

Developing our nature

When and how human aggression and other psychological traits evolved

Dr James Walter, Emeritus Adjunctive Professor at Loyola University Chicago, USA, and PhD student Aasma Khan summarise research conducted by Professor Richard Wrangham and peers on the evolution of human aggression and other psychological traits. Two approaches are used: comparing aggression in different species, and investigating hunter-gatherer cultures. Walter and Khan outline the relationship between aggression and language evolution and highlight the point in our evolutionary history when aggressive tendencies and other psychological traits may have developed.

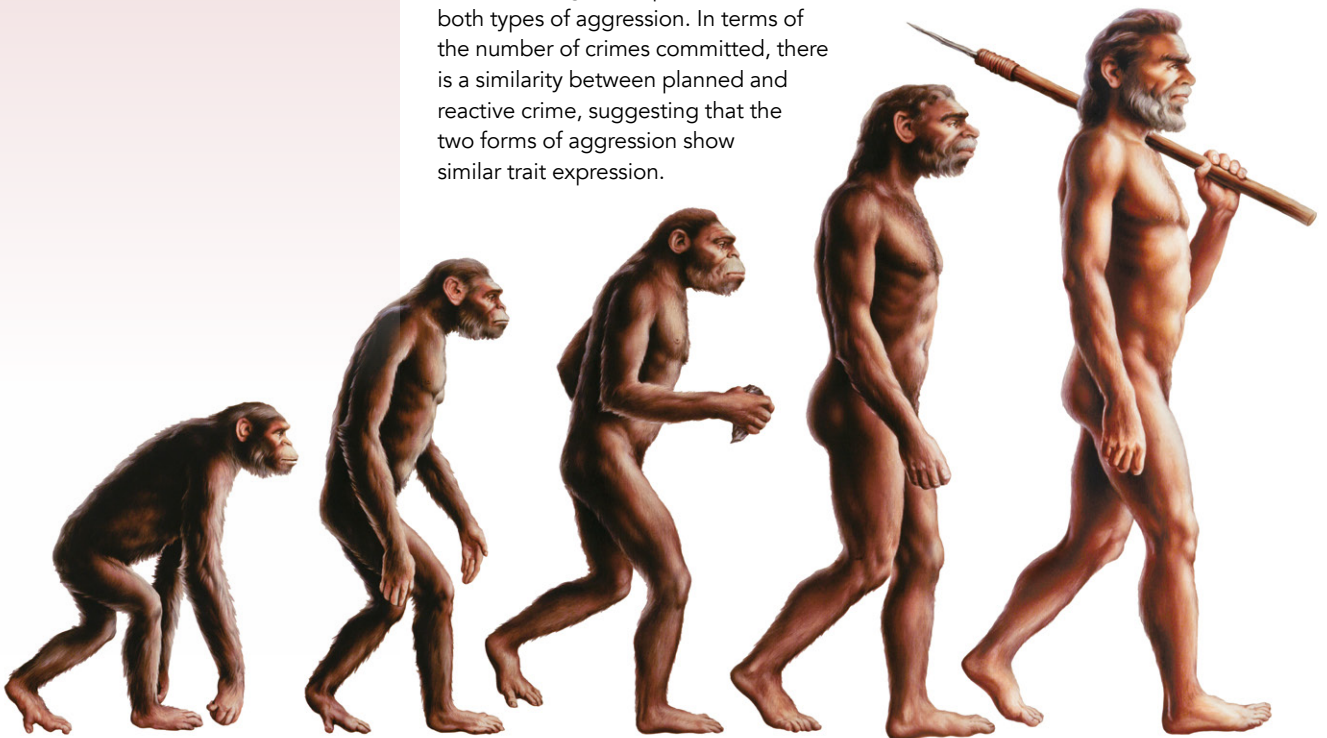
Different perspectives can be taken into account when studying human evolution. The archaeological study of human remains can shed light on prehistoric human cultures, whereas comparative research, in which modern-day humans are compared to other living species or cultures, can provide insights into our evolutionary history.

Distinguished primatologist and anthropologist at Harvard University, Professor Richard Wrangham studies human evolution with particular regard to aggression. He compares *reactive* aggression, which is impulsive rage that emerges in response to a provocation, with *proactive* or *planned* aggression, which is a calculated and manipulative form of aggression. He uses modern statistics on crime to gain a better understanding of the prevalence of both types of aggression. In terms of the number of crimes committed, there is a similarity between planned and reactive crime, suggesting that the two forms of aggression show similar trait expression.

WHAT CAN OTHER SPECIES TEACH US ABOUT HUMAN AGGRESSION?

We can gain an understanding of human aggressive traits by studying our closest living relatives, the chimpanzees, who exhibit extreme and unprovoked *reactive* aggression. Wrangham states that humans have lost most of these *reactive* aggression tendencies which would have been present in our relatives.

Wrangham further states that humans exhibit greater *planned* aggression compared to chimpanzees. Humans are more capable of discussing, planning, and executing more sophisticated forms of *planned* aggression than chimpanzees. He further argues that our *planned* aggression accounts for our decreased *reactive* aggression through natural selection processes as outlined in this article.



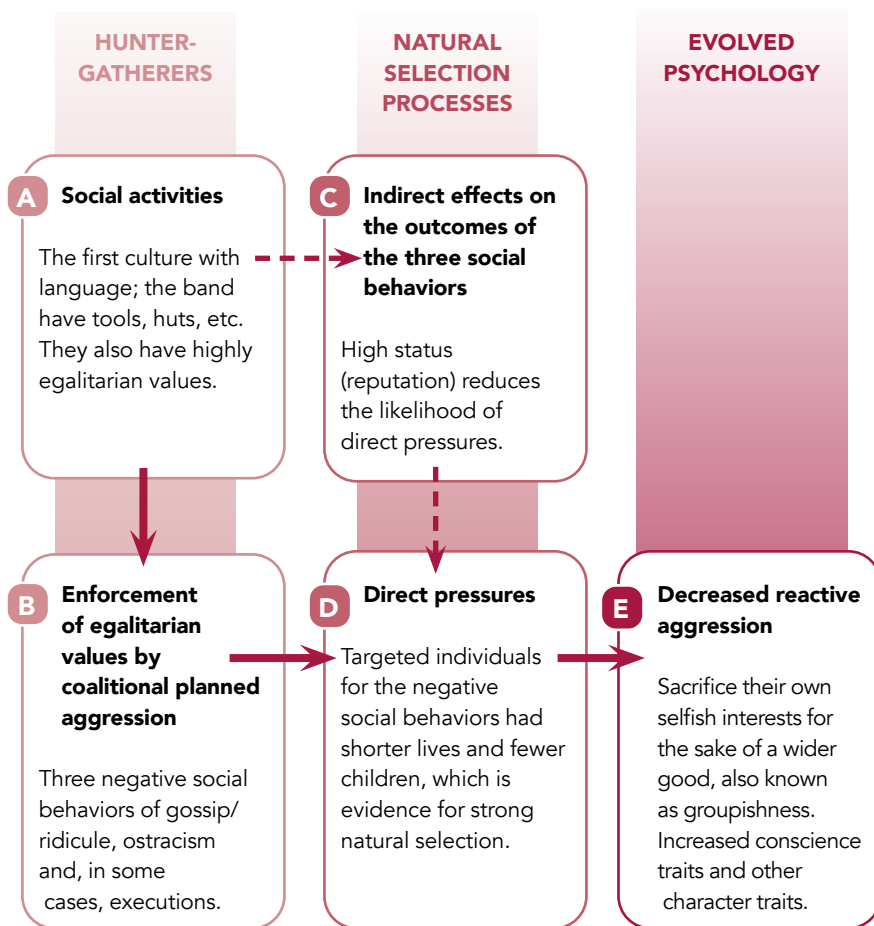


Figure 1. Wrangham and Boehm model of our psychological evolution in the late Pleistocene, 300,000 to 12,000 years ago. **A-E** Primarily based on anthropological studies of hunter-gatherer cultures. Solid arrows are main effects and dashed arrows represent indirect selection effects. Wrangham limited his explanation to a few character traits; however, we expect that his evidence will be extended to include more of our character traits (see text).

occurred during the late Pleistocene era, ie, before the end of the last ice age, with the onset of language. Our fossils during this period had lighter bodies, flatter faces, and smaller teeth; our brains also decreased in size by 10–15%. These anatomical changes are associated with the domestication syndrome, and provide important evidence for our self-domestication.

LEARNING FROM HUNTER-GATHERER SOCIETIES

Wrangham and anthropologist Christopher Boehm use studies of hunter-gatherer societies to explain why the decreased reactive aggression and the self-domestication syndrome took place in our line during the late Pleistocene. These arguments are based on studies of current hunter-gatherer societies that have existed in isolation since the last ice age, and as such represent a similar lifestyle to our ancient relatives.

Complex hunter-gatherer societies are usually made up of 20–50 adults formed into a band (Figure 1A). Their lifestyle is subsistence based and includes huts for sleeping. Males are primarily responsible for hunting, while females gather tubers and other foods, as well as performing household chores, cooking, and caring for children. The

According to Wrangham, natural selection pressures resulted in a 500- to 1,000-fold reduction in reactive aggression in our line compared to chimpanzees.

To understand our decreased reactive aggression, it is important to learn more about the 'Domestication syndrome'. In a study of silver fox breeding, zoologist Dmitry Belyaev characterized this syndrome. His breeding program involved pairing adult silver foxes who displayed the lowest levels of reactive aggression during puphood. He demonstrated that after a few generations, reactive aggression decreased along with other behavioral, biological, and anatomical characteristics.

The domestication of humans is not a form of breeding facilitated by an external force, but occurred through self-domestication. Evidence shows that these processes primarily



Primatologist and anthropologist Richard Wrangham in 2016.

bands are a patriarchal and polygamous society. Tools are used, and animism is often used to explain natural and adverse events. Wars, famines, and disease are the harsh realities of hunter-gatherer societies. To minimize the threat of war, which is usually conducted by raids, loose confederations of bands are formed. These hunter-gatherers possess highly egalitarian values, which, in the absence of institutions such as government and schools, is a primary band organizing process.

Wrangham and Boehm surmised that the hunter-gatherer bands of the late Pleistocene were the first human cultures to use language, which resulted in the development of coalitional, planned aggression (Figure 1B). This type of

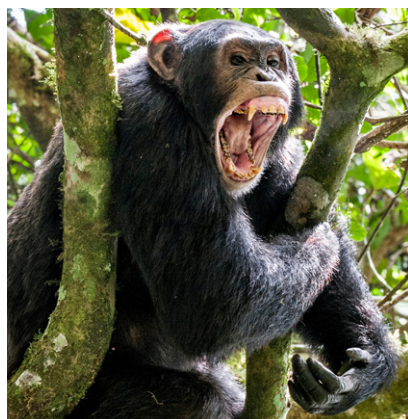


Hunter-gatherer societies can tell us much about how some of our psychological traits developed.

aggression was observed during three behaviors: gossip/ridicule, ostracizing, and in some cases, executions. Gossip/ridicule was the most common, followed by ostracism, and executions. A rate of executions was recorded amounting to up to 10–20% of adults over extended periods. The three negative behaviors have also been named the ‘execution hypothesis.’

Coalitional planned aggression, observed as the three negative behaviors, was found to enforce the highly egalitarian values of hunter-gatherer bands. Furthermore, these processes were identified as producing strong natural selection pressures for psychological traits. People who demonstrated high levels of reactive aggression (eg, tyrants or bullies) or who violated social norms were often targeted. There was a significant decrease in life expectancy and fewer children among the individuals on the receiving end of this planned aggression, which is strong evidence for natural selection. These results can explain our decreased reactive aggressive traits and self-domestication, also known as increased groupishness (Figure 1D and 1E).

Wrangham and Boehm also report that a person’s status within the band had a significant impact on the outcomes of the negative behaviors (Figure 1C). High-quality behavior, such as self-control, rational reasoning, and storytelling, were observed to produce high status, and these individuals were less likely to be targeted or suffer adverse consequences from the three negative behaviors. Status was thus having an indirect natural selection effect on our character traits. They concluded that these direct and



We can examine human aggressive traits by comparing them to our ancestors, the chimpanzees.

indirect natural selection effects produced the 500- to 1,000-fold reduction in the level of our reactive aggression compared to the chimpanzees.

As with the evolution of our reactive aggressive traits, Wrangham uses the same explanations to understand the evolution of our moral conscience and emotions such as shame, embarrassment, and guilt. Wrangham has limited his conclusions to the evolution of a few of our psychological traits. However, it is likely that the identified strong natural selection processes would also affect our other character traits (Figure 1E). Thus, our character traits in the areas of intelligence, emotionality and personality may soon be better understood from this perspective.

WHEN DID THESE AGGRESSIVE TRAITS EVOLVE?

The archaeological site of Gesher Benot Ya-aqov in Israel shows evidence of early hunting and gathering and huts that dates back approximately 780,000 years ago, but no evidence of sophisticated artifacts. This earlier Pleistocene period did not demonstrate the self-domestication changes that occurred in the late Pleistocene. The first fossils of *Homo sapiens* were discovered in Jabel Irhoud, Morocco, dating back to 300,000 years ago. This was the start of the strong natural selection pressures for our psychological traits that occurred with the onset of language in the late Pleistocene era. Wrangham argues that natural selection pressures decreased significantly since the onset of the Holocene and the changing values that occurred during the agrarian and modern ages, which amount to only 12,000 years. It is unlikely human character traits evolved or changed very much since the late Pleistocene era.

UNDERSTANDING OUR PSYCHOLOGY

Wrangham’s and Boehm’s explanation of the evolution of our two types of aggressive traits and the development of groupishness within the hunter-gatherer

Aggressive characteristics are believed to have evolved with the onset of language in the mid to late Pleistocene era.

bands of the late Pleistocene era has expanded the field of evolutionary psychology. The low levels of reactive aggression and high levels of cooperativity and tolerance of others (groupishness) as found in humans today are well explained by natural selection processes associated with language, groupishness, and coalitional proactive (planned) aggression observed as the three negative social processes.

By comparing modern-day humans to hunter-gatherers and other species, we can advance our understanding of the evolution of human cognition, emotions and personality. The research collated by Professor Walter and Aasma Khan help us understand the history of our psychology.

Behind the Research



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Research Objectives

Professor James Walter explores the evolution of human aggression.

Detail

Bio

Dr James Walter is Emeritus, Adjunctive, Associate Professor in Urology, Loyola University Chicago; and Emeritus Principal Investigator in Research Service, Hines Veterans Administration Hospital, in the USA. He is a specialist in neuroprosthetics for the urinary bladder and respiration for patients with multiple sclerosis and spinal cord injury. He is a member of the International Neuro-Urology Society (INUS).

Collaborators

Aasma Khan, PhD candidate in cognitive psychology and clinical psychology

References

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Personal Response

Is the Wrangham and Boehm model for the evolution of our decreased reactive aggression, groupishness, and other character traits well supported? What are its weaknesses and strengths?

// Yes, there is strong evidence for the Wrangham/Boehm model. The evidence is coming from primatology, archaeology, anthropology, and psychology. A strength of the argument is that it may be extended to nearly all of our psychological traits. A weakness is that more research needs to be conducted into the hunter-gatherer bands. Prior anthropological research should be reviewed to determine if the natural selection from the three negative social processes can be extended to more of our psychological traits. In addition, future anthropological studies of current hunter-gatherer bands should include more assessments of individuals character traits and how those traits are being affected by the three negative social processes. **//**

