

Sexual selection

First, let's review...

What is sexual selection?

What are two types of sexual selection?

- intra-sexual selection
- intersexual (= epigamic) selection

Examples?

What *causes* sexual selection? First, some terms...

Parental care: parental behavior that increases fitness of parent's offspring (e.g. care of fetus inside the body, provisioning young, etc)

depreciable care: benefits of parental expenditure decline with number of offspring, e.g. provisioning food

non-depreciable care: benefits do not decline with offspring number, e.g. parental vigilance, establishing a territory

Parental investment: any cost associated with raising offspring that reduces the parents' ability to produce or invest in other offspring.

Sexual selection and parental investment

The more you invest per offspring, the fewer you can produce.

If one sex invests more, their potential rate of reproduction is slower, so fewer of them in the mating pool

Therefore: sex that invests less will compete more strongly for access to the higher-investing sex (Trivers)

The greater the disparity in parental investment, the more intense that competition

But also sexual selection → sex differences in parental investment: The greater the variance in male reproductive success, the greater the payoff to males to find another mate rather than invest in the ones he has.

Parental care varies across taxa

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 - babies need provisioning, and this care is “depreciable”; 2 parents can feed twice as many babies
- **Fish:** usually no parental care; if there is care, by one parent (usually the male)
 - Male care in fish is “non-depreciable”, e.g. protecting eggs. Caring for one doesn’t detract from ability to care for others.

“Sex-reversed species”



Wilson's phalarope: female on right.

Male builds the nest, incubates the eggs, and broods the young.

Female more aggressive in courtship, larger, more brightly colored

Supports argument that parental investment → sexual selection

There are many ways that males compete

Exclude other males (be big; be mean)

Be sneaky (female mimicry, etc.)

Attract females (be beautiful)

Or exclude other males' sperm

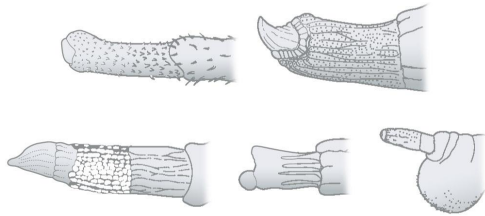
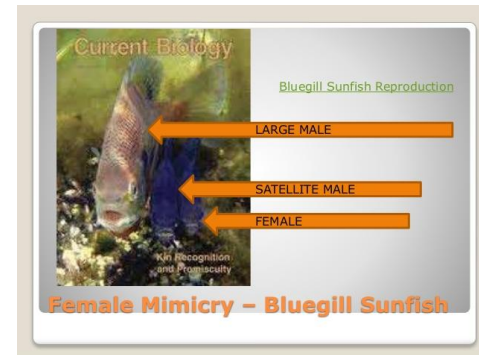


FIGURE 20.20. Male genitalia often have complex morphology, which has evolved both to transfer sperm more effectively and to stimulate the female to accept the sperm. These drawings show examples of primate penes.

20.20, redrawn from Eberhard W.G., *Sexual Selection and Animal Genitalia*, Fig 1.4, © 1985 Harvard University Press

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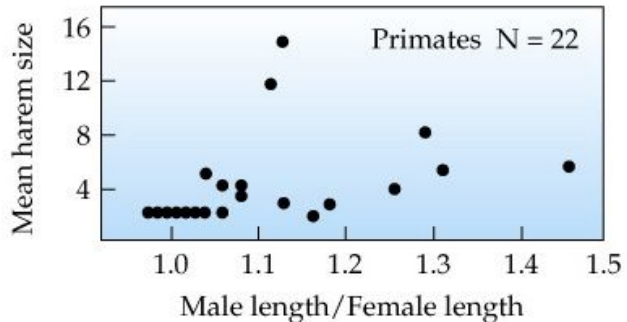
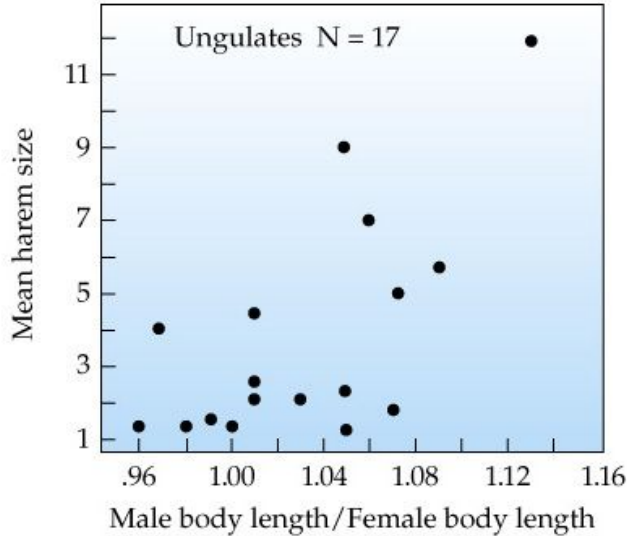
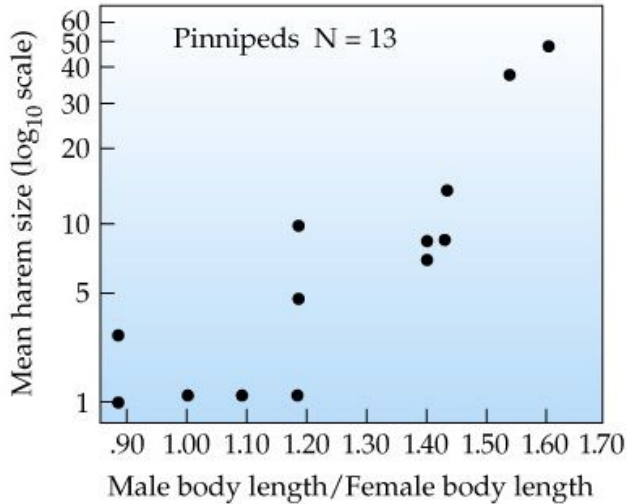
Intrasexual selection & body size

Sexual dimorphism in body size (males larger than females) in mammals associated with

- Male-male competition for mates
- Polygyny (one male mates with many females)
- Larger variance in male reproductive success



Sexual dimorphism in body size and harem size



Larger variance in male reproductive success (high “reproductive skew”) associated with larger sexual dimorphism in body size

Sperm competition in primates

Many of the blue triangles are “harem species” (e.g., gorilla, langurs, Hamadryas baboon) where other mature males are excluded from the group. In multi-male/multi-female groups, a female may mate with several males, so the sperm ‘compete’.

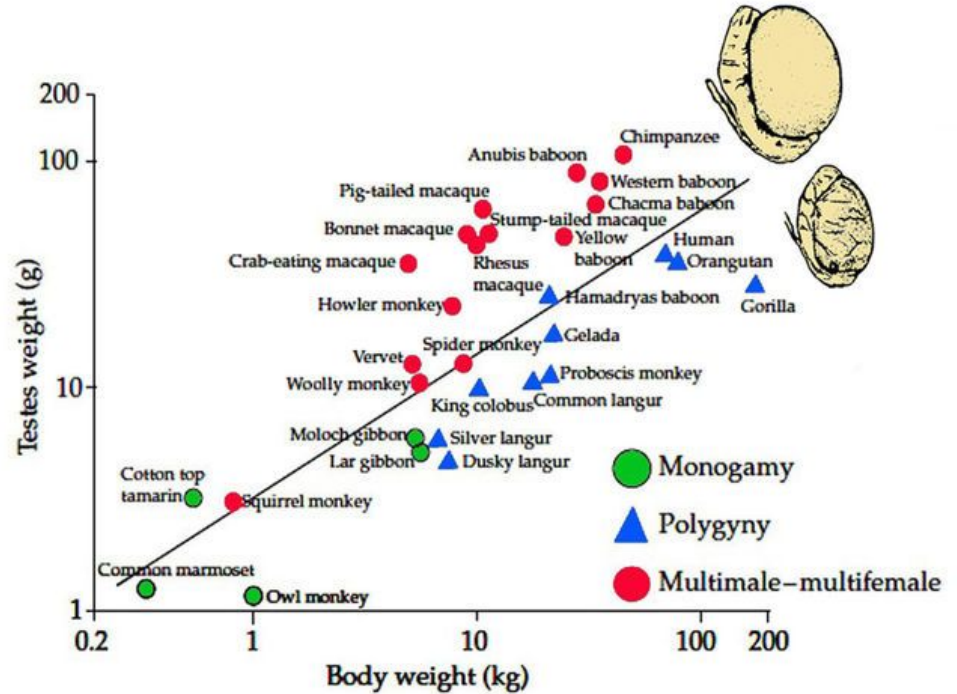
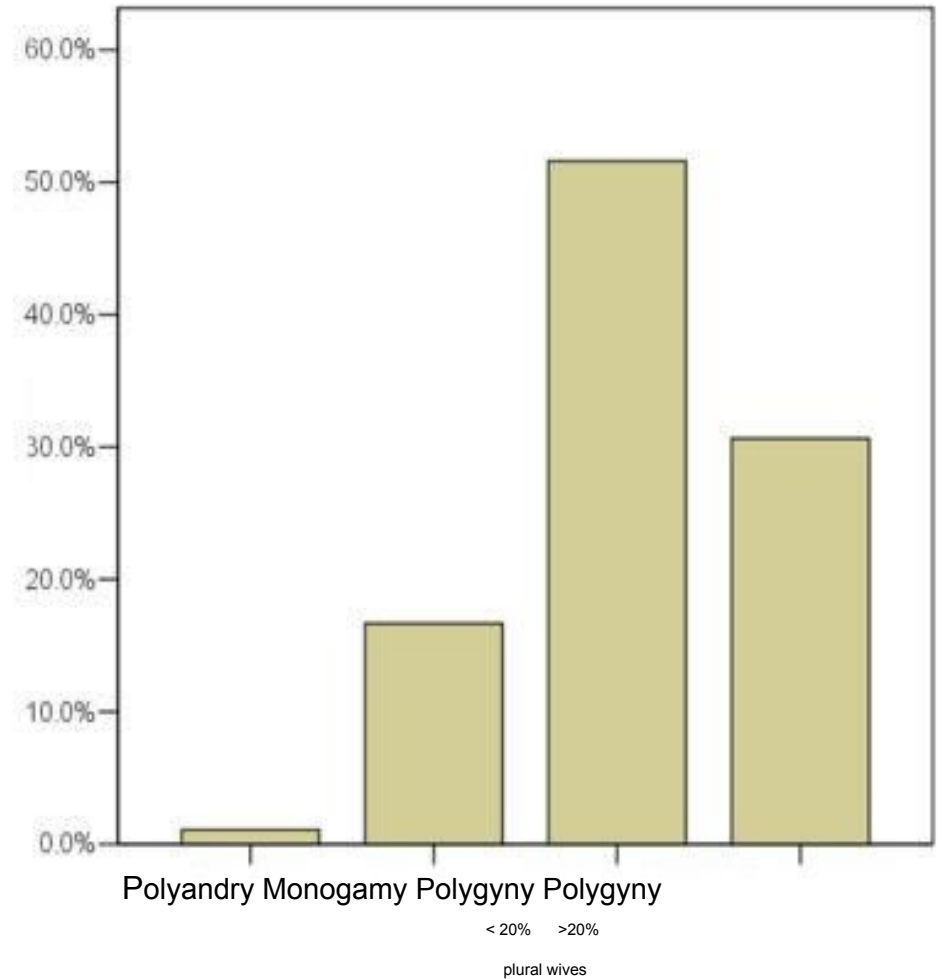


Fig. copied from R. Martin in *Psych. Today*, based on Harcourt et al. *Science* 1981.

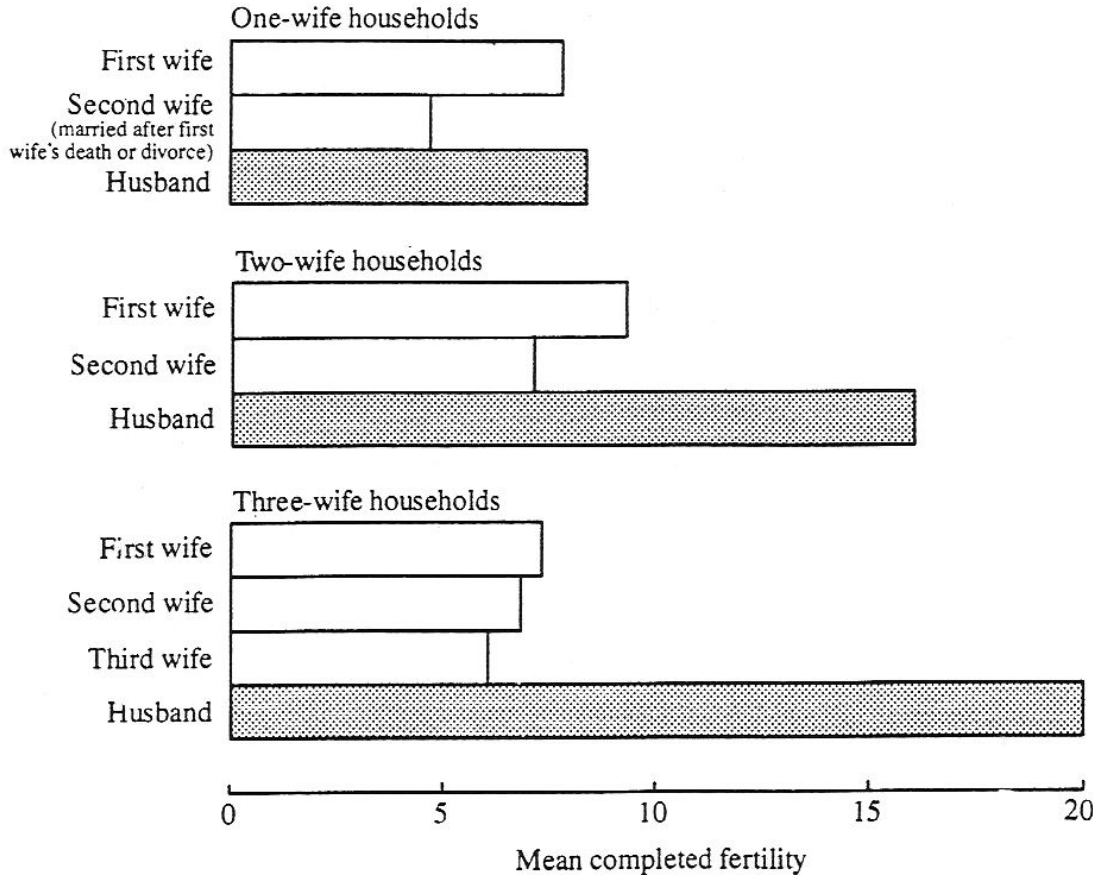
What about humans?

% of cultures with each marriage pattern

Murdock & White 1969)



Men benefit reproductively from multiple mates



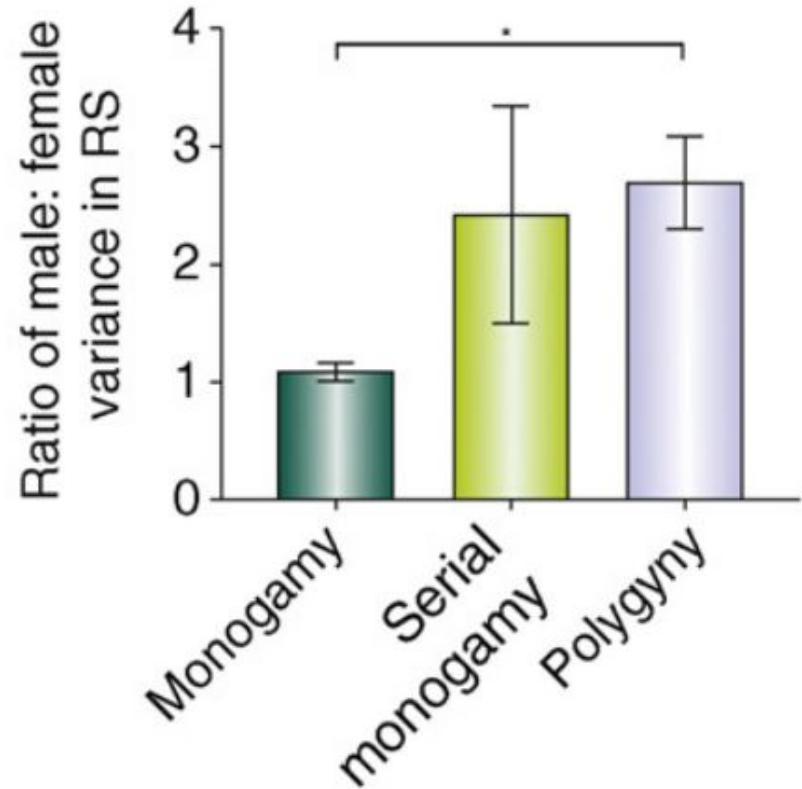
Polygyny and fertility among
19th century Mormons

Daly and Wilson, *Sex Evolution
and Behavior*.

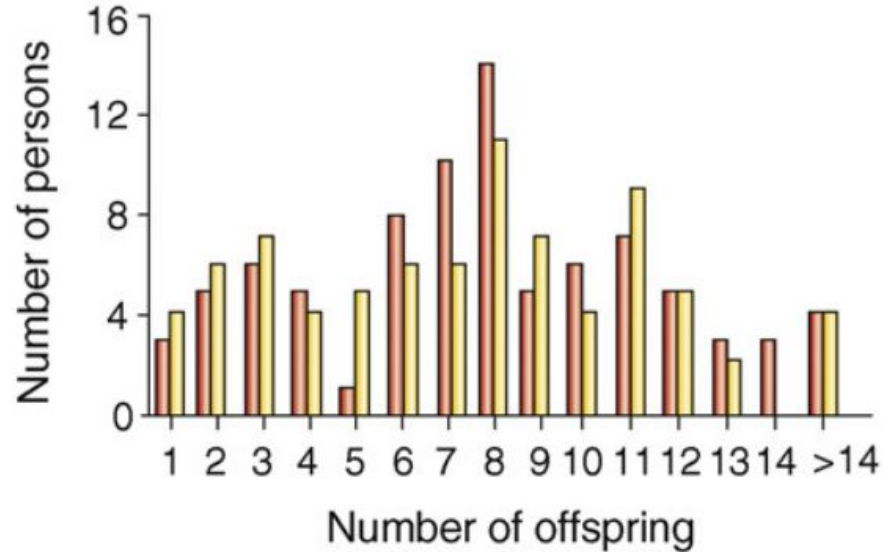
Variance in reproductive success varies cross-culturally

Variance in male reproductive success -- a measure of reproductive skew -- is large in polygynous societies.

In monogamous societies, variance in RS is the same among women and men

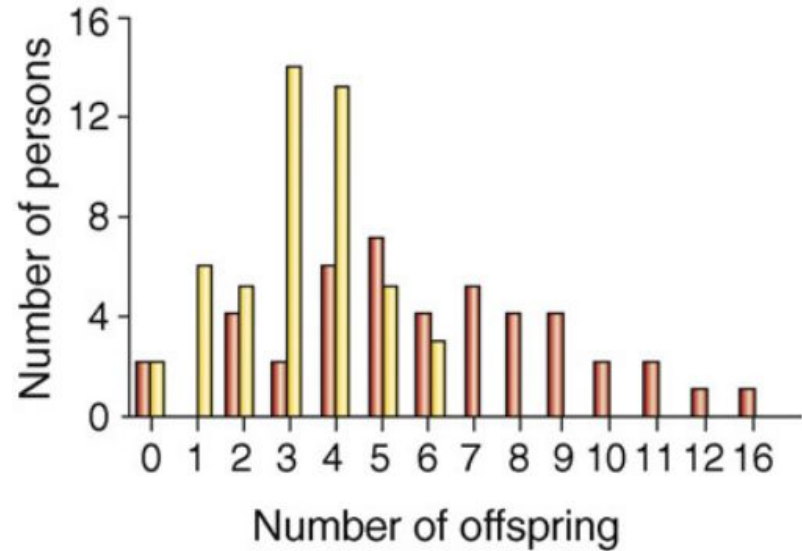


Variance in reproductive success, cross-culturally



MONOGAMY (Pitcairn)

Red bars are male, yellow female



POLYGYNY (Dogon)

Brown, Lalend, and Borgerhoff-Muler, TREE 2009

Intrasexual selection in humans?

- We are a mildly polygynous species
- There is a lot of cross-cultural variation in degree of polygyny (in marriage and mating)
- In polygynous societies, men with more mates have more children

This would suggest some sexual dimorphism related to male-male competition

Sexual dimorphism in humans

Males are:

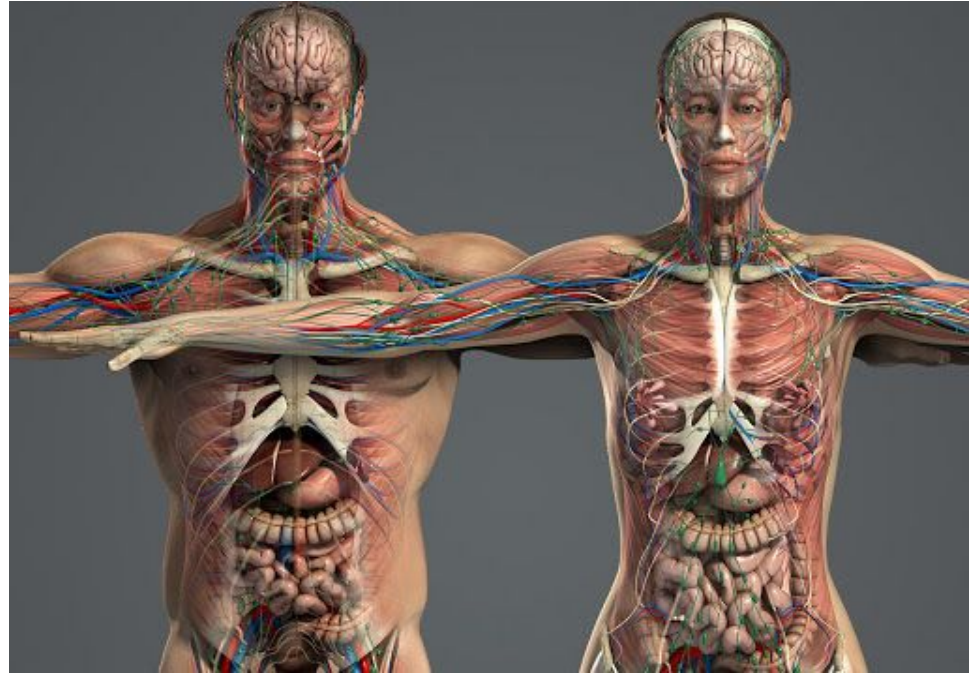
larger, particularly in upper-body muscle mass

more physically aggressive

more risk-prone

reach reproductive maturity later

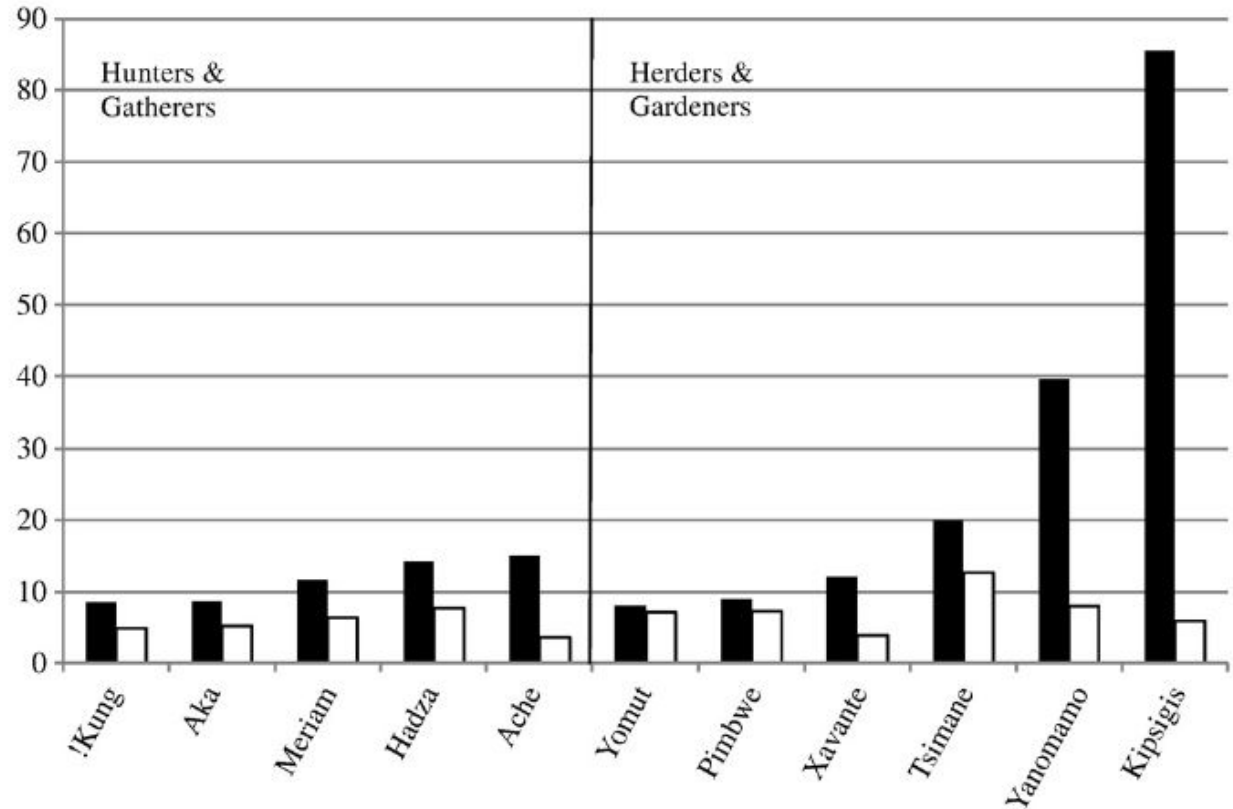
These are indicators of intra-sexual sexual selection



How extreme was reproductive skew in the EEA?

Variance in reproductive success

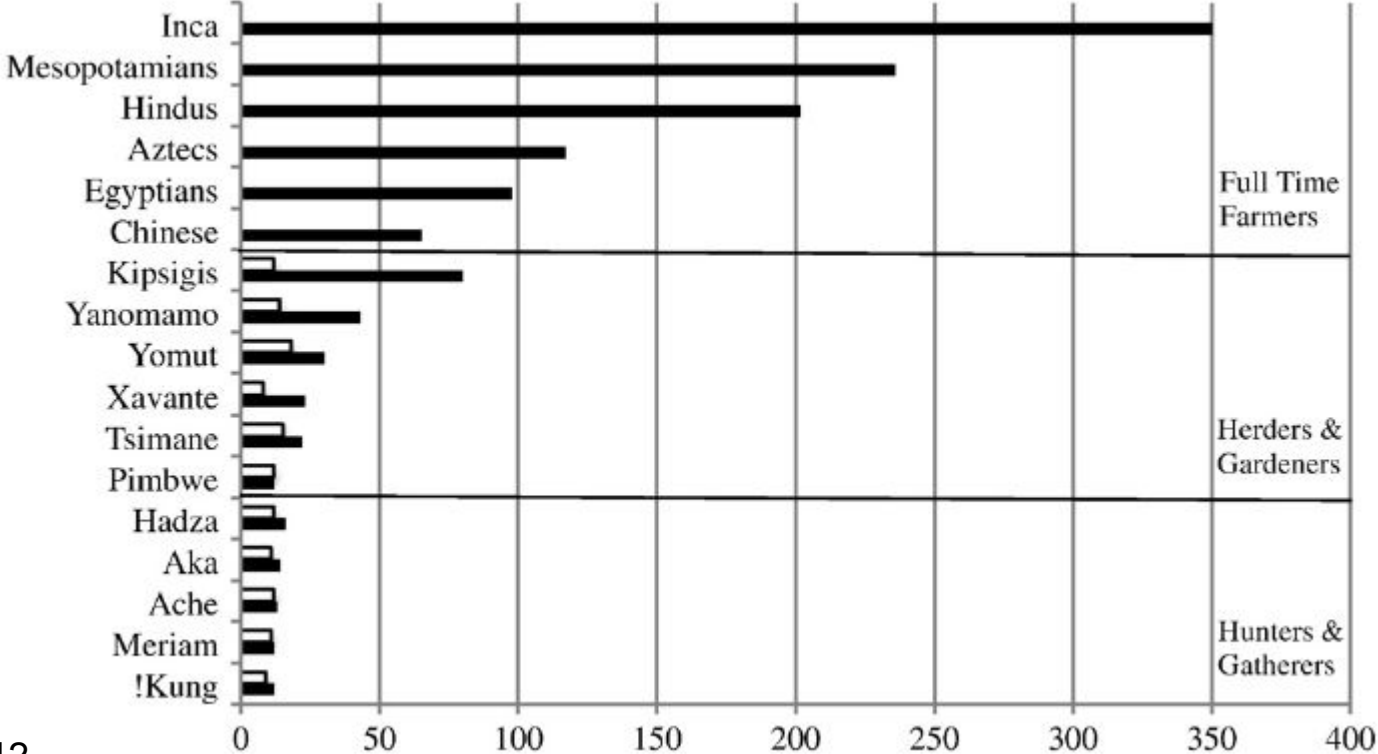
males=black
women=white



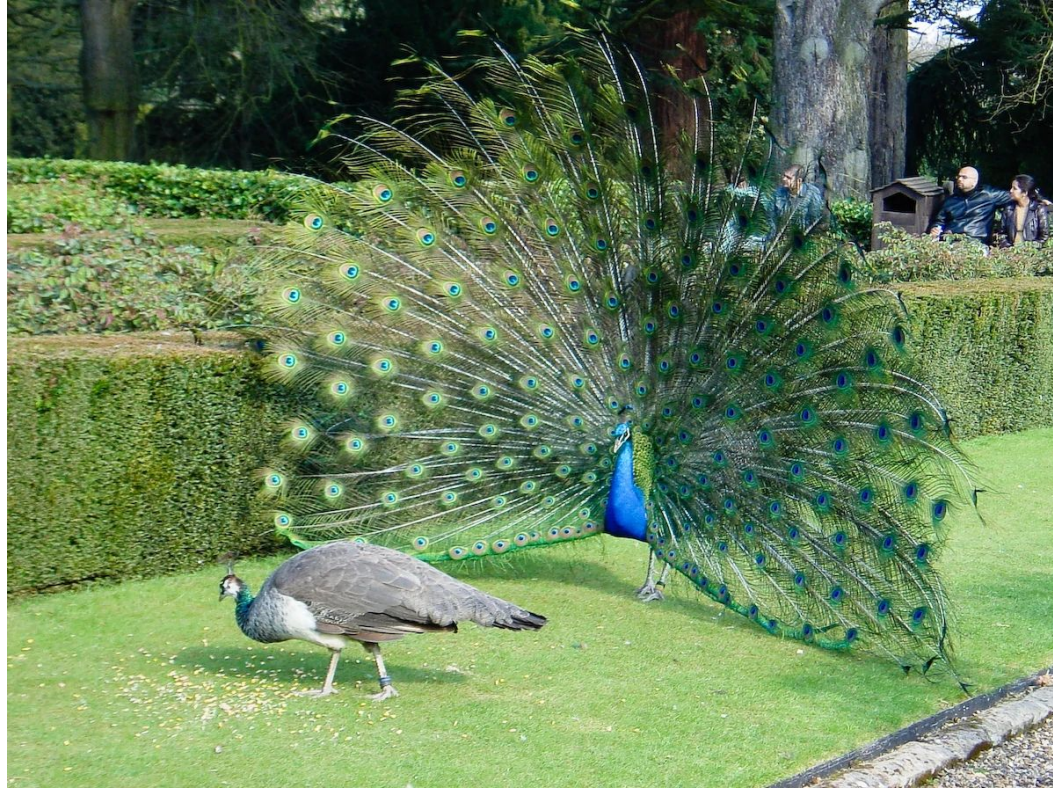
Extremes of reproductive skew found only in states

Range in reproductive success,

males=black
women=white



Inter-sexual selection and sexual dimorphism



Intersexual selection in primates

Female mandrills groom & mate with the most brightly-colored males. Male color is a stronger predictor of female behavior than male dominance rank.

Setchell, *Int'l J Primatology* 2005



Other ways of being attractive, depending on the species: friendly behavior, social dominance, paternal care

But why do females like flashy males ?

It's expensive, not useful, makes them noticeable to predators...

Two explanations:

- They are an honest signal of good condition
 - Some honest signals are a direct effect (redder breasts on house finches come from effective foraging)
 - May be a “costly signal” that only very fit males can afford
- “Sexy sons hypothesis (Fisher 1930)

Sexy son hypothesis

The process starts with a slight tendency for females to prefer males with long tails.

Females who mate with such males have sons with long tails.

The sons get more mates.

The female gets more grand-children.

Females with the preference have more grand-children.

The preference gets stronger, and tails get longer.

Implications for human mating strategies

We are a mildly polygynous species:

- Sexual dimorphism (body size, upper-body strength, etc)
- Marriage cross-culturally (polygyny common, vs. polyandry)
- Men gain in reproductive success from multiple matings
- Greater reproductive skew in males than females
- But a lot of variation across societies
- Extremes of reproductive skew only in complex state-level societies

Next chapters will explore implications of sexual selection for male and female mating psychology