

Faithful Ancestors was Re: Doesn't ANYONE have anything new to say?

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- *From:* "Lorenzo L. Love" <lllove@xxxxxxxxxxx>
 - *Date:* Sat, 25 Jun 2005 21:25:21 GMT
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firstjois wrote:

Lorenzo L. Love wrote:

rmaclarl wrote:

Man, SAP is desperate at the minute. Not only is the Google version flooded by William Conrad's talking horse, but all the loons are here in force - Jimmy, Algie, Marcie, Madam Ross & Mr Howard. Even Mario and Andrew Nowitski.

I posted something about a pre-Clovis site a week ago, and barely a peep was heard. Surely it could have stirred up Phil & Olsen - maybe even dragged MIB out of the woodwork. But no - Olsen's too busy matching wits with the witless on the squishy thread.

Even on Palanth, & Palanthsci, & Paleoanthro, the best discussion is being driven by <gasp> Richard Parker aka coconut boy (to whom due credit).

So doesn't ANYONE have something new to raise the level of discussion???

Ross Macfarlane

I had this long diatribe about the June 11 article in Science News

Faithful Ancestors was Re: Doesn't ANYONE have anything new to say?

about sexual dimorphism in *A. afarensis* and how Owen Lovejoy is the smartest person in the field because he said what I've been saying for years that the dimorphism is wildly over estimated in a self fulfilling prophecy of assuming big bones are male and small bones female. But the damn computer crashed and I lost it all and I don't have the energy to try to re-create it.

Lorenzo L. Love

<http://dept.kent.edu/anthropology/love.html>

Interesting to see both the range and the detail of his research/publications.

It's too early for math but if errors of sex assignment are made in the middle range that shouldn't change the estimates/averages by much of anything at all. I've been trying to think this through via people I know but the people I can think of who are "too tall" for females or "too short" for males came from "mixed marriages" (French-Irish & Italian or Italian & American-Scots). How much variety would you expect in a group of *A. afarensis*? Wouldn't it be a small group and an isolated one?

Can you send me a copy of the article? There's just one too many "yike" in the reply address.

Tia,
Jois

Faithful Ancestors
Researchers debate claims of monogamy for Lucy and her ancient kin

Bruce Bower

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A weird kind of creature strode across the eastern African landscape from around 4 million to 3 million years ago. Known today by the scientific label *Australopithecus afarensis*, these ancient ancestors of people may have taken the battle of the sexes in a strange direction, for primates at any rate. True, no one can re-create with certainty the court and spark that led to sexual unions between early hominids. Nothing short of a time machine full of scientifically trained paparazzi could manage that trick.

All is not lost, though. Scientists are looking to fossil remains of *A. afarensis* to provide, as a prehistoric tabloid would, a revealing exposé of the hominid's intimate tendencies. A statistical analysis 2 years ago indicated that *A. afarensis* males exhibited only a moderate size advantage over females, rather than the larger difference seen in gorillas. According to Owen Lovejoy and Philip L. Reno, both of Kent (Ohio) State University, who directed that study, the size similarity implies that *A. afarensis* adults of both sexes favored long-term relationships, which arose as a matter of survival, not morality. Sleeping around just didn't cut it during hominids' start-up era.

That view has generated controversy, which comes as no surprise to the Kent State scientists. They themselves had unabashedly dismissed other researchers' earlier work that depicted *A. afarensis* males as the considerably larger sex, with the fiercest male fighters monopolizing the mating game.

However, some recent work provides evidence for *A. afarensis* sex differences that were considerably greater than those in modern people and that approach those in gorillas, according to J. Michael Plavcan of the University of Arkansas in Fayetteville and his colleagues. They report their analysis in the March *Journal of Human Evolution*. Large sex differences would indicate a mating style similar to that of modern gorillas.

Lovejoy and Reno, however, stand by their earlier conclusions. "It's entirely possible that much of our sexual physiology and anatomy had already evolved in australopithecines," Lovejoy says. "That set the stage for massive brain growth in our later fossil ancestors."

Lucy's love life

Anthropologists discovered evidence of *A. afarensis*, including the partial skeleton dubbed Lucy, in eastern Africa more than 30 years ago. The bones seemed to fall into two size categories. At that time, researchers butted heads over whether these bones represented two species of human ancestors that lived at the same time or one species that included males with big, bulky bodies relative to those of females.

Faithful Ancestors was Re: Doesn't ANYONE have anything new to say?

After noting similar shapes of the larger and smaller remains, proponents of the one-species view won out. Using measurements of people's bones in relation to body weight as a reference, investigators then estimated that *A. afarensis* males weighed an average of 98 pounds, while their female counterparts tipped the scales at only 65 pounds. That's a much greater sex disparity in weight than is found in people today but approaches that measured among gorillas and orangutans.

Many researchers concluded that in Lucy's species, as among gorillas, the toughest males dominated the mating scene. Gorilla males tend to fight among themselves, baring daggerlike canine teeth. Winners do the lion's share of mating with available females, whom the dominant males guard from skulking suitors.

Demonstrating another lifestyle, chimps exhibit virtually no size differences between sexes, but males retain large, fanglike canines, Lovejoy notes. A female typically mates numerous times with several partners during periods of sexual receptivity, which she advertises via temporarily swollen breasts and hindquarters.

According to Lovejoy, though, behaviors of gorillas or chimps can't serve as a model for Lucy and her comrades. In 1981, he proposed that they were descendants of a new kind of primate built for what he calls social monogamy. *A. afarensis* males blended an upright stance and unusually small, nonthreatening canine teeth. And the female anatomy masked signs of ovulation through features such as permanently enlarged breasts, he says.

Given this species' million-year run of success, Lovejoy theorizes, its males probably obtained food consistently by forming working alliances, mainly among close relatives. Each successful provider thus upped his chances of being accepted as a female's sole mate, the best way to ensure that he would become a dad. From the female perspective, a steady mate would be a good bet not only to bring home food but also to assist in child care.

However, modest size differences between the sexes typically characterize mammals with a penchant for soul mates, rather than the gorillalike pattern that had been proposed.

Simulating sexes

Ten years after Lovejoy set forth the idea of social monogamy among australopithecines, evidence continued to pile up supporting a substantial size difference between males and females. In 1991, Henry M. McHenry of the University of California, Davis published estimates of large weight disparities.

Lovejoy countered that those calculations used as a reference point the

Faithful Ancestors was Re: Doesn't ANYONE have anything new to say?

sex differences observed in modern people, which he says probably don't correspond to those of 3-million-year-old hominids. He also pointed out that McHenry's analyses rested on a small number of fossils that covered a time span of at least 500,000 years and were unearthed at sites separated by nearly 500 miles. The specimens could have come from populations showing a variety of unique male-female anatomical contrasts.

Finally, cursed with a scarcity of pelvic remains that could clearly distinguish wider-hipped females from slimmer-hipped males, McHenry simply assumed that big bones came from males and small bones came from females, Lovejoy says.

In 2003, Lovejoy and his coworkers employed a novel statistical method to simulate skeletal-size differences between ancient sexes without trying to gauge their weights. The enterprise hinged on using measurements of Lucy's partial skeleton to estimate sizes of crucial but missing bones for a set of *A. afarensis* individuals known as the First Family. These fossils, which represent as many as 22 or as few as 5 individuals, were unearthed near the spot where Lucy was found and, like her, date to 3.2 million years ago.

The researchers first measured the width of Lucy's well-preserved femur head, the ball of the upper-leg bone that fits into the hip joint. They then determined the size of various other parts of Lucy's arm and leg bones relative to femur-head width. Lovejoy focused on femur-head size because it's considered a reliable indicator of overall body size.

Next, the scientists measured the First Family arm and leg fossils that corresponded to those for Lucy. Armed with Lucy's skeletal dimensions, the team calculated femur-head sizes. They tagged individuals with big femur heads as male and those with small femur heads as female. In further studies the researchers found that femur-head sizes accurately predict sex and overall body size in people, chimps, and gorillas.

Whether the First Family included two dozen or only a half-dozen members, males exhibited a moderate size advantage over females, close to that observed in people, Lovejoy's team found.

Moderate, humanlike size differences between *A. afarensis* males and females accompanied both an evolutionary shriveling of males' canine teeth and a shift of sexual physiology away from chimplike ancestors and toward humans, Lovejoy asserts. For instance, he suspects that that's when ovulation became concealed and males evolved physical accommodations to mate regularly rather than for short, intense periods during ovulation. The new-style males produce modest amounts of sperm continuously rather than larger amounts timed to ovulation, as do gorillas.

Australopithecines, as highly mobile creatures locked into a socially complex mating game, lit a fuse of brain expansion that exploded in ensuing *Homo* species, Lovejoy proposes. Ironically, large brains

Faithful Ancestors was Re: Doesn't ANYONE have anything new to say?

unleashed cultural evolution, resulting in a plethora of human sexual and mating practices that go far beyond anything Lucy could have imagined, he says.

Weighting game

The Kent State scientists' portrayal of *A. afarensis* sexes has received some positive reviews. Robert G. Tague, an anthropologist at Louisiana State University in Baton Rouge calls Lovejoy's method of estimating skeletal-size differences "a promising one" and suspects that Lucy's kind indeed preferred social monogamy.

Lovejoy's findings indicate that early hominids "may have been more humanlike [than apelike] in their basic social behavior," comments Clark S. Larsen, an anthropologist at Ohio State University in Columbus.

But other researchers contend that the accumulated evidence supports striking size differences between *A. afarensis* sexes. These scientists reject Lovejoy's unconventional approach. To begin with, says Plavcan, the First Family consists mainly of large-bodied males and thus fosters an underestimate of size differences.

Plavcan and his colleagues determined the relationship between various skeletal measures and body mass for 658 people from eight populations in different parts of the world. With those correlations, the team made new calculations of femur-head size and body mass for seven *A. afarensis* specimens not in the First Family and assigned sex on the basis of size.

This work reveals sex differences considerably greater than those in people and approaching those in gorillas, according to Plavcan's team.

Particularly fierce males in Lucy's species probably monopolized mating, although how they did so without sharp canines remains unclear, Plavcan says.

Mating-minded *A. afarensis* males, McHenry theorizes, literally took up arms. An upright posture freed their hands for punching, throwing rocks, and other mayhem. The best fighters thus defended their exclusive sexual access to adult females.

It's risky to judge a hominid's body weight by the size of its bones because nutrition and other factors influence the amount of muscle and fat, says Christopher Ruff of Johns Hopkins University School of Medicine in Baltimore. He discounts Lovejoy's conclusions, arguing that an individual's skeletal size often bears little relationship to body weight.

UC-Davis' McHenry is sticking with his earlier calculation that *A. afarensis* males were about 50 percent heavier than females. Humanlike

Faithful Ancestors was Re: Doesn't ANYONE have anything new to say?

size proportions for the sexes evolved much later, around 1.7 million years ago in *Homo erectus*, McHenry argues. Men today are about 15 percent heavier than women.

Too much sex

Other scientists express a mix of chagrin and disdain at the amount of energy that researchers have expended on trying to separate fossil boys from girls. Investigators need to drop their obsession with the sex of fossils and examine how individual differences in skeletal anatomy arise, contends Maciej Henneberg of the University of Adelaide in Australia. For body weight and many skull measurements, including braincase size and facial width, individuals within each sex usually differ far more from each other than average members of opposite sexes do, he argues.

Erik Trinkaus of Washington University in St. Louis also derides efforts to identify the sex of ancient bones. Sex assessments always begin with the unjustified assumption that bigger bones must belong to males and smaller ones to females, he says. And the numbers of individual specimens of *A. afarensis* and other ancient hominid species are too few to generate reliable estimates of male and female size ranges, in his opinion.

Louisiana State's Tague doesn't go that far, but he notes that even the pelvis, the body part regarded as the gold standard for telling apart primate sexes, is surprisingly tough to read. His work shows no consistent pattern of the pelvis being larger in females than in males.

The shape of Lucy's partially preserved pelvis leaves her sexual identity unclear, Tague notes. Her diminutive size led Tague and Lovejoy in a 1998 paper to peg Lucy as female.

Reports on new fossil finds of *A. afarensis* and even older hominid species are expected soon. Lovejoy plans to factor skeletal data from these discoveries into a larger examination of ancient sex differences.

From Lucy's era to our time, the battle of the sexes appears destined to rage on.

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