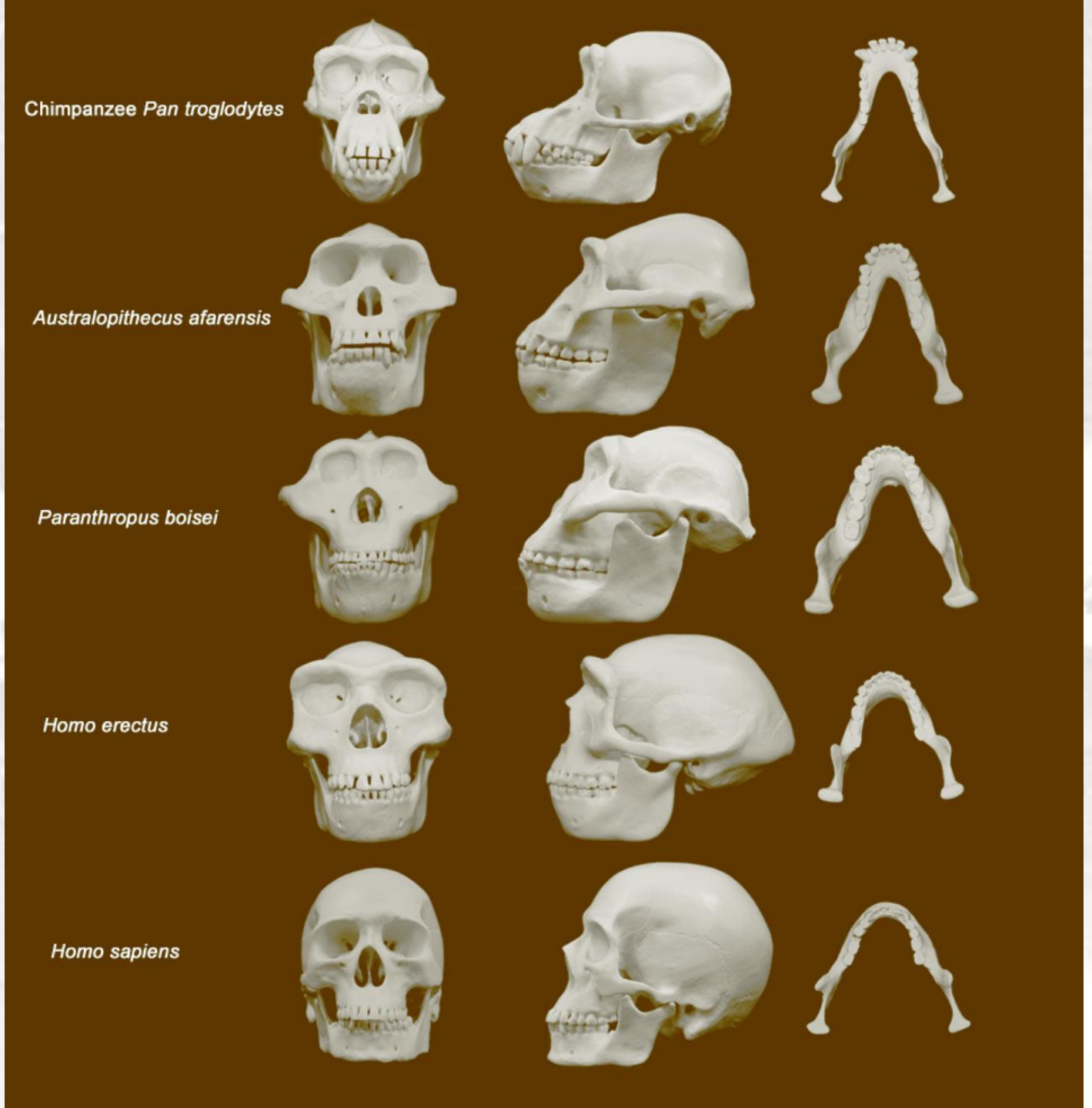
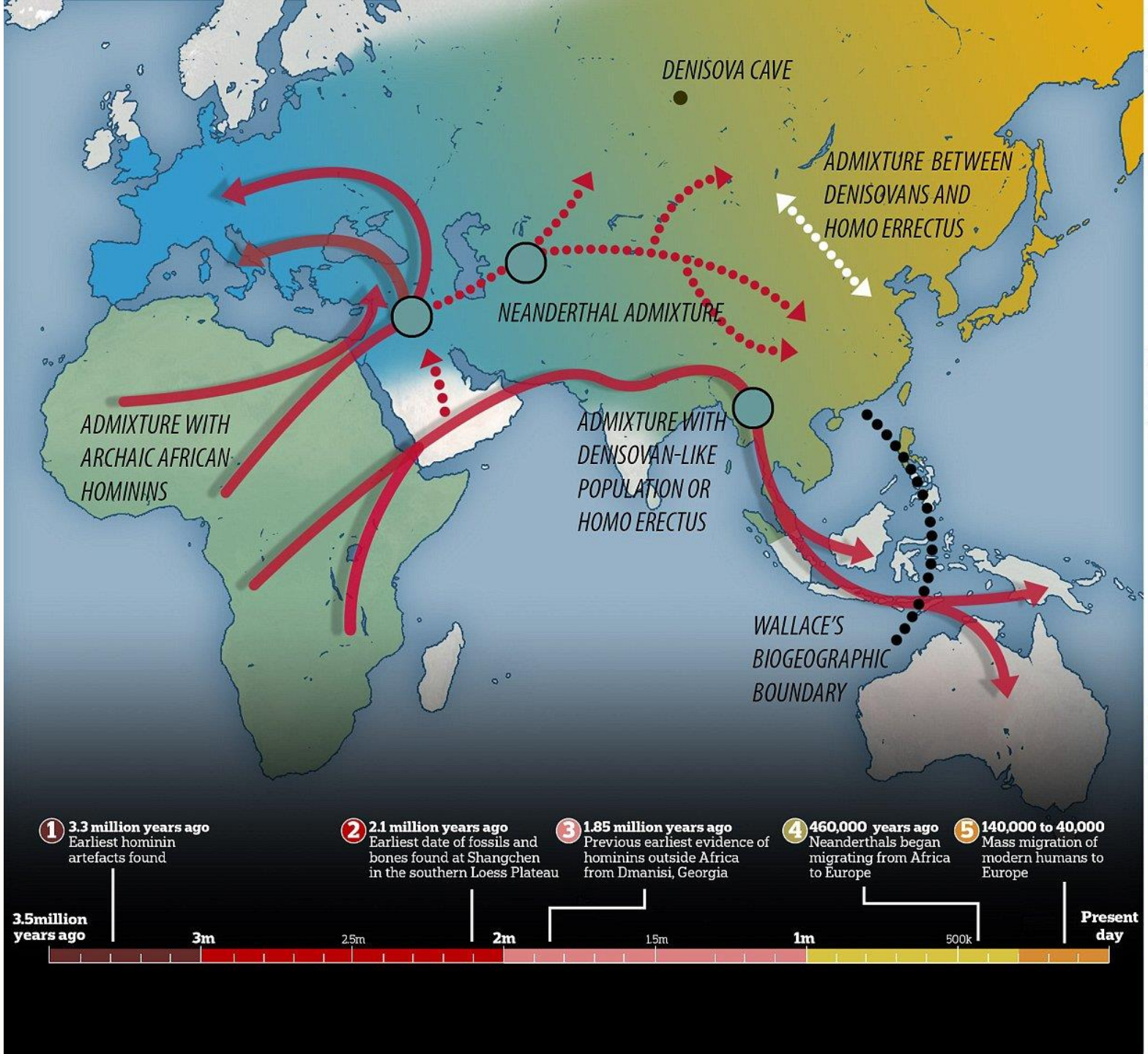
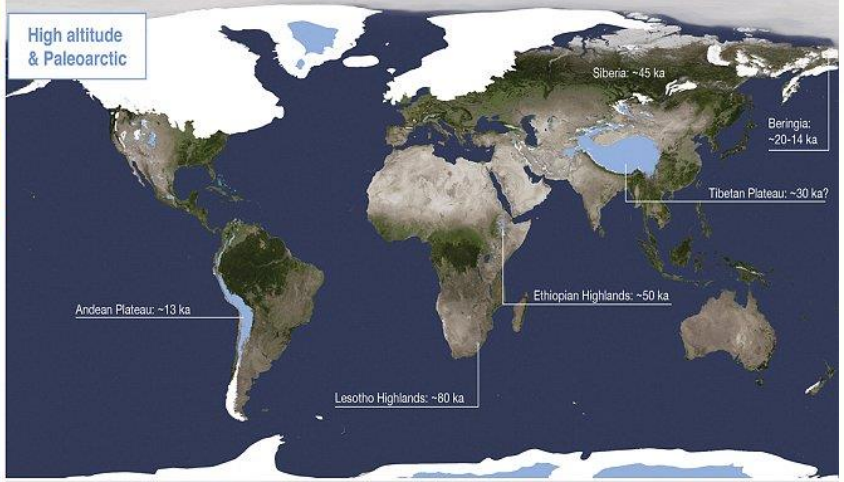
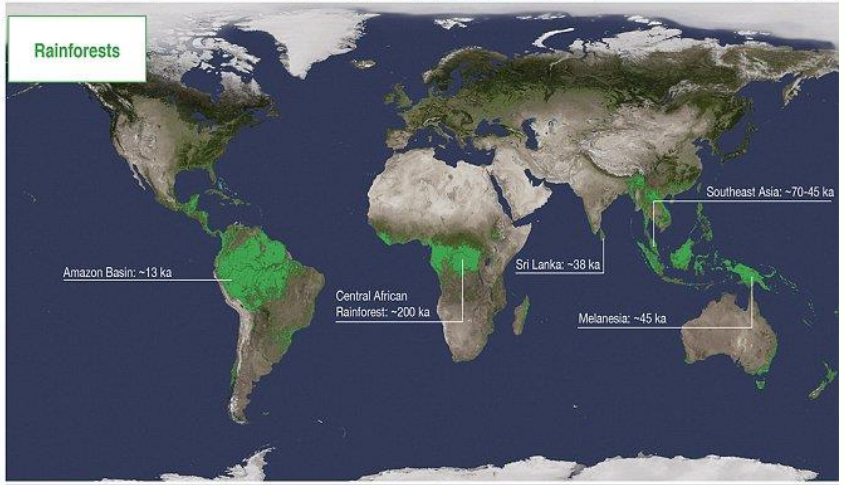

Chimpanzee *Pan troglodytes*
Australopithecus afarensis
Paranthropus boisei
Homo erectus
Homo sapiens

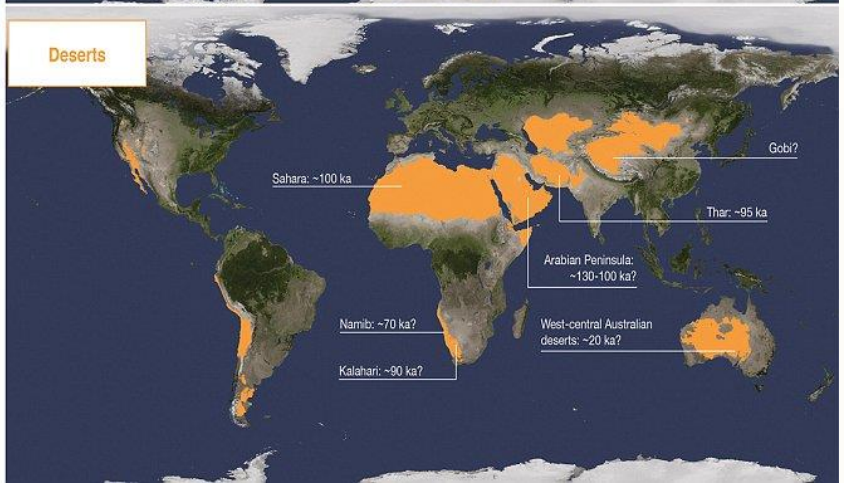

46

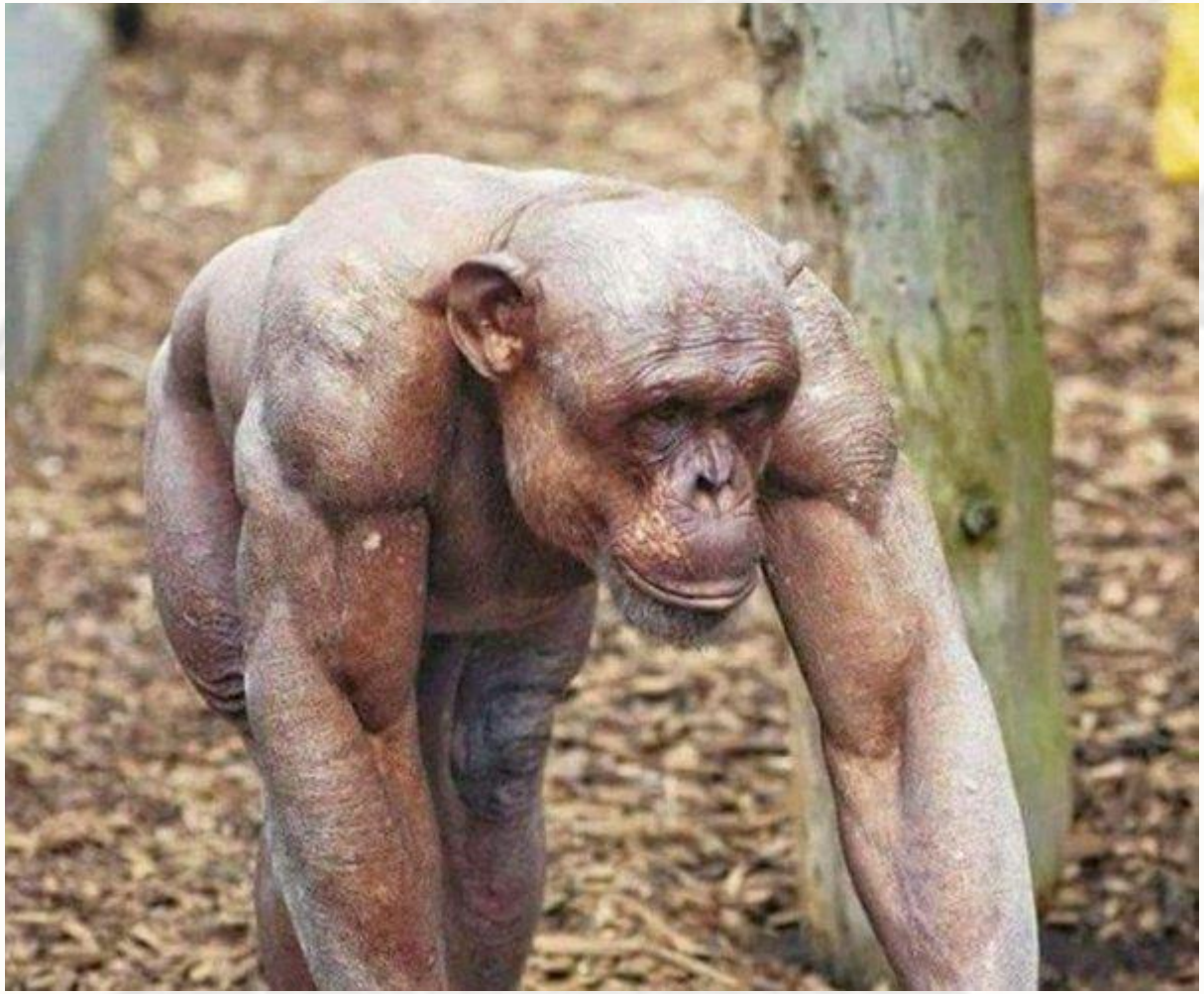

9
1.3
LB
OZ
Zero
Re-
weigh
gm
lb
On
Off
STANDBY
AVERAGING
hands off tray
READ
reading locked

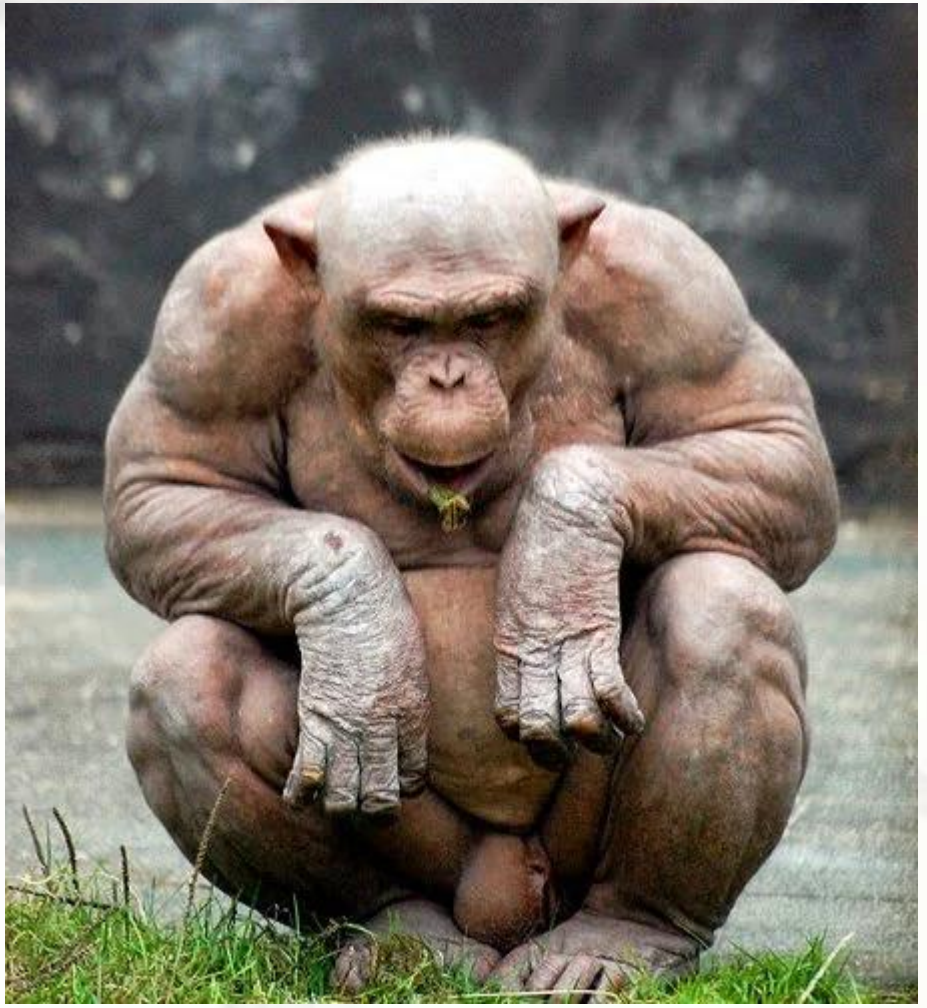

DENISOVA CAVE
ADMIXTURE BETWEEN DENISOVANS AND HOMO ERRECTUS
NEANDERTHAL ADMIXTURE
ADMIXTURE WITH ARCHAIC AFRICAN HOMININS
ADMIXTURE WITH DENISOVAN-LIKE POPULATION OR HOMO ERECTUS
WALLACE'S BIOGEOGRAPHIC BOUNDARY
1 3.3 million years ago
Earliest hominin artefacts found
2 2.1 million years ago
Earliest date of fossils and bones found at Shangchen in the southern Loess Plateau
3 1.85 million years ago
Previous earliest evidence of hominins outside Africa from Dmanisi, Georgia
4 460,000 years ago
Neanderthals began migrating from Africa to Europe
5 140,000 to 40,000
Mass migration of modern humans to Europe
3.5million years ago
3m
2.5m
2m
1.5m
1m
500k
Present day

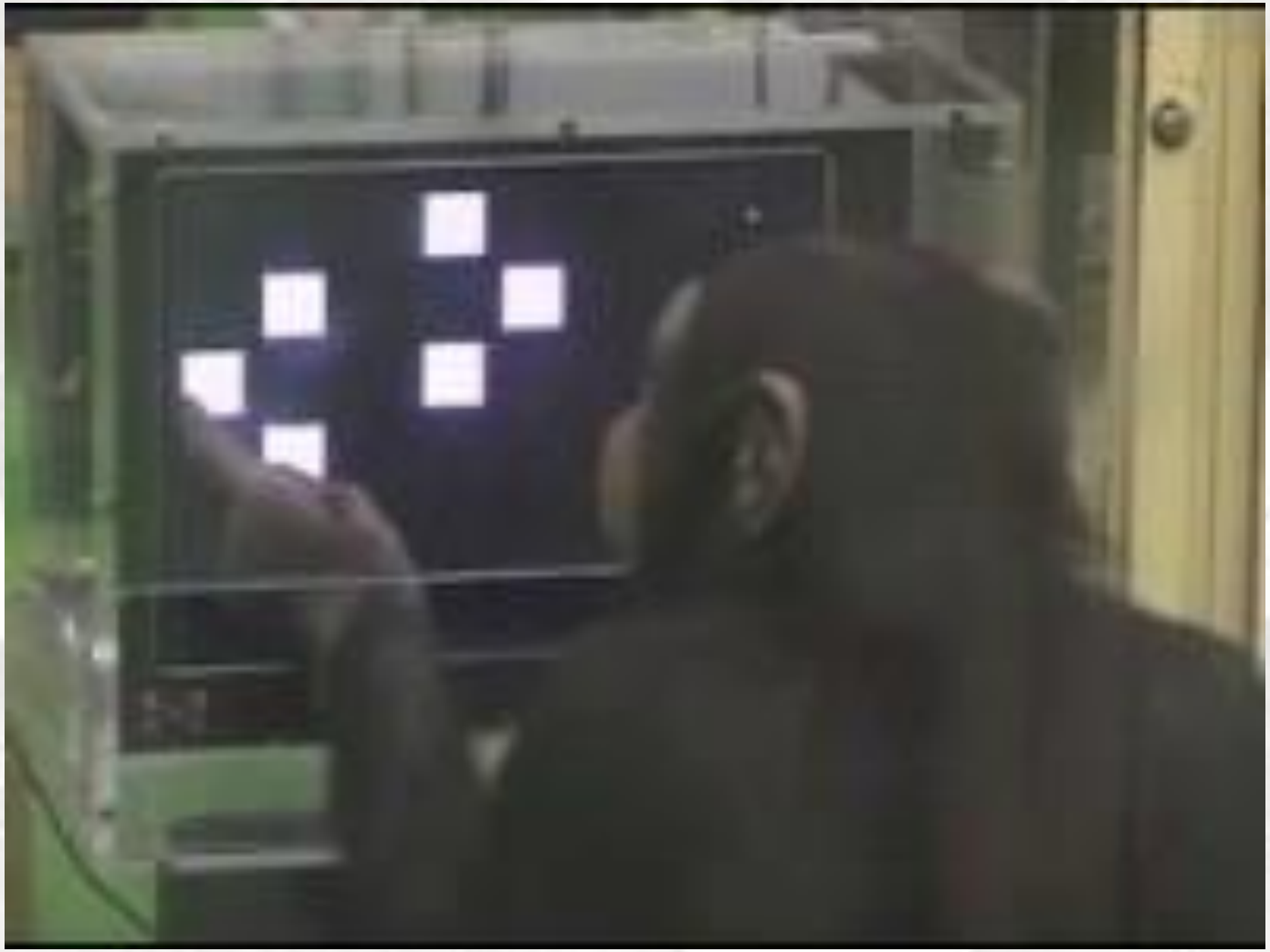

High altitude & Paleoarctic
Siberia: ~45 ka
Beringia: ~20-14 ka
Tibetan Plateau: ~30 ka?
Ethiopian Highlands: ~50 ka
Andean Plateau: ~13 ka
Lesotho Highlands: ~80 ka


Rainforests
Southeast Asia: ~70-45 ka
Sri Lanka: ~38 ka
Amazon Basin: ~13 ka
Central African Rainforest: ~200 ka
Melanesia: ~45 ka


Deserts
Gobi?
Sahara: ~100 ka
Thar: ~95 ka
Arabian Peninsula: ~130-100 ka?
Namib: ~70 ka?
West-central Australian deserts: ~20 ka?
Kalahari: ~90 ka?

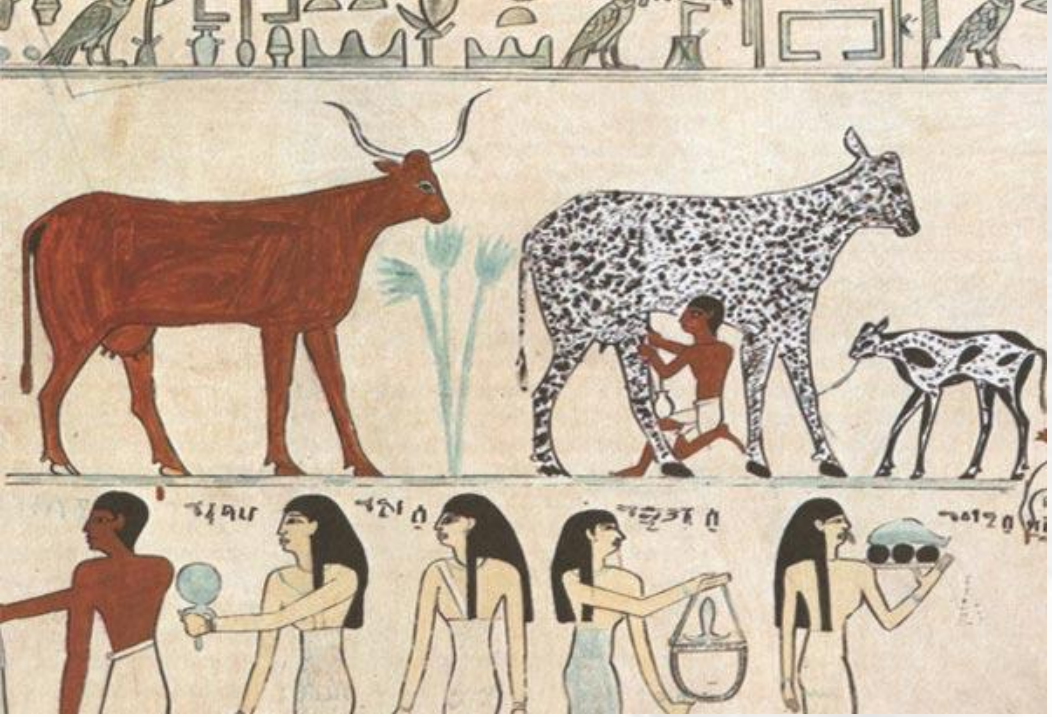


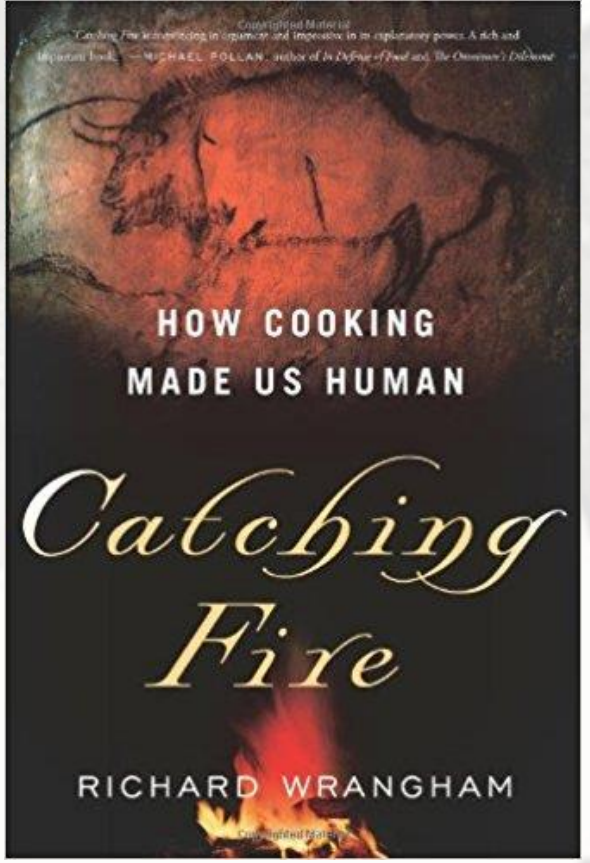




Acheulská industrie (1,4 – 0,5 mil)

KULTURA





KUMULATIVNÍ KULTURA

GENETICKÁ EVOLUCE

KULTURNÍ EVOLUCE

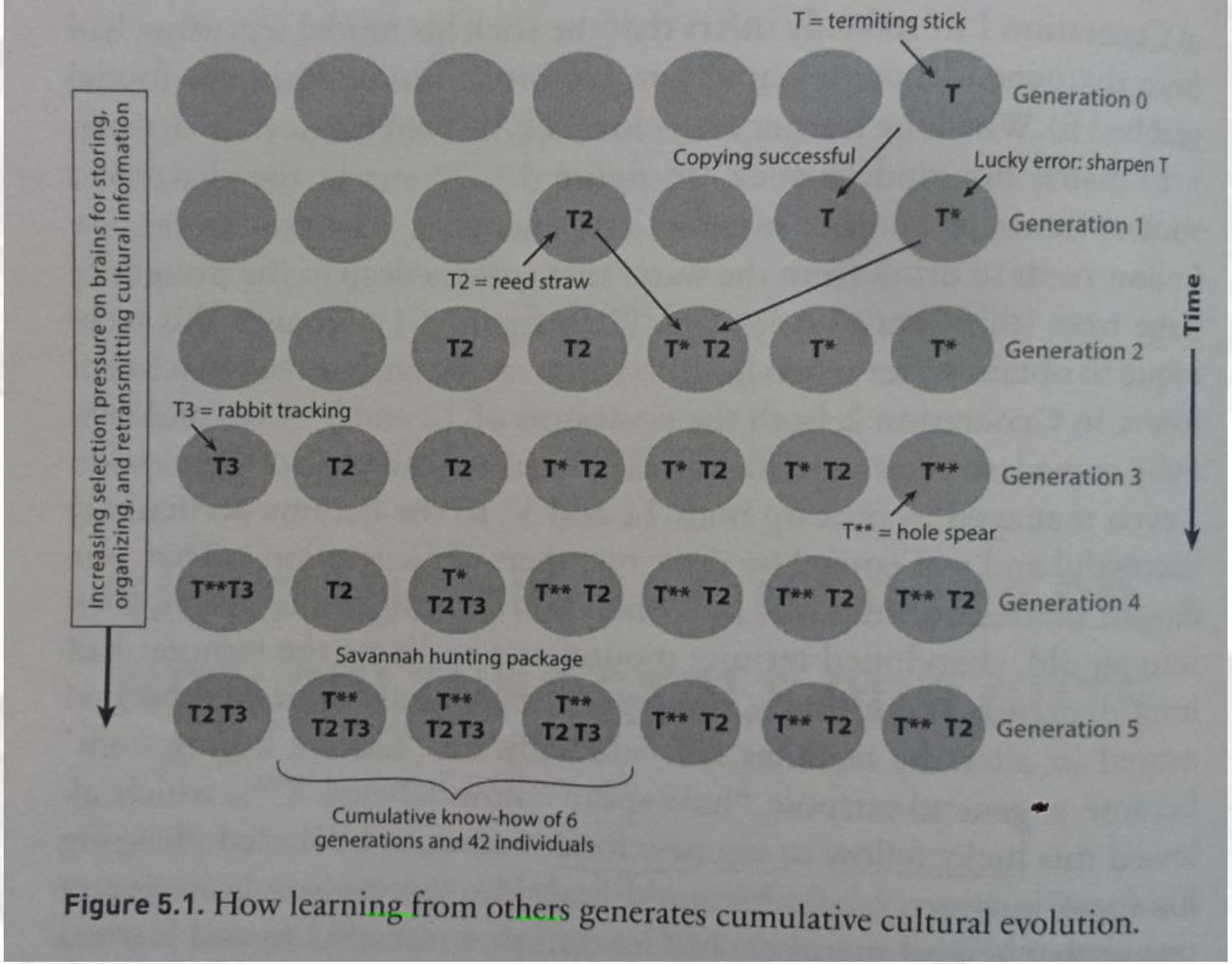


Figure 5.1. How learning from others generates cumulative cultural evolution.

Joseph Henrich (2016). *The Secret of Our Success: How Culture is Driving Human Evolution, Domesticating Our Species, and Making Us Smarter*, Princeton Uni Press, p. 56.

Proces kulturní evoluce

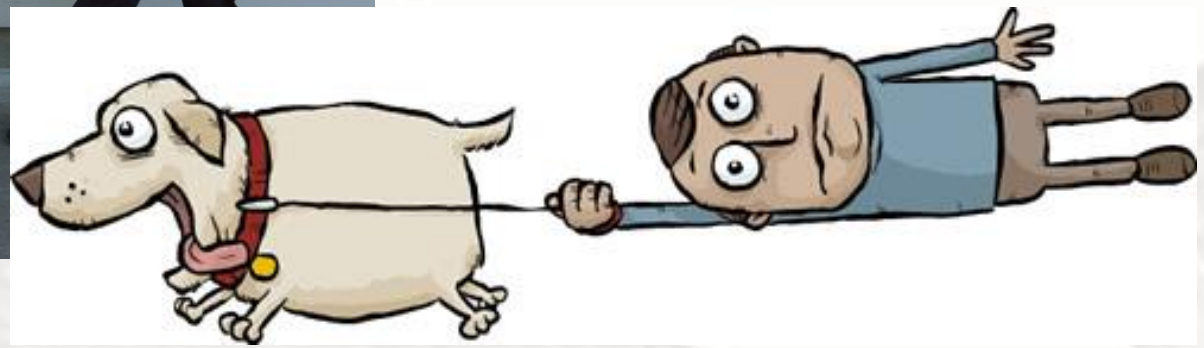
- **Kumulativní kultura** – soubor kulturních prvků (šťastných náhod a náhodných rekombinací) začal agregovat a to té míry, kdy se mu žádný jedinec vlastní vynalézavostí nemůže za svého života vyrovnat

- **Proces je hnaný selektivním učením** – jedinci se ve skupinách učí jeden od druhého adaptivně, tj. aby jim to vylepšovalo fitness (jdou více po některých tématech než po jiných a zaměřují se na starší, úspěšné, prestižní, zdravé nositele), čímž soubor dále roste a stává se adaptivnějším

Genově-kulturní koevoluce

- Úvod:
  - dort upečený z přísad **kulturní evoluce** a **evoluční psychologie** s třešinkou **matematiky**
  - Výzkum **interakce** genové evoluce a kulturní evoluce

HBE + EP



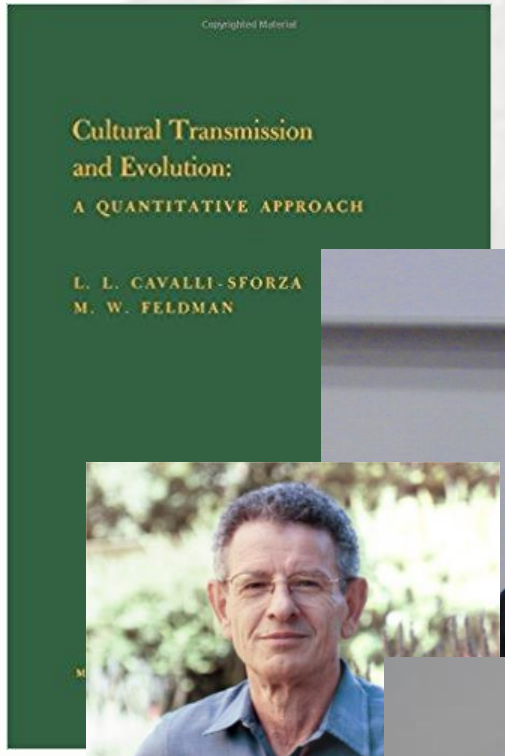
Kulturní evoluce

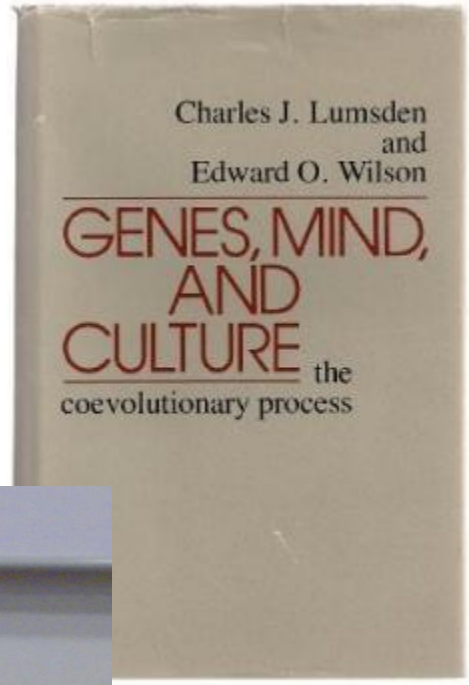
Genově-kulturní koevoluce

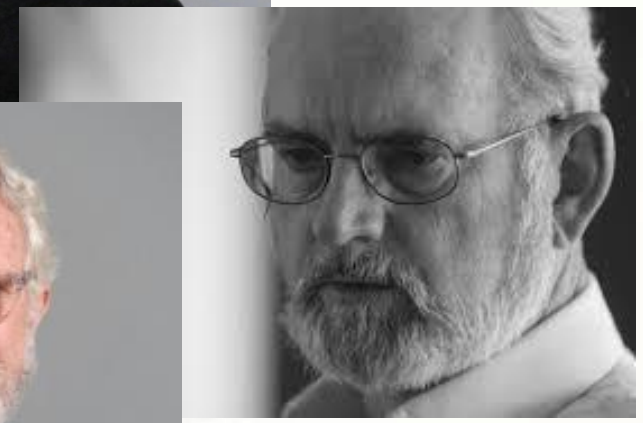
Historie přístupu

Historicky 3 zdroje:

- **Genově-kulturní koevoluční teorie (1981)**
  - Charles Lumsden & E. O. Wilson
    - » Harvard University
  - Marc Feldman & Luca Cavalli-Sforza
    - » Stanford University







- **Teorie dvojí dědičnosti**
  - Robert Boyd & Peter Richerson
    - » University of California

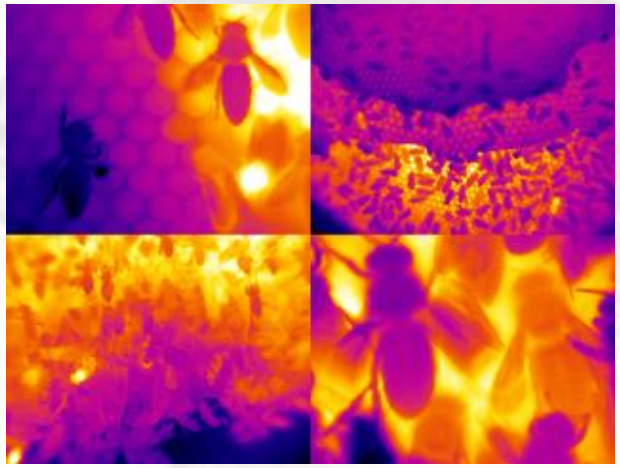
Koncepty

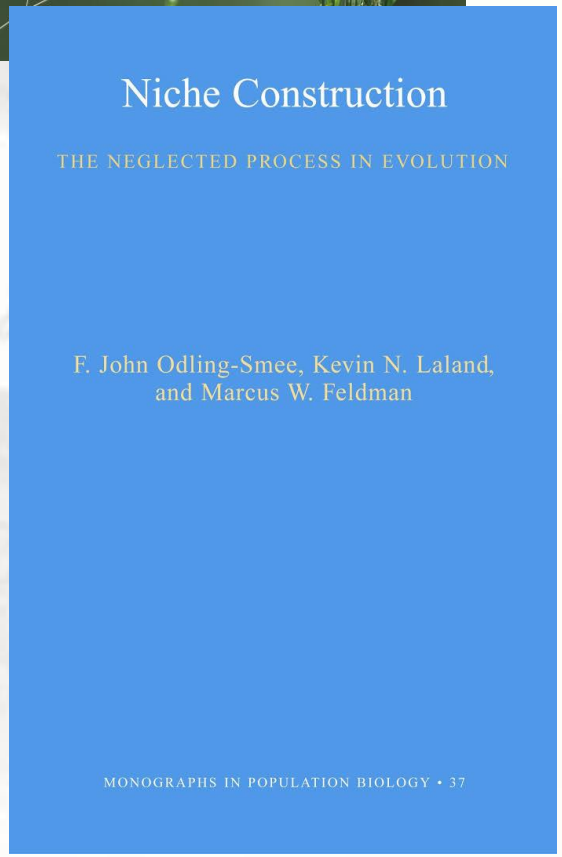
- Rychlá biologická evoluce
  - zemědělství a domestikace (sebe, zvířat, rostlin)
  - Cca 10 % lidského genomu – adaptace 50 000 let (Williamson, 2007)
  - geny nervového systému a mozku
  - + starší fixované genetické varianty (např. gen MYH16 a úbytek čelistních svalů a souvislost s vařením)

- Pomalá kulturní evoluce
  - Acheulská (1,4 – 0,5 mil) a Oldovanská (2,7 – 0,6 mil) industrie

Koncepty

- Niche construction
  - organismem vyvolané změny v samotných selekčních tlacích prostředí
  - přechod do jiných klimat; medicína; zvířecí patogeny
  - *inceptive* vs *counteractive* niche construction





2003

S kulturními evolucionisty sdílí

– kultura je souhrn evolučně se vyvíjejících představ, věr, hodnot, znalostí, které se **učí a sociálně předávají** mezi jedinci

S evolučními psychology sdílí

– kulturní učení je vždy závislé na **biologicky** vyvinutých strukturách získávání znalostí

Kultura

– mění hru, je to tak velký faktor, takový milník v evoluci, že začne měnit **reorganizaci lidského mozku**, který je nyní specializovaný/přednastavený k tomu získávat, uchovávat a užívat **kulturní informace**

Article

Cell

Physiological and Genetic Adaptations to Diving in Sea Nomads

Melissa A. Ilardo,[1] Ida Moltke,[2] Thorfinn S. Korneliussen,[1,3] Jade Cheng,[4] Aaron J. Stern,[4,5] Fernando Racimo,[1] Peter de Barros Damgaard,[1] Martin Sikora,[1] Andaine Seguin-Orlando,[1,6] Simon Rasmussen,[7] Inge C.L. van den Munckhof,[8] Rob ter Horst,[8] Leo A.B. Joosten,[8] Mihai G. Netea,[8,9] Suhartini Salingkat,[10] Rasmus Nielsen,[1,4,12,*] and Eske Willerslev[1,3,11,*]

[1]Centre for GeoGenetics, University of Copenhagen, Copenhagen 1350, Denmark
[2]Department of Biology, University of Copenhagen, Copenhagen 2200, Denmark
[3]Department of Zoology, University of Cambridge, Cambridge, CB2 3EJ, UK
[4]Department of Integrative Biology, University of California at Berkeley, Berkeley, CA 94720, USA
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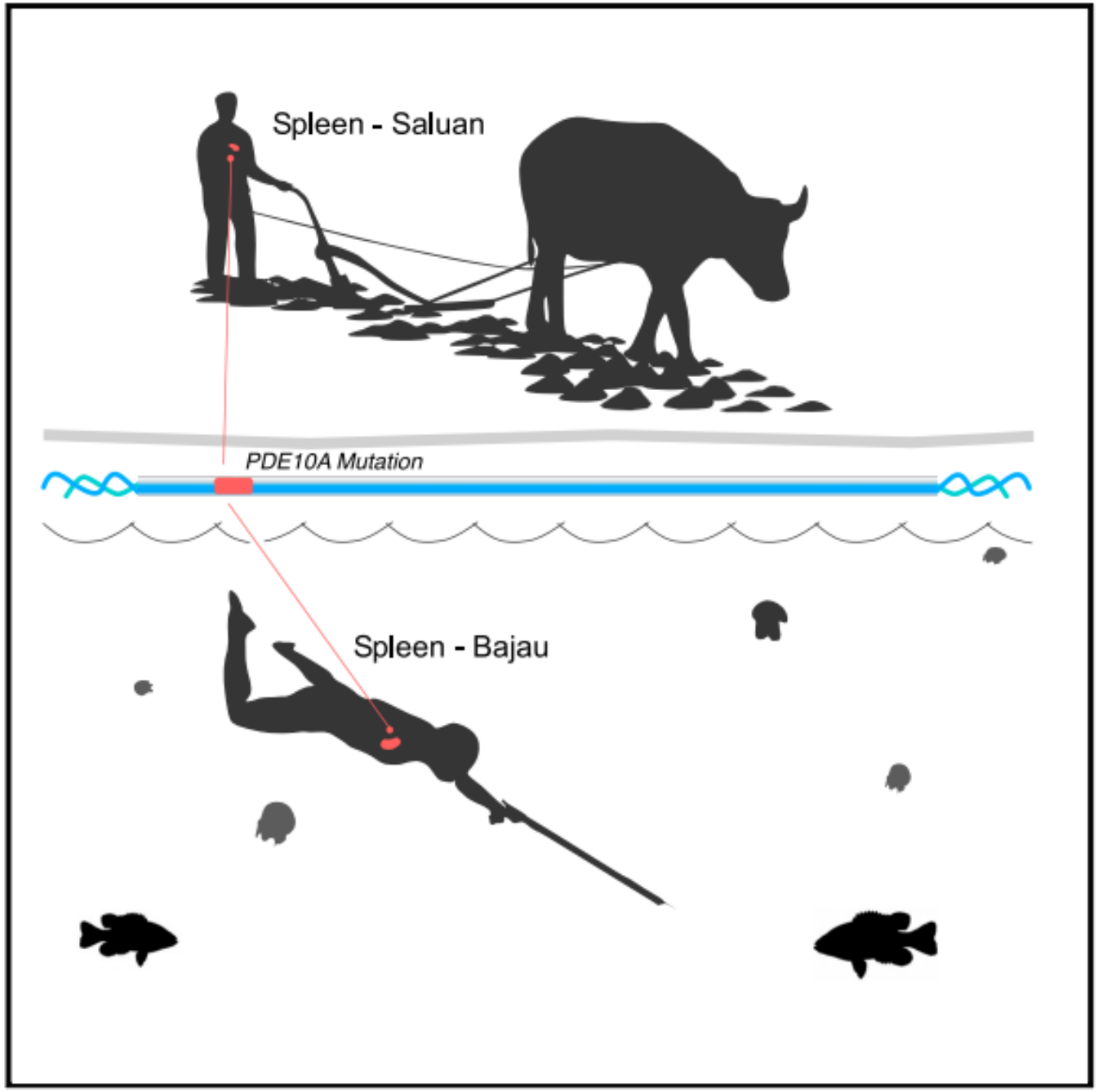
[9]Department for Genomics and Immunoregulation, Life and Medical Sciences Institute (LIMES), University of Bonn, Bonn 53115, Germany
[10]Tompotika Luwuk Banggai, Tompotika University, Luwuk 94711, Indonesia
[11]Wellcome Trust, Sanger Institute, Hinxton CB10 1SA, UK
[12]Lead Contact
*Correspondence: rasmus_nielsen@berkeley.edu (R.N.), ewillerslev@snm.ku.dk (E.W.)
https://doi.org/10.1016/j.cell.2018.03.054

SUMMARY

Understanding the physiology and genetics of human hypoxia tolerance has important medical implications, but this phenomenon has thus far only been investigated in high-altitude human populations. Another system, yet to be explored, is humans who engage in breath-hold diving. The indigenous Bajau people ("Sea Nomads") of Southeast Asia live a subsistence lifestyle based on breath-hold diving and are renowned for their extraordinary breath-holding abilities. However, it is unknown whether this has a genetic basis. Using a comparative genomic

adapted populations provide an opportunity to study the genetic and physiological consequences of environmental perturbations. For example, research on adaptations in the people of Tibet (Beall et al., 2010; Peng et al., 2011; Simonson et al., 2010; Wuren et al., 2014; Xiang et al., 2013; Xu et al., 2011; Yang et al., 2017; Yi et al., 2010) and other high altitude populations (Beall, 2006) has revealed new insight into the physiology of hypoxia with a broad range of implications in medically relevant fields (Grocott et al., 2007; Oosthuyse et al., 2001; Rankin and Giaccia, 2008; Talks et al., 2000; Zhong et al., 1999), including intensive care treatment (McKenna and Martin, 2016) and tumorigenesis (Rankin and Giaccia, 2008). Another possible system of human adaptation to extreme environments with implications for hypoxia research is that of humans who engage in breath-hold diving.

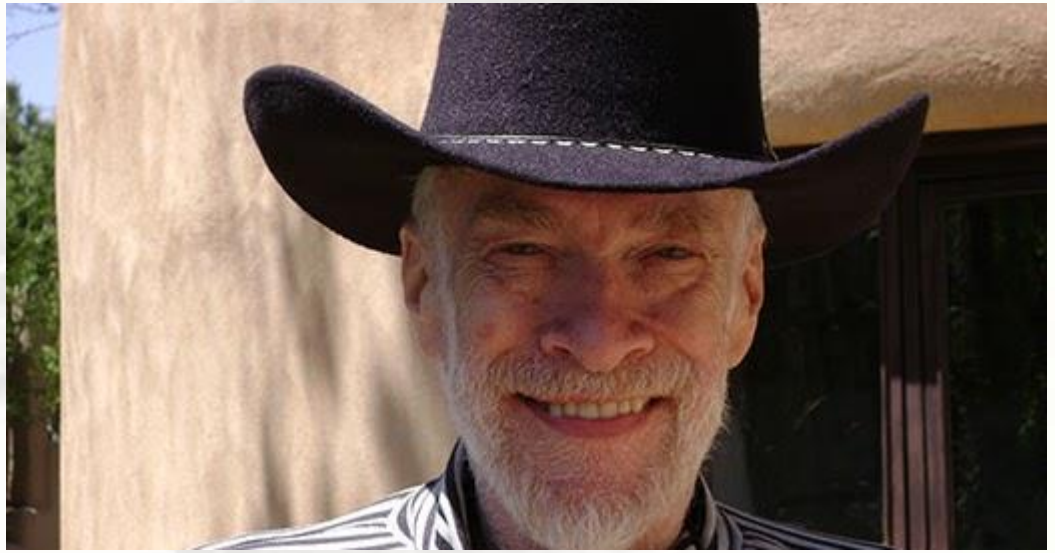
KULTURNĚ-GENOVÁ KOEVOLUCE


Spleen - Saluan
PDE10A Mutation
Spleen - Bajau

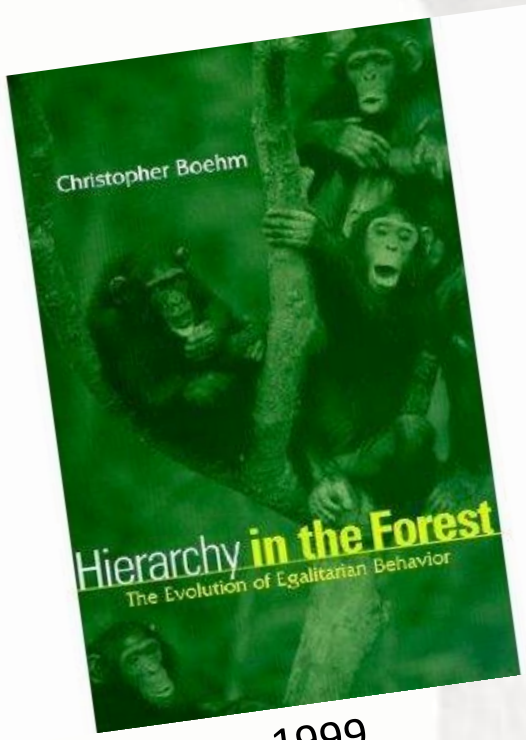
The hypothesis of guarded egalitarianism

- suppression of free-riders in hunter-gatherers at the phenotypic and genetic level through moralistic aggression

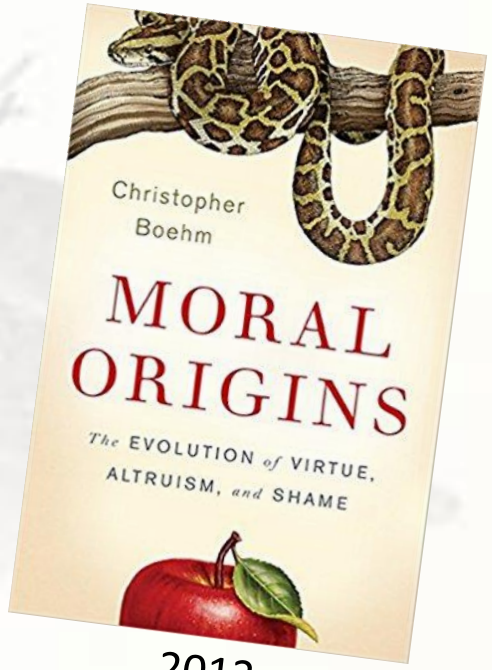
- necessity induced by the need to equally divide hunting duties and the meat => **suppression of hierarchical nature**



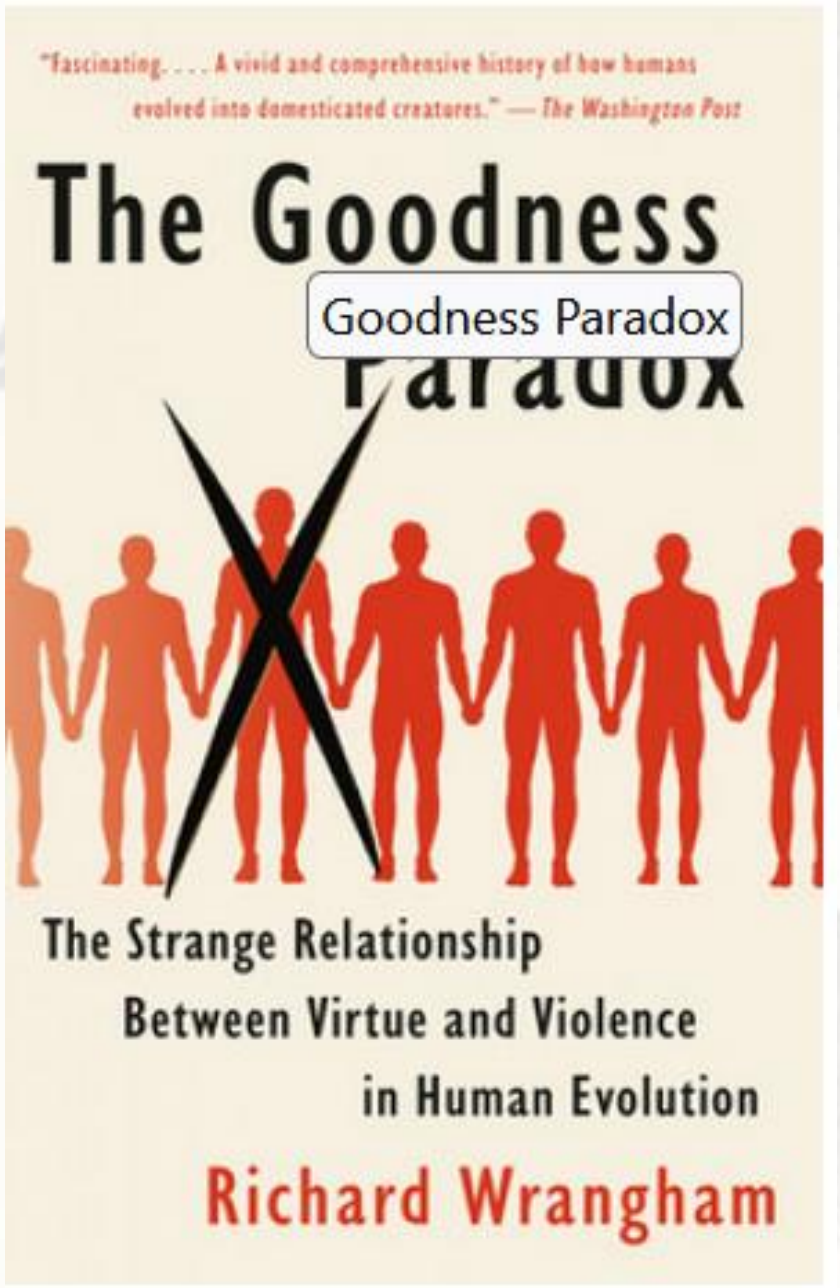
Christopher Boehm



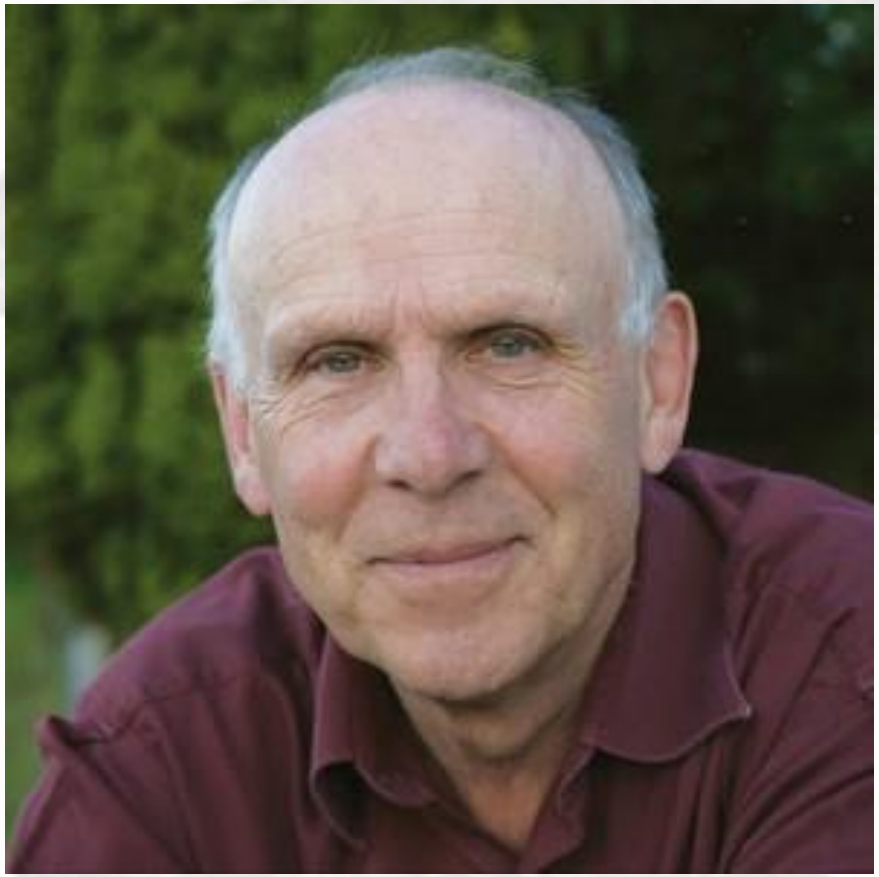
1999



2012



2019



Richard Wrangham

PERSPECTIVE

Two types of aggression in human evolution

Richard W. Wrangham[a,1]

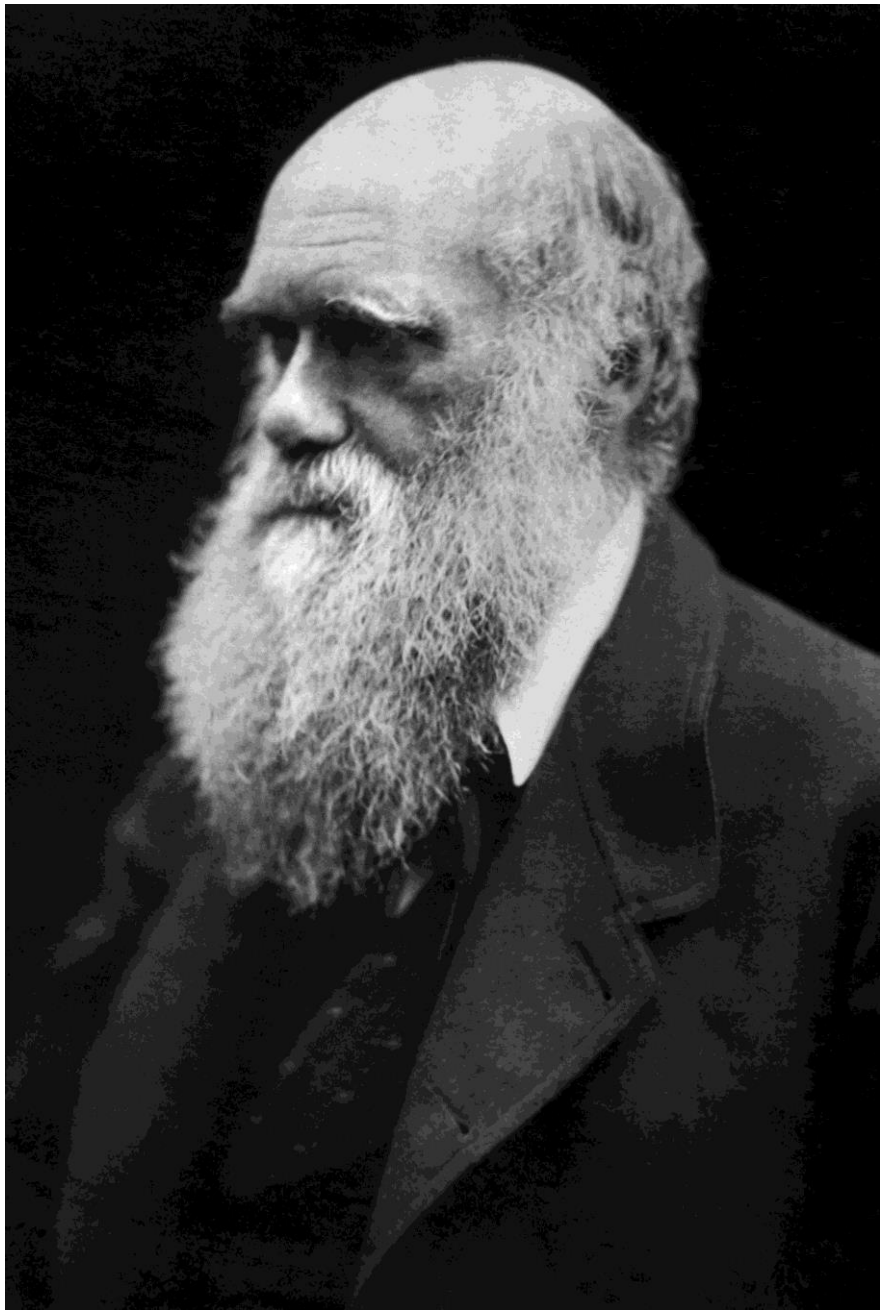
Edited by Kristen Hawkes, University of Utah, Salt Lake City, UT, and approved November 20, 2017 (received for review August 7, 2017)

Two major types of aggression, proactive and reactive, are associated with contrasting expression, eliciting factors, neural pathways, development, and function. The distinction is useful for understanding the nature and evolution of human aggression. Compared with many primates, humans have a high propensity for proactive aggression, a trait shared with chimpanzees but not bonobos. By contrast, humans have a low propensity for reactive aggression compared with chimpanzees, and in this respect humans are more bonobo-like. The bimodal classification of human aggression helps solve two important puzzles. First, a long-standing debate about the significance of aggression in human nature is misconceived, because both positions are partly correct. The Hobbes–Huxley position rightly recognizes the high potential for proactive violence, while the Rousseau–Kropotkin position correctly notes the low frequency of reactive aggression. Second, the occurrence of two major types of human aggression solves the execution paradox, concerned with the hypothesized effects of capital punishment on self-domestication in the Pleistocene. The puzzle is that the propensity for aggressive behavior was supposedly reduced as a result of being selected against by capital punishment, but capital punishment is itself an aggressive behavior. Since the aggression used by executioners is proactive, the execution paradox is solved to the extent that the aggressive behavior of which victims were accused was frequently reactive, as has been reported. Both types of killing are important in humans, although proactive killing appears to be typically more frequent in war. The biology of proactive aggression is less well known and merits increased attention.

proactive aggression | reactive aggression | human evolution | self-domestication | capital punishment

Much human aggression is either currently adaptive or derived from adaptive strategies (1–7). Patterns of violence therefore appear to have been shaped by natural selection. However, an unresolved question is

idea of the noble savage and holds violence in the evolutionary past to have been frequent and adaptive. By this view human tendencies are more like those of primates with steep dominance hierarchies and rela-



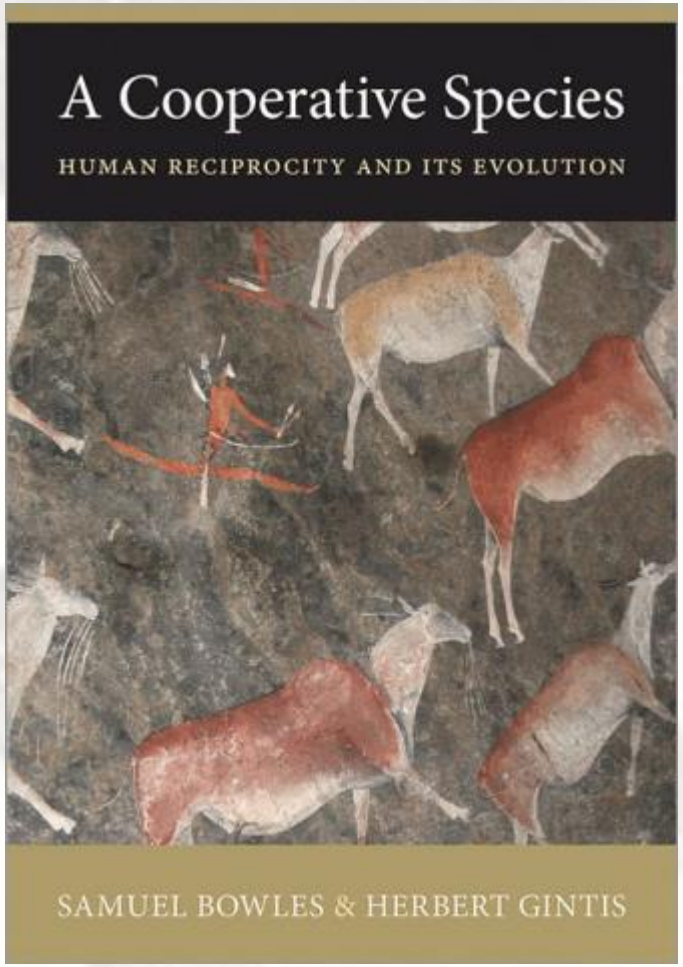
Evolution of cooperation

Identifying cultural features supporting cooperation of unrelated individuals

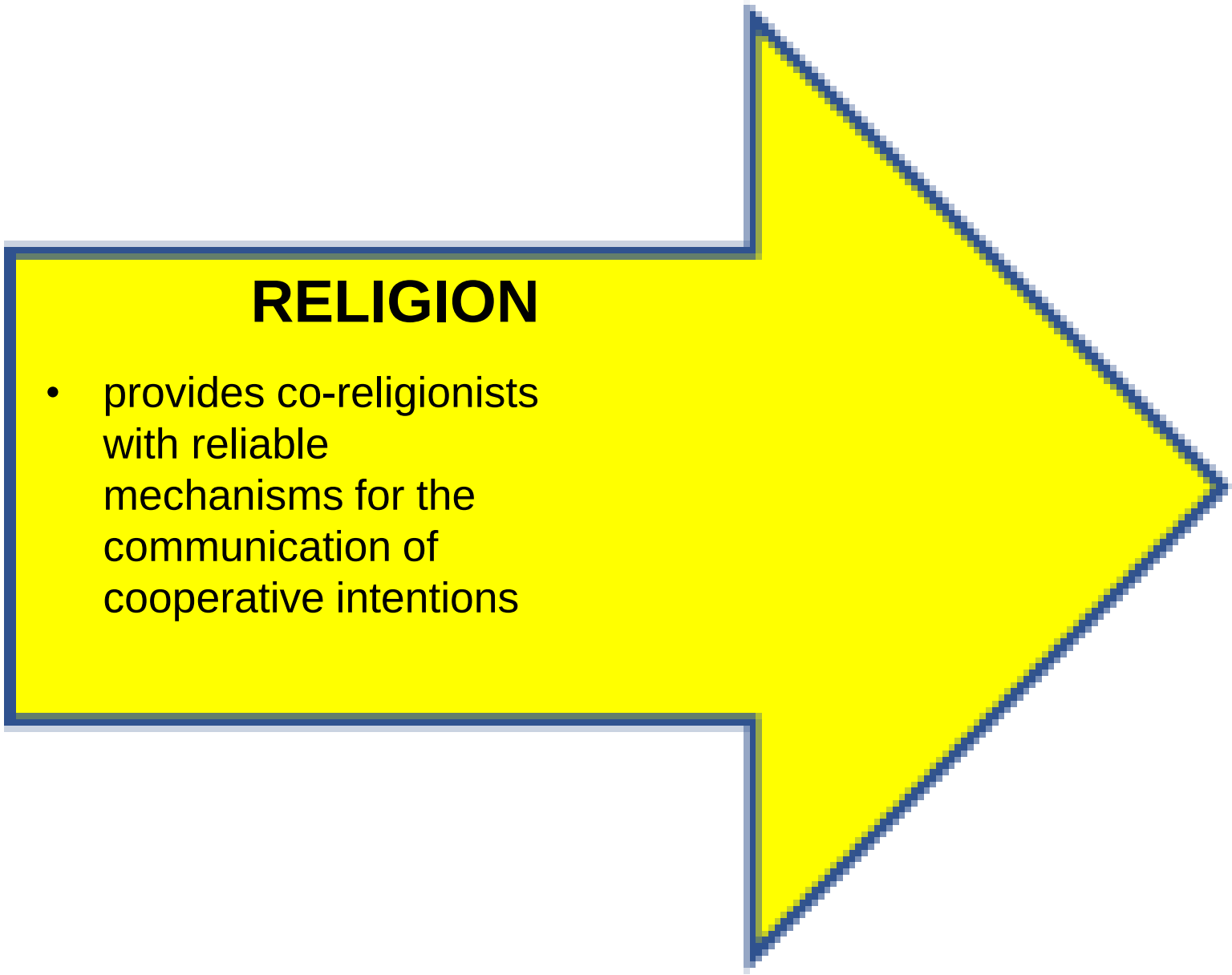
Genově-kulturní koevoluce lidské prosociality a náboženství

- Lidé mají výjimečně vysokou kooperaci mezi nepříbuznými => komplexní sociální útvary a aktivity
- Koncept **kulturní skupinové selekce** => univerzální citlivost ke skupinovým normám + silná reciprocita (*strong reciprocity*), kombinace odměňující normované chování a trestající normy porušující chování

Joseph Henrich



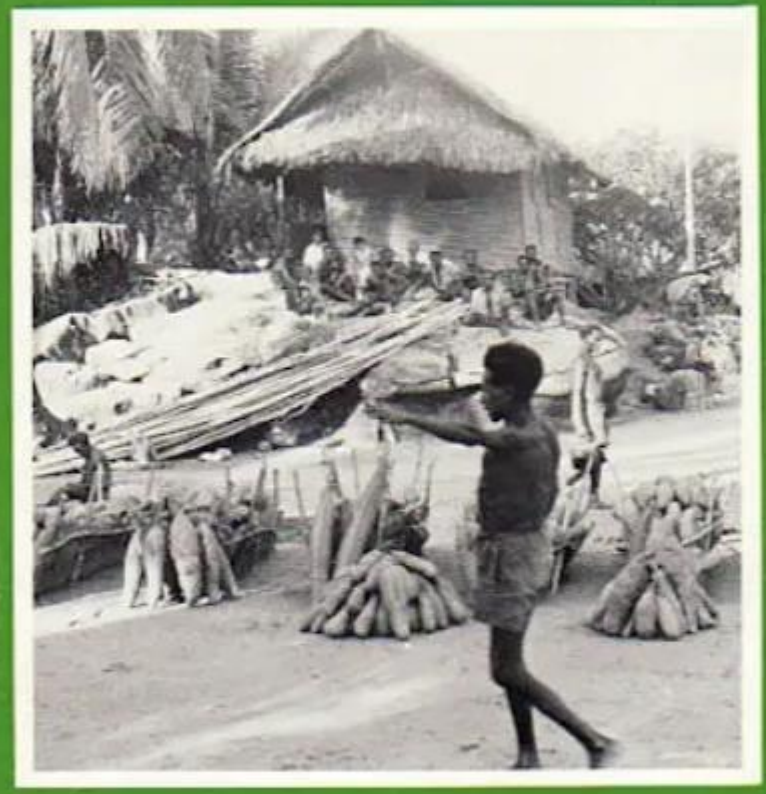
2011


RELIGION
• provides co-religionists with reliable mechanisms for the communication of cooperative intentions

Pleistocene social revolution

3.5 mil – 100 000

The Ilahita Arapesh



Dimensions of Unity

Donald F. Tuzin

INTER-GROUP COMPETITION

INTER-GROUP COMPETITION

- violent conflict

INTER-GROUP COMPETITION

- violent conflict
- differential migration into more successful groups

INTER-GROUP COMPETITION

- violent conflict
- differential migration into more successful groups
- biased copying of practices and beliefs among groups

INTER-GROUP COMPETITION

- violent conflict
- differential migration into more successful groups
- biased copying of practices and beliefs among groups
- differential extinction rates without any actual conflict

CULTURAL GROUP SELECTION

CULTURAL GROUP SELECTION

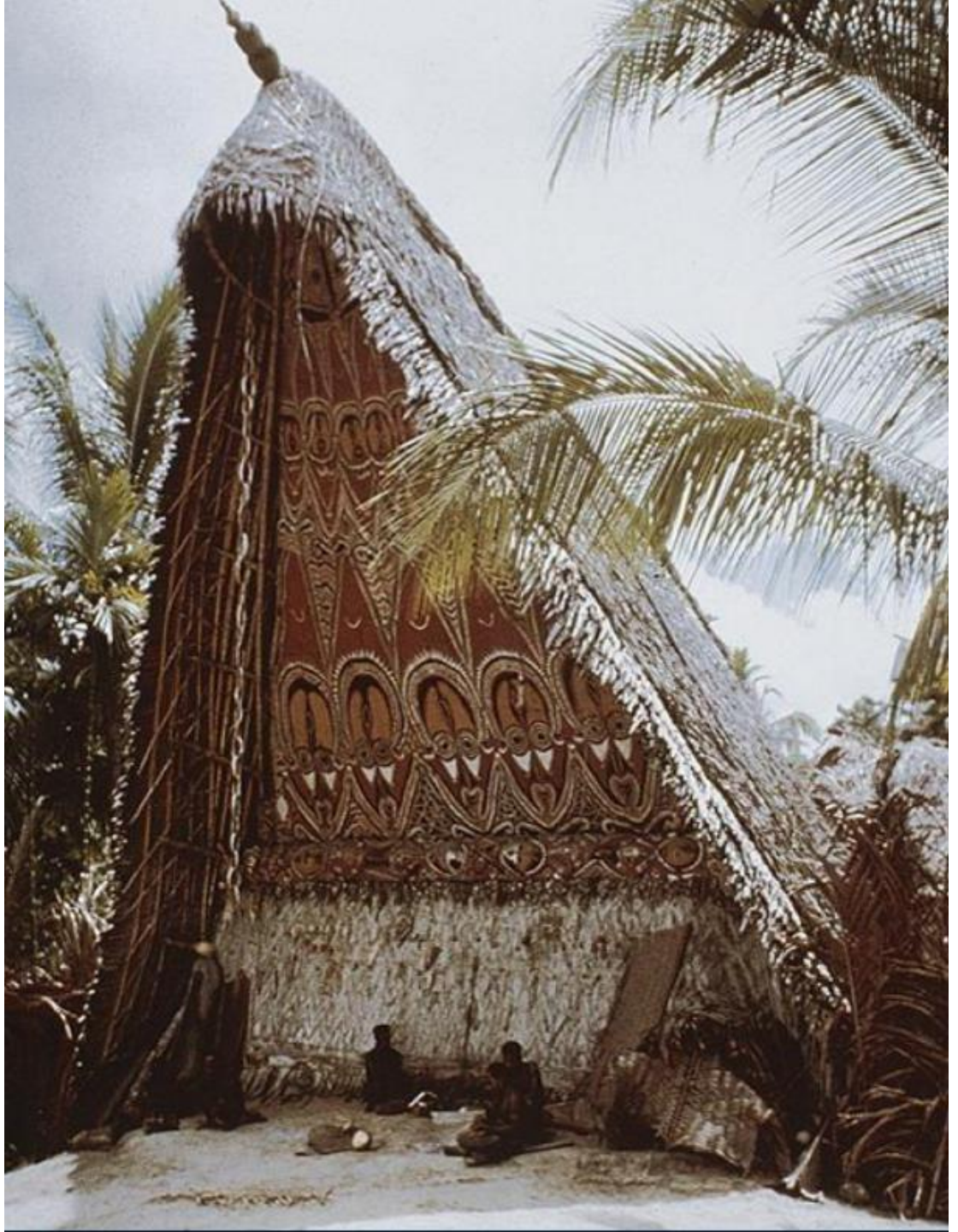
- reduce competition and variation within social groups (sustaining or increasing social cohesion)

CULTURAL GROUP SELECTION

- reduce competition and variation within social groups (sustaining or increasing social cohesion)

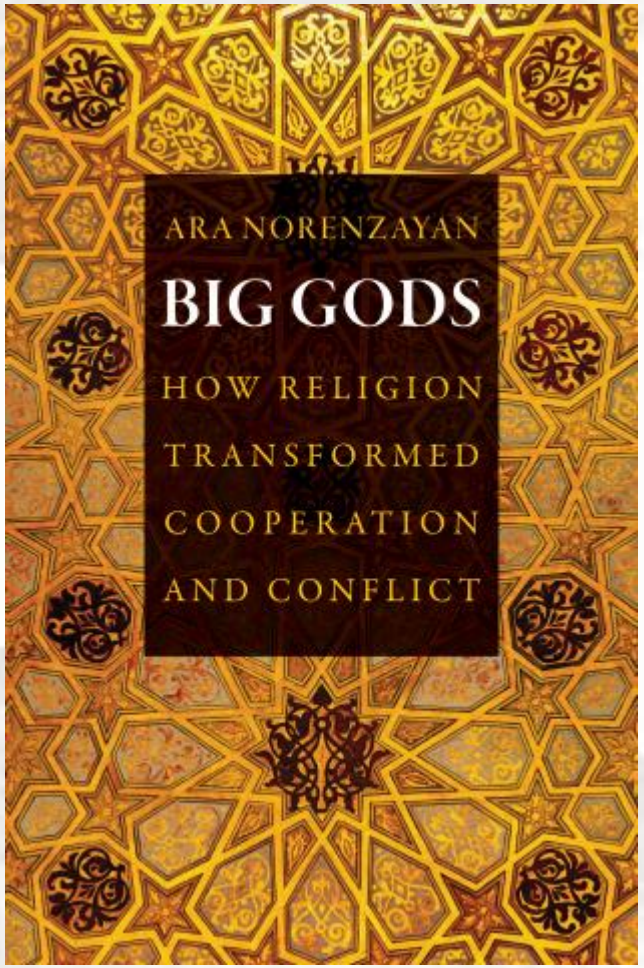
- enhance success in competition with other social groups, by increasing factors such as group size, cooperative intensity, fertility, economic output, and bravery in warfare

TAMBARAN

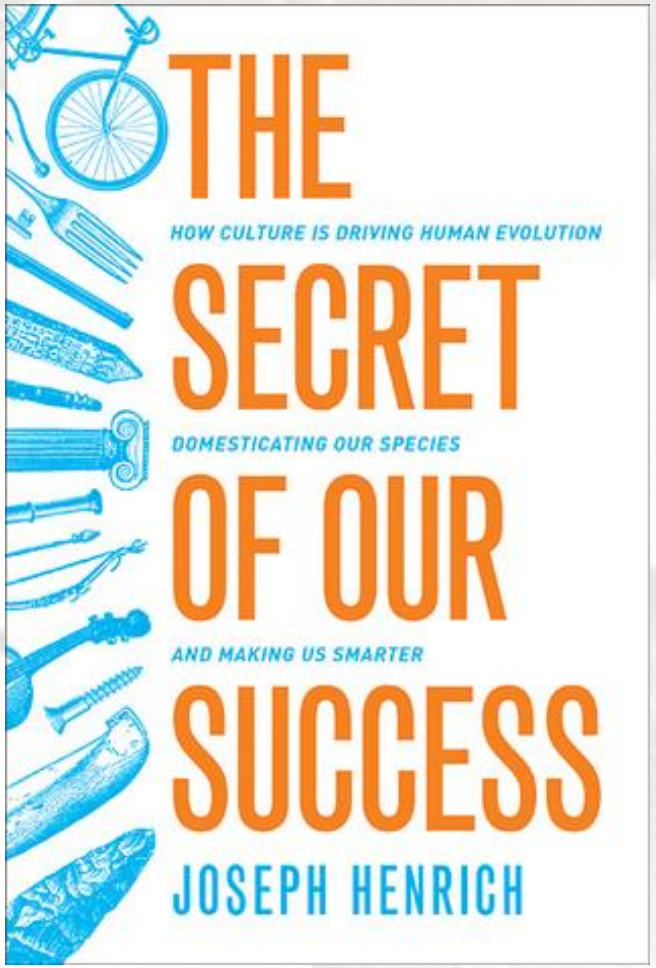


Holocene social revolution

12 000 - …


ARA NORENZAYAN
BIG GODS
HOW RELIGION TRANSFORMED COOPERATION AND CONFLICT

2013


THE
HOW CULTURE IS DRIVING HUMAN EVOLUTION
SECRET
DOMESTICATING OUR SPECIES
OF OUR
AND MAKING US SMARTER
SUCCESS
JOSEPH HENRICH

2016

LETTER

doi:10.1038/nature16980

Moralistic gods, supernatural punishment and the expansion of human sociality

Benjamin Grant Purzycki[1], Coren Apicella[2], Quentin D. Atkinson[3,4], Emma Cohen[5,6], Rita Anne McNamara[7], Aiyana K. Willard[8], Dimitris Xygalatas[9,10,11], Ara Norenzayan[7] & Joseph Henrich[7,12,13]

BEHAVIORAL AND BRAIN SCIENCES (2016), Page 1 of 65
doi:10.1017/S0140525X14001356, e0

The cultural evolution of prosocial religions

Ara Norenzayan

PROCEEDINGS B

royalsocietypublishing.org/journal/rspb

Research

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http://dx.doi.org/10.1098/rspb.2019.0202

Check for updates

Moralizing gods, impartiality and religious parochialism across 15 societies

Martin Lang[1,2], Benjamin G. Purzycki[3], Coren L. Apicella[4], Quentin D. Atkinson[5,6], Alexander Bolyanatz[7], Emma Cohen[8,9], Carla Handley[10], Eva Kundtová Klocová[2], Carolyn Lesorogol[11], Sarah Mathew[10], Rita A. McNamara[12], Cristina Moya[13], Caitlyn D. Placek[14], Montserrat Soler[15], Thomas Vardy[5], Jonathan L. Weigel[16], Aiyana K. Willard[17], Dimitris Xygalatas[18], Ara Norenzayan[19] and Joseph Henrich[1]

[1]Department of Human Evolutionary Biology, Harvard University, Cambridge, MA 02138, USA
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THE EVOLUTION OF RELIGION AND MORALITY

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