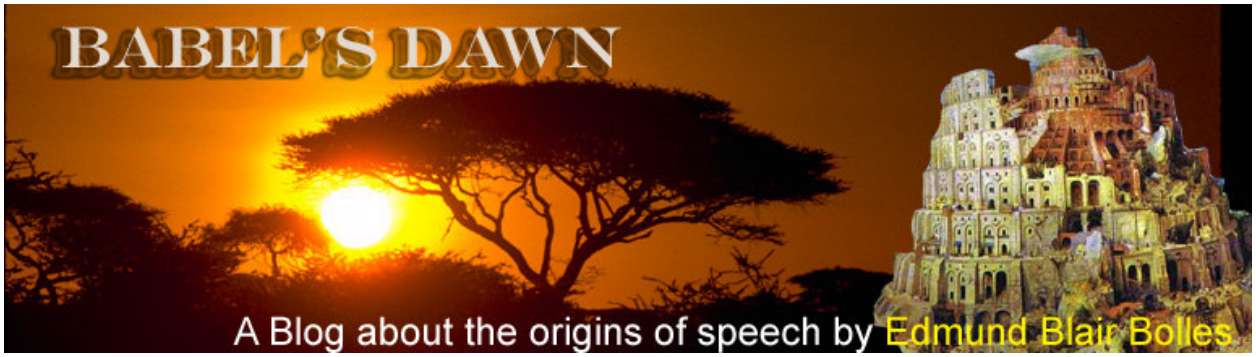
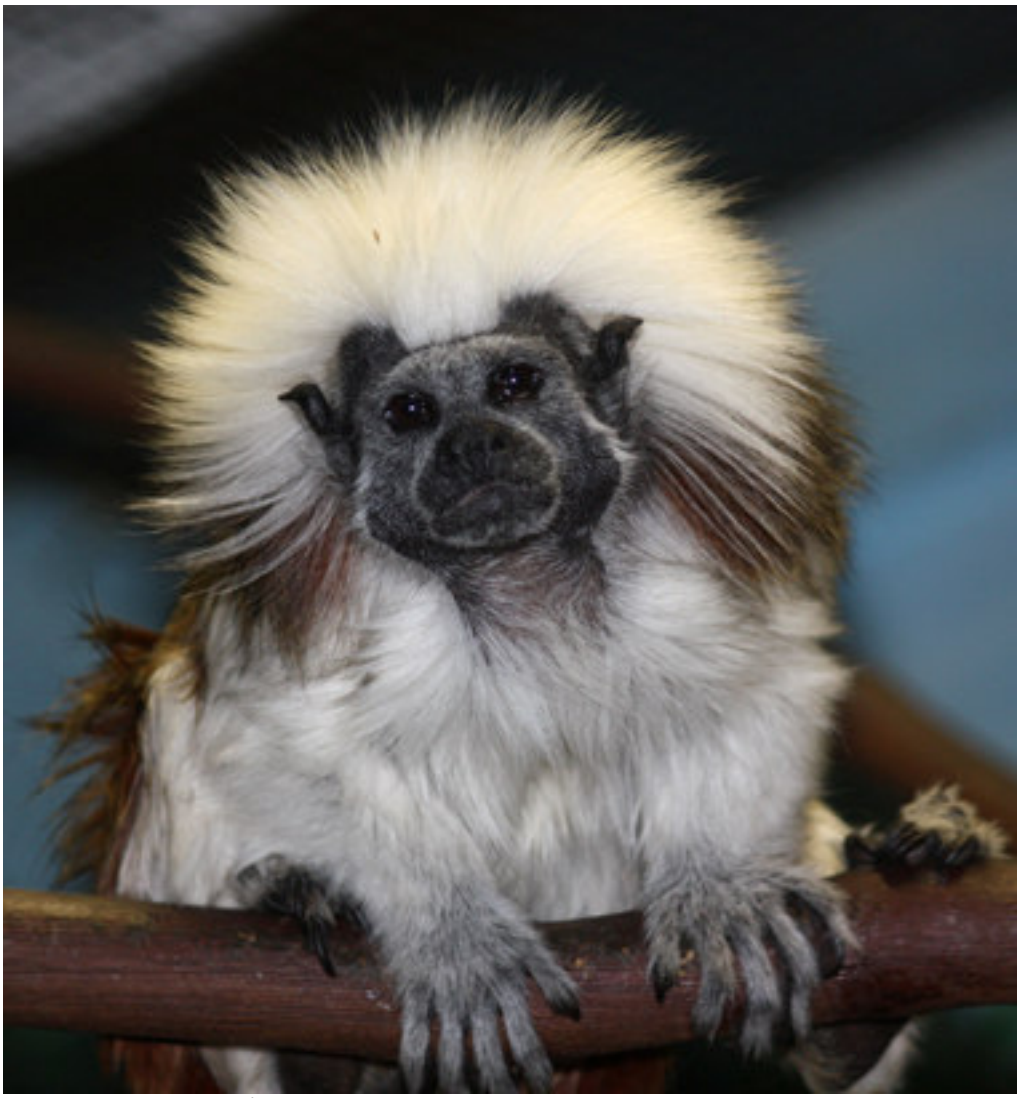



**Post of: July 12, 2009**

## Shboy! Shboy!



**Wouldn't you be surprised if this fellow (a cotton-top tamarin) started correcting your grammar?**

Wow! Sometimes interesting work gets buried in hype, turning something worth noticing into something that needs to be debunked. In this case a group of psychologists led by Ansgar

Endress reported in *Biology Letters* about finding "Evidence of an evolutionary precursor to human language affixation in a non-human primate" (abstract here; prepub draft here). The mild conclusion is:

> some of the computational mechanisms subserving [the tested linguistic task] in a diversity of languages are shared with other animals, relying on basic perceptual or memory primitives that evolved for non-linguistic functions.

In other words, language, including syntax, builds—at least in part—on pre-existing abilities that are older than humans. The point has long been insisted *a priori*. Now we are starting to get experimental evidence. When I first read the work, I thought I would report on it as providing further support for this blog's position that speech builds on perceptual abilities. Then I began reading how the story was being covered:

- **New Scientist** (lede): "Primates can intuitively recognize some rules of grammar." (here)
- **National Geographic News** (headline): "Monkeys Recognize Poor Grammar" (here)
- **BBC News** (headline): "Monkeys recognize 'bad grammar'" (here)
- **RedOrbit** (headline): "Monkeys Understand Unspoken Complexities of Language" (here)

Before we go any further, let's be clear that the experiments do not show the monkeys have any grammatical skills, understanding, or intuitions. So what do I do? Report the news or denounce the hype?

The study itself considers affixation, the addition of prefixes and suffixes to sounds. English adds sounds to the end of many words—e.g., *–s* to make a word plural or *–ed* to set an action in the past. Some languages, like the Bantu group, add the sounds to the start of words. For example in Swahili one can attach *wa-* to pluralize some nouns while *si-* negates some verb forms. English also uses some prefixes, like *un-* and *dis-* to reverse the meaning of what it is attached to. Swahili has suffixes as well. I'll leave it to my commenters to inform me of any languages that do not have prefixes or suffixes, but they are very rare. The study looked to see if cotton-top tamarin monkeys can notice affixes.

The experiment tried to discover whether the monkeys can distinguish between words that use a suffix or a prefix and those that do not. For example, it tested for prefixes by playing the monkeys a series of nonsense syllables, all of them preceded by the sound *sh*.

The next day the monkeys were played combinations of nonsense compounds (from the day before) and words. For example, they heard *shoy-brain*. In a few cases, the order was reversed, and they heard *brain-shoy*.

The experimenters proposed that the monkeys would look at the loudspeaker longer when the shoy- prefix was absent, and the monkeys did.

*So what?* one can ask? Discrimination tasks that do not include operant conditioning are always somewhat ambiguous. The looking- or pausing-test is often used to study human infants because it's the best that ethical science can do. In the case of cotton-tops, it seems to me that more profound testing is possible.

Personally, I would not be surprised to learn that cotton-tops can be trained to go to a box on the right when told *oy* and left when told *shoy*. Then we could train them to go a different container on the right when told *pal* and see if they generalized and spontaneously go to the appropriate container on the left when told *shpal*. My reading in the gestalt world suggests to me that such generalization should be possible. This kind of work would clearly establish that the discriminatory hearing and capacity to generalize that support prefixes and suffixes are scores of millions of years older than language.

I don't think any school of thought about language evolution would be much upset or surprised by such a finding, but at least the point would be established and a technique would have been identified for testing the capacity to demonstrate grammatical discrimination and generalization.

As it stands, so far (interpreting the experiment minimally) all we know is that cotton-tops that have been habituated to sounds beginning *sh-* seem to notice when a sound does not begin with *sh-*. This research has to begin somewhere, but it is absurd for the world of science journalism to pretend anything of interest to non-specialists has happened. Certainly, nothing justifies those over-the-top headlines I quoted above.

Links:
Ansgar Endress: http://adendress.googlepages.com/index.html
Abstract:
http://rsbl.royalsocietypublishing.org/content/early/2009/07/08/rsbl.2009.0445.abstract?maxtoshow=&HITS=1&hits=1&RESULTFORMAT=&andorexacttitle=and&andorexacttitleabs=and&fulltext=%2522evolution+of+language%2522&andorexactfulltext=and&searchid=1&usestrictdates=yes&resourcetype=HWCIT&ct
Prepublication draft: http://adendress.googlepages.com/publications.html
New Scientist story: http://www.newscientist.com/article/dn17426-monkeys-have-a-memory-for-grammar.html
National Geographic News story: http://news.nationalgeographic.com/news/2009/07/090708-monkey-grammar.html
BBC News story: http://news.bbc.co.uk/2/hi/science/nature/8139322.stm
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