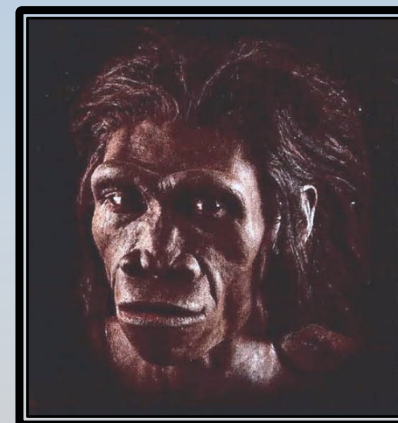


# INTERSECTION OF PREHISTORIC EVOLUTIONARY MODELS FOR MORAL AND RELIGIOUS CAPACITIES

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CHRISTOPHER J. CORBALLY

THE HUMAN SENTIENCE PROJECT, AND  
THE VATICAN OBSERVATORY/UNIVERSITY OF ARIZONA  
TUCSON, ARIZONA, USA

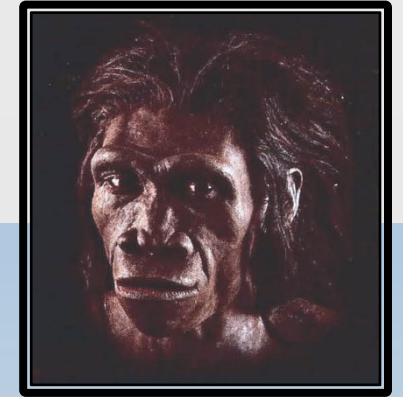


Picture credits:

*Homo sapiens* Natural History Museum, London

*Homo erectus* Smithsonian, Washington DC

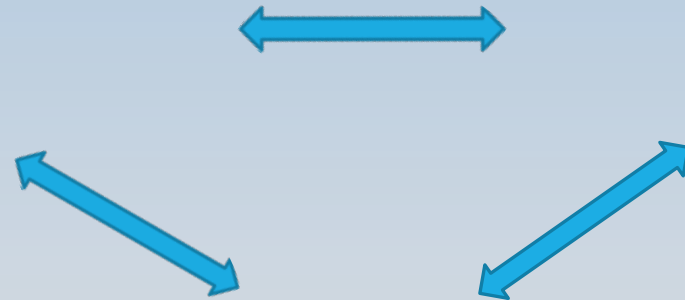
# 2 HYPOTHESIS: EVOLUTION OF MORAL CAPACITY IN *HOMO ERECTUS*



Archaeology



Modern Cognitive Science

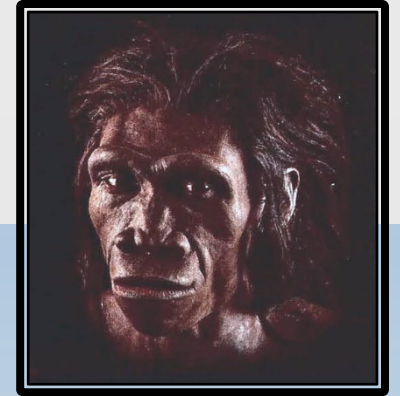


Modern Moral Behavior

## Hypothesis: “The Human Hearth”

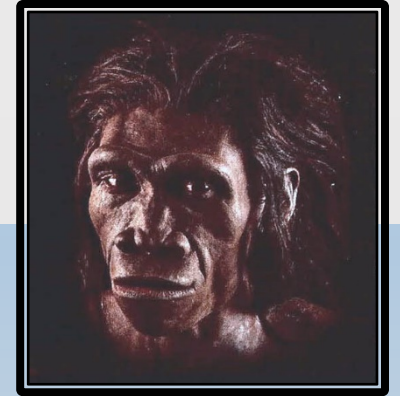
The demography, age and sex structures, longevity, brain size, locomotion, cultural capacity, and likely language abilities together make a strong argument for the initial emergence of moral capacity in *Homo erectus*.

### 3 CHARACTERISTICS CONDUCTIVE TO MORAL CAPACITY IN *HOMO ERECTUS*



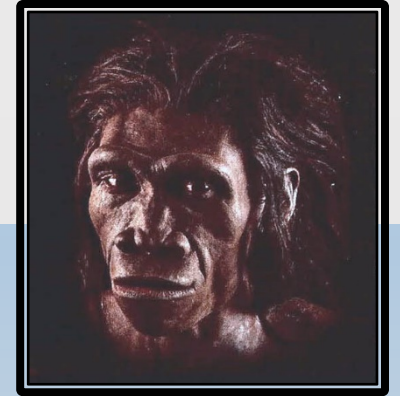
- Territory of 100 sq. miles; and band size of 100-110 individuals
- Percent time grooming down; rudimentary language begins
- Cranial capacity 1000-1100cc and neocortex ratio 3.7 – 3.8
- Fully bipedal, gracile, legs longer than arms
- Aggressive scavenging in a larger home territory to feed a larger brain
- Reduced sexual dimorphism, females now almost as large as males
- Change in food getting strategy from “male-oriented” to “both sexes”
- Menopause as an adaptation; the “Grandmother Hypothesis”
- Longevity for all; more post-reproductive years for women
- Longer developmental trajectory for cognitive and physical traits
- Group of elders available; wisdom in the elderly for decision making

# 4 MORAL CAPACITY IN GENUS HOMO INVOLVES:

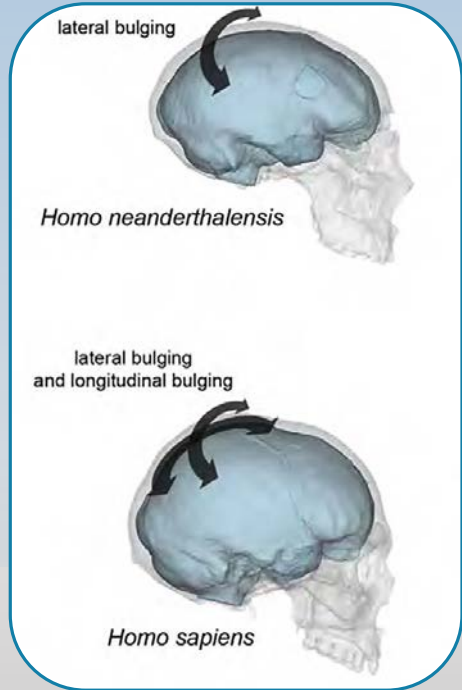


- A mental step both back and up
- An arbitration mechanism that operates along a timeline
- An evaluation using a valence from good to bad
- A regretfully dispassionate reasoning
- A tentativeness in a mental balancing act
- A sad rejection of “wantonness”
- The experience of a burden
- A capacity for empathy with someone receiving moral judgment
- Resolution on the part of the group
- Hope and faith in the future on the part of the group

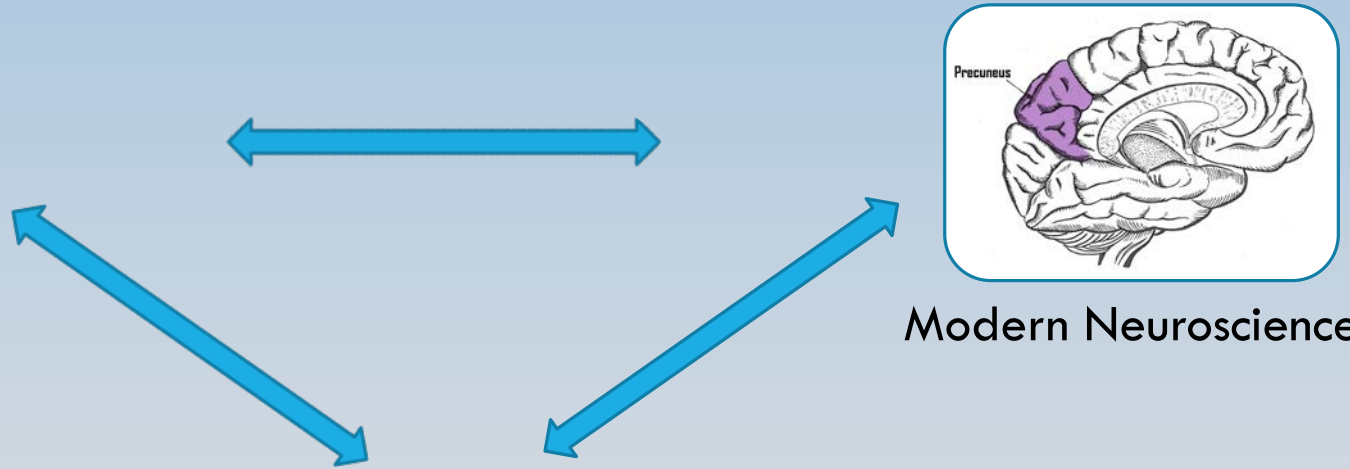
# 5 “STORY OF BO AT 900,000 YEARS AGO”



# 6 HYPOTHESIS: EVOLUTION OF RELIGIOUS CAPACITY IN THE GENUS HOMO



Paleoneurology and Archaeology



Modern Neuroscience



Religious Behavior Worldwide

**Hypothesis:** There is an important role for the parietal lobes (in particular, the precuneus) in the emergence of religious thinking on the hominin line.

# 7 RELIGIOUS CAPACITY EMERGES IN *HOMO SAPIENS*



1. **Sociality** in all Primates, 55 - 65 million years ago
2. **Basic ape model** from the Miocene, 19 million years ago
3. Realignment of the senses, **upgrades of vision and hearing**
  - >> *In some groups of the ancestral ape population giving rise to*
  - >> *the genera Homo and Pan in Africa, changes #4 – 8 occurred:*
4. **Down-regulation of aggression**, 8 - 10 million years ago;  
lengthening developmental trajectory or “secondary altriciality”
5. **Greater social tolerance** among adults, especially while feeding
6. **Upgrades in intellect** to manage aggression in the social group
7. **Greater sensitivity** emerges, both general and emotional
8. Biological foundations for **culture** emerge
  
9. **Moral capacity** emerges in *Homo erectus*, 1-1.5 million years ago
10. **Religious capacity** emerges in *Homo sapiens*, stabilizing at 150,000 years ago

# 8A RELIGIOUS CAPACITY IN *HOMO SAPIENS*: EXPERIENTIAL COMPONENTS



## I. Perception of and Response to a Spiritual Realm

Awe and wonder

Adoration and reverence

## II. The Immediate Experience

Good feelings when neural reward systems tapped

Calm and spiritually connected, after ritual

Reduced anxiety after ritual and social activities

For some, hypo-excited or hyper-excited states

III & IV to follow...



# 8B RELIGIOUS CAPACITY IN *HOMO SAPIENS*: EXPERIENTIAL COMPONENTS



## III. Acquiescence

Introspection, concentration, meditation, self-study, and the habit of prayer

Transformation of self above everyday life, achieving a selflessness periodically

Acknowledgment of a spiritual being's transcendence above everything

Acknowledgment of a spiritual being's immanence in everything, so feelings of being grounded

Acceptance of a belief system's rationalization of order, so feelings of certainty and centeredness

Acceptance of humans' place in the universe

## IV. Commitment

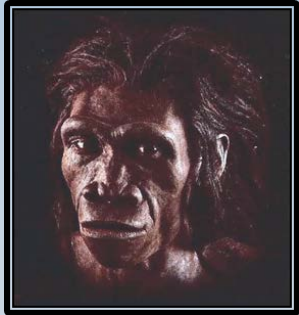
Alignment, or continual comparison of the self with a system of belief

Obedience to serving the spiritual, and living in accordance with it.

# 9 “STORY OF BO AT 150,000 YEARS AGO”



# 10 INTERSECTION OF MORAL AND RELIGIOUS CAPACITIES



*Homo erectus*

- Storytelling
- Ritual
- Chanting, Percussion
- Moral Reasoning and Adjudication



*Homo sapiens*

- Imagining Supernatural Realms and Beings
- Interaction of Supernatural Beings and Humans
- Comparison of the Self to “Revealed” Knowledge
- Music
- Judgment

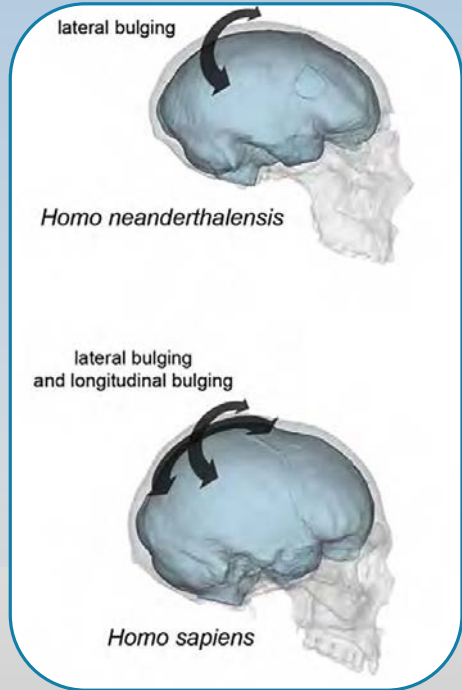
# 11 THE PRECUNEUS IN HIGHER-ORDER COGNITIVE FUNCTIONS: A BASIS FOR RELIGIOUS THINKING



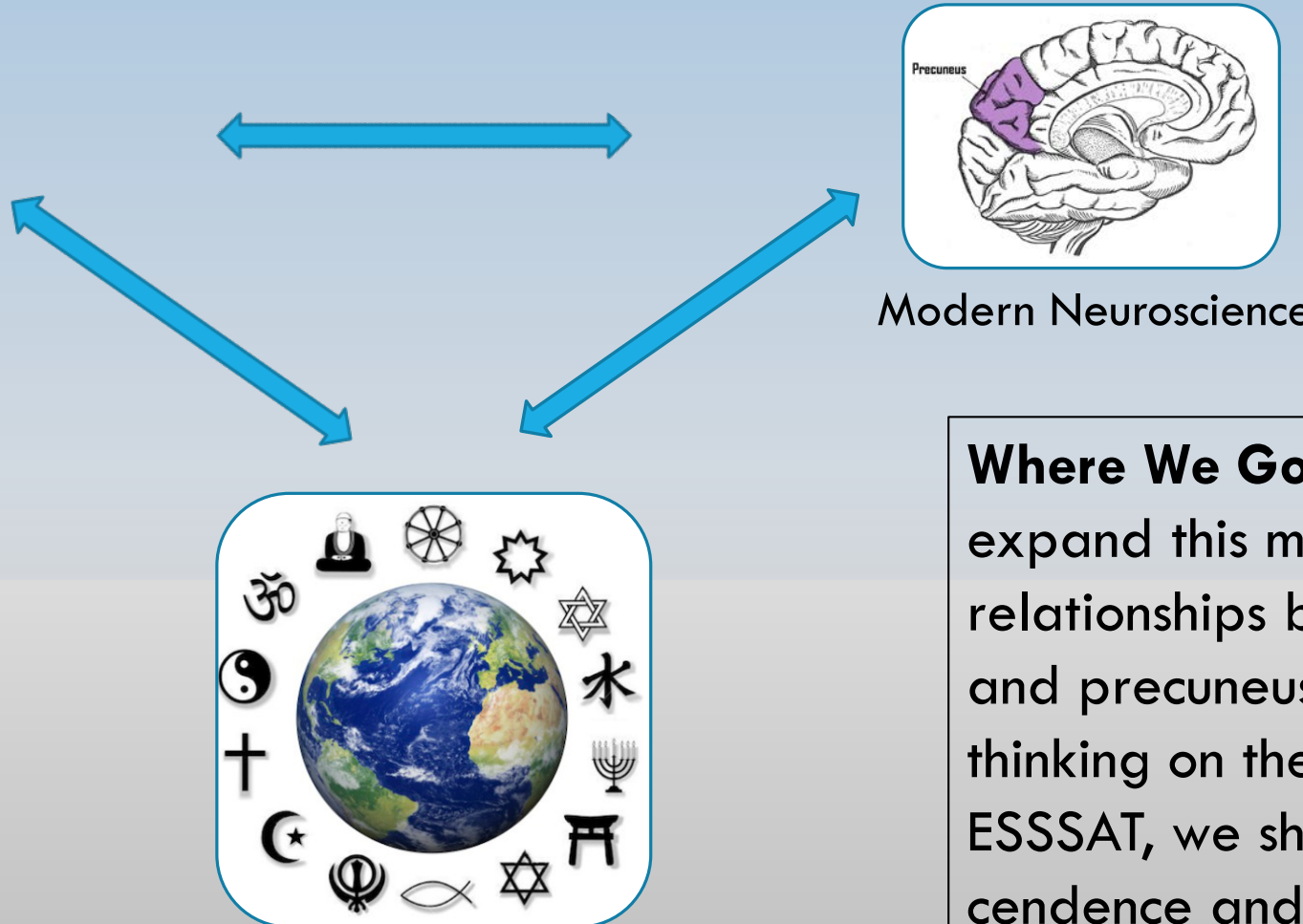
## Broad Functions for the Precuneus in Religious Thinking

- Connectivity, centrality, highly active brain organ
- Default Mode Network, resting consciousness
- Visuospatial: Derivation and manipulation of counter-factual spaces
- Visuospatial: Derivation of spiritual beings who populate these spaces
- Self: Manipulation of the self in interaction with these spiritual beings
- Self: Assessment of self vis-à-vis codes of living given by them
- Self: Assessment of self vs. others according to these codes
- Loss of self-consciousness in meditation, mystical or other altered states
- Episodic Memory
- Music

# 12 HYPOTHESIS: EVOLUTION OF RELIGIOUS CAPACITY IN THE GENUS HOMO



Paleoneurology  
and Archaeology



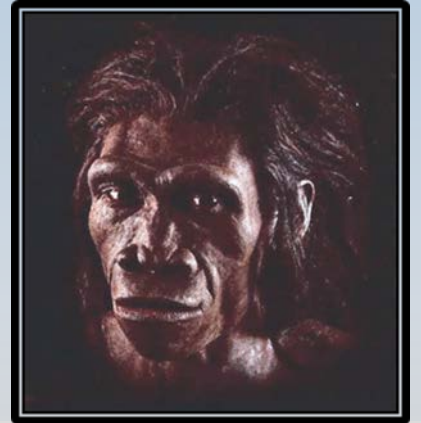
Modern Neuroscience

Religious Behavior Worldwide

**Where We Go Now:** We shall expand this model to explain the relationships between the parietals and precuneus, and theological thinking on the hominin line. At ESSSAT, we shall address transcendence and immanence, and then later, other features of theology.

*"Thank You, Tamaya!"*

*Margaret and Chris*



## For Further Information:

Rappaport, Margaret Boone, and Christopher Corbally. Forthcoming March 2018. Evolution of Religious Capacity in Genus Homo: Origins and Building Blocks. *Zygon; Journal of Religion and Science*. (Paper 1 in a set of 3.)

Rappaport, Margaret Boone, and Christopher Corbally. Forthcoming March 2018. Evolution of Religious Capacity in Genus Homo: Cognitive Time Sequence. *Zygon; Journal of Religion and Science*. (Paper 2 in a set of 3.)

Rappaport, Margaret Boone, and Christopher Corbally. Forthcoming March 2018. Evolution of Religious Capacity in Genus Homo: Trait Complexity in Action. *Zygon; Journal of Religion and Science*. (Paper 3 in a set of 3.)

Rappaport, Margaret Boone, and Christopher Corbally. 2017. Human Phenotypic Morality and the Biological Basis for Knowing Good. *Zygon; Journal of Religion and Science* 52(3): 822-846.

Rappaport, Margaret Boone, and Christopher Corbally. 2016. The Human Hearth and the Dawn of Morality. *Zygon: Journal of Religion and Science* 51(4): 835-866.

Rappaport, Margaret Boone, and Christopher Corbally. 2015. Matrix Thinking: An Adaptation at the Foundation of Human Science, Religion, and Art. *Zygon; Journal of Religion and Science* 50(1): 84-112.

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