HUMAN SEXUALITY

BIOLOGICAL SEX & GENDER IN STUDIES OF HUMAN SKELETAL REMAINS

DR ARWA KHAROBI

Sex, Gender & Sexuality

- **Sex** refers to the biological categories of M & F

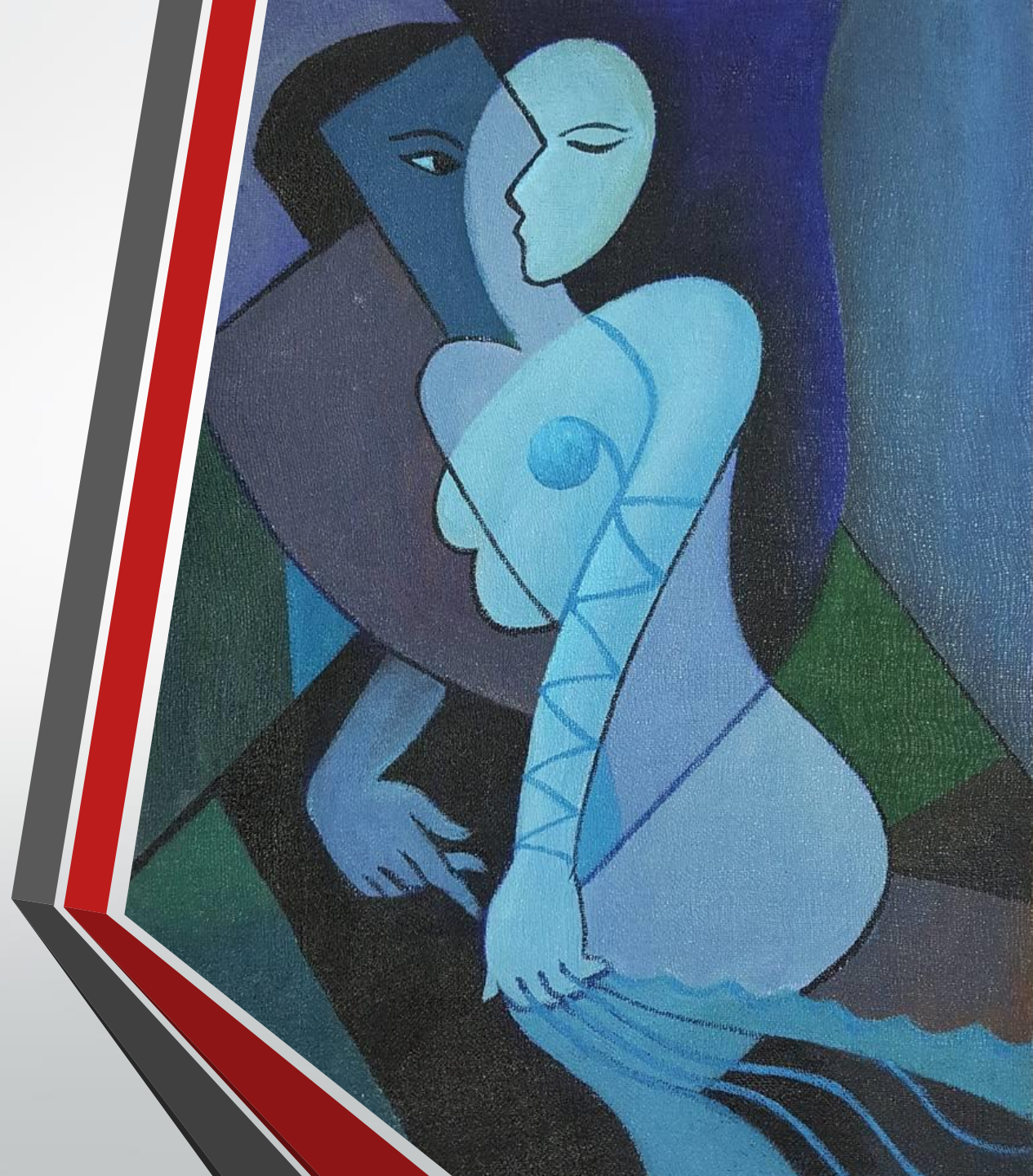
- The sex of a person is determined by an examination of biological & anatomical features, including (but not limited to):

1. visible genitalia (e.g., penis, testes, vagina)
2. internal sex organs (e.g., ovaries, uterus)
3. secondary sex characteristics (e.g., breasts, facial hair),
4. chromosomes (XX for females, XY for males, & other possibilities)
5. reproductive capabilities (including menstruation)
6. activities of growth hormones, particularly testosterone & estrogen

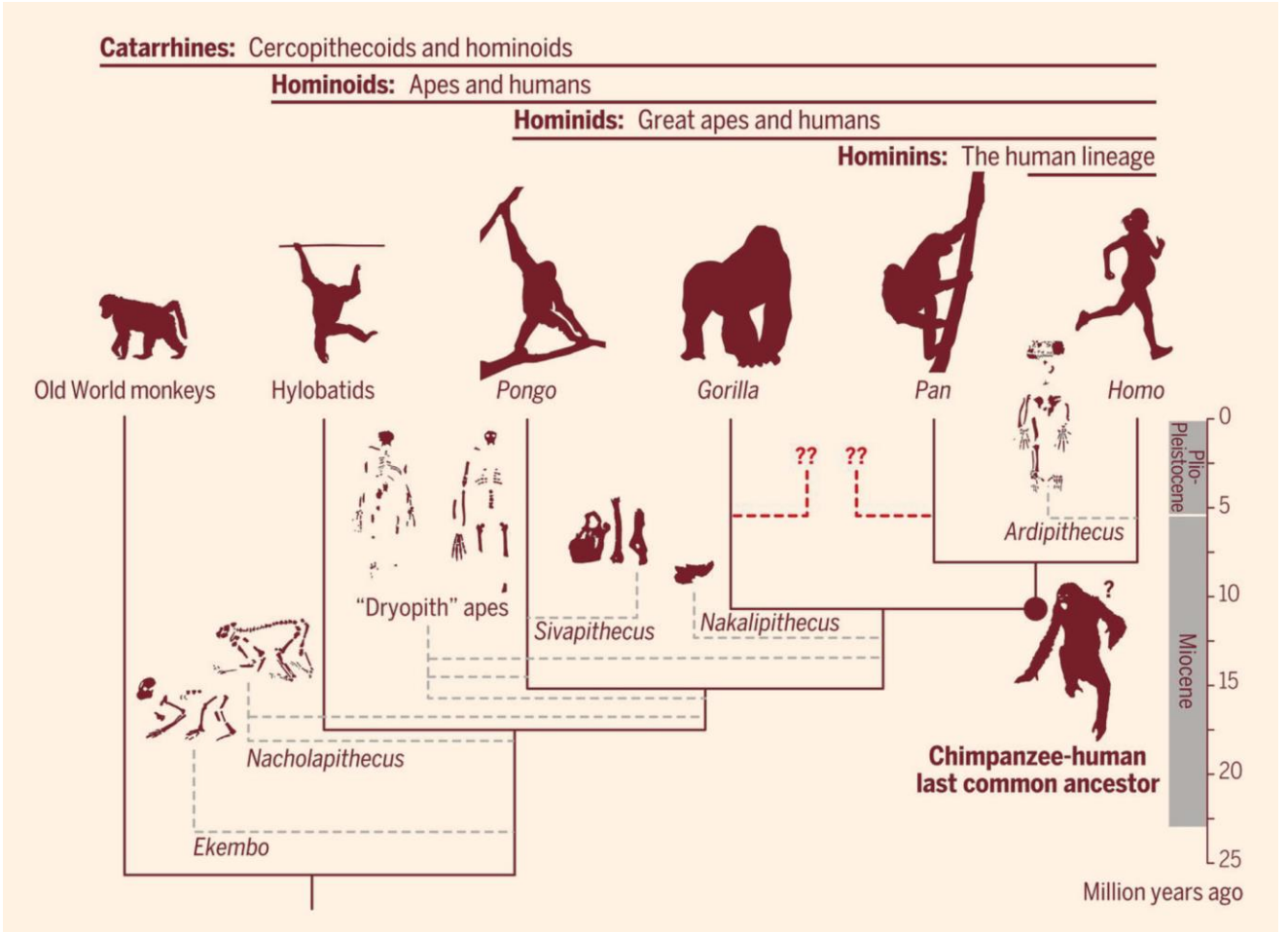
Sex, Gender & Sexuality

- **sex** : based on biology
- **gender** : developed by social scientists to refer to cultural roles based on these biological categories
- The cultural roles of gender assign certain

1. behaviors
2. relationships
3. responsibilities
4. rights differently to people of different genders



The Evolutionary History of Human Sexuality



overview of non-human primate evolution & ancestral relations

The Evolutionary History of Human Sexuality

1. Human arboreal & terrestrial **adaptations** → development of the:
   - ✓ grasping hand
   - ✓ stereoscopic vision
   - ✓ grooming

   → consequences for modern sexual behavior

2. **Importance** of touch, feeling, & vision = important components in sexual attraction

The Evolutionary History of Human Sexuality

3. **Importance** of the social group for human survival
4. Concept of **bonding** in human

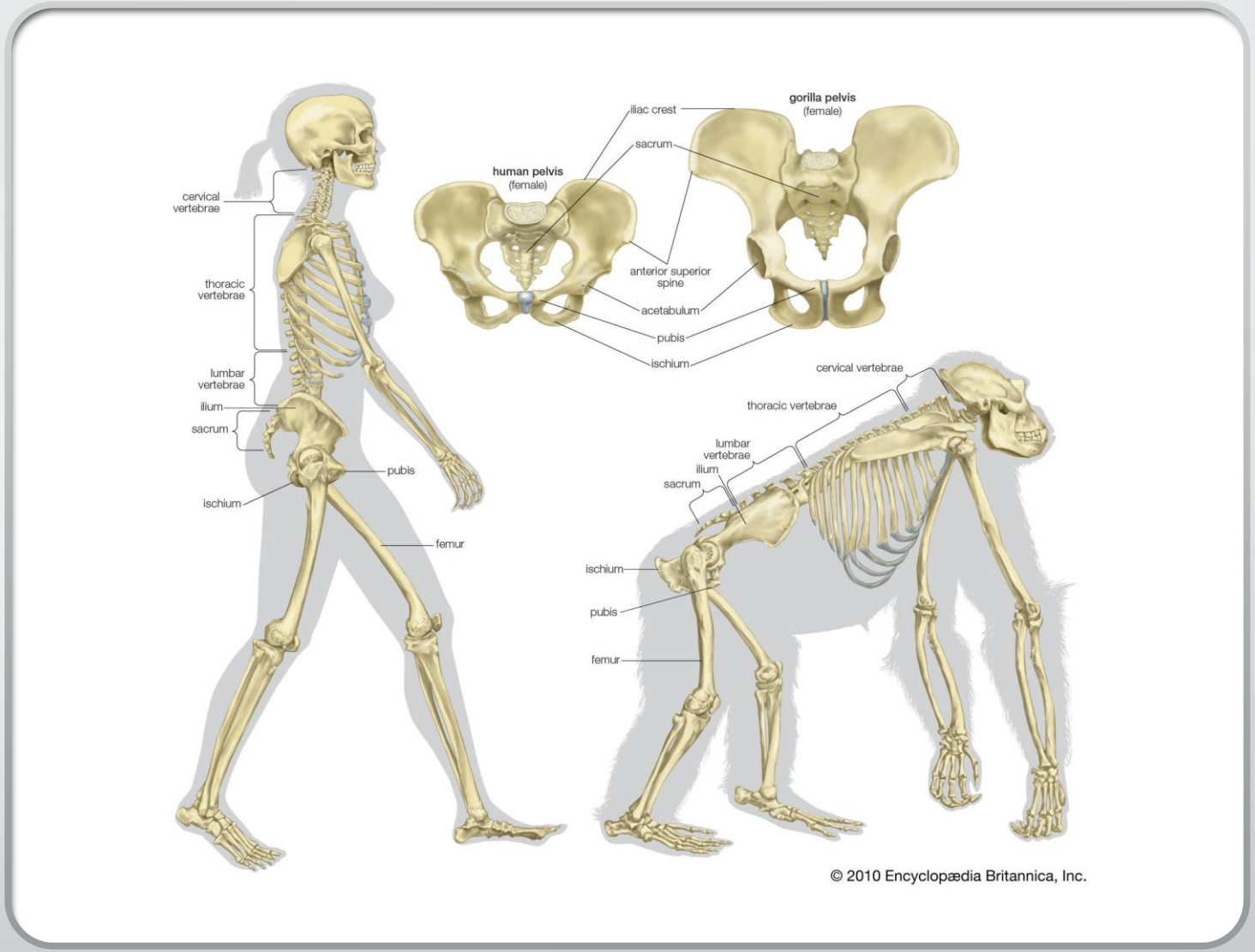
*the establishment of a relationship or link with someone based on **shared feelings**, interests, or experiences*

The Evolutionary History of Human Sexuality

5. **Bipedalism** also had a profound impact on the evolution of human sexuality & reproduction.

it had a consequence for:

- ✓ evolution of the hand
- ✓ manipulation of tools
- ✓ elaboration of the motor areas of the brain
- ✓ memory & thinking



The development of lifelong social relationships or attachments is **a hominid characteristic** that reflects continuities from our non-human primate heritage.

Evidence from Biological Anthropology

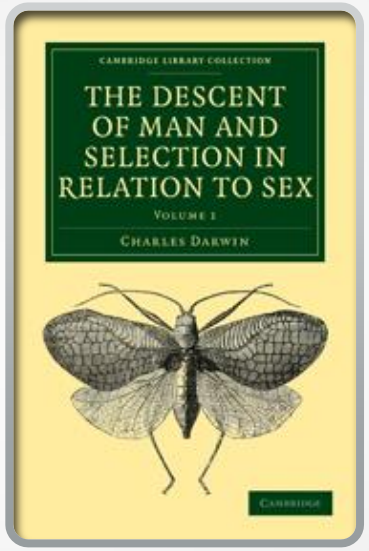
Primate Sex Differences: Behavior

1950 most **primatologists** believed that:

- **males** were the public actors in primate social life, while **females** were passive, marginal figures
- **males** constantly competed against one another for dominance in a rigid group hierarchy, while **females** were more narrowly interested in raising young

(Fedigan & Fedigan 1989)

Primate Sex Differences: Behavior



This view went along with **Charles Darwin's** notion that males are forced to compete for the opportunity to mate with females

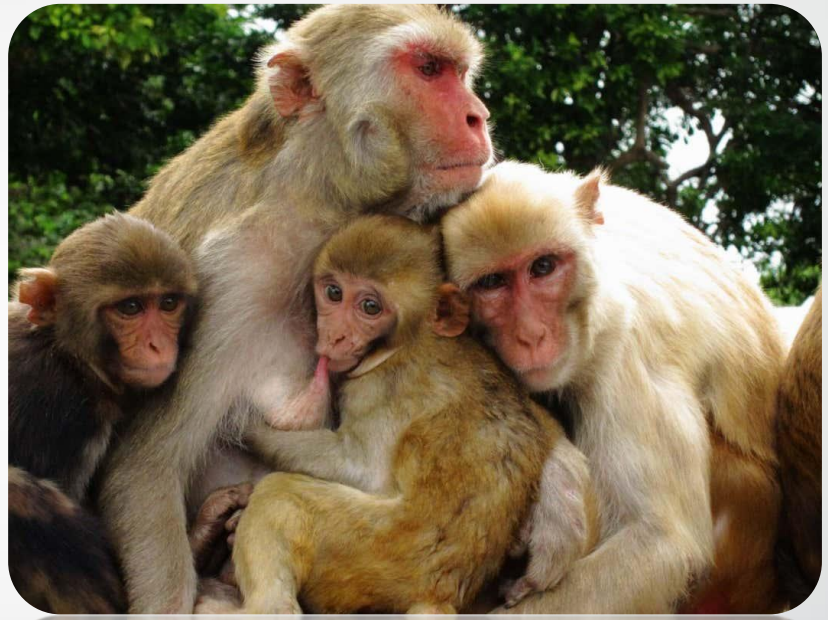
Males	Females
• must be assertive & dominant • forced to compete for the opportunity to mate with females	• shaped by evolution to choose the strongest male to mate with • then concern themselves exclusively with nurturing their offspring to adulthood

Primate Sex Differences: Behavior

By the **1980s**, new studies, new results about primate social organization:

1. most primate groups are essentially composed of related **F** + **M** as temporary members who often move between groups
2. The **heart of primate** society is not a set of competitive **M** but a set of closely bonded **mothers & their young**
3. **F** are not marginal figures but **central actors** in most social life
4. The glue that holds most primate groups together is not male competition but **F kinship** & **solidarity**

Primate Sex Differences: Behavior



- A **complex** social organization with both **M** & **F** actively strategizing for desirable resources, roles & relationships
- **cooperation rather than competition**

Fedigan & Fedigan 1989

Males	Females
• friendliness with females may be a much better reproductive strategy than fighting with other males	• often sexually assertive & highly competitive • actively exercise their preference to mate with certain male "friends" rather than aggressive or dominant males

Primate Sex Differences: Behavior

While evidence suggests that in primate groups males & females are equally important to social life, this still leaves open the question of biological differences & their link to behavioral differences.

- both are competitive
- both are cooperative
- both are central actors in primate social life

equally important to social life

Primate Sex Differences: Biology

What about the **biological differences** & their link to behavioral differences?

Primate Sex Differences: Biology

The anatomy **differs in two main respects**:

1. **Primate adult F**

- bear offspring
- often pregnant or nursing for most of their adult lives
- devote more time & resources to care of young than **M**
- juvenile **F** pay more attention to babies in the group than do juvenile males

Primate Sex Differences: Biology

The anatomy **differs in two main respects**

2. **Primate adult M**

- slightly bigger than **F/** this difference itself is quite variable:

M & **F gibbons** nearly the same

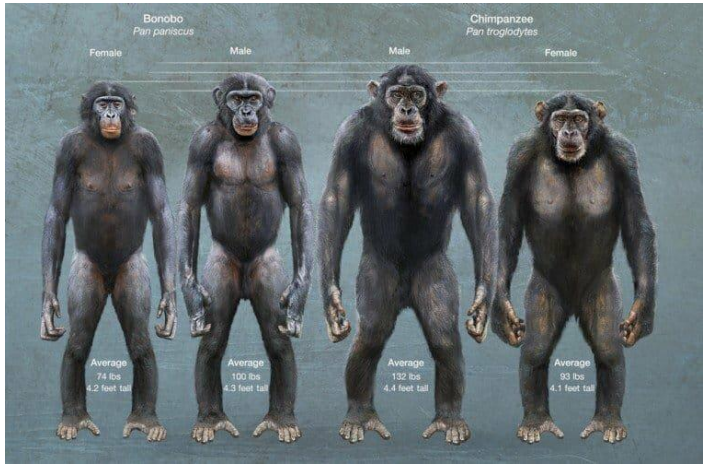
M gorillas twice the size of **F**

F chimpanzees about 75% the size of **M**

Human F about 90% the size of **M**

human sexual dimorphism closer to gibbons than chimpanzees

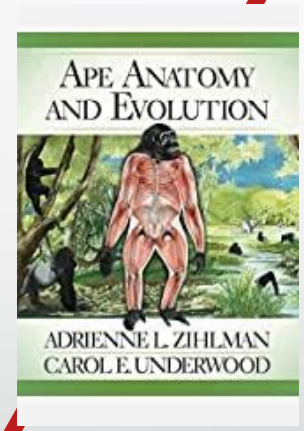
Andrea Rubenstein

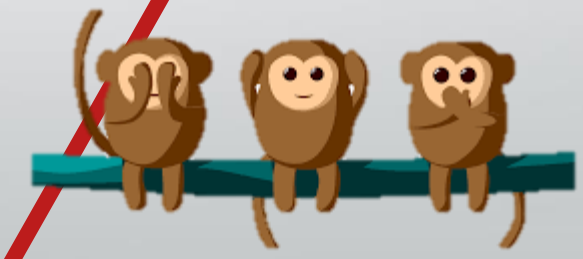


Primate Sex Differences: Sexual dimorphism

Some researchers suggest that a high level of sexual dimorphism is associated with:

1. strong **M** dominance
2. rigid hierarchy
3. **M** competition for mating with **F**





Others:

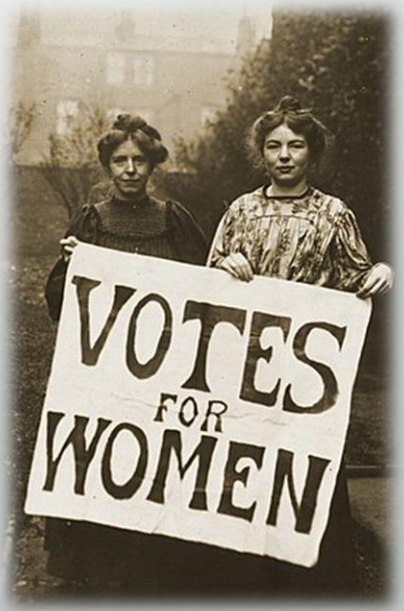
1. **no** simple **correlation** between anatomy & behavioral expression, within or between species
2. each species features a unique "**mosaic**" of sex differences involving anatomy & behavior
3. no clear commonality that might predict what is "natural" for humans

Human Sex Differences

as primate research, research on **human biological sex/gender differences** has been considerably slanted by the gender bias of the (often male) researchers

Euro-American intellectual tradition; scholars have argued that women's biological constitution makes them:

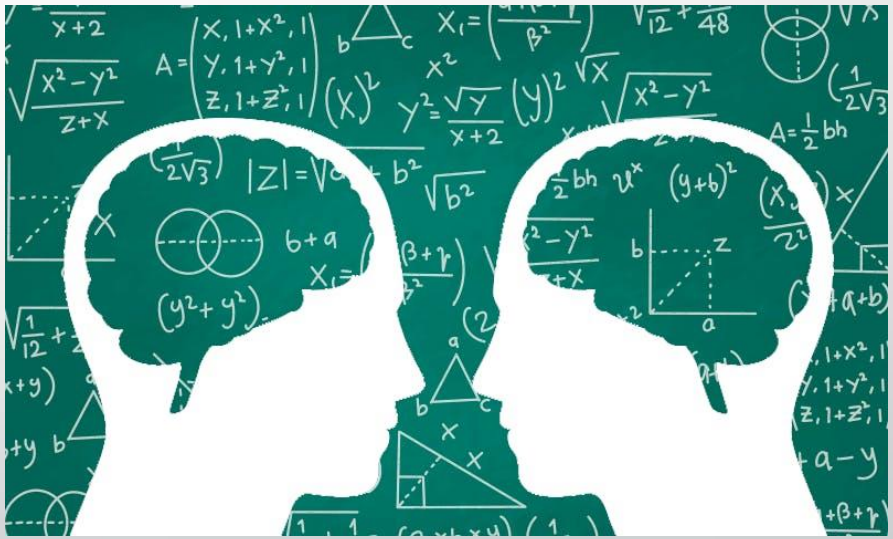
1. unfit to vote
2. go to college
3. compete in the job market
4. hold political office



Human Sex Differences

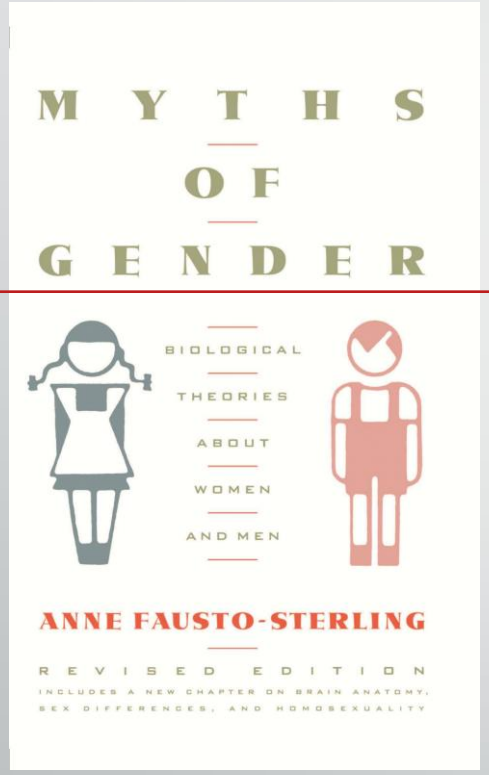
Then the different cognitive abilities

Males	Females
• better at math & spatial relationships • more aggressive	• better at language skills • more emotional



Human Sex Differences

Males	Females
• Spatial abilities	• Verbal abilities

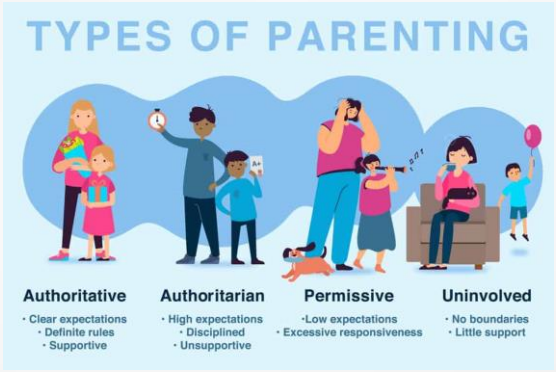


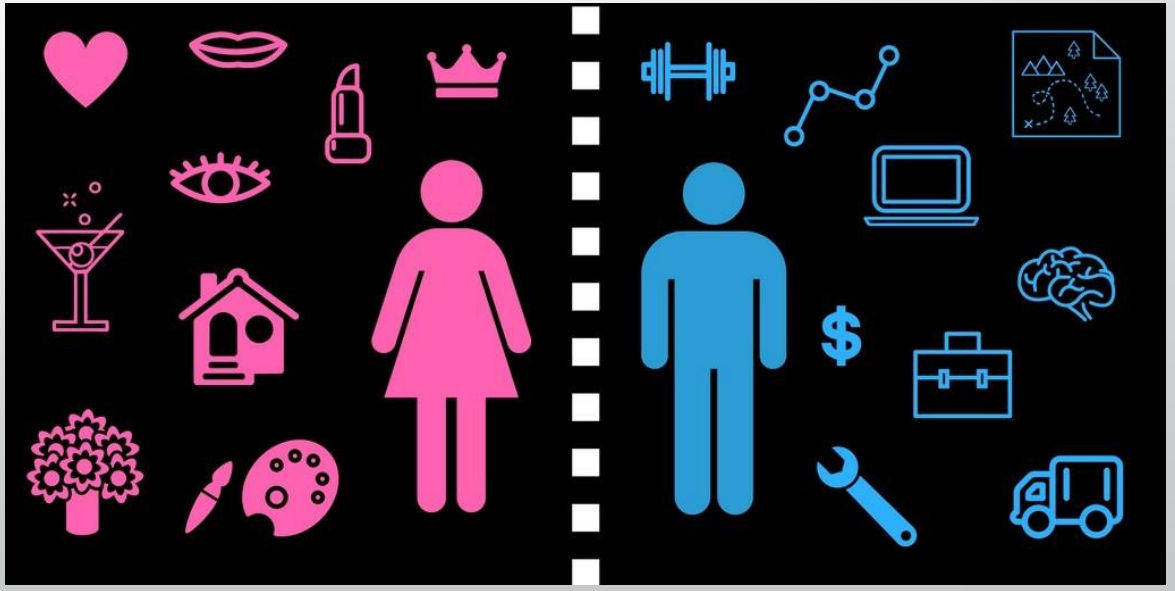
1992: a massive review of research on cognitive & behavioral sex/gender differences in humans

a very small difference
no statistically significant

only about 5% can be attributed to gender
→ 95 % of the differences are due to other factors (i.e., educational opportunities)

Human Sex Differences: Biology & Behavior





not necessarily rooted in biological sex differences

Parenting styles

forms of play

gender roles—all elements of culture—

may shape the data more than biology

As with bonobos & chimpanzees, humans are **biologically quite flexible**, allowing for a diverse array of forms of gender & sexuality

Biological Sex vs. Gender

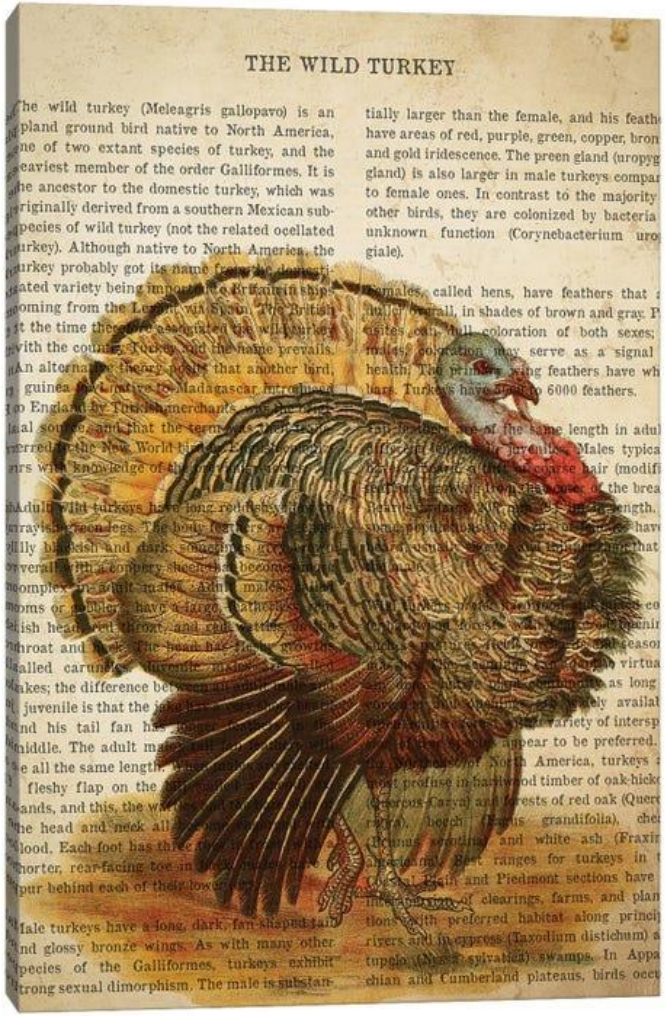
According to the World Health Organisation

- **Biological Sex**: the different biological & physiological characteristics of males & females (i.e. reproductive organs, chromosomes, hormones etc)
- **Gender**: the social constructed characteristics of women & men (i.e. norms, roles, relationship of and between groups of women and men. It varies from society to society and can be changed

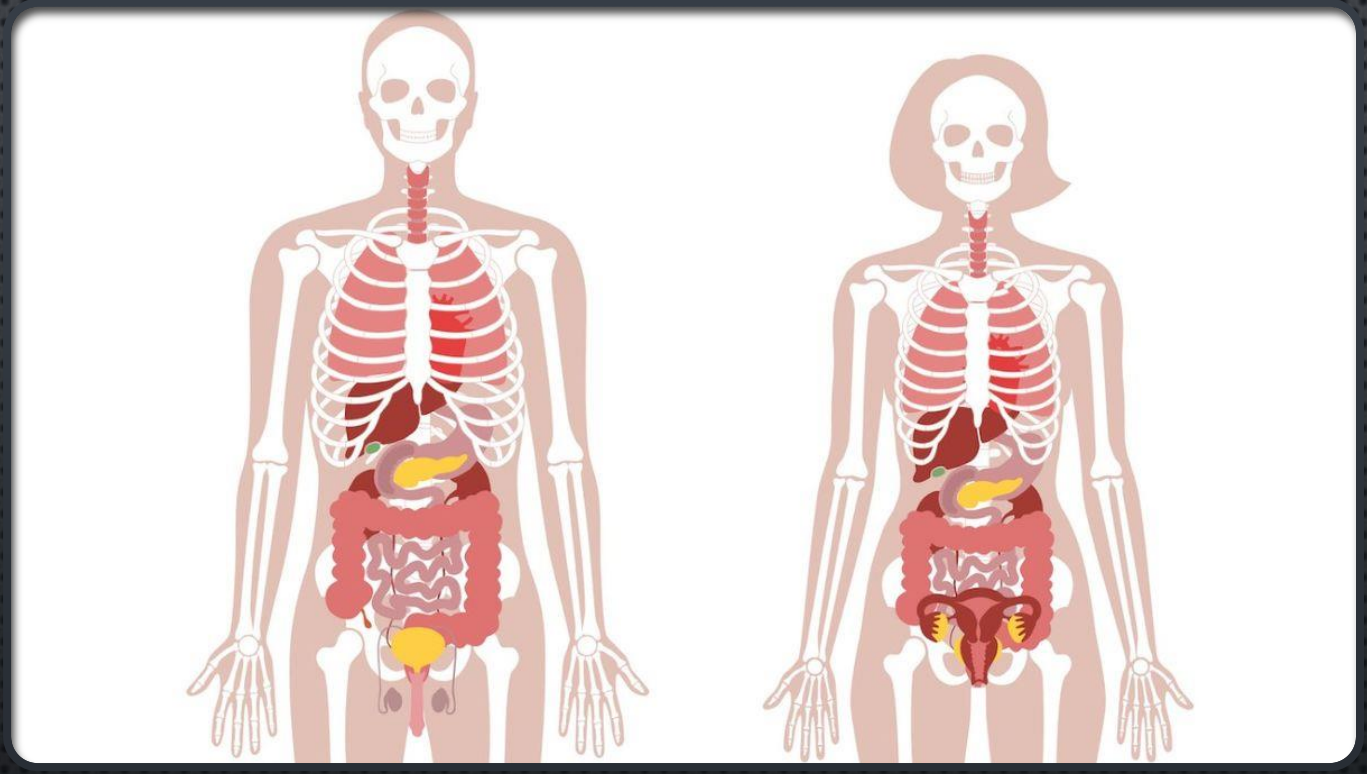
In human osteology it is estimated the biological sex!

I. SEXUAL DIMORPHISM

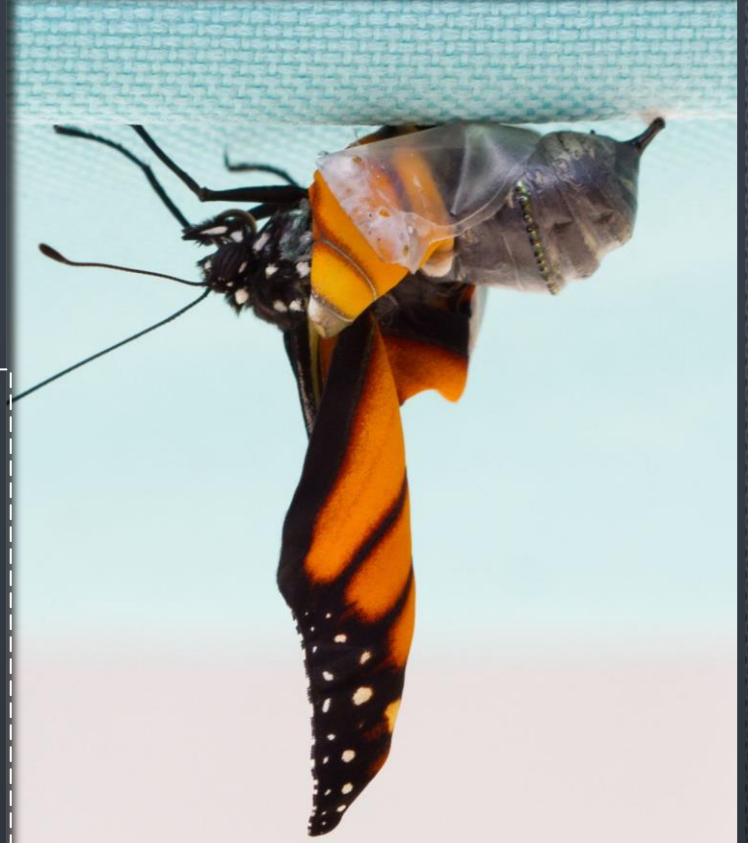
DIFFERENCES BETWEEN MALES AND FEMALES INCLUDE ALL FEATURES RELATED TO REPRODUCTIVE ROLE, NOTABLY THE ENDOCRINE (HORMONAL) SYSTEM AND THEIR PHYSICAL, PHYSIOLOGICAL EFFECTS.



I. SEXUAL DIMORPHISM



DEVELOPMENT OF THE MALE & FEMALE REPRODUCTIVE SYSTEMS

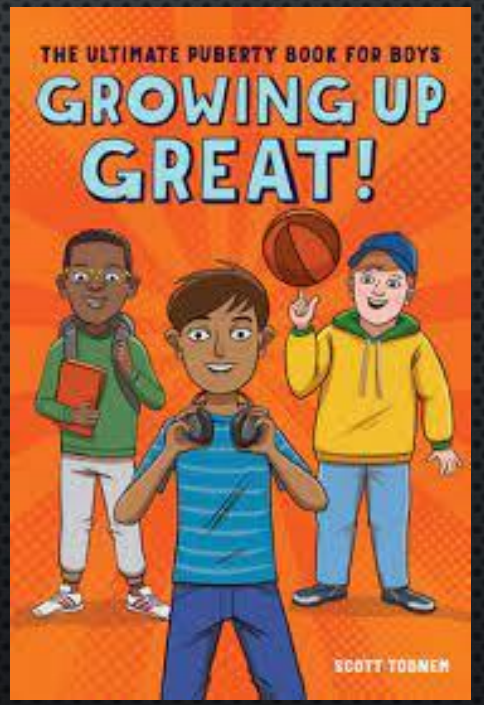


FETUS

- DEVELOPMENT OF THE REPRODUCTIVE SYSTEMS BEGINS SOON AFTER FERTILIZATION OF THE EGG
- WITH PRIMORDIAL GONADS BEGINNING TO DEVELOP APPROXIMATELY ONE MONTH AFTER CONCEPTION
- REPRODUCTIVE DEVELOPMENT CONTINUES IN UTERO

CHILDHOOD

THE DIFFERENCES BEGIN TO ACCENTUATE
BUT STILL SOFT



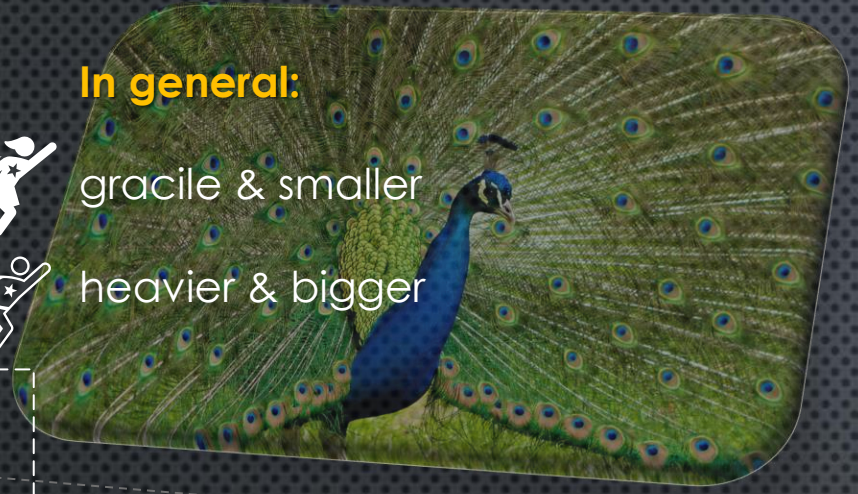
FURTHER SEXUAL DEVELOPMENT OCCURS AT PUBERTY

Male	Female
Increased larynx size & deepening of the voice	Deposition of fat, predominantly in breasts & hips
Increased muscular development	Breast development
Growth of facial, axillary, & pubic hair, & increased growth of body hair	Broadening of the pelvis & growth of axillary & pubic hair

18-20 years: well-marked differences

The sexual estimation is more accurate after the individual hits maturity

I. SEXUAL DIMORPHISM



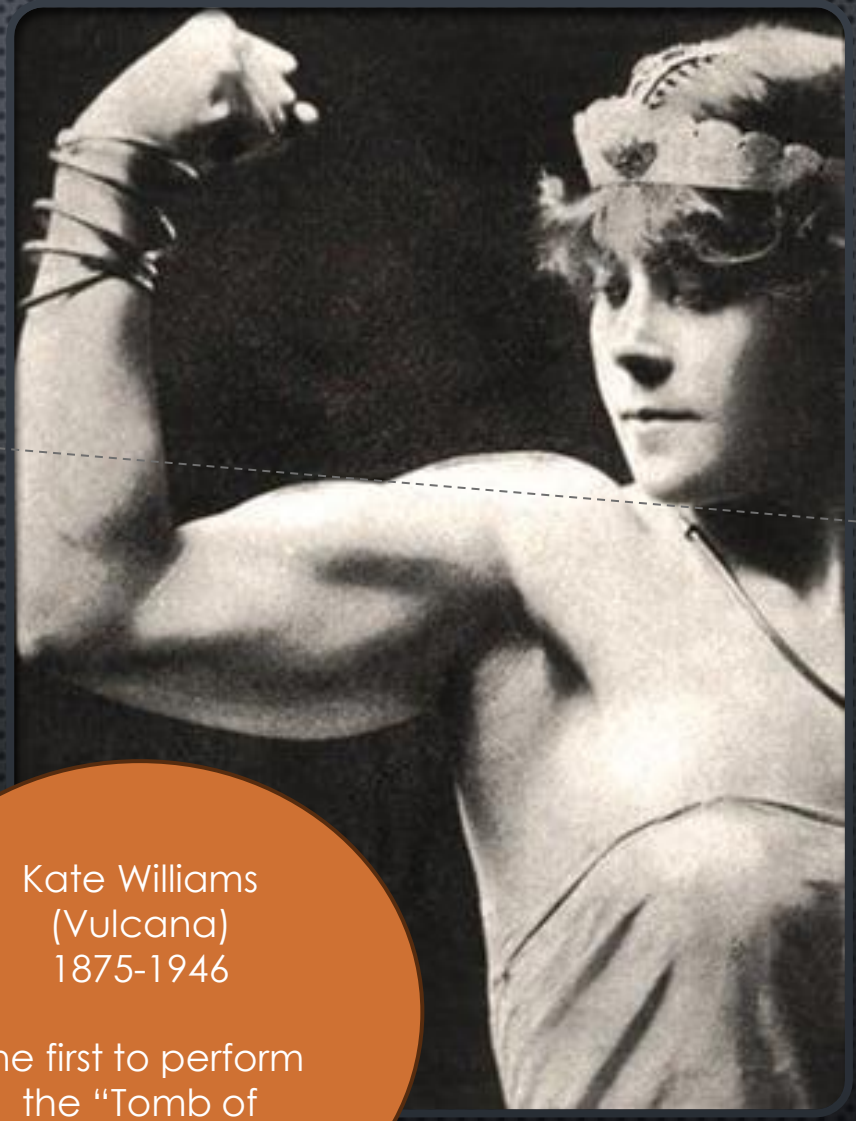
In general:

gracile & smaller

heavier & bigger

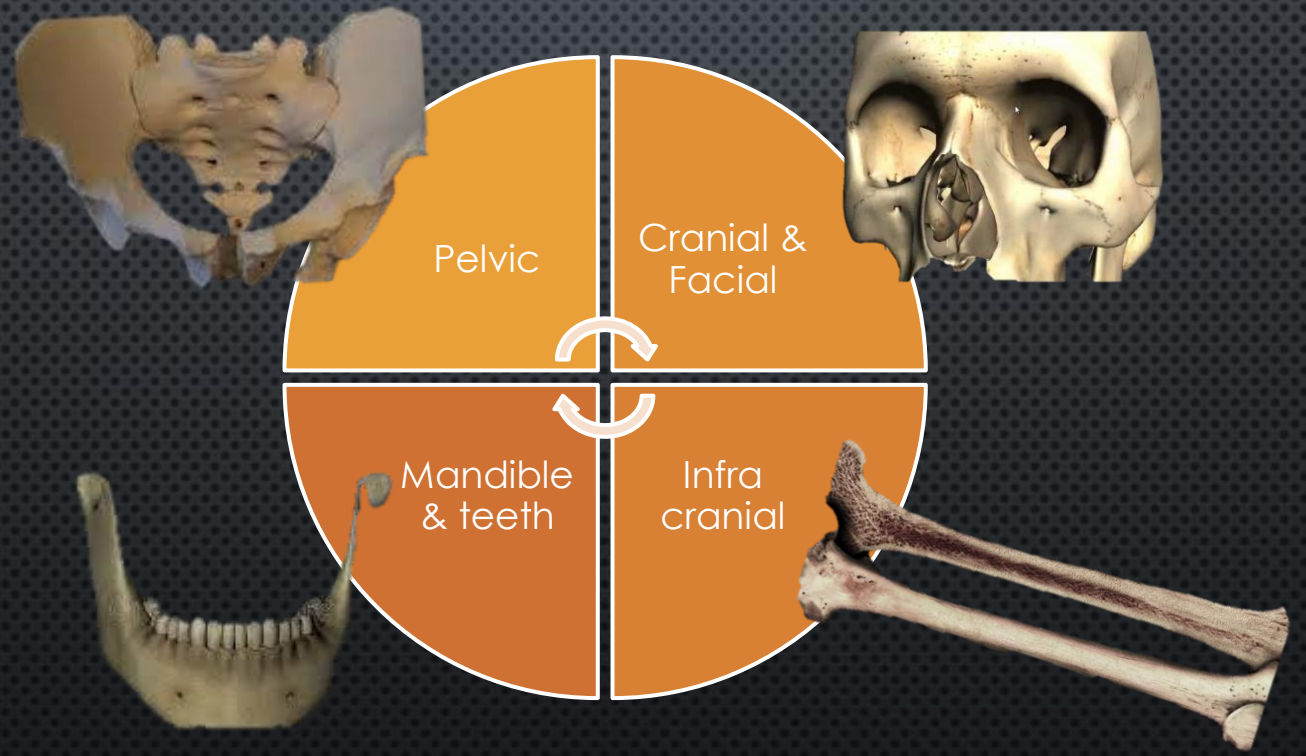
- IMPORTANT TO CONSIDER MORPHOLOGICAL VARIATION
- EACH INDIVIDUAL MAY HAVE MIXED CHARACTERISES (DUE TO THE BIOLOGY OF THE PERSON OR BECAUSE OF THE INTERACTION WITH THE ENVIRONMENT)

WOMAN ++ SPORT # MAN WITH NO EXERCISE



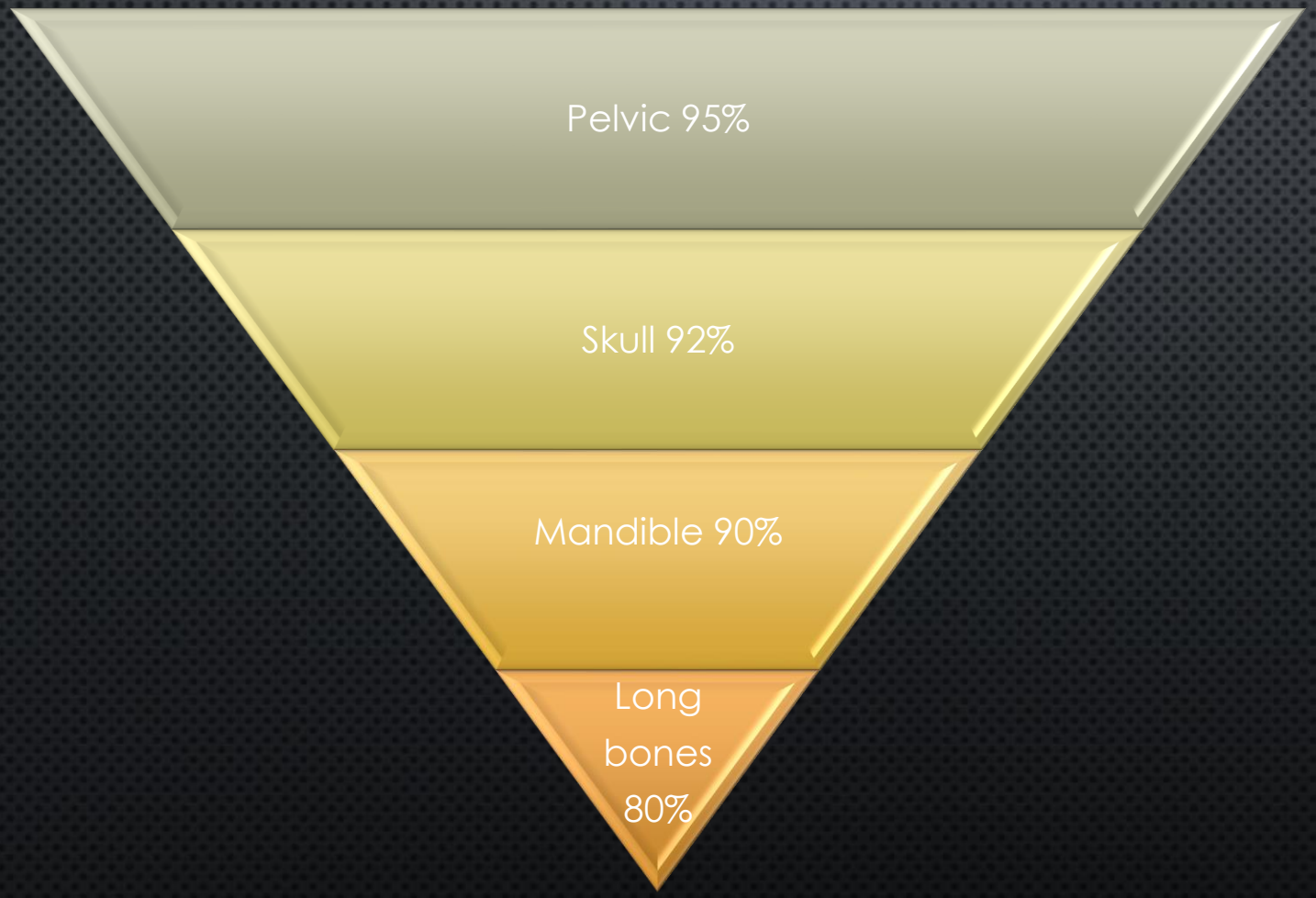
Kate Williams
(Vulcana)
1875-1946

the first to perform the "Tomb of Hercules" stunt.



MORE DIMORPHIC BONES THAN OTHER!

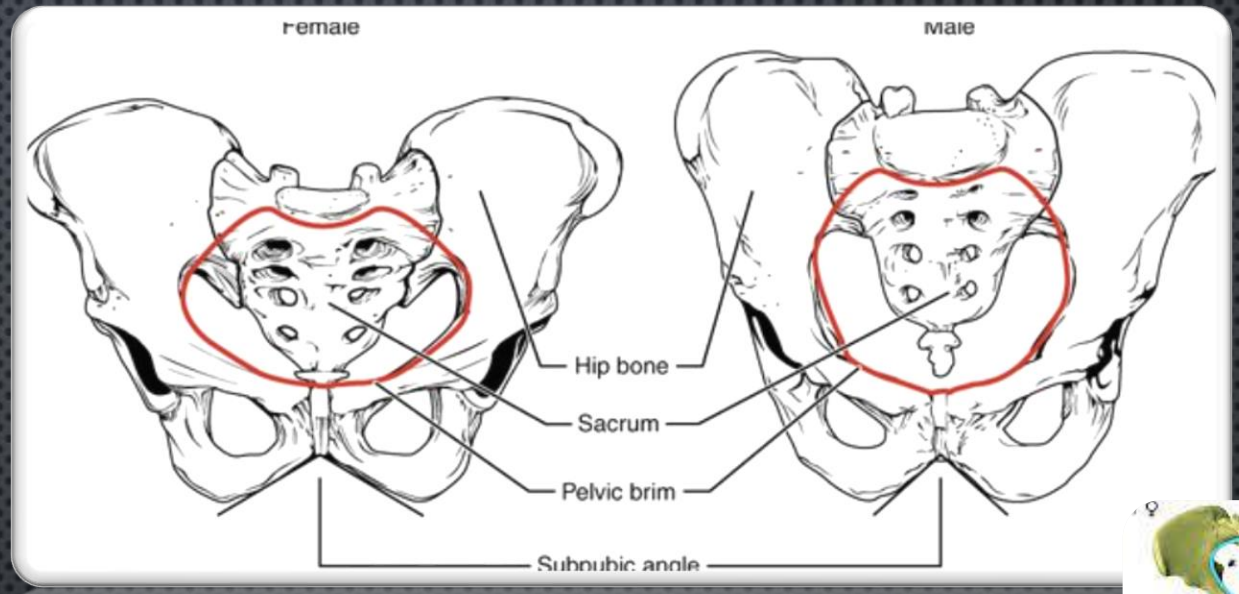
ACCURACY OF SEX DETERMINATION

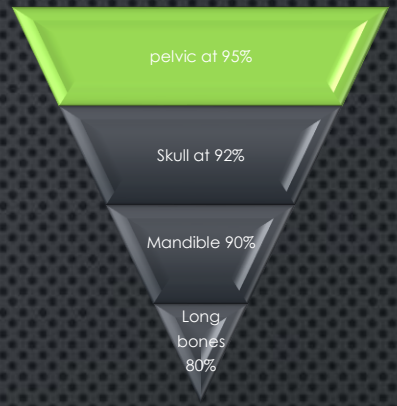


Krongman & Iscan 1986

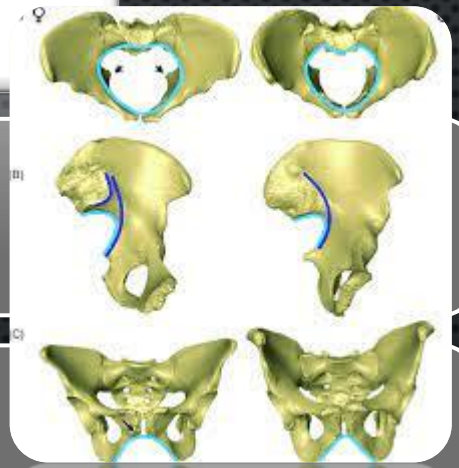
I. SEXUAL DIMORPHISM

1. PELVIC





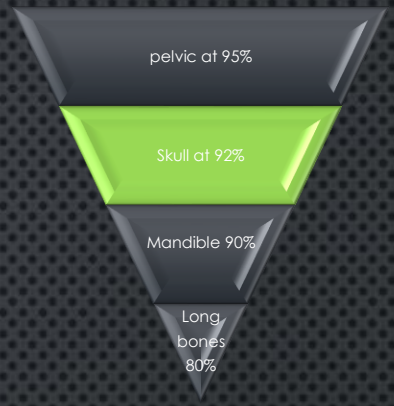
Females: a wider subpubic angle & a broader pelvic inlet
Males: pelvis generally narrower & more robust



The greater sciatic notch
wider in females & narrower in males

Ventral arc & subpubic angle, exhibits differences between males & females

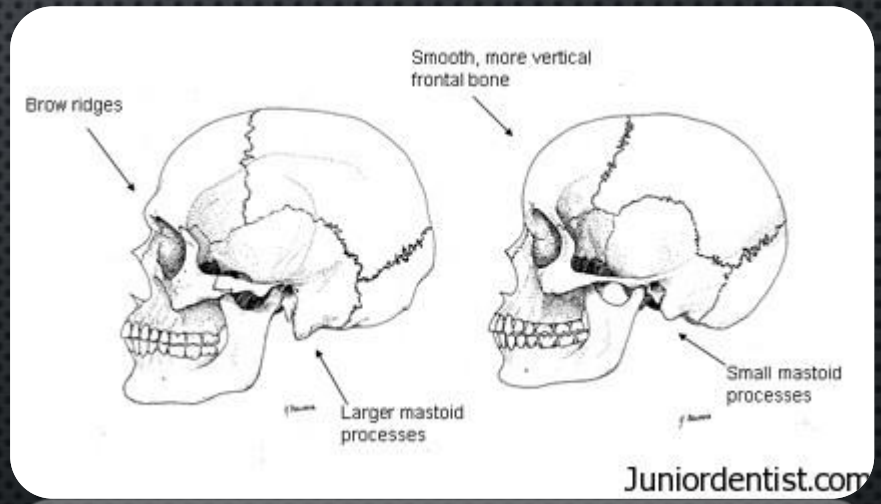
2. CRANIAL & FACIAL FEATURES



MALES (COMPARED TO FEMALES) MAY HAVE:

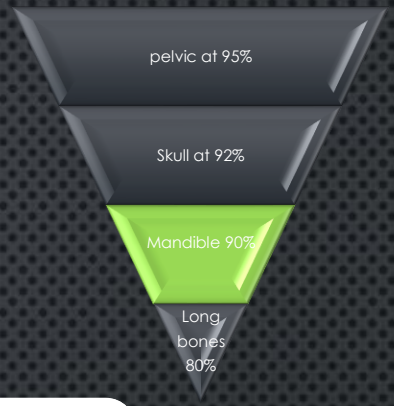
- MORE PROMINENT BROW RIDGES
- LARGER MASTOID PROCESSES
- LARGER SKULL SIZES

REFLECTING DIFFERENCES IN MUSCLE ATTACHMENT POINTS



I. SEXUAL DIMORPHISM

3. MANDIBLE & TEETH

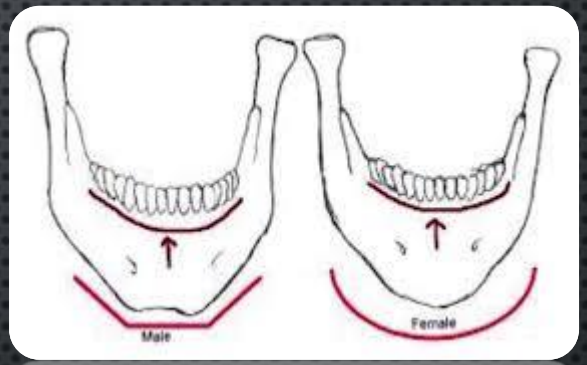


MALES

- MORE ROBUST
- SQUARE-SHAPED MANDIBLE

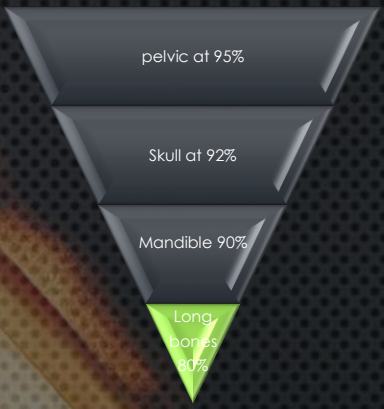
FEMALES

- MORE GRACILE
- ROUNDED MANDIBLE



MALES OFTEN HAVING LARGER & MORE ROBUST TEETH COMPARED TO FEMALES

4. INFRA CRANIAL FEATURES



MALES: LONGER & MORE ROBUST LONG BONES

DIFFERENCES BELIEVED TO BE INFLUENCED BY THE NEED FOR GREATER MUSCLE MASS & STRENGTH IN MALES

MALES: BROADER CHEST & SHOULDERS

FEMALES: NARROWER CHEST & SHOULDERS

REFLECTING THEIR ROLE IN HUNTING AND PHYSICAL LABOR

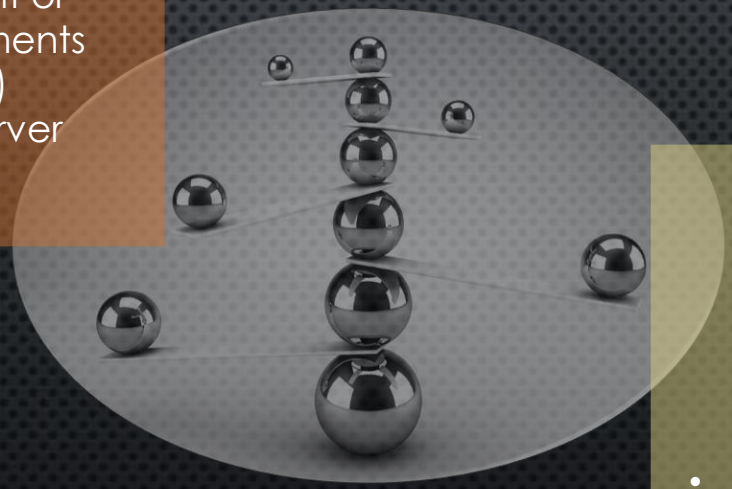
TO ANALYSE THESE BONES

1	• Osteometric
2	• Morphological
3	• Geometric Morphometrics
4	• 3D
5	• Molecular

MORPHOLOGICAL VS OSTEOMETRIC

Osteometric

- based on measures
- taking measurements based on osteological landmarks
- evaluation of a single measurement or index of two or numerous measurements (complex multivariate methods)
- less potential for inter- & intra observer errors



Morphological

- focus on shape
- obvious morphological differences
- allowing optimal separation of the sexes
- Macroscopic observations
- no need of specific tools and/or softwares
- Difficult to learn, based on *Eyeballing*

EYEBALLING

- If formation is not obvious
- experience becomes an essential component
- observer must develop a sense of what is relatively large or small, angled or curved, wide or narrow
- Intra- & inter-observer repeatability + statistical analyses are problematical
- difficult to assign a degree of confidence with which the estimate has been made

II SEX ESTIMATION METHODS

SKULL VS PELVIC

Preservation

Good

Bad

Precision

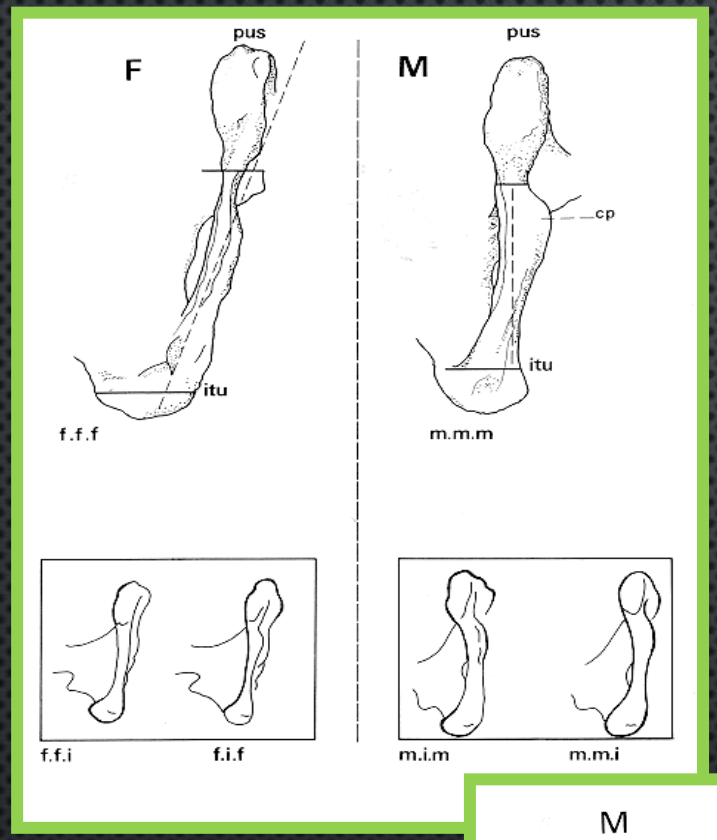
80%

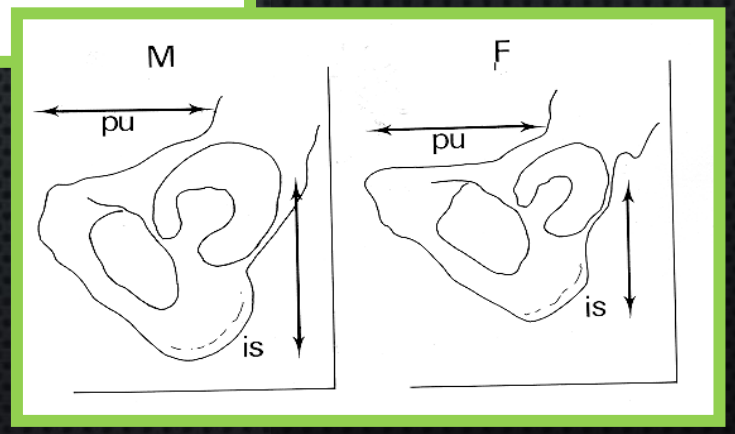
95%

Population specificity

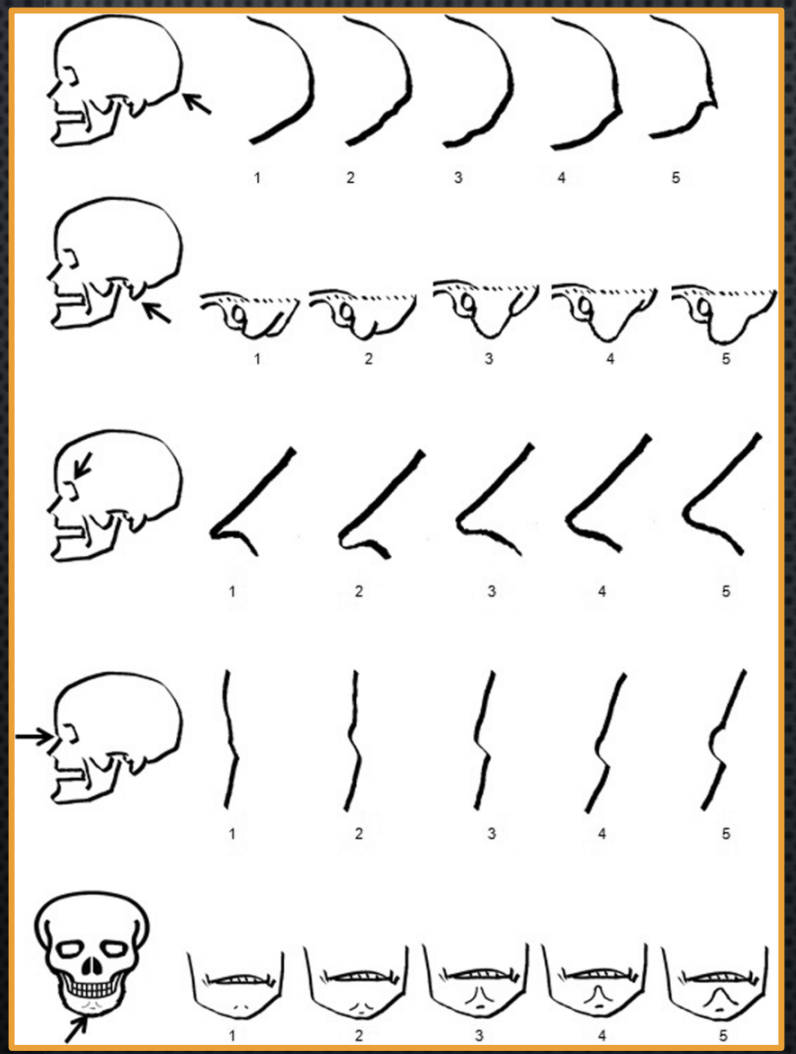
Presence

Absence





A method for visual determination of sex, using the human hip bone (Bruzek 2002)



Standard for scoring cranial traits (Buikstra & Ubelaker 1994)

II SEX ESTIMATION METHODS

GEOMETRIC MORPHOMETRICS

01

Shape-Based Analysis involves the analysis of shape rather than traditional linear measurements.

+ captures spatial distribution of landmarks on bones

02

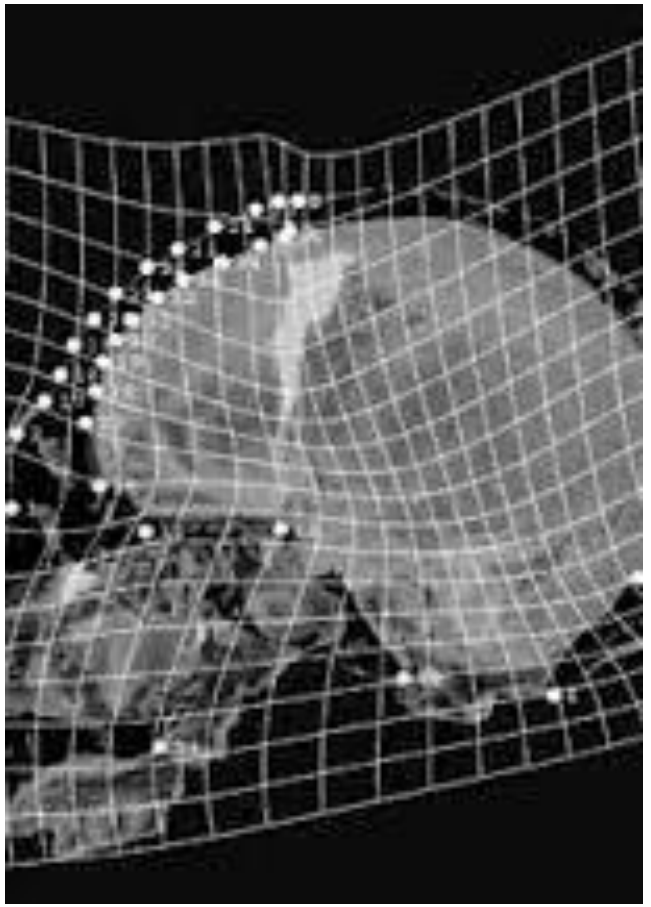
Landmark-Based Approach

place landmarks (anatomically meaningful points) on the skeletal elements. then are used to define the shape of the bone

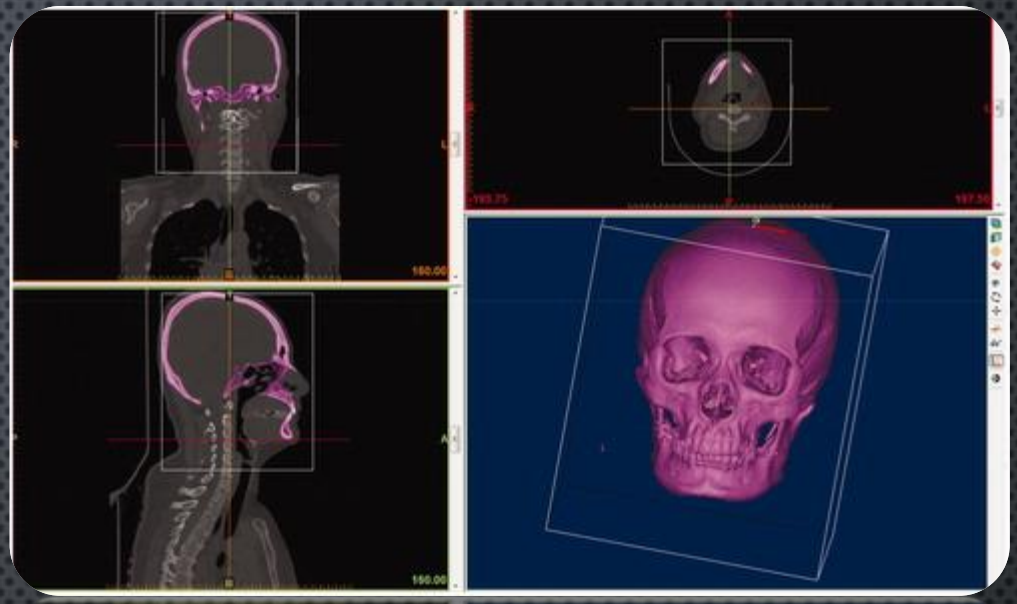
03

Semi-landmarks

In addition to fixed landmarks, semi-landmarks are often used to capture curves & surfaces on bones, ++more comprehensive shape analysis.



THREE-DIMENSIONAL 3D METHODS



High Precision

in capturing the morphology & structure of bones ++ more accurate measurements & analysis.

Detailed Morphometric Analysis

including the measurement of complex 3D structures, which can reveal subtle differences in bone shape & size

Identification of Specific Dimorphic Patterns

reveal specific sexual dimorphism patterns that may not be easily discernible using traditional 2D methods

II SEX ESTIMATION METHODS

- CIVIL STATUS (BIRTH CERTIFICATE, RECORDS)
- WRITTEN SOURCES
- HEADSTONES GRAVES
- GRAVES INSCRIPTIONS
- MUMMIFIED SKELETONS

III.
MISGENDERED SKELETON CHANGES

III. MISGENDERED SKELETON CHANGES

FROM 2009 TO 2019 THE STORY CHANGED

- LOVERS OF MODENA, ITALY
- A CEMETERY, DATING BACK 1,500 YEARS
- 11 GRAVES ALL SINGLE EXCEPT FOR
- TOMB 16 WITH TWO SKELETONS HOLDING HANDS
- PROTEINS IN TOOTH ENAMEL (SEX ESTIMATION)

Photograph: University Of Bologna Handout/EPA

THE LOVERS WERE BOTH MALE

BECAME POTENTIAL EVIDENCE OF A FIFTH-CENTURY SAME-SEX RELATIONSHIP

ONGOING SEXUAL REVOLUTION IN ARCHAEOLOGY

For decades, archaeologists have had to rely on grave goods & the shape of bones to tell :a man or a woman?

but over the past few years, the use of new methods → in a string of skeletons having their presumed sex overturned!!

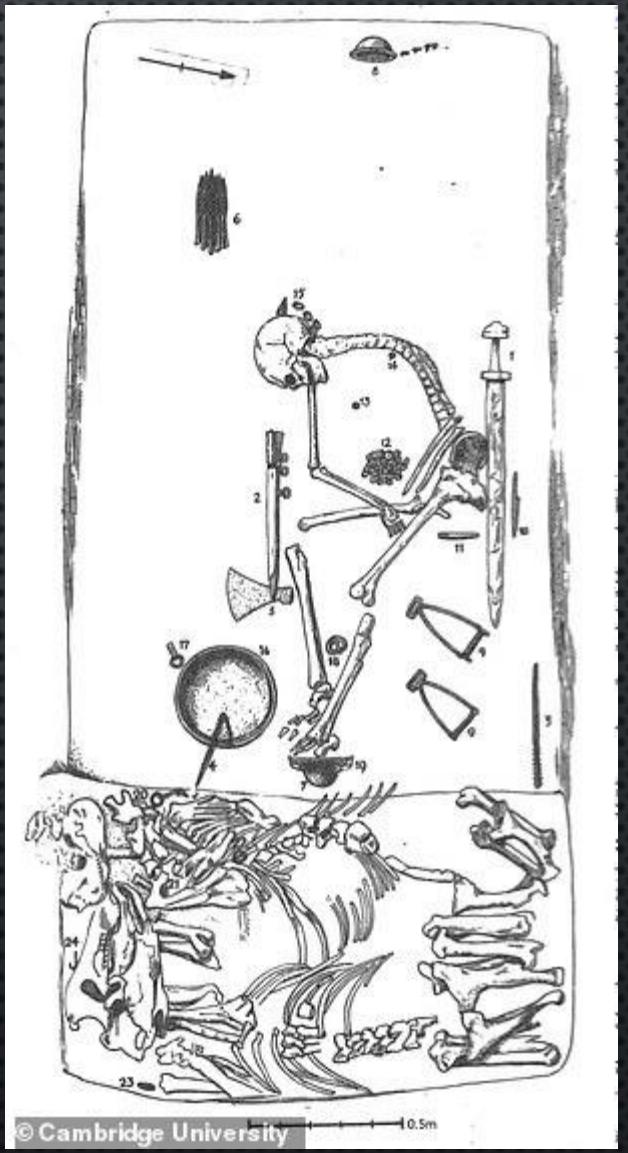
The challenges to our views on sex, gender, & love in ancient societies have stirred debated.

WIDER DEBATE

III. MISGENDERED SKELETON CHANGES

VIKING WARRIOR IN BIRKA, SWEDEN

HISTORICAL ASSUMPTION: THE GRAVE CONTAINED NUMEROUS WEAPONS HAD LONG BEEN ASSUMED TO BELONG TO A MAN SINCE THE LATE 19TH CENTURY



WIDER DEBATE

III. MISGENDERED SKELETON CHANGES

VIKING WARRIOR IN BIRKA, SWEDEN

THE DEBATE WAS INITIATED BY A 2017 PAPER

CONFIRMATION THROUGH DNA TESTING: IT IS A FEMALE!

CHALLENGING CONVENTIONAL IDEAS

- The discovery of a potential female Viking warrior challenged existing perceptions about the roles of men and women in Viking society.
- Conventional Gender Norms: Traditionally, weapons like swords were associated with men, while jewelry was considered feminine. This created a conflict in interpreting the findings.
- Re-evaluation of Warrior Status: Some argued that if the skeleton was indeed a woman, it would require a re-evaluation of the concept of a female warrior, which contradicted traditional beliefs.

INCONSISTENCY IN INTERPRETATION

why the warrior status was accepted when the skeleton was presumed to be a man, but challenged when it turned out to be a woman??

Next question

III. MISGENDERED SKELETON CHANGES

WHICH LONG-STANDING ANALYSIS WILL BE NEXT TO FALL?

WHAT ABOUT TESTING OTHER "LOVERS" BURIED ACROSS ITALY?

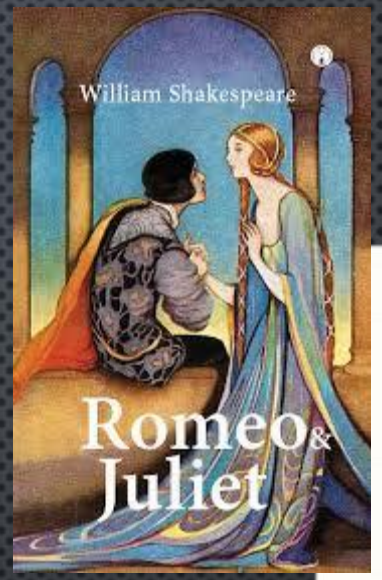
THE LOVERS OF VALDARO AT THE NATIONAL ARCHAEOLOGICAL MUSEUM OF MANTUA

THE 6,000-YEAR-OLD COUPLE BURIED NOSE TO NOSE AND WITH THEIR ARMS PRESSED BETWEEN THEIR CHESTS

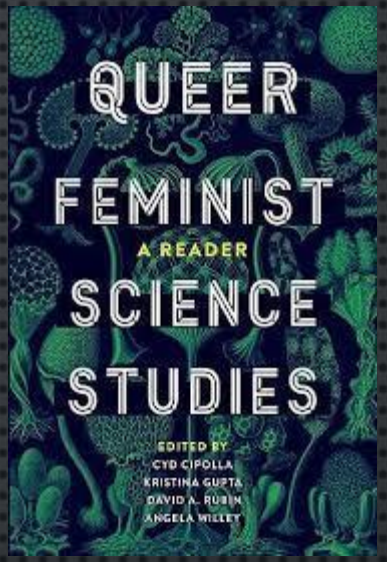
III. MISGENDERED SKELETON CHANGES

ALWAYS QUESTIONING

TEENAGERS WHEN THEY DIED, ONE POSSIBLY AS YOUNG AS 16, SO THE OSTEOLOGICAL EXAMINATION THAT DECLARED THEM "FEMALE" AND "PROBABLY MALE" COULD USE SOME MODERN BACK-UP – AND IT'S ON ITS WAY



II. MISGENDERED SKELETON CHANGES



- LIMITED ANSWERS: WHO LOVED WHOM IS ONE OF THOSE THINGS, AS IS PEOPLE'S SENSE OF IDENTITY
- WE CAN ONLY TRY, AS BEST WE CAN, TO RECONSTRUCT THE LIVES OF PAST PEOPLE BASED ON THE AVAILABLE DATA
- IT IS A MATTER OF RESPECT FOR THE PEOPLE OF THE PAST

"EVERY GRAVE TELLS A DIFFERENT STORY," "BECAUSE THEY WERE ALL REAL HUMANS. THEY HAD THEIR OWN UNIQUE LIVES'

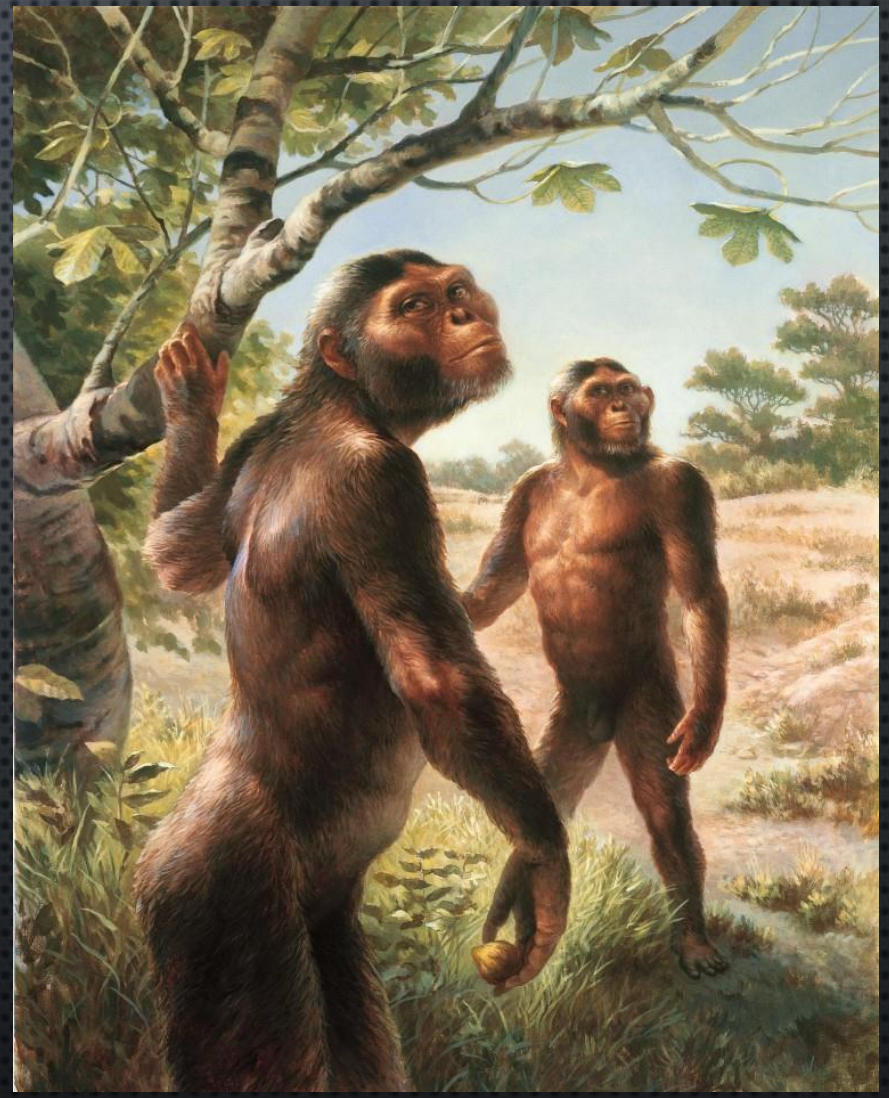
MORE "SEX REVEALS" IN THE FUTURE

1. HOMINIDS

- CHALLENGES WITH POORLY PRESERVED SKELETONS
- LIMITED SKELETAL EVIDENCE: MIGHT ONLY HAVE TWO INDIVIDUALS, MAKING IT HARD TO DETERMINE THE RANGE OF SEXUAL DIMORPHISM.

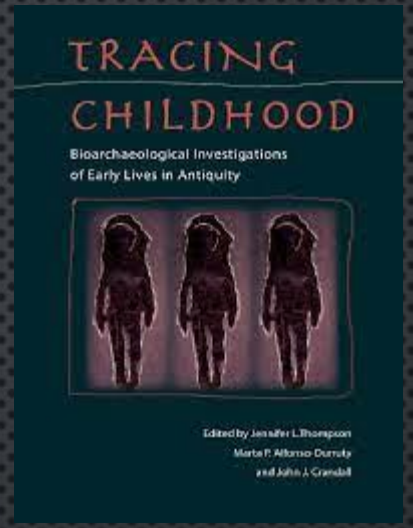
Lucy or Brucey? It Can Be Tricky to Tell the Sex of Fossil Ancestors

Was Lucy a she? After comparing the famous human ancestor's skeleton with other specimens, some researchers say it can be hard to tell.



III. MISGENDERED SKELETON CHANGES

MORE "SEX REVEALS" IN THE FUTURE



2. CHILDREN

- CHALLENGES WITH POORLY PRESERVED SKELETONS
- ABSENCE OF SEXUAL DIMORPHISM
- HIGH GENDER STUDIES (GRAVE GOODS)

III. MISGENDERED SKELETON CHANGES

GENDER-SPECIFIC VALUATION

- THE SEX OF A 10,000-YEAR-OLD INFANT GIRL WAS ESTABLISHED BY ANALYZING HER TOOTH ENAMEL
- FOUND IN A GRAVE CONTAINED A WEALTH OF ARTIFACTS, SHELL BEADS & STONE PENDANTS
- PRESENCE OF VALUABLE ITEMS → BABIES[GIRLS HIGHLY VALUED DURING THE MESOLITHIC AGE
- CHALLENGING PREVIOUS ASSUMPTIONS ABOUT GENDER ROLES AND VALUES

IV. MOTHERHOOD

- What was motherhood like during past ages?
- Who is the mother?
- Any skeletal manifestations for pregnancy or giving birth?

IV. MOTHERHOOD

Endocr Connect. 2020 Jun; 9(6): R143–R157.
Published online 2020 May 12. doi: 10.1530/EC-20-0055
PMCID: PMC
PMID:

Pregnancy and lactation, a challenge for the skeleton

E M Winter,[1] A Ireland,[2] N C Butterfield,[3] M Haffner-Luntzer,[4] M-N Horcajada,[5] A G Veldhuis-Vlug,[1,6] L Oei,[7,8] G Colaianni,[9] and N Bonnet[5]

Review J Forensic Sci. 2012 Jul;57(4):866-72. doi: 10.1111/j.1556-4029.2012.02102.x.
Epub 2012 Feb 28.

Skeletal indicators of pregnancy and parturition: a historical review

Douglas H Ubelaker [1], Jade S De La Paz

Affiliations + expand

PMID: 22372612 DOI: 10.1111/j.1556-4029.2012.02102.x

HUMAN NEWBORN BABIES ARE ACTUALLY BIG

At birth:

Gorillas babies are 2.7 % as big as their mothers

chimps babies are 3.3 % as big as their mothers

humans babies are 6.1 % as big as their mothers

TO ACCOMMODATE LARGER BABIES

A WOMAN'S PELVIS HAD TO

1. WIDEN
2. DEEPEN.
3. THE BIRTH CANAL ALSO CHANGED SHAPE.

PARTURITION SCARS

AMERICAN JOURNAL OF BIOLOGICAL ANTHROPOLOGY
The Official Journal of the American Association of Biological Anthropologists

RESEARCH ARTICLE | Open Access

The association of parturition scars and pelvic shape: A geometric morphometric study

Lukas Waltenberger, Doris Pany-Kucera, Katharina Rebay-Salisbury, Philipp Mitteroecker

First published: 09 December 2020 | https://doi.org/10.1002/ajpa.24196 | Citations: 5

THE ABILITY TO IDENTIFY WHETHER A FEMALE HAS BEEN PREGNANT OR HAS GIVEN BIRTH

1. DORSAL PUBIC PITTING
2. PREAURICULAR GROOVE

IV. MOTHERHOOD

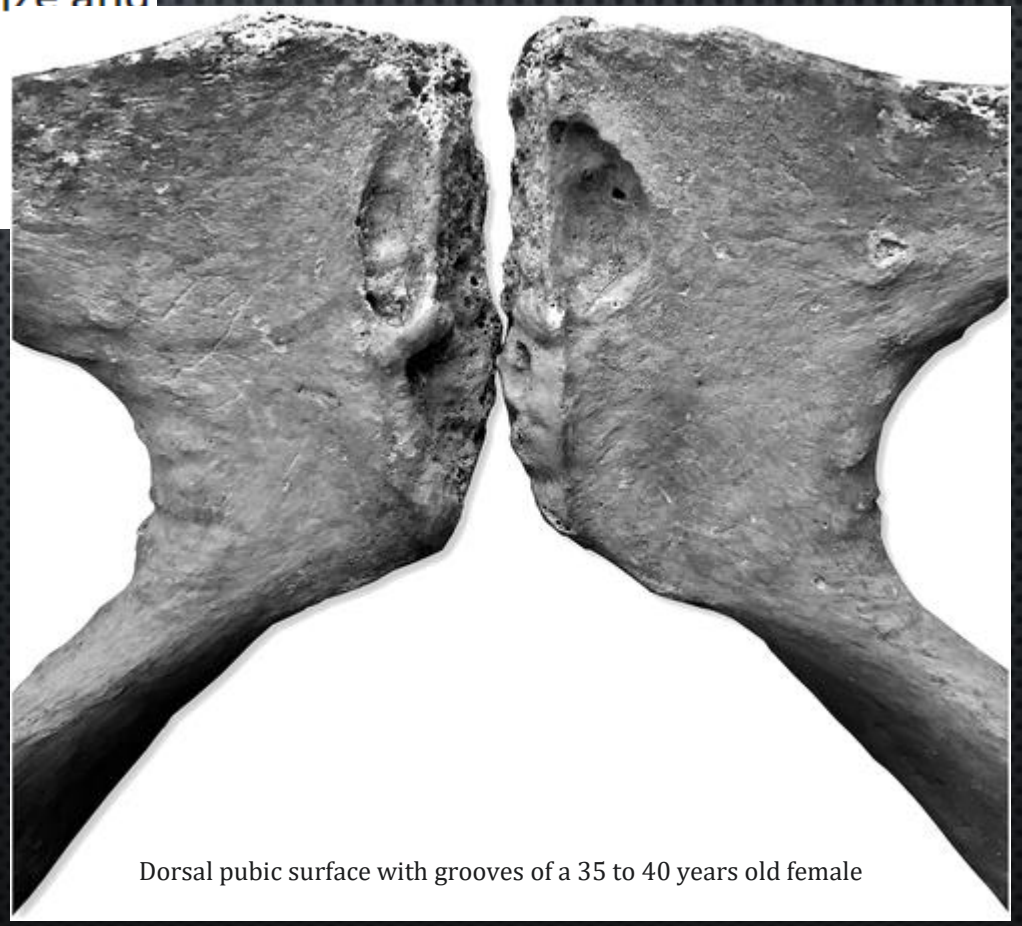
International Journal of Osteoarchaeology

RESEARCH ARTICLE | Open Access

Metric and morphological analysis of pelvic scars in a historical sample from Lithuania: Associations with sex, age, body size and pelvic dimensions

Elisa-Maria Praxmarer, Janina Tutkuviene, Sylvia Kirchengast

First published: 22 May 2020 | https://doi.org/10.1002/oa.2887 | Citations: 2



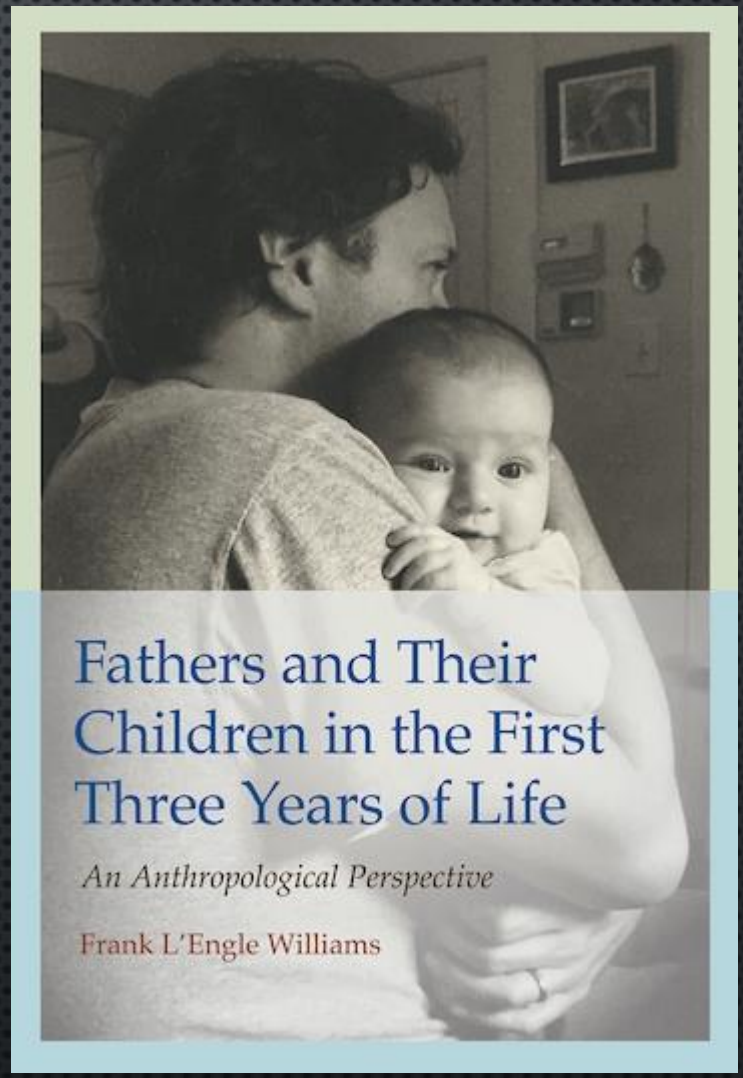
Dorsal pubic surface with grooves of a 35 to 40 years old female

V. FATHERHOOD

V. FATHERHOOD

V. FATHERHOOD

- How ancient is father care of human infants and young children?
- Why did it emerge?
- Is it possible that father care arose among the ancestors of modern humans and became essential for survival?
- Or is it a recent, though variable, development?
- Is father care an evolved trait of Homo sapiens or is it a learned cultural behavior transmitted across generations in some societies but not others?



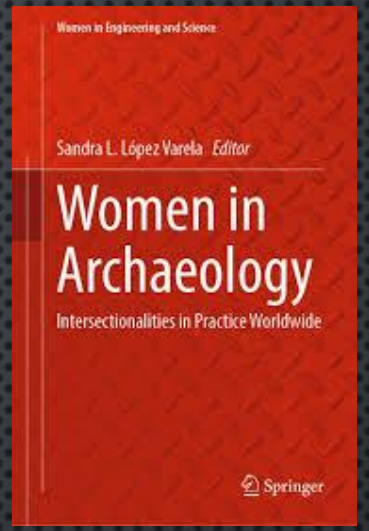
FINAL THOUGHTS & DEBATES

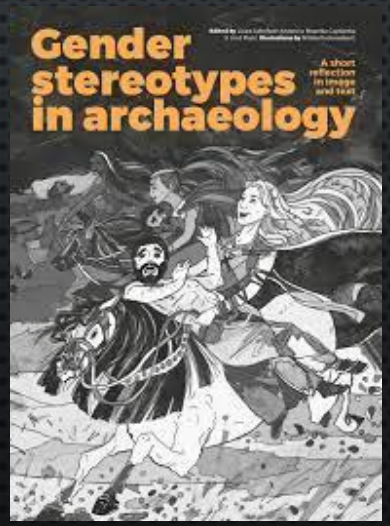
THE GENDER STEREOTYPES

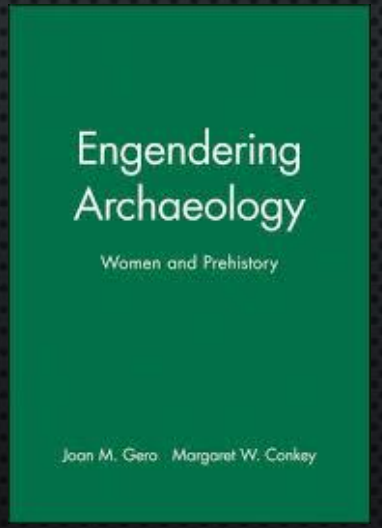
- WERE MEN THE ONLY HUNTERS AND PRODUCERS OF TOOLS, ART AND INNOVATION IN PREHISTORY?
- WERE WOMEN THE ONLY GATHERERS, HOME-BOUND BREEDERS AND CAREGIVERS?
- ARE ALL PREHISTORIC FEMALE DEPICTIONS MOTHER GODDESSES?
- DO WOMEN AND MEN HAVE EQUAL CAREER CHANCES IN ARCHAEOLOGY?

LONGSTANDING BATTLE AGAINST GENDER STEREOTYPES

- GENDER AND FEMINIST ANTHROPOLOGISTS HAVE BEEN ACTIVELY COMBATING GENDER STEREOTYPES THROUGH VARIOUS MEANS, INCLUDING ACADEMIC WORK, MUSEUM EXHIBITIONS, AND PUBLIC WRITING.







PERSISTENCE OF STEREOTYPES

- DESPITE THE EFFORTS,

STEREOTYPES CONTINUE TO EXIST AND THRIVE IN BOTH ACADEMIC AND NON-ACADEMIC SETTINGS

PARTICULARLY IN PLACES WHERE GENDER ARCHAEOLOGY IS UNDERREPRESENTED.

THANK YOU!