

## Homo Erectus and the Semiotic Progression

(From: *How Language Began: The Story of Humanity's Greatest Invention*  
W.W. Norton; DL Everett)

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## Principal Points

**Point 1:** Language is primarily a tool for communication, not thought expression.

**Point 2:** Language has its roots in (likely) intentional iconicity of Australopithecines and probably had reached the level of a G1 grammar (linear ordering of symbols + gestures & pitch modulation, or triality of patterning) more than one million years ago.

**Point 3:** Later forms of language, e.g. hierarchical, recursive grammars, are later embellishments that are functionally useful (Simon 1962) yet are neither necessary nor sufficient to have human language.

**Point 4:** How might archaeological evidence suggest a transition from indexes and icons to symbols

**Point 5:** Homo erectus is the inventor of language via symbols

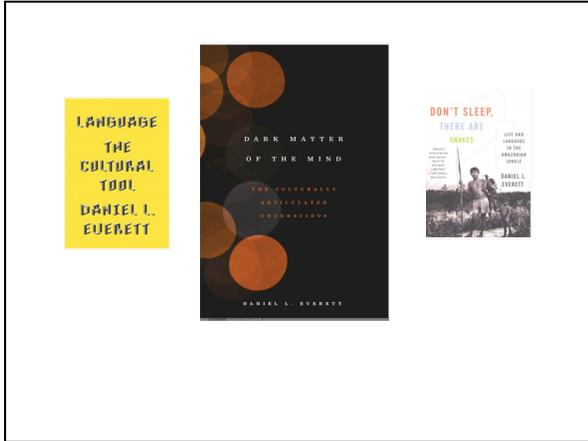
**Point 6:** Symbols led to triality of patterning, the hallmark of all human languages.

Other: **Language is for conversation and is always underdetermined.**

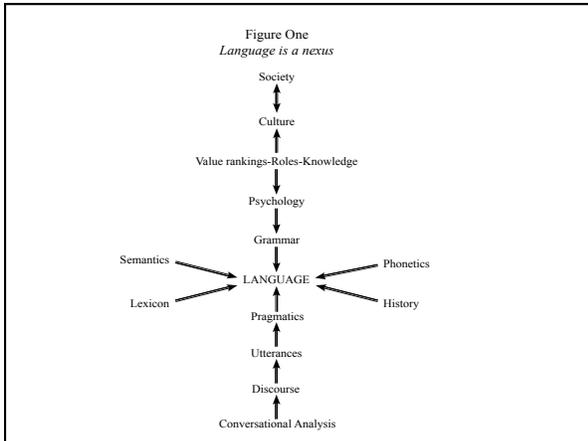
## Central Thesis

- The “Semiotic Progression” (indexes → icons → symbols → triality) predicted implicitly by C.S. Peirce offers the best model the appearance of language in the genus *Homo*.





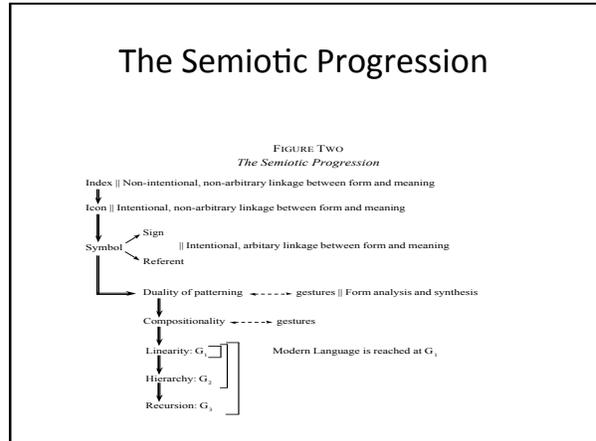
Language is Multimodal



Signs  
Form-meaning composites

**Grammar**

Symbols in Slot:Filler arrangement  
 Gestures, Intonation

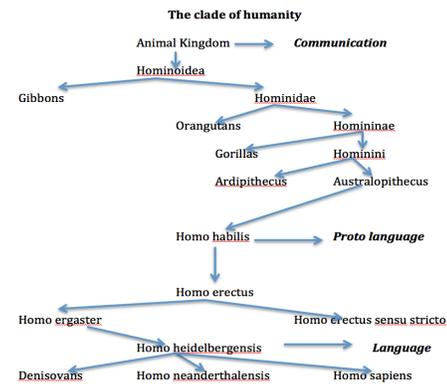


- Indexes**
- All animals – physical connection to “referent”
  - Nonintentional
  - Nonarbitrary

- Icons**
- Physical resemblance
  - Intentional
  - Nonarbitrary
  - Displacement/representation

## Symbols

- 1. Arbitrary
- 2. Intentional
- 3. Displacement
- 4. Saussure vs. Peirce
  - Peirce’s ideas are both earlier and more articulated than Saussure’s
  - The *interpretant* – unique with Peirce



## Erectus vs. habilis, heidelbergensis, etc.

- I recognize only three species (phylogentic/ ecological species, not necessarily “breeding divided” species) – Homo erectus, Homo neanderthalensis, Homo sapiens.
- The genus Homo is changing constantly, but whether the various names of proposed species can be linked satisfyingly to biological, phenotypical, or ecological notions of “species” is debatable. In the meantime, GO ERECTUS

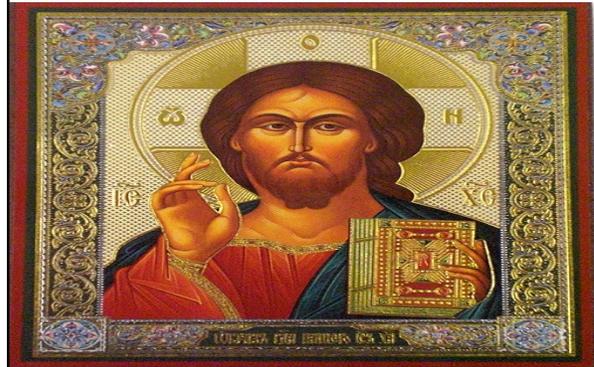
## Indexes: All animals are on the *Semiotic progression* Australopithecus afarensis (3.9-2.9mya)



Indexes (Au.af.):  
Laetoli Footprints: ca. 3.7mya



Icons



Australopithecus africanus



Makapansgat Pebble  
ca 3mya



## Our Hero



## Travels of erectus

- MIDDLE EAST:
  - Gesher Benot Ya'aqov (790kya)
  - Erq al-Ahmar (1.95mya)
  - Ubeidya (1.4mya)
  - Bizat Ruhama (1.96mya)
- ITALY
  - Pirro Nord (1.6mya)
- TURKEY
  - Dursunlu (before 1mya)
- IRAN
  - Kashafrud (before 1mya)
- PAKISTAN
  - Riwat (before 1mya)
  - Pabbi Hills (before 1mya)
- GEORGIA (before 1mya)
- SPAIN (before 1mya)
- INDONESIA (around 1mya)
- CHINA (before 1mya)

## Gesher Benot Ya'aqov (790kya)

- Controlled use of fire
- Specialized spaces: "*Spatial Organization of Hominin Activities at Gesher Benot Ya'aqov, Israel*, authored by Nira Alperson-Afil *et al*, in which they reflect upon the organisational abilities of archaic humans in the Lower Palaeolithic of the Middle Pleistocene, who at GBY, represent the oldest known fisher-hunter-gatherers so far discovered in the archaeological record. It's fair to say this paper has made something of an impact, with the general consensus being that archaic humans of this era were capable of organisational behaviours similar to that of anatomically modern humans..."

## GBY

- The spatial designation of discrete areas for different activities reflects formalized conceptualization of a living space. The results of spatial analyses of a Middle Pleistocene Acheulean archaeological horizon (about 750,000 years ago) at Gesher Benot Ya'aqov, Israel, indicate that hominins differentiated their activities (stone knapping, tool use, floral and faunal processing and consumption) across space. These were organized in two main areas, including multiple activities around a hearth. The diversity of human activities and the distinctive patterning with which they are organized implies advanced organizational skills of the Gesher Benot Ya'aqov hominins.

Flores: 700kya



Socotra: 1.4mya



Erfoud Manuport  
ca. 300kya



Venus of Berekhat Ram  
ca. 250kya



### Symbols emerge from cultures

- *Culture is an abstract network shaping and connecting social roles, hierarchically structured knowledge domains, and ranked values. Culture is dynamic, shifting, reinterpreted moment by moment. Culture is only found in the bodies (the brain is part of the body) and behaviors of its members.*

### Sound “symbolism” (Actually sound iconicity)

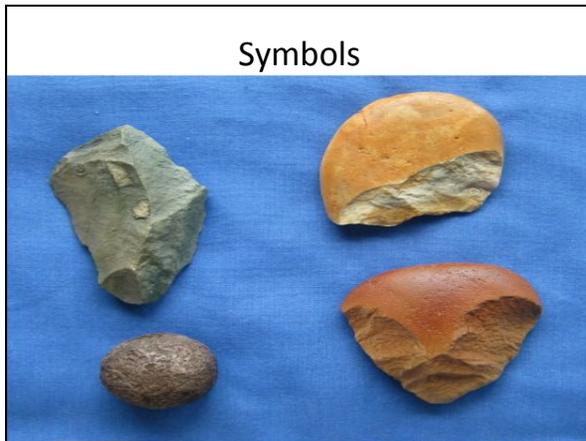
- Swoosh, bam, whack – borderline symbols
- Crying to ritual crying (Greg Urban)
- Mistaken identities - roots vs. snakes
- Exclamations/interjections

### Types of symbols

- Auditory
- Visual

### Culture emerging: Values





### How Much Grammar Does it Take to Sail a Boat? (Gil 2005)

*"This paper argues that the amount of grammar that is needed in order to support the vast majority of basic daily human activities is substantially less than is generally supposed to be the case, and that consequently, much of the observed complexity of contemporary human grammar has no obvious function relating to the development and maintenance of modern human civilization."*

### Grammar and Sailing (cont)

*"Specifically, it is argued that the level of grammatical complexity necessary for modern civilization is no greater than that of Isolating-Monocategorial-Associational, or IMA Language, language with the following three properties: (a) Morphologically Isolating—No word-internal morphological structure; (b) Syntactically Monocategorial—No distinct syntactic categories; (c) Semantically Associational—no distinct construction-specific rules of semantic interpretation, compositional semantics relying exclusively on the Association Operator (Gil 2005)."*

### DUALITY OF PATTERNING

- |   |   |                            |  |  |                         |                         |                         |      |     |      |
|---|---|----------------------------|--|--|-------------------------|-------------------------|-------------------------|------|-----|------|
| <ul style="list-style-type: none"> <li>• Vertical/</li> <li>• Paradigmatic</li> <li>•</li> <li>• Symbol<sub>filler 1</sub> (John)</li> <li>• Symbol<sub>filler 2</sub> (Mary)</li> <li>• Symbol<sub>filler 3</sub> (saw)</li> </ul> | <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 33%;">Horizontal/<br/>Syntagmatic</td> <td style="width: 33%;"></td> <td style="width: 33%;"></td> </tr> <tr> <td>Symbol<sub>slot1</sub></td> <td>Symbol<sub>slot2</sub></td> <td>Symbol<sub>slot3</sub></td> </tr> <tr> <td>John</td> <td>saw</td> <td>Mary</td> </tr> </table> | Horizontal/<br>Syntagmatic |  |  | Symbol <sub>slot1</sub> | Symbol <sub>slot2</sub> | Symbol <sub>slot3</sub> | John | saw | Mary |
| Horizontal/<br>Syntagmatic  |   |                            |  |  |                         |                         |                         |      |     |      |
| Symbol <sub>slot1</sub>   | Symbol <sub>slot2</sub>   | Symbol <sub>slot3</sub>    |  |  |                         |                         |                         |      |     |      |
| John  | saw   | Mary                       |  |  |                         |                         |                         |      |     |      |

### Syllables and duality of patterning

- Sonority, margins, nuclei
- Bad, strong, opa vs. pao vs. pwa
- Each sound becomes a symbol if rearranged with other sounds

### Slot:Filler

- What did John give to Mary in the library?
- LM:Q-word Mood marker-auxiliary, etc.

### Holophrastic utterances first

- shamalamadingdong

### SHAMAlamaDINGdong



### Break it down

- Gestures
- Syllables
- Intonation

Each will highlight a portion of the utterance  
Portions will often overlap

### The naturalness of hierarchy

- Chunking for memory and processing (e.g. "Magic number 7 +/- 2" (George Miller)
- Syllables, phrases, morphemes, words

Chunking in each hierarchy  
Slight bias for overlapping chunking

### Architecture of Complexity Herbert Simon 1962

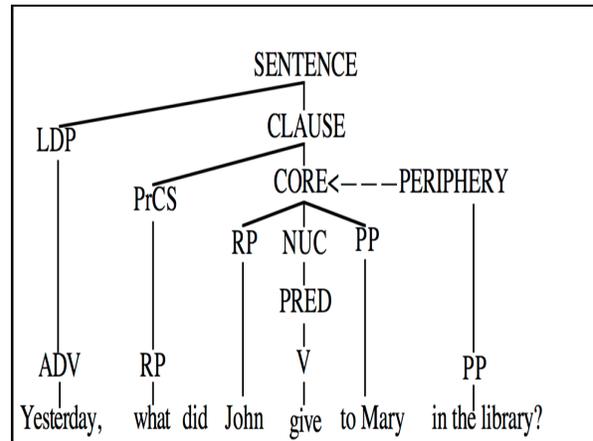
*"Thus, the central theme that runs through my remarks is that complexity frequently takes the form of hierarchy, and that hierarchic systems have some common properties that are independent of their specific content. Hierarchy, I shall argue, is one of the central structural schemes that the architect of complexity uses. "*

### Simon (continued)

*"By a hierarchic system, or hierarchy, I mean a system that is composed of interrelated subsystems, each of the latter being, in turn, hierarchic in structure until we reach some lowest level of elementary subsystem."*

### Triality of patterning

- Yesterday, what did JOHN give to Mary in the
- library?



### Phonological Hierarchy

- Phonemes
- Syllables
- Phonological words
- Phonological phrases
- Phonological paragraphs
- Phonological texts
- Conversational features

### Grammatical Hierarchy

- Morpheme
- Word
- Phrase
- Sentence
- Paragraph
- Discourse
- Conversation

### Recursion: information organizer beyond hierarchy

Languages lacking recursion: Pirahã and Riau.

Jackendoff, Ray, and Eva Wittenberg 2012. Even Simpler Syntax:  
[https://depts.washington.edu/lingconf/abstracts/  
JackendoffandWittenberg.pdf](https://depts.washington.edu/lingconf/abstracts/JackendoffandWittenberg.pdf).

Futrell, et. al. on Piraha: [http://  
journals.plos.org/plosone/article?id=10.1371/  
journal.pone.0145289](http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0145289)

### Disadvantages of erectus: speech

- Erectus speech more garbled, making it harder to hear the differences between words. *The existence of ambiguity, homonyms, confusion, and the importance of context continues in modern speech.* Erectus lacked a modern hyoid bone. Air sacs are inferred.
- The erectus hyoid bone has profound implications for the evolution of speech and language.
- Erectus faces were prognathous.
- Position of tongue...

### Disadvantages of erectus 2: Laryngeal and emotional control

- The Fox P2 gene has evolved since erectus. It gives us greater speech control. With its more primitive FOXP2 gene, erectus would have had less laryngeal and less emotional control in their speech. FOXP2 also elongates our neurons and makes cognition faster and more effective. Without this erectus would certainly have been "duller" than us. But this we knew.
- This FOXP2 difference could also have resulted in a lack of parallel processing of language by erectus, another reason they would have thought more slowly. FOXP2 in modern humans increases length and synaptic plasticity of the basal ganglia, aiding motor learning and performance of complex tasks.

### Disadvantages of erectus 3: Cognitive plasticity?

- We are also not sure if erectus have as much cognitive plasticity as we do. It does seem that erectus was a dull, non-inventive creature compared to us. That doesn't mean that it was a language-less creature. Could have been a politician.
- The early tools of erectus were more similar in some respects to the tools of other primates. Early tools are homogeneous and non-com. Erectus lacked complex tools (bows and arrows or spear-throwers). Perhaps.

### Erectus tools vs. language

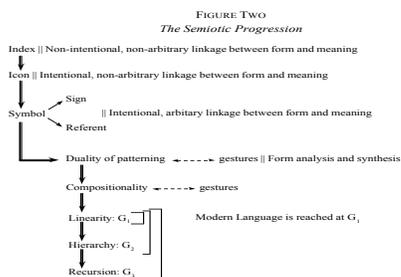
- Current day Amazonians – what they would leave behind is not a great source of information as to what they had.
- Be careful, therefore, about inferences from silence.

### What took them so long?

- Acheulian tools → Clactonian/Mousterian tools (800,000-1,000,000 years)
- Erectus → Neandertals → Sapiens (each associated with different levels of tool complexity, apparently)
- Imitation vs. Innovation – Was erectus conservative as well as dull, or just dull?

But! SAILING

### The Semiotic Progression



### Gestures, intonation, slot:filler

All present at the beginning. None takes precedence. Equiprimordial (David McNeill)

### G1 – G3 Languages

G1: Erectus

G2: Standard Average European (Karlsson);  
Pirahã; Riau.

G3 – Some elicited examples; fewer  
spontaneous examples, in select languages.

### Summary

- 1 million years ago - G1 Language
- Separate bands – dialects, cultures
- Tools as cultural products are symbols
- Status symbols and sailing
- Space specialization in erectus settlements