Lecture 10: Sexuality and Orgasm

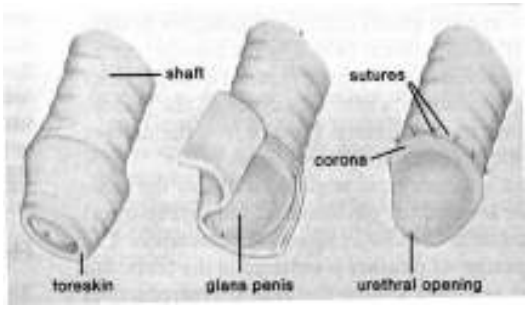
- Primate Sexuality — where do we come from?
- Concealed ovulation
- Hormones & Sexual behavior
- Human Female Orgasm
  - > Physiology
  - > Explanations — adaptation or artifact?

Warrior Initiation & Circumcison in the Maasai

Circumcision

- Found especially in strongly patrilineal and patriarchial societies
- Symbolizes belonging to a male kin group.
- Ritual circumcision -- at puberty or after birth
- Why the penis?
- Non-religious circumcision developed in English speaking countries at the end of 19th century as ‘cure’ for masturbation
- Medical foundation for circumcision debated.
  - US only country in world with routine non-religious circumcision
  - 80% of men in world not circumcised
  - By 1984, 40% of US babies not circumcised.

Circumcision



Functions of Foreskin

- Protects the glans of the penis
  - Shield glans and urinary opening from irritation due to feces and urine (newborn) and friction

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- Smegma - produced by Tyson's glands of Glans
  - Protects the glans
  - Lubricates the glans during intercourse.

Changes with Circumcision

- Cornification of the Glans:
  - Increased thickness (10x) in outer cell layer
  - Free nerve endings disappear
  - Surface cells covered with a layer of dead cells
- Smega no longer produced for lubrication
- Skin on penile shaft is tighter

Cost & Benefits of Non-Religious Circumcision

Costs	Benefits
• Risk of non-essential surgical procedure. mutilation or damage - 1-3%	• Possible slight decrease in rates of penile cancer and STD's, but study results are equivocal
• Emotional stress on baby	• 1% risk of urinary tract infection during 1st year of life without circumcision
• Ulcerations formed around urinary opening	• May decrease AIDS risk
• Decreased sensitivity of glans	
• Lack of smega production for lubrication	
• Increased tightening of skin of shaft	

Examples of Primate Sexuality

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Primate Sexuality

- Non-reproductive sexuality is NOT uniquely human

Primate Sexuality

- Sexuality can be situation dependent

Gorilla Sexuality

- Mating confined to a few days around ovulation
- Slight sexual swelling
- Females solicit mating from silverback male

Chimpanzee Sexuality

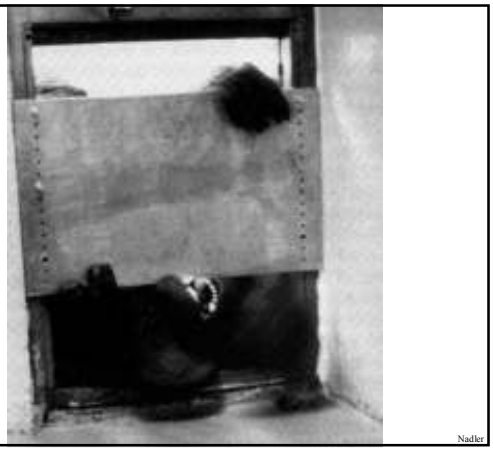
- Promiscuous mating
- Estrus chimp may copulate 30-50 x per day
- Concentration of mating with dominant male(s) mid-cycle

Function of Estrus Swellings?

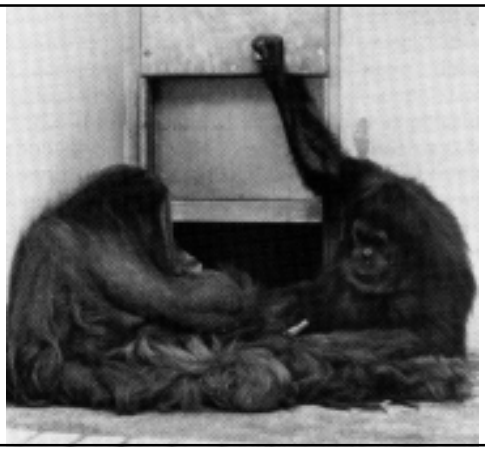
- Attraction of many males to avoid infanticide
- Incite male-male competition
- Ensure mating with the dominant male
- Advertise fecundity
- Select males with particular genotypes

Orangutan Sexuality

- Females do not show signs of ovulation
- Variety of sexual behaviors and positions
- Long periods of mating (3-17 minutes)
- Forced copulations
- Mating during periods of high energy balance/hormonal levels



Nadler



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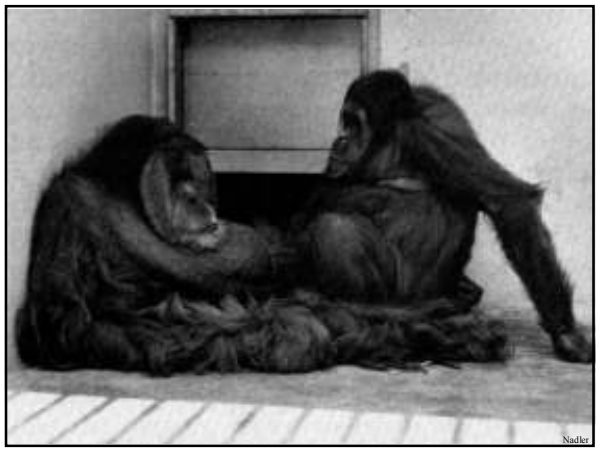

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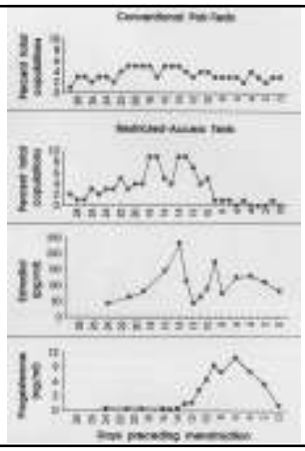


Nadler

Bonobo Sexuality

- A high degree of non-procreative sexual activity

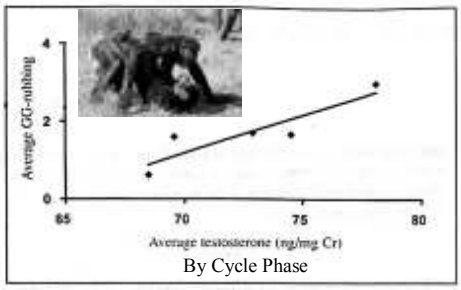
Bonobo Sexuality

- A high degree of non-procreative sexual activity
- Regular occurrence of female-female sexual behavior

Bonobos
Explanations for G-G Rubbing

- Reconciliation
- Mate attraction
- Tension Regulation
- Expression of social status
- Social bonding/alliance formation

Bonobo Testosterone Levels and G-G Rubbing



By Cycle Phase

Jurke et al., 2000

Orgasm in Female Primates

- Rhesus macaques
- Stumptail macaques
- Japanese macaques
- Orangutans
- Chimpanzees
- Bonobos

All involved manual stimulation, not during intercourse

What is our Sexual Inheritance?

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- Primate females are much more actively sexual than previously thought
- Primates engage in sex for other reasons besides procreation
- Some evidence for orgasm in female primates through manual stimulation

Concealed Ovulation in Humans

- Continuous receptivity in humans strengthened the pair-bond and increased paternal investment in offspring through frequent copulations

(Morris, 1967)

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Weakened by:

Evidence of high, non-reproductive sexual behavior in non pair-bonding primates

Low rates of sexual activity in other pair-bonded species

(Morris, 1967)

Concealed Ovulation in Humans

- Force desirable males into consort relationships long enough to ensure paternity and not seek other matings

(Alexander and Noonan)

Concealed Ovulation in Humans

- Force desirable males into consort relationships long enough to ensure paternity and not seek other matings
- Raised paternity confidence because other males don't know female is ovulating

(Alexander and Noonan)

Concealed Ovulation in Humans

- Prevention of women themselves limiting the number of their children because of pain of childbirth.

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- Prevention of women themselves limiting the number of their children because of pain of childbirth.
  - No evidence modern women do this
  - Concealed ovulation may have evolved before the increase in brain size and thus painful childbirth

Concealed Ovulation in Humans

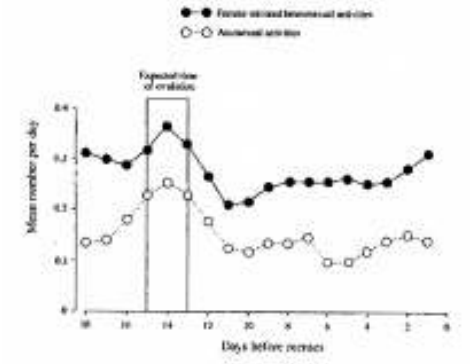
- Energetically more efficient if humans not living in a multi-male mating system

Hormonal Influence on Sexual Behavior

- Slight rise in testosterone around time of ovulation - some studies show increase in sexual behavior (female initiated)

Testosterone and Female Sexual Behavior

Western Populations



Female Sexuality in !Kung

- Peak in sexual behavior at mid-cycle
  - Husbands and lovers

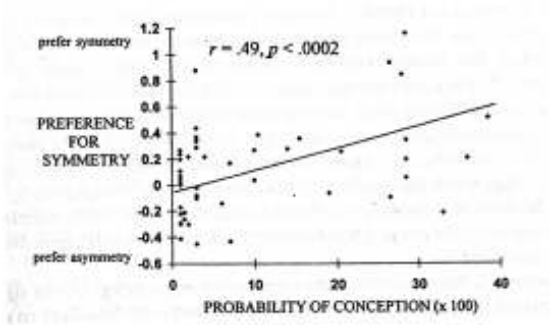
(Worthman, Ph.D. thesis)

Female Sexuality in !Kung

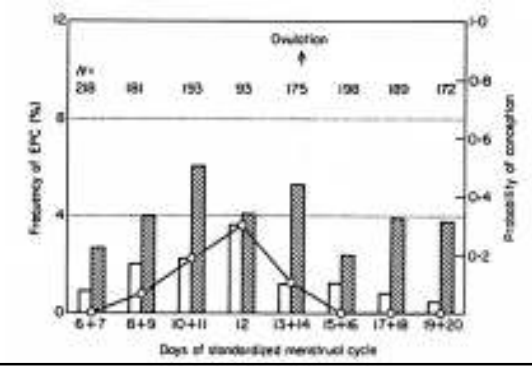
- Peak in sexual behavior at mid-cycle
  - Husbands and lovers
- Increase in peak rate of orgasm at mid-cycle

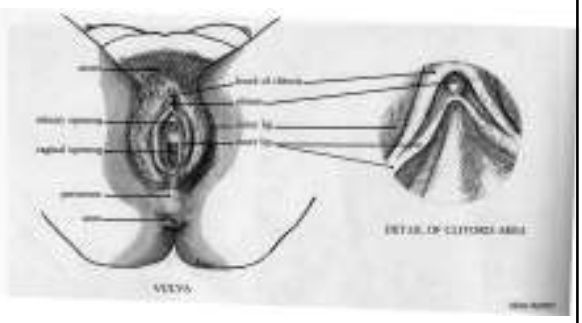
(Worthman, Ph.D. thesis)

Orgasm and Symmetry



Ovulation and Extra-pair copulations





Sexual Response Cycle

- Excitation
  - Vaginal lubrication
    - Transudation - vasocongestion in walls of vagina lead to moisture
  - Inner 2/3 of vagina expands
  - Cervix and uterus pulled upwards
  - Labia majora flatten and move apart
  - Labia minor and clitoris enlarge
  - Contraction of small muscle fibers in nipples
  - Breast size may increase
  - Veins on breast more visible

Sexual Response Cycle

- Excitation
- Plateau
  - Prominent vasocongestion in outer 2/3 of vagina cause tissue to swell
  - Vagina narrows by 30% or more
  - Clitoris pulled back against pubic bone (hides and protects it from direct touch)
  - Labia minora may double or triple in size
  - Color changes develop

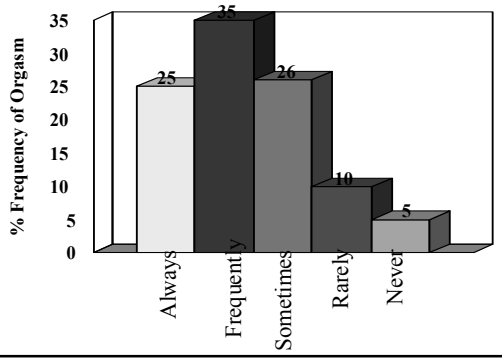
Sexual Response Cycle

- Excitation
- Plateau
- Orgasm
  - Through intercourse alone= indirectly from penile shaft distention (manual traction) of labia minora at opening of vagina.
  - Or through direct manual stimulation
  - Contractions at 0.8 second intervals
  - Average time = 4 minutes (masturbation) and 10 minutes (intercourse)

Sexual Response Cycle

- Excitation
- Plateau
- Orgasm
- Resolution
  - Return to pre-orgasmic state

Frequency of Female Orgasm (western populations)



How do women achieve orgasm?

- 95% women said could orgasm easily with masturbation
- Women masturbate through manual stimulation of clitoris
- 1.5% through vaginal insertion alone
- Little cross-cultural information

Multiple Orgasms? *Women*

- 14% of women
- Return to the plateau phase, rather than resolution after orgasm

Multiple Orgasms?
Men

- Pattern seen in pre-pubescent boys (55%)
- 8-15% of younger adult males and 3% of adult men
- Ejaculation seems to prevent return to plateau stage

Is 'The Female Orgasm' Adaptive?

Female orgasm as non-adaptive

- Females have low variance in reproductive success (RS)

(Symons 1979; Gould 1991)

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- Female orgasm is a by-product of mammalian bi-sexual potential. Orgasm is possible because it is adaptive for males.

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- Females have low variance in reproductive success (RS)
- Variance in sexual behavior does not effect a woman's RS
- Female orgasm is a by-product of mammalian bi-sexual potential. Orgasm is possible because it is adaptive for males.
- Can't be adaptive because it doesn't always happen.

(Symons 1979; Gould 1991)

Problems with Non-adaptive Hypothesis

- Assumes that females in a natural state — unlike males — breed at or near their reproductive capacity, and that there is little room for natural selection to operate on females

Blaffer-Hrdy, 1981

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- Assumes that females in a natural state — unlike males — breed at or near their reproductive capacity, and that there is little room for natural selection to operate on females
- Assumption that copulation serves no function other than insemination

Blaffer-Hrdy, 1981

Adaptive Hypothesis: Intermittent Reinforcement

- Female orgasm has been selected to be irregular
  - Increases likelihood of mating
  - Encourage Extra-Pair Copulations (EPC)
- Non-human primates have orgasms

Blaffer-Hrdy, 1979/1981; Diamond 1980

Intermittent Reinforcement

- Female orgasm has been selected to be irregular
  - Increases likelihood of mating
  - Encourage Extra-Pair Copulations (EPC)
    - Little evidence that human females engaged in closely spaced repeated copulations with multiple males
- Non-human primates have orgasms
  - But, not during intercourse

Blaffer-Hrdy, 1979/1981; Diamond 1980

Is 'The Female Orgasm' Adaptive?

Problem with debate:

Assumes female orgasm = Female sexuality

"It is difficult to see how expending time and energy pursuing the will-o-the wisp of sexual satiation, endlessly and fruitlessly attempting to make a bottomless cup run over, could conceivably contribute to a female's reproductive success. On the contrary, insatiability would markedly interfere with the adaptively significant activities of food gathering and preparing and child care.

Symons, "The Evolution of Human Sexuality," 1979

Questions about female sexuality:

(1) Is 'the female orgasm' adaptive?

(2) Is the clitoris a product of natural selection?

(3) Is female sexual response adaptive?

Is female orgasm adaptive?

- Capacity for orgasm may be a universal — although not universally realized (Masters & Johnson) but not necessarily from intercourse
- Non-human primate females appear capable of orgasm (not during intercourse)
- Orgasm probably not frequent in many cultures
- Orgasm during intercourse occurs about 1/4 of the time in some studies of western women (should go to fixation if adaptive for intercourse)
- Problems with adaptive argument
- Probably does not qualify as a physiological adaptation per se

Has the clitoris evolved through natural selection?

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- Function of the clitoris: transmits pleasure upon stimulation that may or may not culminate in orgasm.
- The size and position of the clitoris shows variation between primate species
- In humans, the clitoris is sometimes removed as a way to control/remove female sexual pleasure.

Is female sexual pleasure adaptive?

- Does the potential for female sexual pleasure affect her behavior and ultimately her reproductive success?

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  - > Increase the probability of seeking extra-pair copulations, which under some circumstances may lead to:
    - _ Improved "genetic" quality of offspring
    - _ Confusion of paternity and investment from more than one male

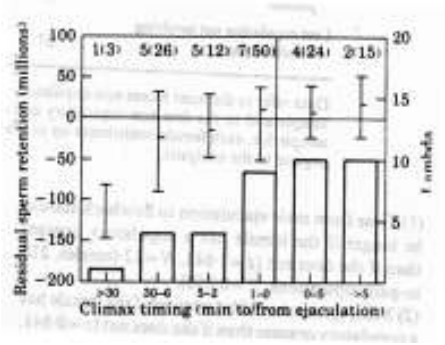
Is female sexual pleasure adaptive?

- Does the potential for female sexual pleasure effect her behavior and ultimately her reproductive success?
  - > Increase the probability of seeking extra-pair copulations, which under some circumstances may lead to:
    - _ Improved "genetic" quality of offspring
    - _ Paternity confusion and investment from more than one male
  - > Strengthen the duration of pair-bond with an investing male — influencing offspring survival

Is female sexual pleasure adaptive?

- Does female arousability (or orgasm) increase the probability of conception?
  - > Arousability facilitates copulation
  - > Orgasm and sperm retention

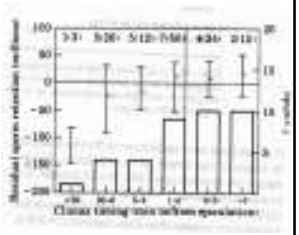
Orgasm & Sperm Retention



Baker & Bellis, 1993

Orgasm & Sperm Retention

- 35% sperm ejected by female within 30 minutes
- Sperm retention influenced by female orgasm
- Orgasm more than 1 minute before male ejaculation led to highest level of sperm retention
- Sperm from one copulation hindered retention of sperm at next copulation up to 8 days



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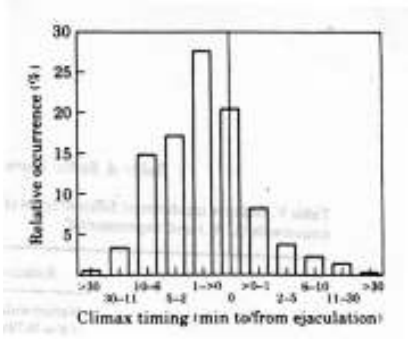
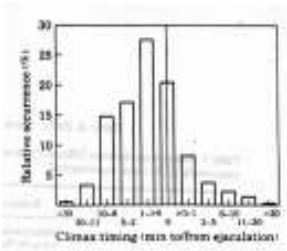
Female Orgasm and Male Ejaculation



Baker & Bellis, 1993

Female Orgasm and Male Ejaculation

- Timing isn't right
- Don't know how much ejaculated, thus hard to measure flow-back accurately
- Small sample size, certain individuals over sampled
- Hasn't been replicated



Intercourse and oxytocin release

- Intercourse alone causes release of oxytocin
- Oxytocin may increase sperm uptake

Is female sexual pleasure adaptive?

- Does female arousability (or orgasm) increase the probability of conception?
  - > Arousability facilitates copulation
  - > Orgasm and sperm retention
    - >Evidence not good for orgasm and sperm retention
    - >IS evidence for a role of intercourse in oxytocin release and sperm retention

Female Sexual Adaptations:

(1) Is 'the female orgasm' adaptive?

No, Probably has not been selected for independently

(2) Is the clitoris a product of natural selection?

Yes, shows evidence of this.

(3) Is female sexual response adaptive?

Yes, there is evidence of this

Next Time …Male Reproductive Strategies

- Male Reproductive Strategies
- Control of Females & Female Sexuality
- Evolution of Patriarchy
- Fathering