. Whiten, The Second Inheritance System of Chimpanzees and Humans, *Nature* 2005.
A. Whiten, The Scope of Culture in Chimpanzees, Humans and Ancestral Apes
Phil Trans R Soc B 2011: and *Ann Rev Psychology* 2017

COMPARING ANIMAL CULTURES

Transmission
processes

types of social learning

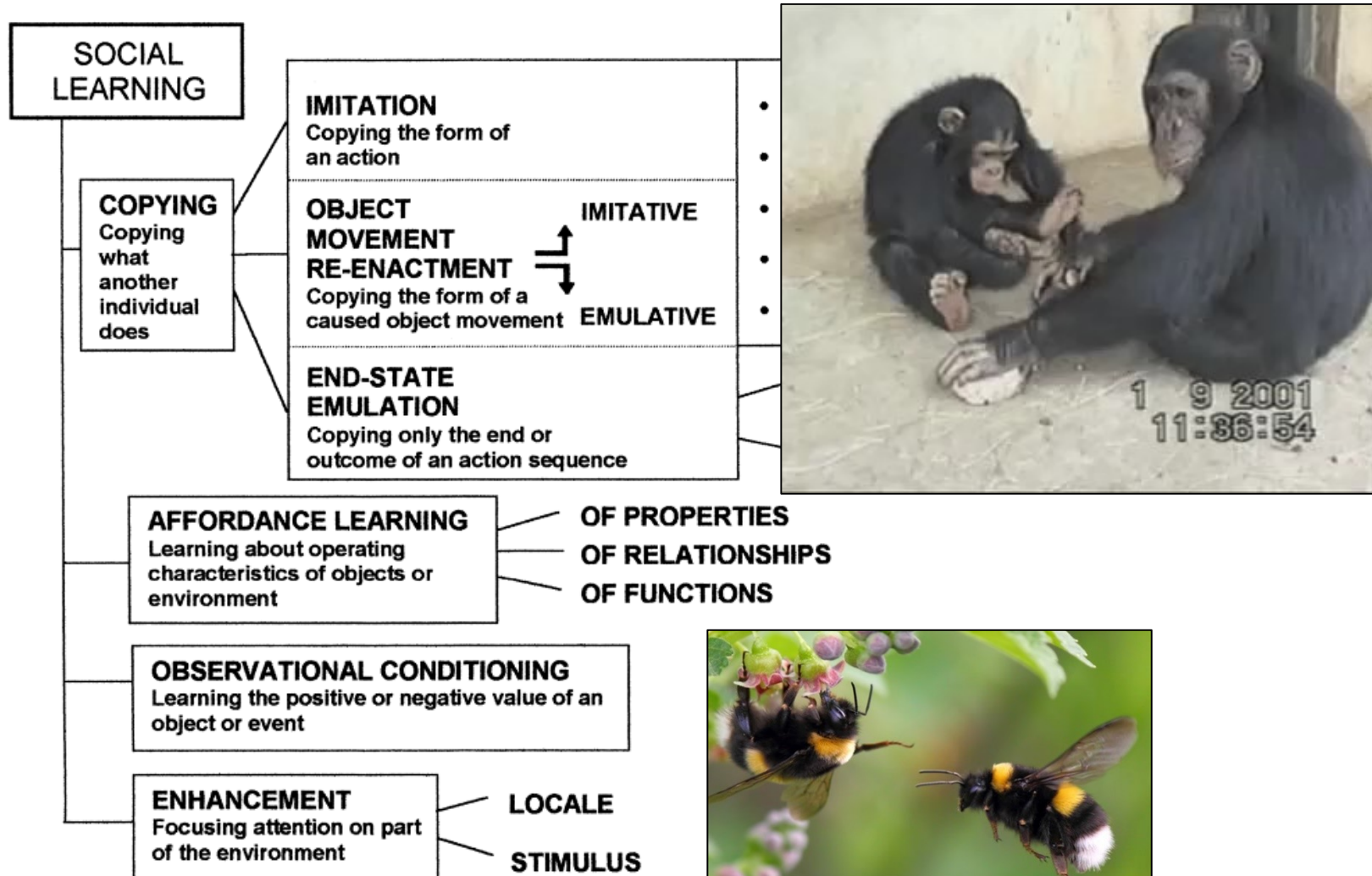
social learning biases or
strategies



Whiten, Horner, Litchfield
& Marshall-Pescini (2004)
How Do Apes Ape?
Learn. Behav. 32, 365-52

Emulation, imitation, over-imitation and the scope of culture for child and chimpanzee

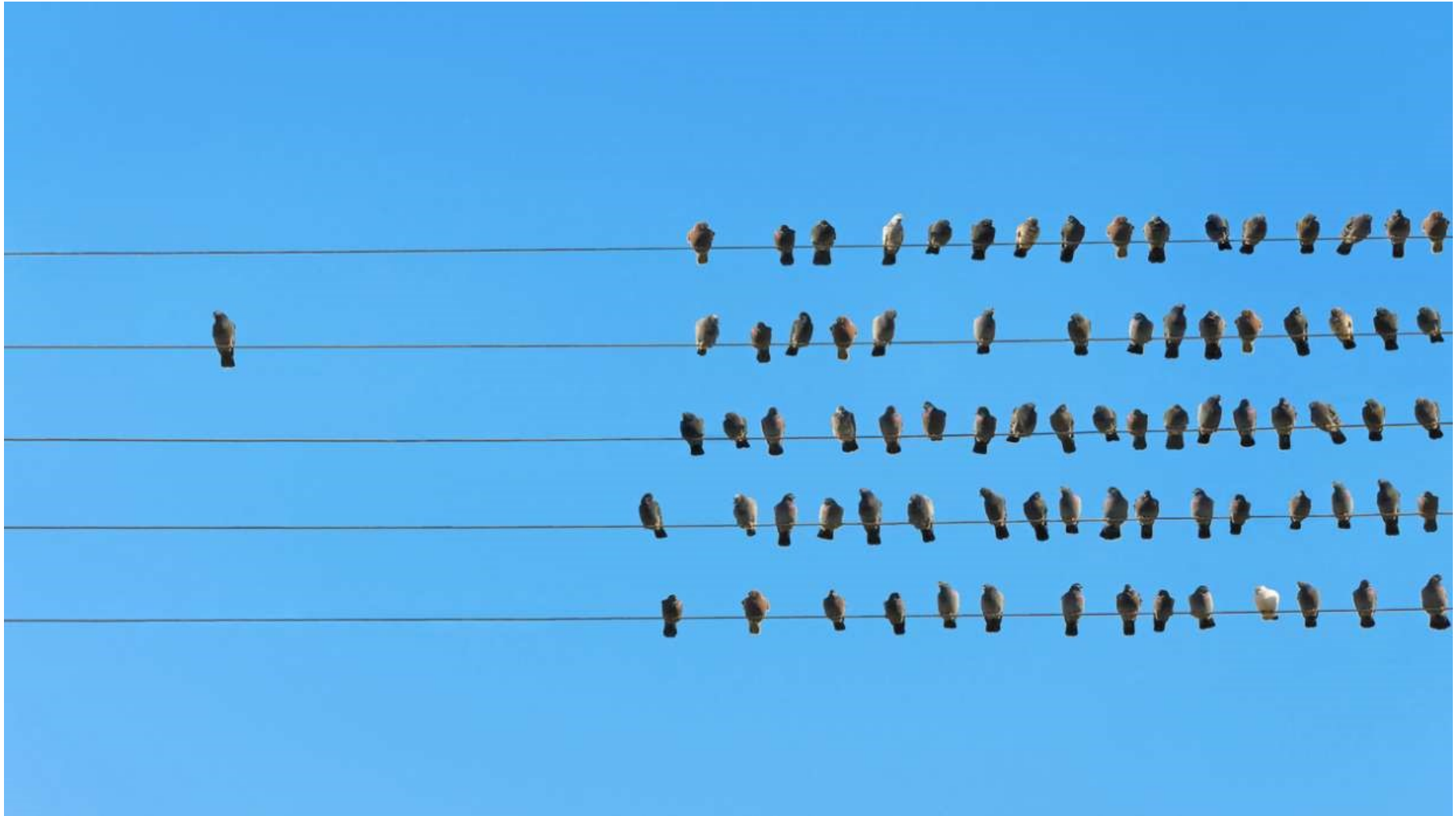
Andrew Whiten^{1,*}, Nicola McGuigan², Sarah Marshall-Pescini^{1,3}
and Lydia M. Hopper^{1,4}



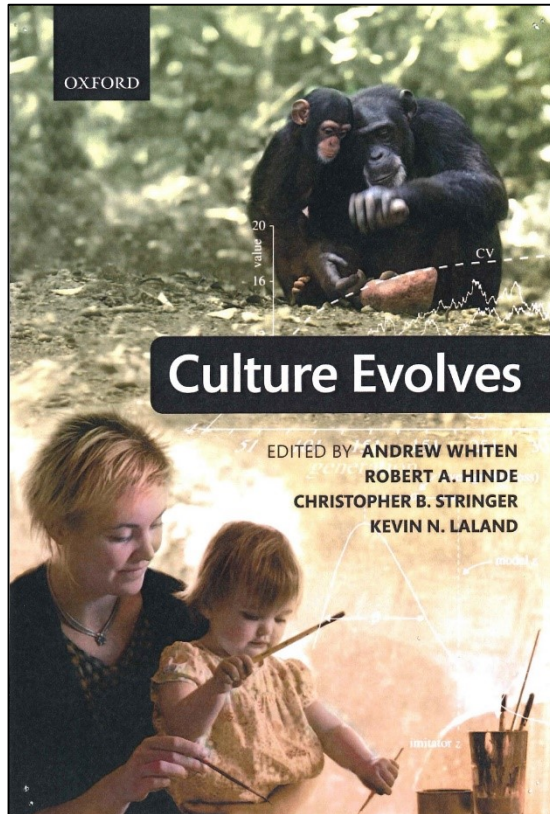
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social learning biases / social learning strategies



COMPARING ANIMAL CULTURES



Transmission
processes



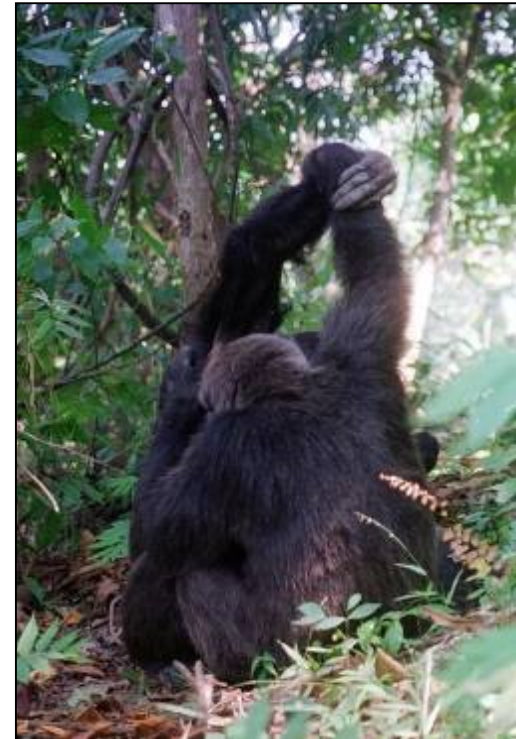
Cultural contents



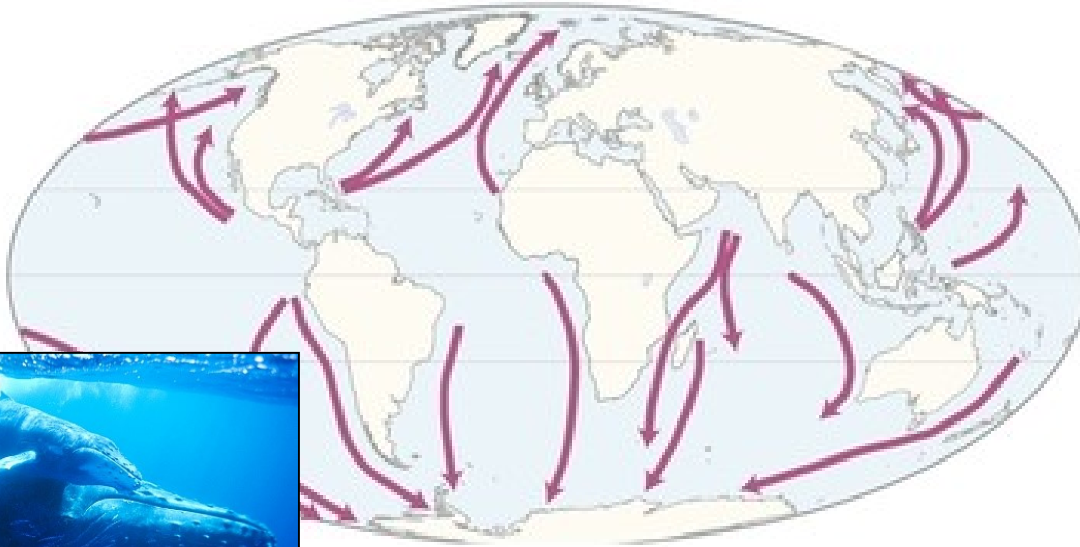
Contents and Contexts of Animal Culture



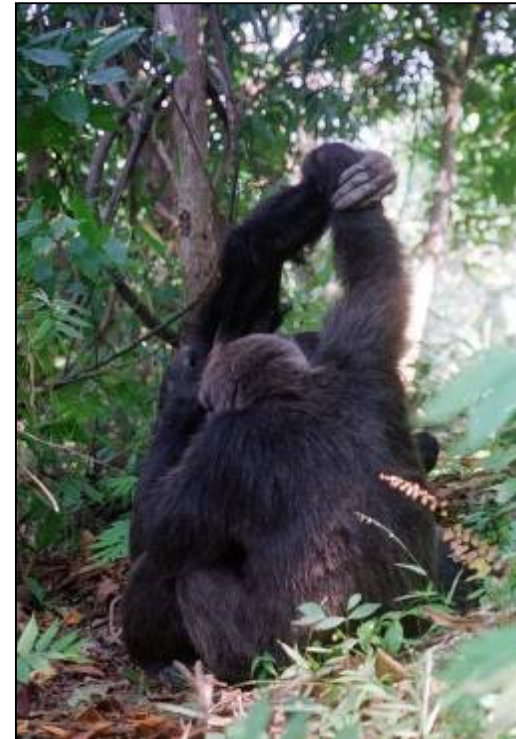
***dietary profiles
feeding techniques
predator avoidance
mate choice
courtship behaviour
vocal communication
migration routes
tool use
social customs
circadian rhythms
locomotion styles***



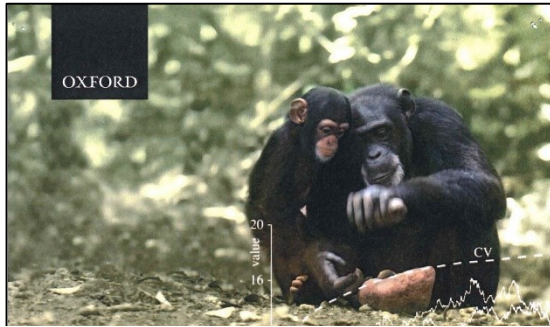
Contents and Contexts of Animal Culture



migration routes
tool use
social customs
circadian rhythms
locomotion styles



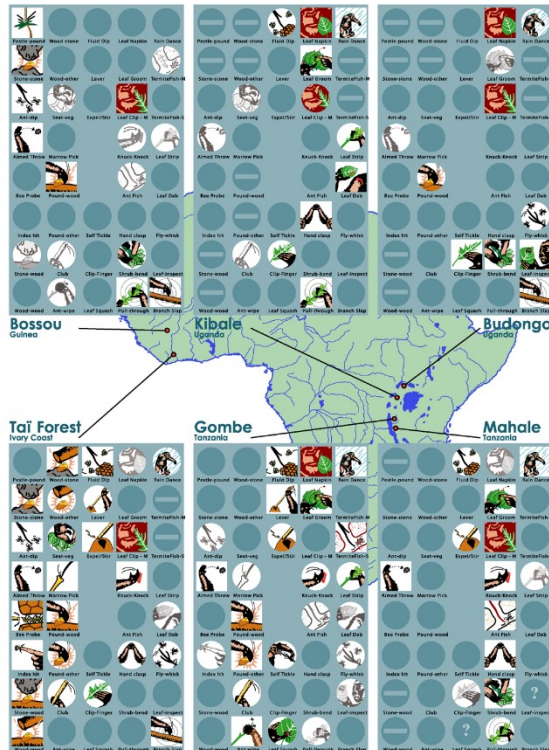
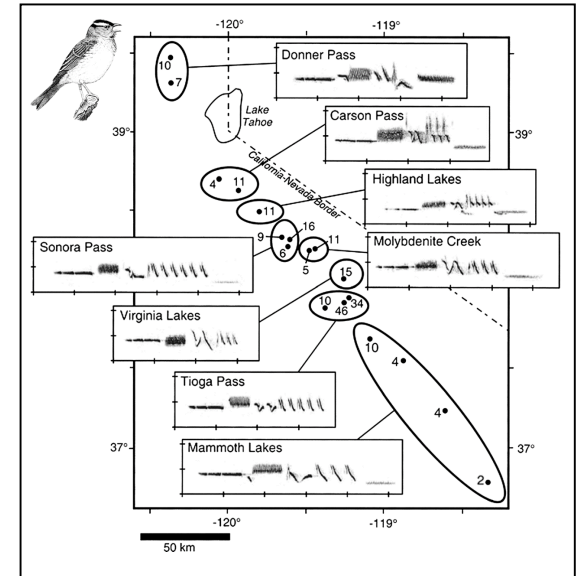
COMPARING ANIMAL CULTURES



Transmission
processes

Cultural contents

Population level
patterning



Animal Cultures - Core Discoveries and New Horizons

INTRODUCTORY OVERVIEW



culture

tradition



KEY CONCEPTS

social learning

social information transfer



HISTORY METHODS



THE REACH OF ANIMAL CULTURE



COMPARING ANIMAL CULTURES

