SCIENCE B-29 STUDY GUIDE
THE EVOLUTION OF HUMAN NATURE
Spring 2009

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COURSE OVERVIEW

Demonic Males Ch 1-2, Moral Minds Prologue

LECTURE NOTES

Your Name: Kat Kim

Lecture Title: Introduction (Lecture 1)

Three-sentence summary of lecture: Biology controls the form of what culture gets to do; we are not a blank slate. Biological traits that we share in common with nonhuman primate relatives include the tendency to live in groups, form social bonds, and have dominance pairs. Our human nature is shaped by our evolutionary past

Lecture Notes:

Implausibility of Human Nature – how can we define human nature when culture seems to let anything happen?

The Blank Slate?
- We are born with nothing written in the brain's wiring?
- Culture can do what it wants to do, culture gets to decide our behavior

Challenging the Blank State View
- Instead, argue that we are equipped with **INSTINCTS** (capacities) for:
    - Language
    - Inferring others' minds (think, feel, desire, believe)
    - Aesthetics (beauty)
    - Morality (what is right or wrong)
- Biology of human beings, our genetic code, sets us up to be predisposed for certain KINDS of behaviors, thoughts
- Culture plays an important role – **certain signatures of differences between cultures** (but doesn't get do whatever it pleases)
- Biology controls FORM of what culture gets to do

Charles Darwin
- Evolution: how our body provides unification with different species
- 3 different time depths:
    - Deep time (evolutionary past as it links to other animals) – what can we learn from the study of other animals: what do we share in common? What's different?
    - Recent time (human recent) – hunter-gatherers
    - Modern time – how we have been transformed and how we have stayed the same in modern culture

How cultures can **MODIFY** biological heritage
To understand human behavior, we have to understand human biology
    - New evidence that pushes harder how biological approach can explain the variations we see in human behavior
    - How we think about human behavior – is guided by thinking about **fitness consequences**: how we reproduce successfully

- **Marc Hauser**
    - How the human mind evolved – what is similar with other primates? Different?
    - How do cultures of violence emerge in modern societies? Why are some more violent than others?
    - Psychological mechanisms that underpin certain KINDS of violence
    - South of US was colonized – culture of HONOR, very different from the rest of the country → led to diff ways people deal with social norms (compared to NORTH)
    - **Problems emerge in development, damage** – violence in disorders (psychopath!!!) do they KNOW right from wrong??? Typically very intelligent, rational, but what went wrong?? Something about their emotional systems, don't prevent them from doing the wrong thing even when they know it's wrong. – learning about spectrum of violence
    - Sex difference (intelligence vs. how much you invest in a relationship)
    - **Cooperation** – cheating, punishing, fairness (in genetically related animals, MORE cooperation) what protects us from CHEATERS? Behavioral economics, neuroimaging, etc. to better understand our cooperative tendencies
    - Evolving LANGUAGE – structure of languages of humans has NO parallel in other animals; what is it about the human brain that lets us have language? After it evolved, what else does it give us?
    - **Moral instincts** – judge spontaneously, without knowing why, why something is morally right or wrong – can understand with evolutionary thinking; **altruism at a distance** is NOT in our psychology
        - We have been equipped with certain instincts that push us one way or another; and we can decide whether they are the RIGHT kinds of instincts

- **Karen Kramer**
    - Biological traits that we **share in common** with nonhuman primate relatives: *tendency to live in groups, social bonds, tendency for dominance pairs*
    - Deep into the **ancestral past**: large brains, underdeveloped young, decrease in size between males and females (low sexual dimorphism)
    - Capacity for reciprocity not shared in other animals
    - No one way to define human nature, but many perspectives
    - So how will we think about it?
    - **Our human nature is SHAPED by our evolutionary past**
        - Shift in focus of specific cultures (similarities and diff) to focusing on underlying tendencies
        - Females spend much of their life in old age while chimps don't

        - Young children are helpless to forage for food they need to survive, but not chimps
        - Human nature → what we share in common with each other
            - Our physiology
            - Our psychology: assume patient has certain psychological capacities
            - Our behavior: New Guinea tribes – Malinowski in 1918 met them; despite separation (without same culture), they smiled/frowned at same things that we do
        - Culturally we do things differently
            - When girls reach puberty, some rite of passage: bat mitzvah, quinceanera, etc.
            - Underlying question that comes up when we look at cross-cultural differences: why does it seem so important? Interest in displaying/signaling when girls reach sexual maturity
        - Instead of focusing on particulars, we ask general questions
    - Few peculiar things about humans:
        - Large brains
        - Bipeds – constrain birth canal size
        - So have to be born small and underdeveloped
        - Leads to other needs – we are dependent on others well into our teens
        - **Because we grow slowly and are dependent on others –we expect that human history evolves so that we have few children, far apart, but this is NOT true**
            - We're focusing on natural fertility populations: "recent past" – not controlled by contraception
        - **The "onion"**
            - To solve fundamental problem that **we are biologically set to have lots of children but we can't really support them**, gives us dispensation to be **<u>socially dependent</u>** (unlike other animals)
            - Most animals spend their time in search of mates or food; to accomplish this, animals have to expand social sphere (cooperate to hunt for fish; fish swim in schools to protect each other; coyotes hunt in packs)
            - But they don't marry, share food with large community, don't have complex social networks to regulate distribution of resource, but WE DO: levels of **complexity of social life**
            - **Song, dance, art** to support this complex social life
            - Evolution of Human Nature
                - Human life history
                - Sex
                - Parenting
                - Cooperation
                - Division of labor
                - Social cohesion (art)****

- **→ Develop to maintain deep social bonds fundamental to human nature**

  - This shapes our life history: what traits do we share in common with other animals? What in primates? And how are we set apart as humans?
  - What implications does our human life history (mother's dilemma) on how it shapes mating strategies, sexual division of labor, and how do we cooperate on diff levels (kinship, non-kinship interactions)
  - **Role of ART in holding together social fabric important to human nature**
  - **People living in small, preindustrial societies** (Maya Indians in Mexico, Hunter-gatherers in Venezuela (Pume), Horticulturalists in Madagascar (Tanala))
    - Help us with behavioral dimensions that we can't see in past (**closest natural experiment** to observe what life was like before environmental conditions changed, before birth control, etc.)
    - Book Ends that establish "**reaction norms**" – **<u>possible</u> range of variation in behavior** = expands sense of what humans are capable of

- **Richard Wrangham**
  - HEB:
    - Genetics
    - Human biology
    - Paleoanthropology
    - Functional morphology
    - **Behavioral ecology**
  - How does natural selection work?
    - Is behavior adaptive?
      - Evolutionary "error"?
      - If benefit, what kind?
      - Individual or group?
    - Chimps do things a lot like human warfare – what is it about this behavior that is adaptive? (Is warfare just a social construction?? Doesn't make evolutionary sense? – traditional analysis)
  - Evolution
    - How has behavior evolved?
      - Other species? When? Why? How far does it go back into our evolutionary past?
    - Who's closer? Chimps or gorillas? – knuckle-walk, diet, teeth, guts
      - Darwin said that chimps and gorillas must be each other closest relatives, BUT
      - In 1984: **DNA analysis showed that chimps are closer related to humans than to gorillas (98.6%)**
      - Reason it's amazing is b/c they share more with US than something that looks like them
    - How did human behavior evolve? From the behavior of other apes (look at evolutionary TREE)

        - Chimps, bonobos and gorillas look the most similar (because their ancestor looked like them as well)
        - Group territoriality: common origin or convergence?
            - Is this something that goes back to when species diverges? Or is it something that has emerged by chance?
- 4 core principles of B-29
    1. "Nothing in biology makes sense except in the light of evolution" – Theodosius Dobhzansky, 20th c geneticist
        - all animals are aggregations of cells
        - something else
    2. No animal is a blank slate
        - species have typical behaviors – though with their own "norm of reaction" (how they vary)
        - chimps and bonobos – different anatomy and very different behavioral (chimps are more violent, ingenious, use tools, aggressive; bonobos: sex!! Homosexual and heterosexual, non-violent, live peacefully together = both show human nature)
    3. Sex differences are everywhere, though they vary by species
        - Y-chromosome
        - Importance of testosterone
    4. Genes and environment COMBINE → phenotype
        - "the premise which cannot be stressed too often is that what the hereditary process determines are not fixed characters or traits but **DEVELOPMENTAL PROCESSES**" – Dobzhansky
        - context in which development occurs is critical
        - **4 processes, questions about where our behavior comes from:**
            - *immediate causes*: what caused anger?
            - *adaptive logic*: what about it caused anger?
            - *individual ontogeny*: something specific about the individual?
            - *evolutionary history*: in the past
- Biology underlies ALL SOCIAL LIFE – HOW?
    Physics → Chemistry → Biology → Behavior → Religion, sociology, history, politics, etc.
- Worked in Gombe Tanzania (with Goodall), worked in Ituri DR Congo
- Work in Kibale, Uganda
- Impact of Cooking – only humans cook, we NEED to cook; imp to understand ecological evolution

Key words and definitions:

The Blank Slate: the idea that we are born with nothing written in brain's wiring, and culture can dictate all behavior
Deep time: evolutionary past as it links to other species of animals
Recent time: evolutionary past as it links to past humans like hunter-gatherer societies
Modern time: how we have transformed/stayed the same in modern culture

Fitness consequence: how we reproduce successfully
Reaction norms: possible range of variation in behavior (can be determined by observing those in small, preindustrial societies)

READING NOTES

Reading Title: Demonic Males, chapters 1-2

Chapter 1:
Dale Peterson and Wrangham were in Africa studying deep origins of human violence by observing behavior of bonobos in Burundi. He first talks about the violence in Rwanda, as an example of human aggression.

Our first view of chimps was peaceful, with Jane Gooddall's observations. Scientists thought that animals killed each other by accident, an idea that fit with the theory that saw animal behavior as designed by evolution for **mutual good** (natural selection eliminating murder?)

In January 1974, 8 chimps in Gombe National Park in Tanzania killed another chimp from a neighboring range, the first time a human had seen it. Until this incident, scientists thought this kind of violence (deliberately killing a member of their own species) was a uniquely human trait. → implies human killing is rooted in prehuman history.

Sexual violence was also observed: brother chimp rapes female chimp that refuses to mate with brother

Wrangham observed divisions within communities of chimps in Gombe (Kasekela versus Kahama), and realized that the male chimps were defending their specific group territory by raiding the other. Eventually the Kasekela males killed off the Kahama by attacking them and beating the females.

Kahama killings undermined explanation that violence is uniquely human (via culture, brainpower, God), and showed that maybe warring tendencies is in prehuman past.

3 discoveries re: relationship between chimps and humans:

1. fossils found showing bipedal human ancestor with chimp-like head
2. chimps and humans are more closely related than chimps and gorillas (via DNA analysis)
3. chimp behavior parallels with human behavior (affection, friendships, math, signs, and **social world** of chimps

Chapter 2:
Yale biologists Sibley and Ahlquist claimed that human DNA was inside the ape group, and thus our separation from apes may have been much more recent than we thought.

"Lucy" (*Australopithecus afarensis*): ape-like in upper body, brain, mouth, belly; human-like in leg, pelvis, tooth enamel.

Apes are not that closely related to monkeys: Huxley showed this in comparing anatomy; can also be seen in biochemistry and DNA analysis.

Date of divergence between humans and chimps is estimated at around 5 million years. (Recent!) It is important to remember that humans have evolved particularly fast (*Homo sapiens* are only ~150,000-230,000 years old). The last common ancestor was a rainforest ape.

Key words and definitions:
Selfish-gene theory of natural selection, inclusive fitness theory, sociobiology, behavioral ecology: ultimate explanation of individual behavior considers only how

behavior tends to maximize genetic success by passing on individual's genes into next generations
Male bonded: males forming aggressive coalitions with each other in mutual support against others
Matrilineal/matrilocal: inheritance (from male to male) is according to mother's line
Convergence: through natural selection, when unrelated or distantly related species can evolve toward physical similarity as a response to similar environmental stressors. Not a problem on a molecular level, but can be an issue when dealing with comparative anatomy.

Reading Title: Moral Minds Prologue

We have evolved a moral instinct, like an unconscious "grammar of action." This moral instinct can be compared to our capacity for language. Language can be described as an "exquisitely designed organ," that all humans share. Hauser believes that we all have a "universal moral grammar," in that once we get our culture's specific moral norms, we can decide right/wrong without conscious reasoning. Book is basically a detailed explanation of how an unconscious and universal moral grammar underlies these moral judgments.

Legal policies ignore or cover up essential psychological distinctions (for example, that we view actions one way and omissions another), conflict with moral intuitions; and when policy and intuition conflict, policy is in trouble (example of mercy killings: permissible to help patient die by ending life support, but not okay to overdose patient – seems illogical).

He says that it is likely that some intuitions we evolved are no longer applicable to current societal problems.

Key words and definitions:
Universal moral grammar: As Hauser says, a "toolkit for building specific moral systems"

EVOLUTIONARY THEORY

EHB 1-2

LECTURE NOTES

YOUR NAME: Jesse Ge

LECTURE TITLE: Evolutionary Theory

THREE SENTENCE SUMMARY OF LECTURE:

1. Evolution is driven by natural selection, which in turn is dependent upon: over-reproduction, competition, individual variation, and genetically linked traits.
2. Inclusive fitness theory states that our structures and behavior have evolved solely as a means to pass on our *individual* genes.
3. Not everything is adaptive – beware of several unique exceptions (see last section)!

LECTURE NOTES:

Introduction

- We are born with instincts
    - Cooperative approach right from beginning
- How can we understand the evolution of cooperative behavior?
    - Two islands: selfish or cooperative?

Evolution and Natural Selection

- <u>Background</u>
    - Anti-evolutionism
        - U.S. reluctant to accept natural selection theory
        - Due to creationists and proselytizers
        - If you hold previous preview, education will likely not change
    - Evolutionary "Theory"
        - Scientific definition
            - "a well tested explanation of a series of phenomenon which has been tested in multiple experiments and has produced a coherent understanding of the phenomenon"
            - Has almost become fact
        - Common thinking: theory as in speculation
            - Evolution is NOT this kind
- <u>Two Big Ideas</u>
    - Evolution "what happened"
        - CHANGE
            - In phenotype of species, consequence of changes in genes
        - Pre-Darwinian: Erasmus Darwin & Jean-Baptise Lamarck
        - Darwin
    - Natural Selection "how it happened"
        - Mechanism by which evolution happened
        - Pre-Darwinian: Natural Theology and Pruning
- <u>**Evolution** VIA Natural Selection – Darwin's "Combination"</u>

- Biogeography
  - Closely related species geographically isolated
  - Therefore, deep organic bond must have existed
- Paleontology
  - Deeper layers show change
  - Adjacent layers show related species
- Embryology
  - Embryos of related species are VERY similar (common ancestor)
- Morphology
  - Natural taxonomy of organisms based on internal structures
  - Homologies: traits with similar underlying structure, despite different function
    - Example is limb, wings, fins (all have similar structures)
  - Vestigial traits: homologous traits with functions lost
    - Male nipples, human tail bone
- Genetics
  - Biochemistry & DNA analysis shows similarities between related species
- Evolution observed
  - See viruses, bacteria, Galapagos finches (less food → eat harder seeds → select for larger beaks → next generation had larger beaks)

- <u>Evolutions via Natural Selection</u>
  - Anagenesis
    - Single species changes over time
  - Cladogenesis/Speciation
    - Creation of a new species
    - Usually from geographic isolation of same species in two places
    - Anagenesis within each population until the two species cannot interbreed
- **<u>Natural Selection</u>**
  - Thomas Malthus - more are born can survive/reproduce - OVERREPRODUCTION
    - 1. COMPETITION between individuals to survive and reproduce
    - 2. VARIATION between individuals creates some advantages
      - Ex.) rock doves have white rumps
        - Effective protection vs peregrine falcons
          - Pass on genes b/c survive
      - Ex.) stock doves don't have white rumps
        - More likely to be captured
      - Experimentally tested by changing colors of rumps
      - Net result: descendent generations have whiter rumps
    - 3. GENETIC LINK of favorable traits so can be passed on to next generation
  - All three factors lead to shift in species

Inclusive Fitness Theory

- <u>Change in thought</u>
  - 1859 onwards, people try to explain phylogeny
  - 1960 onwards, explaining species traits as adaptations
    - Why food choice? Why war? Why homosexuality?

        - How have these contributed to the survival of our species? Do they at all?
- Adaptation
    - A trait/tendency that has been shaped by natural selection
    - A trait/tendency that enhances the "genetic fitness" of its possessor
        - "fitness" is a measure of how fast genes spread
- Recognizing Adaptation - Criteria
    - 1. Reliability – predictable occurrence
    - 2. Efficiency – well designed to achieve goal (crying baby gets mother's attention)
    - 3. Economy – cost effective
    - 4. Logic – not explainable by incidental occurrences
- What fitness is maximized?
    - Who?
        - NOT the species as whole
        - NOT a social group
        - YES individual's genes
    - Direct fitness
        - Number of gene copies passed to next generation (50% of genes)
    - Indirect fitness
        - Smaller % of own genes passed on through relatives
        - Should know how to work out %'s of relationships
    - Inclusive fitness
        - Inclusive fitness = direct fitness + indirect fitness
        - This is what needs to be maximized
- Inclusive Fitness Theory
    - Structures and behavior is evolved such that they lead to the maximization of an individual's inclusive fitness
        - Tremendous pressure on kinship
            - "a man should lay down his life for two brothers, four nephews, and eight cousins"
        - No examples of any one species having a structure or behavior that is exclusively for the good of another species
        - All self interested
    - Hamilton's Inequality
        - B * r > C
        - (OPPOSITE OF WHAT'S ON LECTURE SLIDES! Slides are wrong!):
            - B = benefit to the recipient
            - C = cost to the actor
            - r = coefficient of relatedness (shared genes)
    - Richard Dawkins – the selfish gene
        - "genes are the units that are responsible for evolution over time"
- Challenges to Inclusive Fitness Theory
    - 1. Restrained breeding
        - How can natural selection favor small family size (see humans)?
            - Rebuttal: too many babies → less resources for each baby
    - 2. Restrained fighting
        - Why don't we eliminate all competition?
            - Rebuttal: fighting leads to injuries

- 3. Restrained feeding
  - Why don't we overconsume to help ourselves?
    - Rebuttal: sometimes it does occur, sometimes it's not possible
- 4. **Cooperation/Group Selection Theory**
  - Definition
    - Selection caused by the differential productivity and/or survival of whole groups
    - Natural selection works at the level of the group, not the individual
    - Ex.) termites
  - Support
    - To explain cooperation
    - Plausible fit
  - Rebuttal
    - Moral island vs immoral island example
      - Will immoral island go extinct? RARE
      - Or will the migrate to the moral island? COMMON
      - Defeats premise of group extinction/natural selection
    - Selfishness easily provoked
    - Group cooperation is enforced by culture, not genes

Adaptation and Non-Adaptation

- Not everything is adaptive!
  - Mutations
    - But not very common
    - If they are common, they are successful and become adaptive
  - Genetic Drift
    - Presence of a trait from a random sampling of genes due to demographic patterns
    - Example) Hutterities and endogenous population lead to unusual blood groups and high rates of mental illness
    - Mostly applies to small populations where random effects can be important
  - Incidental By-Product
    - Example) Females ducks have a clitoris as unintended consequence of male ducks having a penis
    - Example) During domestication, select for tameness, by-products: floppier ears, more sexual, small brains, color changes

KEY WORDS AND DEFINITIONS:

- THEORY - a well tested explanation of a series of phenomenon which has been tested in multiple experiments and has produced a coherent understanding of the phenomenon
- ANAGENESIS – a single species changing over time
- CLADOGENESIS – development of a new species that evolves from previous species
- ADAPTATION - a trait/tendency that has been shaped by natural selection and also enhances the "genetic fitness" of its possessor

- INCLUSIVE FITNESS THEORY - structures and behavior is evolved such that they lead to the maximization of an individual's inclusive fitness
- HAMILTON's INEQUALITY – B * r > C (see notes for explanation)
- GROUP SELECTION THEORY – challenge to Inclusive Fitness Theory, suggests that natural selection occurs at the group level, not the individual level
- GENETIC DRIFT – presence of a trait due to random sampling of demographic patterns (usually occurs in small, isolated populations), and not representative of natural selection

READING NOTES

EHB: Chapter 1 – Historical Introduction: Evolution and Theories of Mind and Behavior, Darwin and After

Key Movements and People

ETHOLOGY (1800's)

- Scientific study of animals, relevant because of the realization that humans are not all that different from animals and that the study of animal behavior could be helpful in learning about human behavior
- Still a heavy influence today in evolutionary science

Lamarck – believed animals could willing adapt themselves and pass on changes genetically (i.e. bigger muscles)
Darwin – major figure in ethology, with implications for humans
Lorenz – focused on animal instincts and their direct relations to similar instincts in humans

COMPARATIVE PSYCHOLOGY/BEHAVIORISM (1900-1970)

- Focus on the direct link between stimuli and response (i.e. in operant conditioning)
- Eventually departed from the evolutionary studies and into pure psychology

Pavlov – started the field with his experiments on dogs salivating when dinner bell was rung (conditioned behavior)
Skinner – major figure in early operant conditioning research
Chomsky – his study on language and how behaviorism failed to explain the complexity of language eventually contributed to the downfall of behaviorism

EARLY EVOLUTIONARY PERSPECTIVE (1890-1960)

- Led initially by Morgan, Baldwin, and James
- Basic premises of Darwin's ethology applied to humans
- Led to eugenics, and suffered a major setback following the events of WWII

COGNITIVE REVOLUTION (1950-1960)

- Adapted behaviorism to include mental states and inherited structures
- Led by Chomsky, Piaget, and the rise of computers (model for the brain)
- Still a major field of study

EVOLUTIONARY PSYCHOLOGY (1970-present)

- Focus on the human adaptive mental mechanisms that developed in the distant past
- Heavily influenced by cognitive psychology
- Synthesized first by Wilson, but still developing (i.e. what we are studying in this course)

EHB: Chapter 2 – Darwinism, Inclusive Fitness, and the Selfish Gene

BASIC DARWINIAN EVOLUTION

- Individuals grouped into species, but each individual has variations
- Due to competition, individuals with better adapted variations survive and reproduce
- Over time this, leads to a process of natural selection
- There is no teleology or final purpose to evolution, but a simple response to the environment and time

4 MAJOR CHALLENGES TO DARWINISM (AND THEIR RESPONSES)

1. Mechanism of inheritance?
    a. ANSWER: central dogma that traits can be passed on through genes
    b. Details about DNA, RNA, chromosomes, dominant, recessive, etc
    c. See pages 33-38 for charts and diagrams
2. How do new variations enter the genetic line?
    a. ANSWER: mutations
    b. Heritability estimates – variation between individuals that can be accounted for by the differences in the genome
3. Why do individuals cooperate?
    a. ANSWER: inclusive fitness theory
    b. Not only do we want to pass on genes directly through reproduction, but we can also facilitate gene survival by helping relatives
    c. See lecture note about kin selection and Hamilton's rule (B*r > C)
    d. ALTERNATIVE ANSWER: stupidity of genes
    e. Individuals with "selfish" genes never helped each other
    f. Individuals with "cooperative" genes helped each other to survive
    g. Cooperatives survive, while selfish die off, leaving everyone cooperative
4. Why some creatures have selected for distinct disadvantages (peacock 's cumbersome tail)
    a. Not discussed

LIFE HISTORY THEORY

EHB 3-4

LECTURE NOTES

YOUR NAME: **Christian Franco**

LECTURE TITLE: **Life History Theory**

THREE SENTENCE SUMMARY OF LECTURE:

Life history theory is basically concerned with the timing and growth of development as well as fertility and mortality schedules across the life course. Each species has a unique way of sorting out life history events (when to be born, when to be weaned, when to die, etc.). This is important because of its effect on survival, reproduction, and fitness.

LECTURE NOTES:

Life history theory is concerned with the timing and growth of development, fertility and mortality schedules across the life course.

Individual life histories vary, but species-specific central tendencies are guided by phylogenetic constraints.

Fast Life Histories:
- -small mammals
- -grow steadily and quicklynreach maturity and begin to reproduce

Slow life histories:
- -large mammals
- -longer gestation
- -fewer and larger infants
- -longer weaning ages
- -longer time to sexual maturity

Several reasons why primates take so long to grown and mature:
- -large brains
- -time to learn foraging and social skills
- -con-specific competition and minimizing mortality risk

Principle of Allocation: Time or resources used towards one purpose cannot simultaneously be used for another.

Tradeoff: An increase in one investment implies a decrease in something else.

Species can produce many LOW QUALITY offspring who may not survive, or few HIGH QUALITY offspring whose likelihood of surviving is much greater.
- -Quantity is about PRODUCTION and SURVIVAL of offspring
- -Quality is about INVESTMENT in offspring after they're born

Across taxa there is a strong relationship between mortality rates and age at first birth. When life expectancy is low or variable, life histories tend to be fast and early.

How does a child benefit from human life history?

-An extended period for brain growth
-Time to acquire necessary skills
-Time for socialization

KEY WORDS AND DEFINITIONS:

Life History Theory: framework to explain species diversity in terms of differences in the potential for population growth and the complexity of their life cycles. It's also concerned with the timing and growth of development, fertility and mortality schedules across the life course.

Principle of Allocation: Time or resources used towards one purpose cannot simultaneously be used for another.

Tradeoff: An increase in one investment implies a decrease in something else.

READING NOTES

READING TITLE: **EHB Chapter 3- Sex Sexual Selection, and Life History Theory**

READING NOTES:

Intro

Chapter argues that a better approach (rather than to classify sexual behavior in terms of mating systems) is to focus on the strategies of individuals rather than the putative behavior of whole groups.

Sex is as much about conflict as about cooperation, each sex employing strategies that best serve its own interests.

Variation and selection cannot act for the good of the species: genes only care for themselves.

WHY SEX?

4 major theories to explain the persistence of sexual modes of reproduction in the face of all the apparent disadvantages:

1.) **The Lottery Principle**: Basic idea behind this principle is that since sex introduces variability, organisms have a better chance of producing offspring that survive if they produce a range of types rather than more of the same.
2.) **Tangled Bank Hypothesis, or spatial heterogeneity**: Similar to the lottery principle. According to this theory, in environments where there is an intense competition for space, light, and other resources, a premium is placed on diversification. From a gene-centered point of view, a gene will have an interest

in teaming up with a wide variety of other genes in the hope that at least one such combo will do well in a competitive environment.

3.) **Red Queen Hypothesis**: Now offers one of the most promising explanations of sex. The hypothesis is intended to explain two different phenomena: the advantage of sexual reproduction at the level of individuals, and the constant evolutionary arms race between competing species. In the first (microevolutionary) version, by making every individual an experiment when mixing mother's and father's genes, sexual reproduction may allow a species to evolve quickly just to hold onto the ecological niche that it already occupies in the ecosystem. In the second (macroevolutionary) version, the probability of extinction for groups (usually families) of organisms is hypothesized to be constant within the group and random among groups.

4.) **DNA Repair Hypothesis**: Basically says that sex serves to keep at bay the effects of damage wreaked daily on our DNA and thus weed out deleterious mutations.

DESCRIBING MATING BEHAVIOUR: Systems and Strategies

There is as yet no universally accepted precise system to classify patterns of mating behavior. Commonly used criteria fall into two groups: 1.) mating exclusivity and 2.) pair bond characteristics.

A more individually focused approach to the study of mating reveals as much conflict as cooperation between the sexes, and the so-called pair bond for many species could be seen with equal validity as a sort of 'grudging truce.'

Problems with the Concept of Mating System (Great chart on p56 that lists the mating systems and their characteristics):

1.) *The label is sex specific*
2.) *Species in themselves do not behave as a single entity.*
3.) *Within any species, individuals even of one sex may differ and utilize different strategies.*

The Sex Ratio: Fisher and After

Each ejaculate of the human male contains around 280 x 10^6 sperm, enough if they were all viable and suitably distributed to fertilize the entire female population of the USA. Any single male could, in principle and in practice, fertilize many women. Why so many men? It would seem that a species would do better by skewing the sex ratio in favor of women, thereby producing fewer men.

Fisher's argument: Proposes an ultimate explanation to the question of why roughly even numbers of human males and females are born. Based on the idea that selection cannot operate on species, but rather selection acts on genes carried out by individuals. His argument can be verbally expressed in terms of negative feedback.

Suppose that a gene gains foothold and shifts the ratio of males to females to 1:2. Sons are more profitable than daughters and it pays to produce sons rather than daughters. In genetic terms, the arrival of a gene that now shifts the sex ratio of offspring in favor of males will flourish.

Natural Selection and Sexual Selection Compared

Darwin's idea of natural selection was that animals should end up with the physical and behavioral characteristics that allow them to perform well in the ordinary processes of life such as competing with their rivals, finding food, avoiding predators and finding a mate. What about the spectacular train of the peacock, which does not help the peacock fly any faster or better. In fact, its predators seem pretty adept at pulling down peacocks by their tails.

Darwin realized that the force of natural selection must be complimented by the force of **sexual selection**: individuals posses features that make them attractive to members of the opposite sex or help them to compete with members of the same sex for access to mates.

Natural selection gives rise to the adaptations favored by the biotic environment, while sexual selection results in adaptations selected by the social environment.

Parental Investment

As a rough guide, the degree of discrimination exercised by an individual in selecting a partner is related to the degree of commitment and investment that is made by both parties. The more investment an individual makes, the more important it becomes to choose its mate more carefully.

The sex that invests least will compete over the sex that invests most, and the sex that invests most will have more to lose by a poor match and so will be choosier over its choice of partner.

A male for example, could increase his reproductive success by increasing the number of his copulations. On the other hand, females should prefer quality rather than quantity.

The Operational Sex Ratio

Operational sex ratio = Fertilizable females/ sexually active males

When this ratio is high, the reproductive bottleneck rests with males and females could compete with other females for available males. When the ratio is low, the situation is reversed and males will vie with other males for the sexual favors of fewer females.

Generally speaking, women are the limiting resource for men. In virtually all cultures, it is significant that men engage in competitive display tactics and are more likely to take risks that women are.

Consequences of Sexual Selection

Darwin argued that intrasexual selection was bound to favor the evolution of a variety of special adaptations, such as weapons, defensive organs, sexual differences in size and shape and a whole range of devices to threaten or deter rivals.

Differences in body size between males and females is an example of sexual dimorphism. We see the importance of size in seal species, in which males compete in head-butting contests for access to females. Such fighting has led to a strong selection pressure in favor of size, and consequently males seals are several times larger than female seals.

Humans show sexual dimorphism as well. Men have greater upper body strength and more facial and body hair than do women. Men have deeper voices, and a different pattern of fat distribution. IT is likely that many of these are the results of sexual selection.

The fact that human infants need prolonged care would ensure that females were alert to the abilities of males to provide resources. Females would therefore be on the lookout for males who show signs of being genetically fit and healthy and who are able to provide resources. BOTH these attributes, genetic and material, would ensure that her offspring receive a good start in life.

Sperm competition is competition between sperm from two or more males that is present in the reproductive tract of the female. Species facing intense sperm competition have larger testes than those where sperm competition is less pronounced.

Good Genes and Honest Signals

Darwin had difficulty in explaining in adaptationist terms why females find certain features attractive. There are basically two camps of thought regarding this question.

1.) The 'good taste' school of thought: Stems from the idea of Fisher. Consider a male characteristic such as tail length that females once found attractive for sound evolutionary reasons, such as it indicated the species and sex of the male. Under some conditions, a '**runaway**' effect could result, leading to longer and longer tails. The overall effect is to saddle males with increasingly longer tails, until the sheer expense of producing them outweighs any benefit in attracting females.
2.) The 'good sense school of thought: This view suggests that an animal estimates the quality of ht genotype of a prospective mate through the signals he or she sends out prior to mating. Females are in effect looking for good genes. The important point here is that the female is able to judge the quality of the male's genotype from the **honest signals** he is forced to send. In this respect, size, bodily condition, symmetry and social status are all signals providing the female with information about the potential of her mate.

Life History Theory

Life history theory is based on the idea that organisms must balance competing demands on their time and energy budgets. In this respect, we can think of organisms capturing energy from their environment and allocating it to 3 types of activity

1.) Growth
2.) Repair and Maintenance
3.) Reproduction

Complex decisions have to be made about the allocation of resources and so it may be supposed we have a psychological adaptation to assist us in this task. Endocrine systems have evolved to serve this role. In puberty, for example, the release of hormones initiates changes to energy budgets that can manifest effects over several years.

Choices (either by the individual or the phylogenetic line) have to be made regarding the investment in offspring. Should an individual invest energy in a few high-value offspring or large numbers of lower value offspring? R-selected species produce large numbers of energetically cheap offspring. K-selected species produce few but energetically expensive offspring.

Organisms also have to decide how to allocate effort between mating and parenting. Often this decision has been made for an individual through the phylogeny of the species. Hence,

in about 95 % of all mammalian species, females provide all the investment to offspring, whereas males expend more energy on mating through displays and contests.

In a nutshell, life history theory (LHT) is based on how organisms allocate energy into different essential functions over the lifespan. This time-oriented perspective is needed to help make sense of behavior that can only be appreciated as adaptive over a longer perspective.

KEY WORDS AND DEFINITIONS:

Androgens- Males sex hormones such as testosterone.

Anisogamy – A situation where the gametes from sexually reproducing species are of different sizes. Males produce small, highly mobile gametes in large numbers; females produce fewer and larger eggs.

Parthenogenesis- Asexual reproduction. Production of offspring by virgin birth.

Asexual Reproduction- Production of offspring without sexual fertilization of eggs (see parthenogenesis).

Demographic transition- A phase in the economic development of cultures such that both mortality and fertility fall, often leading to families that produce children at or below the replacement rate (two children per couple). This phase has already been reached by most advanced industrialized nations such as those of Europe and the USA.

Extrapair copulation- Mating by a member of one sex with another outside what appears to be the stable pair bond in a supposed monogamous relationship.

Good genes- An approach to sexual selection that suggests individuals choose mates according to the fitness potential of their genome.

Handicap- Features of an organism that seem at first sight to have a negative impact on fitness. The handicap principle was advanced by Zahavi in 1975 to account for what appear to be maladaptive features, or handicaps, of an organism, such as the long train of a peacock or the huge antlers of a deer. Zahavi suggested that these features were honest advertisement of genetic quality, since an animal, usually the male, must be strong in order to grow and bear such a burden.

Honest signal- A signal that reliably communicates the quality of an individual in terms of its fitness.

Intersexual selection- A form of selection driven by the exercise of choice by one sex for specific characteristics in a mating partner of the opposite sex.

Intrasexual selection- Competition between members of the same sex (typically males) for access to the opposite sex.

Isogamy- A condition where the gametes from each partner engaged in sexual reproduction are of equal size. Isogamy is common among protists and algae. Higher plants and all animals display anisogamy.

K selected- Species that produce small numbers of slow-growing and long-lived offspring that require considerable parental investment.

Life history theory (LHT)- A theory that considers how organisms allocate resources to various life processes, such as mating, growth, and repair across the lifespan.

Menarche- The first menstrual period or bleeding experience by a girl. In the USA, the average age of menarche is now about 12 years. It is a key feature of puberty.

Menopause- The cessation of monthly ovulation experienced by women usually in their late forties. Women are infertile after the menopause. The adaptive significance of the menopause is probably related to the risks of childbirth and the need to care for existing children.

Monogamy- The mating of a single male with a single female. In annual monogamy, the bond is dissolved each year and a fresh partner found. In perennial monogamy, the bond lasts for the reproductive life of the organisms.

Mutation- In modern genetics, a mutation is a heritable change in the base sequences in the DNA of a genome. Most mutations are deleterious.

Operational sex ratio- The ratio of sexually receptive males to females in a particular area or over a particular time.

Parasite- An organism in a symbiotic relationship with another (host) such that the parasite gains in fitness at the expense of the host.

Parental investment- Actions that increase the survival chances of one set of offspring but at the expense of the parent procuring more offspring.

Polyandry- A type of mating system such that a single female mates with more than one male in a given breeding season.

Polygamy- The mating of one member of one sex with more than one member of the other sex. The two varieties are polyandry and polygyny.

Polygynandry- A mating system in which males and females mate with each other in a promiscuous way.

Polygyny- A mating system whereby a single male mates with more than one female in a given breeding season.

R selected- Species that produce many short-lived and quickly maturing offspring that need little parental investment.

Sex ratio- The ratio of males to females at any one time. At birth for humans the ratio is about 1.06.

Sexual dimorphism- Differences in morphology, physiology, or behavior between the sexes in a single species.

Sexual selection- Selection that takes place as a result of mating behavior. Intrasexual selection occurs as a result of competition between members of the same sex. Intersexual selection occurs as a result of choices made by one sex for features of another.

Sperm competition- Competition between sperm from two or more males that is present in the reproductive tract of the female.

READING TITLE: **EHB Chapter 4- Foundations of Darwinian Psychology**

READING NOTES:

This chapter basically examines the plurality of Darwinian perspectives on human nature and the theoretical and methodological problems the discipline as to face.

Testing for adaptive significance

To say that a feature or behavioral trait is adaptive means that it promotes or once promoted reproductive success. However, it's all to easy to jump to conclusions and to find adaptations that aren't there. These are 'just so' stories.'

An **adaptation** is a characteristic that has arisen through and been shaped by natural and/ or sexual selection.

Pitfalls of the adaptationist paradigm:

1.) Just so stories: A metaphor for an evolutionary account that is easily constructed to explain the evidence but makes few predictions that are open to testing.
2.) Panglossianism: the attempt to find an adaptive reason for every facet of an animal's morphology, physiology, and behavior.

Three criteria should be employed to ascertain whether the feature in question is truly an adaptation: reliability, economy, and efficiency.

The Testing of Hypotheses

There is no such thing as a single scientific method. However, one crucial feature common to all sciences is interplay between <u>theory</u> and <u>experience</u>.

Hypothetico-deductive method:

1.) A hypothesis is framed to account for a particular phenomenon.
2.) The consequences of the hypothesis being correct are deduced and turned into predictions.

3.) Predictions are tested by experiment or by the analysis of other evidence and, if they are found not to hold, the original hypothesis is rejected or considerably modified.
4.) If a hypothesis successfully predicts an outcome, we can cautiously say that the hypothesis is supported.

Different methods of testing hypothesis:

1.) Theory-down approach: Used to derive specific hypotheses from higher level theories. Example: theory of sperm competition.
2.) Observation-driven strategy: A bottom-up approach. In evolutionary theory this is also called **reverse engineering:** the features of an organism can be used to infer backwards to the function for which it was designed. Example: Pregnancy sickness.

Important to note that to suppose that the hypothesis is proved by a successful prediction is to commit the fallacy of affirming the consequent.

Scientific theories predict unknown findings, but these could be in the past, present, or future. Evolutionary theories, can, for example, make predictions about fossils of intermediary species yet to be discovered. Evolutionary theory is in principle falsifiable, although it has not yet been falsified.

Adaptations and fitness: then and now

Darwinism is ultimately about the differential survival of genes rather than about the fitness of the gene carriers.

An adaptation must always represent a trade-off between different survival and reproductive needs.

Two crucial forms of thinking in Evolutionary Psychology:

1.) Adaptive thinking- claims to infer the solution from the problem.
2.) Reverse Engineering- claims to be able to suggest the problem by examining the solution.

Evolutionary Psychology vs Darwinian Anthropology

One major question to address is whether the adaptations we see are to current conditions or conditions of the past. Basically two schools of thought:

1.) Evolutionary psychologists argue that human behavior as we observe it today is a product of contemporary environmental influences acting upon ancestrally designed mental hardware. Basically the human mind was only designed to cope with specific problems found in the EEA.
2.) Darwinian anthropologists argue that ancestral adaptation was not so specific and that we possess domain-general mechanisms that enable individuals to maximize their fitness even in the different environments of today.

Objections to the approach of evolutionary focus on the mysterious EEA (Environment of Evolutionary Adaptedness). What was it like and how far did it go back? What were the conditions back then and how do you account for the various different series of EEAs?

Again, Darwinian anthropologists focus on 'adaptiveness' to different environments, implying that humans will tend to maximize their reproductive output in circumstances in which they find themselves.

In contrast, evolutionary psychologists focus on 'adaptation'- discrete mechanisms and traits that an organism carries as a result of past selective pressures.

Natural selection can shape how development and learning occur in relation to local environments. Nat selection could have shaped our minds to respond to what is fitness enhancing under prevailing conditions, and to behave accordingly.

IMPORTANT TAKEHOME INFO: Book doesn't really advocate one school of thought over the other on this matter. Rather, there is room for both methodologies. In a nutshell, the human brain is complex enough and powerful enough to accommodate behaviors that are learnt or unlearnt, behaviors that are soft wired and hard wired, behaviors that adjust to local conditions and behaviros that are invariant.

Orders of Explanation in Evolutionary Thinking

Enables us to answer 'why' questions in a scientific and non-metaphysical fashion. I highly recommend taking a look at TABLE 4.2 on p89 to get a sense of the different types of explanation in evolutionary thinking. Most will already be familiar with these but it's great for those who haven't had many HEB courses.

Basically, understanding human behavior in terms of ADAPTATIONS is central to Darwinian psychology and gives us ultimate explanations for current behavior.

KEY WORDS AND DEFINITIONS:

Adaptation- A feature of an organism that has been shaped by natural selection such that it enhances the fitness of its possessor. Adaptation can also refer to the process by which the differential survival of genes moulds a particular trait so that it now appears designed for some particular survival-related purpose.

Adaptive significance- The way in which the existence of a physical or behavioral feature can be related to the function it served and may continue to serve in helping an animal to survive and reproduce.

Founder effect- If a new group of organisms is formed from a few in a larger population, the new group is likely to have less genetic variation and have an average genotype that may be shifted in some direction even though the shift was not the result of natural selection.

Genetic drift- A change in the frequency of alleles in a pop due to chance alone (as opposed to selection).

Hypothesis- A conjecture set forward as a provisional explanation for a phenomenon.

Optimality- The idea that the behavior of animals will be that which is ideally suited to bring maximum gain for minimum cost or, more precisely, where gain minus cost is maximized. The assumption that all behavior must be optimal can be misleading.

Reverse engineering- A way of thinking about the consequences of evolution. It starts with a contemporary understanding of the function of adaptive behavioral or physiological attributes and tries to infer what problems our ancestors faced to give rise to these adaptive solutions.

Strategy- A pattern of behavior or rules guiding behavior shaped by nat selection to increase the fitness of an animal. A strategy is not taken to be a set of conscious decisions in non-human animals. Strategy may also be flexible, in that different biotic and abiotic factors may

Brain Theory

EHB 6-8

LECTURE NOTES

YOUR NAME: Kiahana Brooks

LECTURE TITLE: Brain Biology

LECTURE NOTES:

The Brain

- Does the thinking
- very expensive
- sea squirt tadpoles have brain to find location to be sessile, t
  - he sessile adults have no rain
  - the function of the brain was served
- The brain is computational
  - brain is a processor capable of making predictions of what will come
  - acquires information and uses information to make predictions
- All brains
  - modules, cell types, neural chemistry left hemisphere is language, right is spatial, lateralized brains , size function relationships within the brain, size
  - size tells about adaptive significance
- Human
  - interaction of modules
  - digital symbols
  - representations detached- abstract thoughts- no anchored in perception
  - recursive computational thought- operation that allow generative way of thinking about the world, can combine words to make a phrase etc
  - these things give us distinctive human things- language, music and social justice
- Phylogentic patterns
- Functional specialization
  - the brains mechanisms- neurochemistry
    - dopamine- reward system
    - neuron- single cells activate by certain events
    - cortical regions or lobes- populations of neurons with function
    - intercortical connections
    - psychological state- recognition
  - comparative modules
    - cerebellum, optic lobe, olfactory bulb, cerebra hemisphere, medulla, pituitary
  - **Top brain** in motor strip- motor action
  - next to motor strip is **somatosensory** which control touch and feel
    - make sense they are connected
  - top brain in **parietal area-** spacial analysis
  - **occipital lobe**- low level vision and motion detection
  - **temporal lob**e – involved in sound analysis and speech analysis and auditory function, and high level vision and object recognition

        - passes from occipital
        - area involved when reading
        - object recognition evolved meaning this area evolved
    - **frontal lobes**- decisions making, memory
    - how do we find function- damage- show loss of function where damage is
        - also imaging – show what brain does with blood flow
    - **Granny Cells**
        - cells that fire only to faces in Macaques
        - how do we recognize our granny as not some other old woman
        - mirror neuron- discovered in Macaques
            - when an animal grasps something the neuron fires
            - also fires when the monkey watches other people grasp
                - code for action and the perception of the action
                - putting self in their situation- imaging in that we are them
            - sensitivity for action and perception of action
    - Evolutionary Psychology
        - brain has tool for solving problems
        - functional specialization
    - Features of the brain module
        - system is domain specific
            - different mechanism that deal with only a certain kind of input
            - when the module operates it fast and automatic procession
            - dedicated neural architecture for that problem
            - when that system in damage -that function goes down that was controlled by that module
            - information is encapsulated onto itself- works automatically- like an island of operation
- domain specific face recognition
    - faces- slower to recognize face when upside down
        - looking at face upside down has different system then right side up
    - face recognition fits above criteria
    - fusiform face area- area of the brain that selectively reacts to faces but not other objects
    - prosopagnosia- when fusiform face area is broken- people cannot recognize familiar faces but can recognize other objects
        - prove module-specific reaction
- **Brains vary in size and folding**
    - body mass. Brain mass has linear relationships
    - animals below isometric are dumber
    - animals with positive allometry are smarter
    - above the line means have a larger brain
        - implication- big brain means smart
    - in scientific record- brains were signs of intelligence
    - difference in humans in terms of sexes
        - variance in male brain size is larger than female variation
            - male- dumbell and nobels
        - brain size seems to be correlated with IQ
            - different in humans driven by different in brain size
        - chihuahua fallacy

- dogs have same intellective capacity between breeds
- dogs have different body size
- selection of dogs by body size-
- chihuahua- as huge brain to body size but the selection was on body size

- **Adaptation**
  - design of the predators brain
  - bat
    - problem- darkness- biosonar
      - bats need to find and capture insects in the dark
      - biosonar- loud high frequency
        - causes echo
        - bats have large ears to decode the echo when come back
        - memory of sound allow to assess the distortion of the sound
        - brain tells the object, what it is etc
        - changes signal etc to find prey
        - auditory specialist
          - in brain the auditory cortex s the largest part of the brain
            - large auditory mean s an animal to help with acoustic problems
      - If you record from neurons
      - they have stimuli that causes them respond more or less
      - neurons are tuned for certain frequencies- will fire when in signal in their frequency
        - In bat they are finely tuned because need to be precise to find a prey
  - Co evolutionary arms races
    - prey want to evolve to avoid predation
    - predatory evolving to catch prey better
    - constantly moving with different selection pressure on each
    - preying mantis can detect things- sonar of the bat and hides itself
    - specialization to capture the prey and evade the predator
- Ecology and brain design
  - fruit v . leaves
    - fruit make u sick
    - fruit is hard to find
    - when is it ripe- has to do with toxicity
    - fruitivore have problem of tracking food
    - outs demands on memory
      - size linked to solving the problem
      - fruitivore have large brains than leave eater
        - has constrains on skull size because of the birth canal
          - increases surface area with folds
- Social behavior
  - social pressures – brain design for spatial memory
    - hippocamps- memory and spatial
    - cells in the hippocampus- give information on the direction of movement, other cell on the specific location
    - voles
      - tow species that closely related
      - meadow v prairievoe

        - meadow- polygamous, prairie – monogamous
      - when monogamous- male and females live in the same area- same are to keep track
      - in polygynous- females have on area- males travel to multiple places
        - males must keep track of large territory in polygyny, female do not have to keep track
        - more spatial analysis
        - must keep track of females
      - matting systems have different pressure on memory
        - expect males to have better spacial in polygyny
        - males and females same in mono
    - maze test
      - will test the spatial capability of each animal
      - males solved the problem faster than females in polygynous
        - monogamous same
    - No difference in brain
      - polygynous have more experience
      - monogamous have less
    - hippocampus volume
      - females smaller than males in polygamous
      - males and fems same in monogamous
    - Make sex differences
- Link between social issues and hippocamal volume
  - Coucous- species where parents are no evolved to raise the young
  - parasite species
    - in some of these both the male and female deposit the egg to another bird nest and check
    - in other species on the females go to vise
    - in species where both visit- no difference in hippocampus
    - when fem go- she has large hippocampus
- Social life and brain size
  - social group
  - must keep track of what everyone is doing
  - repetitions matter
  - neocortex ration- new part of cortex
  - proximian- group size small neocortex
  - as group size increase- neocortex increases
  - pressure for the evolution of language
- social life puts pressure on the design of the brain
- How does our evolutionary past put pressure on how we think about the world
  - we return to hunter gathers
- Hyper social brain
  - whites of sclera of eyes
  - so we can see where others are looking

READING NOTES

Chapter 6

- Owen- humans have a hippocampus so not descended from primates

- Henry found primates also had hippocampus
- larger bodies, larger brains
- allometry- expected values for organs as an organism increases in size
- Brain size = C(body size) ^ k
  - c= brin weight of a hypothetical adult
  - k= brain scaling constant
- encephalisation quotient – departure from allometric line
- Chihuahua fallacy
  - chihuahua are not smarter than other dogs but people selected for a smaller body size so the body- brain volume naturally increased
  - conversely human brain sizes kept increasing
- brain is very expensive organ
  - trade off in gut size
  - herbivores have easy to get food so don't need large brain but need large gut to digest calorie low foods
  - for humans obtaining food in a different environment required more brain power
    - human diet s intellectually challenging
  - tool use could have facilitated the brain
  - Social structure necessitate large brain
    - Machiavallian intelligence
      - comparison of the social strategies of chimp and the advice given in *the Prince*
      - Chimps
        - serving people without making disruption
          - social conflicts are costly
          - order is maintained with a dominance hierarchy
          - grooming avoids conflict intra-group
          - deceptive techniques seen in chimps
            - theory of Mind- chimps can appreciate the intentions of others
      - intentionality
        - first order- self awareness
        - second order – realization that others are similarly self aware
        - humans have an acute sense o their own existence and live are dominated by motives and goals
        - mirror test for intentionality
- Brain division (Maclean)
  - primitive core inherited from reptile ancestors
  - midsection with sensory perception and integrating body functions
  - cerebral cortex- distinct to mammals
- Brain evolved from self feeding evolution
  - Brain growth reinforced itself
- Genomic imprint
  - some genes are silenced when inherited from one parent and not another
- evolution depends on mutations
  - most which would be detrimental
  - neoteny
    - extension of juvenile features into adulthood

- Language
  - Brocas area
    - effect language when syphilis region is present – impairments in speech output
  - Wernicke area
    - also linked to decreases language capability
  - Grooming
    - the current equivalent of grooming is gossip
      - language allowed us to "groom"while doing other things
    - this allows larger group sizes and social coalitions than expected for humans
    - because less time allocated to grooming

Chapter 7

- Plato mind is born with pre-equipped ideas of ways of structuring experience
- Nativism- we arr born knowing certain things
- Epistemology- theory that out knowledge is evolutionary
  - phylogentic- during evolution the mental circuitry of a species becomes circuited
  - ontogenetic- selection occurs in the individual mind and maturity occurs
- Baillargeon Study- 18 week year olds have knowledge of impossibilities
- modularity- function entities dedicated to facilitating that function
  - domain specific mental modules
    - face recognition, learning language etc.
  - social group module are important and all primates seem to live in social groups
- Unbounded rationality
  - no limits to human cognition
    - cognition for maximizing returns and optimal decision making
    - humans always behave optimally
    - but all relevant information for optimal thinking is rarely available under human constrain models
    - suboptimal patterns may be used by risk averse people
- bounded rationality
  - optimization under restraints
  - not strictly irrational but no optimizing because of the limitation of human cognition and incompleteness of information
  - humans uses heuristics- strategies for problem solving which consist of simple and economical rules
  - people are usually overconfident
- Logical reasoning and social contract
  - ancestor lived in a difficult environment with nonreciprocating people
    - we have built in mechanisms to deal with cold
    - human have an accurate way to identify cheaters
      - detection of cheating must have been evolutionarily necessary
      - people better remember the faces of cheaters or untrustworthy people
- Women have better cognition for gathering, men have better cognition for hunting
  - males are better in way- finding tasks

Chapter 8

- Darwin
  - emotions originated for movements that were once useful

        - surprised eyes from mechanism to let light in
    - if certain frame of minds made and action, the opposite frame of mind would make the opposite reaction
    - some actions are the nervous system acting against the body with no purpose
- James- Lange- emotions accompany bodily reactions
    - actions inspire emotions
- Cannon
    - absence of autonomic response to correspond with each emotion
- No consensus on what our emotions are and what emotions are primary and secondary
    - Wilson – child has fear rage and love
    - emotions have adaptive purpose
    - homology- emotions shared with primates
- Universality
    - New Guinea study that joy, anger, fear, surprise, sadness and disgust hold across all cultures
- To examine the brain origins of disease
    - looks at people with damage as oppose to just autonomic nervous system
    - orbitofrontal cortex – emotional centers
- The brain structure
    - nervous system- brain and spinal chord
    - neurons- cell bodies
        - average connected to 1000 neurons
        - brain divided in to hemisphere with different functions
            - lateralization
        - amygdala
            - part of limbic system
            - damage makes decreased emotion
            - signals other areas of the brain
                - low circuit
                    - bypass thalamus- instinctive unthinking reactions
                    - fast
                - high circuit
                    - slow but allows to consider appropriate response
        - Kruver- Bucy syndrome
            - emotional reactions dulled when amygdala damaged
- Mirror neurons
    - insula- activated with facial expression of disgust of others
- Love reinforces pair bonds and commitments which allows both parties to benefit from th pair bond
- Emotion paradox
    - some interfere with decision making while others reinforce good things

DEEP SEX

EHB 11, 13

YOUR NAME: **Wendy Wang**

LECTURE TITLE: **Deep Sex**

LECTURE NOTES:

I. Sex and Evolution: How to identify Sex
   a. Natural Selection→ Primary (Genitals; XY gametes)
   b. Sexual Selection→ Secondary (Size, color, behavior, physiology)
   c. Ie: male advertisement
      i. Adaptive, for the advantage of the individual
      ii. Females as the "ecological sex"
         1. Parthenogenesis (virgin birth)
      iii. Males as the "mate getting sex"
         1. Fighting
         2. Courting
         3. Displaying
         4. Seeking
   d. Bateman Principle
      i. Used fruit-flies in experiment
      ii. Male RS increased as number of copulation partners increased
      iii. Relating secondary sexual traits to gametes
   e. Components of Sexual Selection
      i. Darwin: Sexual Selection is the cooperative behavior between sexes because it produced the fittest partners
      ii. Modern: Sexual selection involves male traits that over-ride female choices leading to female-male "arms race"
         1. Intrasexual selection: competition (mostly among males)
         2. Intrasexual selection: Choices (mostly by females)
         3. Coercion: mostly males overcoming female choice by force
         4. Ex: spiny genitalia→ male-male competition
            a. Anchor during copulation
      iii. Exception to Bateman's Principle
         1. # of males attending females mater to survival of female's babies. More males→ better RS
         2. females can solicit multiple males
   f. 3 Sexual Fallacies
      i. Procreative Bias
         1. The error of thinking that sexual behavior is used by animals purely for conception
            a. Infertile heterosexual behavior
            b. Before ovulation
            c. Why mate often? Frequent mating→ younger sperm
            d. Social reason: ex- get food from male
               i. get more sex if bring more food

e. In multi-male groups: why mate often when 100's of copulations per birth?
    i. Male sperm competition
f. Beneficent behavior by males to offspring of their mating partners
    i. Alliance support, defense of territory, inhibition of infanticide

2. Autosexual
    a. Masturbation
        i. More in captivity than wild
        ii. Ie: lucy chimpanzee
        iii. Low rank males mate less, masturbate more
            1. Optimize sperm production?
3. Homosexual Behavior
    a. Homosexuality in bisexual groups
    b. Multi-female, multi-male groups
    c. Females highly proceptive
    d. Integrated into social system
        i. Context: bond formation, reconciliation, tension reduction
    e. Bonobos- all mature females ("bisexuals")
    f. Sex imbalance
        i. Female homosexual pairs
        ii. Rear own young
        iii. Higher RS than lone females
4. All male groups of adults and adolescents- male homosexual strategy
    a. Older males treat younger males like females
    b. Copulations
    c. Sexual dyads resemble pair-bonds
    d. Older compete over younger (ex: mountain gorillas)
5. Polygyny
    a. Highland New Guinea
    b. Boys recipients of semen from older males
    c. System integrated in culture. Semen as "life source"
6. Modern view, sexual behavior is biological function that can also be non-conceptive

ii. Naturalistic Fallacy
1. The error of thinking that non-conceptive sexual behavior is immoral because it is unnatural
2. Homosexuality as an example of he problem of the pro-creative bias to the naturalistic fallacy

iii. The blank Slate
1. Error of thinking that human sexual behavior is infinitely plastic
2. High plasticity
    a. Sexual positions
        i. Idea that Only one position that is biologically natural
    b. Foreplay

i. Regarded as ludicrous infantilization of men

3. Low plasticity
    a. Romantic love
        i. Universally celebrated
    b. Limited sperm competition
        i. Evolutionary history of multi-male-mating→ large testes
    c. Male interest in youth
        i. Humans peculiar, male prefer young female

READING NOTES

READING TITLE: **Evolution and Human Behavior Chapters 11, 13**

Chapter 11: Human Sexual Behavior: Mating Systems and Mating Strategies

I. Contemporary Traditional or preindustrial societies
    a. Sexual behavior observed in different human societies departs from monogamy advocated in most Western cultures
    b. Ie: !Kung San people, tend to reveal pattern of mild polygyny
    c. Men would often donate meat to women in exchange for sex, high ranking men gaining most from this practice
        i. Foraging way of life that relied on hunting sustained high degree of polygyny
        ii. In most hunter gatherer groups, men will have one or at most two wives

II. Physical comparisons between humans and other primates
    a. Testis size
        i. Indicates the degree of sperm competition
        ii. A single male in a harem does not need to produce as much sperm as a male in a multi-male group since rival sperm are unlikely to be a threat
        iii. Better to encourage competition among potential father
        iv. *Lek* refers to species where a male will display before femaes, and females will then choose the most successful male
    b. Testis size and bodily dimorphism applied to humans
        i. The fact that men are heavier than women could indicate the protective role of men in open savannah environments
        ii. If sperm have competed in our past, then women must have mated (polygandrously) with more than one man
    c. Evidence from immunology
        i. Higher white blood cell count found in females who had greater number of mating partners
        ii. STDs, need more complex immune system

III. Pluralistic Sexual Strategies
    a. Sexual strategies theory
        i. Long-term mating is characterized by a heavy investment by both partners. Short-term mating is conceived as a brief encounter
        ii. Sex differences in long and short-term mating strategies
            1. Women look for signs of genetic quality in her mates

2. Men alert to signs of fertility
3. Men will also be interested in a large number of partners than women since male reproductive output is not constrained by their biology but by number of women he can persuade to have sex with him.

iii. Sexual strategies in relation to context
1. Low score is characteristic of subjects who favour monogamous relationships, prolonged courtship, and make a heavy investment in long term relationship. A high score is associated with individuals who are more promiscuous rapidly proceed to sexual intercourse after meeting someone, and are less interested in romantic closeness.
2. Men should have a higher sociosexuality than women across all cultures
3. Cultures with lower operational sex ratios should be associated with higher female sociosexuality. Conversely, highly operational sex ratios should be associated with lower female sociosexuality scores.
4. Early childhood experiences have some impact on adult mating strateges
5. Environments are harsh, unpredictable, stressful, and resources scare, then it pays not to adopt a high investment strategy, since such investments may be lost or impossible to sustain.

Chapter 13: Incest Avoidance and the Westermarck Effect

I. Early views about inbreeding and incest taboo
   a. "alliance theories" stress the functional role of interfamilial alliances

II. Westermarck's alternative Darwinian Explanation
   a. Westerarck suggested that men do not mate with their mothers and sisters because they are disposed not to find them sexually attractive
   b. Children who are raised together will, therefore, experience a sort of negative imprinting against finding each other sexually attractive
   c. He thought to conjoin the moral imperatives of the taboo with its biological basis; in other words, to show how ethical prescriptions can be integrated with natural science
   d. Have no logical connection and to attempt to unite them somehow commits what became known as the 'naturalistic fallacy'.
   e. Younger the girl at adoption, the longer the cosocialisation with her intended spouse and the longer the time for negative sexually inhibiting imprinting to occur

III. Inbreeding as injurious to offspring (inbreeding depression)
   a. Coefficient of inbreeding
   b. Proportion of gene (f) sites on the chromosome where they have inherited two identical copies of any gene
   c. F is the probability that an individual has both alleles of a gene identical by descent from the same allele in a common ancestor
   d. Incestuous relationships often involve confounding variables such as low maternal age, mental abnormalities and low socioeconomic status

e. Length of co-residence between siblings was positively associated with their moral condemnation of incest

IV. Keeping it in the family: incest, paternity confidence and social stratification
   a. rules are made to ensure reliability of paternity
   b. rules are made by socially powerful individuals to maintain their privileged position and prevent the accumulation of wealth and power in subordinates

V. Incest and morality
   a. The proposed connection between morality and biology places Westermarck in a long line of thinkers who have argued for a naturalistic, as apposed to transcendental approach to ethics.

RECENT SEX

Nisa Ch 1-6

LECTURE NOTES

YOUR NAME: **Becky Dillaway**

LECTURE TITLE: **Recent Sex**

THREE SENTENCE SUMMARY OF LECTURE: This class dealt with different mating systems and human marriage systems (monogamy, polygamy – polyandry/polygyny). Also the role of wealth accumulation and how it led to polygyny and reproductive skew was discussed. Certain reproductive conflicts between men and women also emerge and as a result men often exercise reproductive control over women.

LECTURE NOTES:

I. Principles: sex differences between males and females, mating systems

A. Asymmetries between Males and Females

-males can potentially father many more offspring than females can mother
- male fitness benefits from mating opportunities
    - female fitness benefits from access to resources
- a female always knows who the mother is. A male is never absolutely certain – paternity confidence/certainty
- male fitness is more variable than female fitness – reproductive skew
- implication of mate choice are very different for males and females
    - if a female chooses poorly the penalty is high (a poor return on her investment)
    - for a male, a poor decision may be of little consequence
        - this varies with the extent that the parent invests in offspring

B. Mating Systems

- one strategy is round up as many mates as possible and persuade them to mate w/you OR You can mate w/ one partner and stay w/ them for life and share the duties of parenthood equally
- Monogamy: one male and one female
- Polygamy: union involving more than 1 partner of either sex
    - Polygyny: 1 male and multiple females
    - Polyandry: 1 female who monopolizes multiple males

II. Human Marriage Systems

- Are humans monogamous or polygamous by nature?

- occurs in all human societies and is a socially recognized liaison between men and women
- separates couples from other sexually active members of a society, designates who has an exclusive relationship
    - legitimizes sex (also limits it)
- While Darwin recognized the profound importance of mating strategies we knew nothing about human variation until recently
- Murdock's cross cultural classification of marriage practices in 849 societies found: monogamy in 16.1%, polyandry in 0.5% and polygyny in 83.4%

A. Monogamy

- a man's willingness to commit means he's willing to forfeit other mating opportunities
- a female is giving up her choice to partner w/ other men
- men tend to help raise kids when their help makes a difference to their child's survival and when they are confident their help is going towards <u>their</u> kids.
    - if females count on economic or financial help from males she may have little or nothing to gain from extramarital liaisons.
- the human sexual contract: economic cooperation = paternity confidence
    - women are pair bonded regardless of whether they are monogamous or polygamously
    married
    - pair-bond: a long term affiliation between 2 individuals

B. Polygyny

- serves male interests more than females
- when is it worthwhile for a female to be in a polygynous relationship?
- Polygyny Threshold
    - developed to explain why some birds are monogamous or polygamous
    - if territories vary (some are better for female survival/fitness) she benefits from being a second mate in a good territory instead of the only mate in a bad one
    - if they don't differ, she's better off being the only mate
        - there has to be a difference in male quality that affects the female and her offspring's survival
- Sororal polygyny (a man marries 2 sisters) is the most common form in mildly polygynous societies --- the scale at which polygyny occurs varies a lot

C. Serial Monogamy

- a pattern of marriage: divorce and remarriage are common (common in US following WWII)
- what do societies w/ high divorce rates have in common?
    - women are economically independent (w/ independent sources of money, autonomy)
- in most modern nation states, monogamy is the sanctioned marriage system
    - legal codes prohibit polygyny
    - what about affairs, adultery, prostitution?
        - studies show a wide range of infidelity
        - we know little about illegitimate children
- many modern states have outlawed polygamy (morally and legally)
    - why should the state care? Whose interests does it protect?
- historically when there are huge disparities in wealth, men at top have access to harems
    - societies w/ extreme reproductive skew have some common traits:
        1) classes of disenfranchised and marginalized men
        2) classes of eunuchs
        3) slaves and servants
        4) women are often held against their own free will
    - leads to political instability in these societies

D. Polyandry

- very rare, benefits females in terms of resources, doesn't benefit husbands
- why do we see it all?
    - occurs in places where land is very heavily restricted (agricultural) and they tend to be brittle marriages, often among brothers

<u>III. Wealth Accumulation, polygyny and reproductive skew</u>

- in hunter-gatherer societies male status isn't distinguished in terms of material wealth
- marriages are formalized through bride service
- What happens when there is a change in economy that introduces venue for some men to accumulate wealth?
    - creates a competitive marriage market
    - male status hierarchy emerges (many men are left out creating a skew)
    - sanctions against female indiscretions become more severe
        - polygyny is institutionalized

<u>IV. Conflicts of Power/conflict</u>

A. Reproductive Conflict

- paternity uncertainty and female choice = conflict
- Why do males get the upper hand in some societies?
    - in many traditional societies women have autonomy in their sex decisions
        - marriage alliances are flexible, both sides can instigate divorce
    - women in matrilineal/matrilocal societies fare best
        - females are less dependent on males for support, they live in coalitions of related females
- something happens when wealth disparities develop
    - stakes on female purity are higher
    - mild forms of control over women: separate eating/socializing places, veiled, separated by screens/barriers, live in separate structures (most can't afford this life style)

B. Reproductive Control

- foot binding in Asia
    - only the richest could afford such helpless women
    - it became a symbol of wealth – suitors favored it, fathers/families encouraged it
- Corseting in Europe
- occur in societies with hypergynous marriage systems (where women marry men of higher status) – never widespread
    - families use their daughters dowry/virtuosity which leads to extreme female to female competition
- have strong ethics of honor and shame
    - woman's is gained through chasteness and modesty
    - man's is gained/lost by deeds of his female kinfolk – a woman's relatives' honor is bound up in her chastity
- concerned with paternity confidence
    - the lengths to which men will go to assure it varies
    - women enjoy some autonomy in some circumstances
    - some control over women's reproduction is extreme
- now we highly value monogamy

KEY WORDS AND DEFINITIONS:

- Monogamy: one male and one female
- Polygamy: union involving more than 1 partner of either sex
    - Polygyny: 1 male and multiple females
    - Polyandry: 1 female who monopolizes multiple males
        - pair-bond: a long term affiliation between 2 individuals

READING NOTES

READING TITLE: **Nisa: The Life and Words of a !Kung Woman Ch. 1-6 (w/ intro)**

READING NOTES:

Introduction

- Begins with story of Nisa giving birth to her first child (alone, away from the village). She is an
African woman of about 50 years living in remote corner of Botswana, and is the primary informant for book.
- Shostak discusses how she gathered information (by interviewing women who she "paid" with money or goods) and how she came about interviewing Nisa.

Ch 1 Earliest Memories

- Children are carried in a sling w/ direct access to the mother's breast for the first 3 years of life.
- Kung fathers are devoted, affectionate, and indulgent and form intense mutual relationships with their kids
- Babies are weaned when mother becomes pregnant again—think it's unhealthy for baby to feed on new baby's milk—strong resistance from child
- Culture promotes sharing and giving or withholding food or possessions can be a powerful way to express emotions
- Parents are tolerant but do hit kids
- Nisa describes her own weaning and the ways she reacted—crying, not sharing, stealing, sneak nursing, living with grandmother—and her parent's reactions—tolerance and physical punishments

<u>Chapter 2: Family Life</u>

- Anger and resentment is often experienced by an older child with the birth of a sibling for months or even years. This sometimes results is violence.
- Violence among children isn't usually encouraged, but they learn to handle anger
- Conflict resolution among the !Kung is achieved through hours of talk or less commonly the splitting up of the group, temporarily or sometimes permanently.
- !Kung siblings are usually 4 years apart in age. Many factors are thought to have an impact on this phenomenon, such as: plants that cause miscarriage, the taboo against resuming sexual relations for at 6 months after the birth of a child, and infanticide. However, the spacing is more than likely caused by a life or death issue: if a woman had another baby too soon, either the baby or the older child would die. Nursing a child requires a large daily intake of calories by the mother and it would be debilitating/ impossible for the mother to produce milk for 2 children. Today, cow's milk is available for toddlers, so this problem has been essentially eliminated.
- The term of prolonged nursing is probably the main reason for the large gap between siblings. Nursing continues for several years after the child's birth, and done several times an hour. This constant stimulation of the nipple suppresses the hormones that induce ovulation and therefore, conception during this period is highly unlikely. Also, the calories

expended during nursing combined with the subsistence level diet do not leave much extra energy for ovulation to restart.
- Infanticide among the !Kung is extremely rare (birth defects, still births, inability to have two small children at once) and is the result of a personal and painful decision by the mother. The child was not considered a true person till it was brought back to the village.
- The interval between pregnancies is a necessity to the !Kung way of life. Women are small and
must carry children and belongings out to search for food each day. Two small children are a heavy burden to carry.
- Menstruation is not considered a thing of importance except for the fact that the !Kung believe that it is a mixture of the menstrual blood and semen that allows for conception. Women have physical symptoms but no psychological ones. Woman desire cleanliness during this time but water is scarce, so they only wash the blood from their legs at the end of the cycle.

Chapter 3: Life in the Bush

- A man's hunting skills and inclinations are fostered early in childhood, often beginning when he is only a toddler (they play with bows and arrows). Their first targets are stationary. Soon, moving ones are added. As the get older, aim is improved by throwing sticks and spears. Their mastery of identifying animal tracks and native plants and animals is a slow process of observation and practice.
- At 12, boys learn how to set snares and get their first real bows and arrows. The next step is to go out and hunt with their older male relatives.
- Hunts are often dangerous and they are faced courageously but risks aren't sought out or taken to prove this courage. Actively avoiding dangerous situations is considered prudent, not cowardly.
- A boy is likely to kill his first big game animal /w the years of 15-18. This is considered a cultural milestone, and two ceremonies are performed—one for the first male animal that is killed and another for the first female. Although now considered eligible for marriage, he will not marry for another 10 years.
- The age of thirty is the more productive period of a !Kung man's hunting career.
- If a hunter is successful in killing a large animal, it is butchered, brought back to the village, and distributed according to rules of precedence.
- Meat is highly valued and is prized when full of fat. Since availability of meat is so uncertain, distributions are emotionally charged events—portion size depends on issues of kinship and amount of contribution to the hunt.
- The person whose arrow killed the animal id considered the true "owner" of the meat and had rights over its distribution.
- !Kung men vary widely in their hunting skills, but different levels of success do not lead to differences in status. Self-deprecation and understatement are rigorously required of the hunter after a successful hunter.
- Problem for truly accomplished hunter or other talented individual is to perform as well as possible without provoking anger or envy in others. There are many methods of alleviating tension such as sharing arrows, therefore diffusing responsibility for the kill or alternating hunting periods to give others a chance to make the kill.
- When he is older, a hunter starts to help young men to learn the skills of the hunt that he has accumulated over about 40 years.

Chapter 4: Discovering Sex

- !Kung have little privacy, either in the village or within the family dwelling. Adults try to keep children from noticing their sexual activity, but arranging meeting in the bush is difficult and young children often insist on going wherever their mothers go. All it takes is a little curiosity to find out what's going on.
- Early sexual awareness and curiosity flourishes in unrestricted free time that makes up most of
a child's day. They have no schools and are not expected to contribute to subsistence or to help out much around the village. Adolescents help out less than their younger siblings do.
- Village life gives a secure and socially rich environment in which to play. A village averages about 30 people—relatives, friends, and visitors, all of whom the child knows—and most activities take place outside, beside the fire that defines each family's living space. Children have easy access to the entire village area.
- Owning little, the! Kung do not have to worry much about protecting their possessions from children's' harm or vice versa, and children can safely roam throughout the village.
- Kids set up their own little play "villages" within earshot of the main village, but not within view. They play at adult activities including marriage and parenthood.
- Little formal teaching is done, so observation and practice is the basis of all learning. It is in this play groups that children will learn many of the skills that will help them to become productive adults.
- Nomadic travels have an effect on kids' playgroups, as the former varies from week to week and from season to season.
- !Kung children are not segregated by sex, neither sex is trained to be submissive or fierce, and neither is restrained from expressing the full breadth of emotion that seems inherent in the human spirit.
- Because the !Kung impose no responsibilities on their children, place no value on virginity, and do not require that the female body be covered or hidden, girls are as free and unfettered as boys.
- There is no competition in !Kung society and each child attempts, though repetition, to become more accomplished, not to defeat or outshine someone else.
- People are aware of the often-impressive talents of others around them, and they derive great benefit from those talents, but it is considered bad manners to call attention to them.
- Boys are more physically aggressive than girls and girls interact more with adults other than their mothers than boys do, but neither shows a preference for playing exclusively with children of their own sex.
- Sexual play of younger children begins with boys playing together and girls playing together, and then changes to boys and girls playing together, with the boys as the usual—sometimes aggressive—initiators. The play of older children often involves some genital contact, but actual sexual intercourse does not seem to occur until much later, and some girls marry without ever experiencing it, unlike your mom who was a dirty whore.
- Adults do not approve of sexual play among children and adolescents, but they do little to keep it from happening.
- Children have a 50-50 chance of survival before reaching adulthood, and later-born children may lose one or both of their parents before they themselves reach maturity.

<u>Chapter 5: Trial Marriages</u>
- Young women are not considered truly adult or expected to assume full responsibility for themselves or for others until they reach their late teens, have menstruated and married, and are likely to soon become mothers.

- Boys, in contrast, are usually not considered eligible for marriage until they are between 20 and 30, and then only after they have demonstrated their ability to provide for a family by killing a large animal.
- Sexual relations are not expected to begin until the girl shows signs of sexual maturity - culturally recognized as the time around the first menstruation. These early marriages are unstable and often brief in duration, and a girl may enter several of them before she starts having children, usually with one life-long partner.
- Parents and other close relatives arrange first marriages and, if the children are still young, subsequent ones as well. Trips are made to the visit potential spouses residing within a wide geographical area, to ensure parents the broadest possible choice. !Kung prohibit marriage between close kin.
- In choosing a son-in-law, parents consider age (man shouldn't be too much older than daughter), marital status (unmarried man is preferable), hunting ability, and willingness to accept the responsibilities of family life. Also a cooperative, generous, and ingressive nature is good.
- A first wife should be young, industrious, agreeable, and capable of bearing children.
- Resistance to marriage is typical of young girls, and is usually interpreted as being directed at marriage itself, rather than at a specific man.
- After marriage, the man usually joins his wife at her parents' village, because girls are not expected to leave their mothers while they are still young. This arrangement is advantageous for the girl's family because the husband helps to provide meat for the family, her parents represent her in times of conflict, it expands the parents' social world, and allows them access to resources in times of need.
- If a girl is determined that she will never feel any affection for her husband she can insist on ending the marriage. When she is older, she may decide for herself who she wants to marry, and hope that the adults will accept her choice.
- The early years of many marriages are stressful for both parties, especially when they vary widely in age. The girl is expected to sleep in the same hut with a man who is much older than she, and to gradually assume some of the burden of the household—while her unmarried peers are still essentially carefree. The groom, meanwhile, is usually fully grown and sexually mature so he has to wait for his wife to slowly develop, he must also help her father bring back food and endure his wife's indifference or rejection.
- Marriage ceremony is modest; negotiations are done long before the actual marriage. A hut is built and set apart from the village; the bride is placed with head covered in the hut. The husband sits outside and the friends party while the couple does nothing. Coals from both families form fire. They sleep in hut and in the morning oil is rubbed on them.
- Neither spouse gives shit to the marriage so they can just peace out at any time. Possessions are individually owned, so nobody fights over whose property it may be.
- The divorced girl or woman simply returns to the category of highly desirable potential wives, to be sought after by eligible men.
- Women don't give up their friends for any man, friends are very important for the !Kung and are kept forever. Even the close relationships between co-wives are kept for many years.

<u>Chapter 6: Marriage</u>

- Marriage and first menstruation are two of the milestones of women's lives that are formally recognized and celebrated by the !Kung (a first animal kill and initiation are comparable occasions for men). The ceremonial aspects may require that the participants

assume a demeanor or restraint, respect, and even silence. “Kua” describes the way she is expected to act and, most likely, to feel.
- Even if she is eager to marry her prospective spouse, a young girl may hide her willingness or feign distress: this is appropriate and almost expected behavior.
- Although sexual knowledge is each !Kung woman’s legacy from the sexual play of childhood,
most young girls see a world of difference between playing with boys their own age and having sex with their husbands—grown men. A girl’s first experience of adult sex is, therefore, often traumatic. Sexual relations may be postponed for years, but once a girl shows clear signs of development she is generally pressured to accept her husband’s sexual advances.
- The !Kung express strong emotions, so an unhappy wife is free to act out her displeasure. If her distress becomes too great, and the marriage is still not terminated she might take more drastic action such as threaten her own life or run away to the bush at night.
- People usually view such actions with tolerance, especially if the woman is still young. She may not be ready to accept sexual commitment and adult responsibility. As she gets older, however, her rejection of these inevitable steps forward will be less indulged, and she will experience increased pressure to conform.
- A girl’s first menstruation is celebrated in a ritual performed by adult women, somewhat reminiscent of the marriage ceremony. The girl has been instructed ahead of time to sit and cover herself, and not to speak or move, when she notices her first menstrual blood. This behavior is easily interpreted by other women, who find her and carry her to the village.
- While women dance and sing outside her hut, she lies inside her hut, unable to speak or move.
- First menstruation is believed to engage powerful spiritual forces identical to those involved in trance medicine. It must be approached properly and handled respectfully. Men cannot see the girl during first menstruation.
- While this female initiation ceremony is public (viewed by all villagers), the male initiation ceremony takes place in secret, far away from where the women can see or hear.
- The ceremony lasts for 3-4 days, ending with the end of the menstrual flow. The girl is then washed, rubbed with herbs, and brought out of the hut.
- When the young woman has her first child, usually between the ages of 18 and 20, she will finally be considered an adult.
- The average age of first menstruation for !Kung girls is 16 ½, quite late compared to the U.S., where in 1970 it was abt. 12 ½. !Kung girls also tend to be infertile for 2 years after the onset of menstruation.
- The benefits of late maturity, with their early and frequent sex play, are evident. The dangers of childbirth, great enough for the !Kung generally, would probably be even greater for teenage mothers. Then too, mothers who were little more than children themselves might not have the emotional maturity to care for infants as responsibly as older woman do. With infant and child mortality as high as they are, even a slight departure from optimal conditions or care would probably result in a higher mortality.

KEY WORDS AND DEFINITIONS:
- !Kung—hunter-gatherers, small semi-permanent camps, share food and meat, privacy not important, no hierarchies, medicinal trance dance is central ritual event, travel in search of food or to visit relatives, staple of nutrition is the mongongo nut, women care for kids and perform daily domestic chores, men average 3 hours of work per day in making and repairing tools and domestic chores, devoted and loving fathers and participate in child

care, women's status in the community is high and their influence considerable, men hunt meat, good diet and relaxed lifestyle but high child immortality rate

MODERN SEX

EHB 12

LECTURE NOTES

YOUR NAME: **Tessa Lyons-Laing**

LECTURE TITLE: **Modern Sex**

THREE SENTENCE SUMMARY OF LECTURE: This lecture covered positive mate choice preferences. Evolution predicts that males and females will desire different attributes in their partners. Physical beauty in both sexes is expected to be correlated with signs of reproductive fitness – faces may convey honest signals about fitness and reproductive value.

LECTURE NOTES:

Four misconceptions of human sexuality

1. **The procreative bias:** error of thinking that sexual behavior is used by animals purely for conception
2. **The naturalistic fallacy:** error of thinking that non-conceptive sexual behavior is immoral (error of assuming that IS leads to OUGHT)
3. **Blank slate:** error of thinking that human sexual behavior is inifinitely plastic
4. **Genetic determinist:** error of thinking that our genes fully determine the range of sexual behaviors and our attitudes towards them

Changing attitudes towards sexual behavior and sexual orientation:

- Evelyn Hooker: crushed view that homosexuals were psychologically damaged
- Demolished that diagnosis by means of a scientific one
    - Original study had looked only at prisoners, Hooker demanded that they also look at non-hookers
- Changing attitudes in our moral circle about what constitutes appropriate versus inappropriate views
    - 3-6% of pop is homosexual in countries where its acceptable, other countries say its illegal
    - keep in mind how culture can impose and change attitudes towards sexual behavior
    - how does biology compose another layer of constraints

General Argument:

- Evidence for grounding of our sexual preferences and behavior in biology
    - Comparative
    - Universality
    - Anatomical-physiological

<u>Sexual Selection: more theory</u>

- 2 key factors in sexual behavior in Darwin's time
    - competition within sex (male-male)
    - choice between the sexes (female choice of males)
- sexual selection and sex differences
    - males: cheap sperm, high mating variance, lo parental investment, offer resources
    - females: expensive eggs, low mating variance, hi parental investment, seek resources
    - this sets you up to think about what each sex is looking for to optimize reproductive success
        - what are the qualities of a male that would make a femal say: that's a good choice
        - what are the qualities of a female that would make a male see her as a good childbearer

for any seemingly adaptive trait, distinguish between

- what it evolved for
- what it is used for
- some things for survival, other for reproduction

selection for…

- survival (natural selection) – reproduction (sexual selection)
- example from frogs: **wine and chuck**
    - in many frog species females are choose and males are competing but only provide sperm, so females must be picky on some characteristic of the male that indicates it has high quality sperm that is most likely to yield the best reproductive outcome
    - trade-offs between survival and mating: whine versus whine and chuck
    - **male with chuck has higher reproductive success than males who do not, more chucks more success**
    - fundamental evolutionary paradox, why don't males just put more chucks, why doesn't runaway process lead to massive number of chucks??
        - More chucks means lower survival because bats can find and eat them…
    - Traits that play key role in mating success could in fact lower survivorship
    - **So males who are in swamp and chucking must be great – high sperm and have survived handicap of bats**

Signals

- Zahavi: honesty and the handicap principle, if you're a male who produces a chuck plus a whine then you must be good because the bats haven't gotten you yet
    - **<u>Signals are honest if and only if they are</u>**
        - **Costly to produce (cost of potential threat to survival)**
        - **Cost is relative to current condition**
        - **Relation between cost and signal is heritable**
    - Another example is gazelle slotting
        - Ask why they are doing this? Who are they signaling to?
        - Only gazelles in good position (non-visible ribs) stot, successes in cheetah kills only in non-stopping individuals
            - Two of the three criteria
                - **Costly to produce, only individuals in good condition can stot, but nothing about heritability**
    - When thinking about signals in modern day think about how we lie (perfume, plastic surgery, etc)
- **Waist to hip ratio** → apple versus pear, pear shape shows fat needed in development, more fat below waist than above waist seems to be linked to health, given certain ratio of waist to hip what preferences do we see of men towards women??
    - Ratio between **0.6 and 0.7** is highly preferred waist to hip ratio
    - **More common pattern is female choice of males but male choice of females also happens**
    - Universal perception on waist to hip preferences → **universality is a signature of a common biological mechanism**
    - Ways to cheat → corsettes
    - What is an honest signal of quality?? How can we counter dishonesty??

<u>Signals of attractiveness</u>

Fluctuating asymmetry (FA): small, random deviations from perfect bilateral symmetry in a bilateral symmetrical trait, such variation arises due to environment stressors that alter the typical pattern of bilateral symmetry

- Asymmetries are signs of development going wrong in some way
- In humans, evidence for attention to symmetry is a biological evolved preference
- Examples:
    - Barn Swallows: Females prefer to mate with symmetrical males versus asymmetrical ones, also symmetrical tailed birds were less likely to injure themselves, Chernobyl: did nuclear disaster affect symmetry of tails? Not for females but huge increase in asymmetry in males (females choose males), showed tight correlation between symmetry of tail and laying date (a proxy for RS)
        - Tail symmetry is sexually selected, variable, and vulnerable to environmental stressors. Females are sensitive to FA.

FA, stress and mate choice

- **Given that symmetry is optimal and given that FA results from suboptimal genes or environment → low FA individuals should be preferred as mates**
- People prefer symmetrical faces over assymetrical ones

Faces, features and FA
- Ability to detect symmetry goes away when face is inverted
- We are sensitive to symmetry and prefer it

Symmetry "sounds" attractive
- Quality of voice might be telling in terms of symmetry and asymmetry
- Correlation between attractiveness of voice and symmetry of the person's body
- Mechanism is vocal folds
- So we have visual and acoustic features…. What about smell??

Symmetry "smells" attractive
- Men given white t-shirt and told to wear it for two days, women handed boxes and told to smell the boxes and rate it, rate attractiveness of the smell and just like with sound it was found that there is a positive correlation between symmetry and the attractiveness of the smell
- Don't know what the mechanism is here

Symmetric "dancers" are attractive
- Experiment using point light displays
- Symmetrical individuals rated as better dancers for both sexes

**** Summary thus far… ****
- FA is indicator of developmental stability/normalcy
- There are many correlates of FA that show up in various aspects of anatomy and behavior
- Sexual selection has capitalized on FA as an honest indicator of quality

→ Hard to find connection between choice and RS in humans → isn't that a weakness of human studies? Yes BUT we see it in other species as well so we can build off animal evidence

Is FA honest? Is it costly?
- Honest in the sense that its hard to fake (other than plastic surgery)
- Not costly in the sense of survival but its an honest indicator linked to the biology of development

Beauty if rewarding
- **Orbitofrontal cortext**
  - rating attractiveness of same and other sex → signal stronger for attractive opposite sex face than same sex face, controls for attractiveness so shows that we are attracted to opposite sex
- **Beauty and eye gaze**
  - Fusiform face area → lights up more when looking at face than other objects
  - Intraparietal sulcus → face making eye contact will activate this more
  - Ventral striatum reward area → face looking at you is more attractive

Sexual Orientation

Homosexuality among animals: not unique to our species

Hormones: maleness and femaleness

- Countless correlational and experimentally causal studies show impact of hormones on degree of males or femaleness
- In utero effects are significant → experiments in rodents, where fetus is located and who its next to has impact
    - Female sitting between two males is more masculinized in its latter behaviour than a female sitting between two females
    - Intra-uteral environment already beginning to sculpt the sex specific behavior you see later in life

Sexual and gender identity

- "sameness, unity and persistence of one's individuality as male or female (or ambivalent) and it is experienced in self-awareness and behavior"
- Gay Men: 57% identical twins, 24% fraternal twins, 13% borhtesr, 2% without gay brother → higher proportion of gay men traced along the maternal side, given higher incidence of homosexual men along the maternal side suggests that something on x chromosome is affecting homosexuality
- 1) Genetic study of x chromosomes, recruits gay men on mother's side looks for pattern to discriminate gay from non gay, if you look at proportion of random brothers and gay brothers you find a higher incident where brothers share Xq28
    - Chromosomal region Xq28 contains a gene that influences male sexual orientation
        - PROBLEMS:
            - Only samples from openly gay men and only from maternal side
            - There are gay men without Xq28
            - Rice et Al failed to replicate finding
- 2) Hypothalamus → important in regulating hormones
    - INAH3: 2x larger in men than women
    - INAH3: 2 to 3x larger in straight than gay men
    - INAH3 in gay men approx = to women
    - Concluded that you've got a neuro biological difference
        - PROBLEM
            - All but one of the gay subjects died of AIDS, while non of the striagh subjects did
            - Cause of difference unclear
                - Present before birth
                - Emerge after birth due to experience (social, physiology)
                - No causal connection between orientation and brain anatomy (confounding factor of AIDS
- 3) Female brain in male body
    - Trinidad, CO is sex change capital of the world
    - What is the feeling of being a different sex?

- Neurobiology of transsexualism
  - Hippothalamus: individuals born male having sex change to female had hypothalamus area equivalent to females
    - BSTc???
    - BSTc volume larger in men than women
    - Male → Female trassex = female heterosexuals for BSTc
    - Volume is indpendent of sexual orientation
  - PROBLEMS:
    - anatomy taken from post mortems
    - Don't know cause of differences

**** Summary… ****

- Sexual orientation is not strictly a cultural phenomenon
- **Studies are beginning to make connections between sexual orientation and the underlying genetic and neurobiological mechanisms**
- **We have yet to understand how the brain differences underlying sexual orientation develop**

→ important because these issues are very heavily political loaded, biology playing role in court systems

KEY WORDS AND DEFINITIONS:

** Since the readings for this lecture directly complemented the lecture information, all related keynotes and definitions are included after the reading notes **

READING NOTES

READING TITLE: **EHB 12 Human Mate Choice: the Evolutionary Logic of Sexual Desire**

READING NOTES:

Introduction

- sexual desire is highly discriminating
  - we have strong preferences, both in the short term and long term
- criteria
  - above all: physical appearance (reservoir of information)
  - intelligence
  - age
  - occupation and income
- whether there are universal and cross-cultural standards in aesthetics of the body is still debatable
- **where does the aesthetic sense come from?**
  - Darwin concluded that there was no universal standard for beauty in the human body
  - **Recent meta-analyses of literature on attractiveness show that there is massive agreement in attractiveness ratings within and between cultures**

- Darwininan would believe that our perceptual apparatus was designed to respond positively to features that are **honest indicators of fitness** (for reproductive potential)
- We can expect that any criteria we use in choosing a mate to be **fitness enhancing**

12.1 Evolution and sexual desire: some expectations and approaches

- Darwinians view attractiveness in terms of reproductive fitness
  - Beauty in the eye of the genes
- Since both sexes invest time and energy both should be choosy about future partners (but in different ways)
  - **Difference between female and male taste**
    - **Male status : Females respond to indicators of potential provisioning and status**
      - Females look for men with resources, this ability could be indicated by dominance of male within a intersexual or intrasexual relationships (crude indication would be size)
    - **Female attractiveness : Men attracted to women that appear fecund and physically capable of caring for children**
    - **Evaluate age differently because periods of fertility vary**
      - Men will rate physical features that correlate with youth/fertility higher
      - Younger women preferred because they are more fertile and have a longer period of fertility ahead of them

We examine human preferences using data from 4 sources.

12.2 Questionnaire approaches
12.3 The use of published advertisements
12.4 The use of stimulus pictures to investigate body shape preferences
12.5 Facial attractiveness: honest signals, symmetry and averageness

12.2 Questionnaire approaches.

12.2.1 Cross-cultural comparisons

- looking at only one culture → responses may reflect cultural practices/norms of socialization
- cross-cultural comparisons → illuminate universal constants of human nature
- David Buss conducted questionnaire survey of men and women in 37 different cultures
  - Moderate to strong support for each of the following hypotheses

Prediction/Hypothesis	Adaptive significance in relation to reproductive success
Women should value earning potential in a mate more highly than men do	Reproductive success is increased by allocation of resources to woman and child
Men should value physical attractiveness more highly than women do	Fitness and reproductive potential of a female is more heavily influenced by age than for a man. Attractiveness is a strong indicator of age and fertility.
Men are likely to prefer younger women**	Men reach sexual maturity later, and the

	same reasoning above regarding the influence of age on reproductive potential
Men will value chastity in a partner more so than women	For a mal to raise a child that is not his own is highly damaging to his reproductive fitness
Women should rate ambition and drive in a prospective partner more highly than men do in their partners	Ambition and drive are linked to the ability to secure resources and offer protection, both of which would be fitness enhancing to a woman

** Men prefer younger women
- Men prefer women who are 2.66 years younger
- Women prefer men who are 3.42 years older
- Actual differences: men marry women 2.99 years younger
- One explanation: age in a male is an indicator of status

12.2.2 Urgency in Copulation
- **Studies suggest that the human mind is sexually dimorphic in the psychology of sexual attraction**
- Men would be more likely to engage in infidelity because "sexual novelty benefits a male's reproductive interests more than that of a female"

12.2.3 A qualified parental investment model: the effect of levels of involvement
- Studies show differences in psychology of sexual attraction between men and women but also reveal some convergence
    - Seven of the top ten criteria for a good long term partner listed by men and women were the same
- Consider that there is a large range in the possible amount of investment made by couples in any relationship → so Kenrick et al investigated whether the criteria for choosing a mate varied with the level of involvement in a relationship
    - **Investment implications of different levels of involvement vary according to gender**

Level of Involvement	**Date**	**Sexual Relations**	**Steady Dating**	**Marriage**
Investment by Female	Low	High	High	High
Investment by Male	Low	Low	High	High

There are problems with studies based on questionnaires but findings tend to be in agreement with evolutionary expectations.
- "If responses are conditioned by social norms, we still have the problem of explaining why so many social norms correspond with evolutionary predictions."

<u>12.3 The use of published advertisements</u>

- personal ads offer advantages over surveys → they are serious attempts / real data
    - but selective, don't represent the whole population profile

- results of examination of 1,599 advertisements support the following hypothesis
    - women more than men seek cues to financial security
    - men more than women offer financial security
    - women more than men advertise traits of physical appearance
    - men more than women seek indications of physical appearance
- **men of high status seek and are able to attract women of higher reproductive value**
    - positive relationship between the income of men and then number of years separating their age from the younger women they seek
- **Number of responses**
    - Number of responses to female advertisements decrease with the age of the female while the responses for male advertisers increased with their age
    - **Consistent with evolutionary expectations since…**
        - Female fertility and so sexual desirability declines with age, while that of males remains steadier
        - Males tend to acquire more resources as they age and become fewer in number
- **Content of advertisements**
    - As females age they become less demanding in terms of age and status of potential partner whereas males become more demanding as they age and more interested in childless partners

12.3.1 Origin of mate choice preferences: evolutionary psychology or structural powerlessness

- Studies on expressed preferences reveal nothing about the ontogeny (origin and development of an organism) of those preferences
- **Alternative to adaptive explanations: "structural powerlessness and sex role socialization" hypothesis**
    - In patriarchal societies where women have less access to power/wealth the best way to attain them is by **hypergamy** (marrying up the social ladder) and trading "looks for status"
        - Problem: makes a prediction at variance with facts → assumes that women would be less selective as their power/wealth increased but high-status women still value high-status men

12.4 The use of stimulus pictures to investigate body shape preferences

12.4.1 Waist to hip ratios (WHRs): male assessment of females

- Devendra Singh: two conditions must be met by any universal ideal
    - **1) Attraction must equate with fitness.** There must be some plausible linkage to features designated as attractive to physiological mechanisms regulating some component of reproductive fitness (and therefore a positive correlation between variation in attractiveness and variation in reproductive potential)
    - **2) Males should possess mechanisms to judge such features.**
- **Example of universal ideal: WHR (waist to hip ratio)**
    - WHR is important indicator of fitness and attractiveness
        - WHR is crucial factor in predicting health status of women (see Table 12.5 on page 254 if you want a lot of examples but basically WHR is

related to health and reproductive effects, a healthy WHR is between 0.67 and 0.80)
    - Weight as an indicator of attraction is subject to fashionable change, WHR is far more resilient
- **WHR is universal norm of female beauty**
    - **Stable among women deemed to be attractive**
    - **Correlates with physical health and fertility**
    - But is it a factor in the assessment of beauty? Stimulus pictures test showed that lowest WHR is found to be most attractive, and overweight woman with low WHR was found to be more attractive than thin woman with high WHR

12.4.2 Waist to hip ratios (WHRS): female assessment of males

- Fat distribution in humans is sexually dimorphic → factor unique among the hominoids
- Women prefer high WHR in men (0.9)

12.4.3 The cultural variability of attractiveness judgements

Learning from the media

- To test influence of cultural cues → worked with one of the few remaining cultures that exists in isolation from Western influences
    - Results were *strikingly* different
- **Conclude that many cross-cultural tests in evolutionary psychology may "have only reflected the pervasiveness of western media"**
- Still possible that there is an adaptationist explanation → in westernized countries we may have sharpened our need to make judgements using visual cues since we lack the information that's available in traditional societies

WHR Preference in a hunter-gatherer culture

- Hadza: HG culture where labour is sexually divided
    - Hadza men prefer higher WHR
        - Complicated by BMI effect → higher WHR means higher BMI and in HG societies higher BMI indicates better health (not starving)
    - Need to take weaighted mean (frontal WHR and side-view WHR) to account for more protruding buttocks of Hadza women, results of weightend mean is that ideal WHR is closer between US and Hadza males than it is if only frton WHR is considered
    - Possible genetic reasons: Hadza need bigger gut to digest bulky tubers
    - **Marlowe et al fixed WHR prefernce is not a human universal but rather men adjust their evaltuion of ideal WHRs according to local ecologies (adjust according to local averages)**

WHR and BMI: confounding effects and cultural variability

- Singh's work ignores BMI which is influenced by WHR
- Consider: a high BMI carries positive connotations and implications in rural south Africa but potentially negative ones in the UK → evidence for flexible attractiveness preferences that shift according to local conditions and corresponding health associations

    - Human brain may be receptive to cues about what constitutes optimality or normality in the local population → recent arrivals to a new cultural context imitate the norms prevailing there
- Aesthetic judgment of male and female body shapes is related to SES (socio-economic status) → lower SES groups prefer higher BMI
    - Degree of hunger can also influence attractiveness judgments → hungry men prefer women with higher BMI
        - **This relates to the environmental security hypothesis:** when environmental conditions are uncertain individuals are attracted to those with more mature characteristics, and BMI increases with age
- **Cultural variability in ideals of male and female body shape does pose a challenge to the view that our preferences were adapted to conditions in past environments**
    - Consider WHR and BMI as part of a nested hierarchy of cues → first pass WHR (broad filter), then BMI effect (context-specific)

12.4.4 The Female Breast

- What are they for? Obviously milk… but we need to consider other facts
    - Breasts are strongly sexually dimorphic and appear at puberty
    - Permanently enlarged breasts not found among any other primates
    - Large breasts are attractive to males but interfere with "locomotion"
    - Some cross-cultural variation in breast morphology but with no obvious ecological correlates
    - Size of breast bears little relationship to ability to lactate (could feed babies with smaller breasts)
- **Therefore breasts aren't shaped by natural selection →** women would move better without them and permanently enlarged state isn't necessary for milk production
    - Breasts are prime candidates for good genes or runaway sexual selection
        - Breast symmetry correlates with fertility
        - Breasts may serve as sign of reproductive value
    - **They have been sexually selected but the mechanism is not certain**

12.5 Facial attractiveness: honest signals, symmetry and averageness

12.5.1 Honest Signals

- sex is defence against pathogens
    - by outbreeding parents produce offspring that are different from themselves and any parasites that were successful in parents may be less so with offspring
    - **the greater the genetic polymorphism at the population level the more likely it is at least some individuals will stay ahead of parasites**
        - but excessive outbreeding may introduce less well-adapted variations
        - need to strike balance
- four preferences expected to evolve through sexual selection in environment with parasites:
    - preference for **heterozygosity**
        - humans are attracted to smells that indicate differences in major histocompatibility complex (MHC)

- preference for parasite-resistant **alleles**
- preference for indicators of development stability are signs of well-functioning genome
- preference for handicaps that can only be afforded by parasite resistant individuals → honest signals of genetic value

Check out Figure 12.13 Conjectured relationship between resistance to parasites, secondary display characteristics and honest signals on page 264

- basically only fit males can afford to suppress their immune system with a high level of testosterone

12.5.2 Symmetry and fluctuating asymmetry

- symmetry (all features of the body) enhances attractiveness
- why should symmetry be attractive?
  - Requires sound metabolism and good deal of physiological precision → symmetry may serve as an honest signal of phenotypic and genotypic quality
- **Fluctuating asymmetry (FA)**
  - Refers to bilateral characters for which the population mean of asymmetry is zero and for which the degree of asymmetry in an organism is not under direct genetic control but may fluctuate form one generation to the next
  - **FA is increased by mutations, parasitic infections and environmental stress so FA becomes a negative indicator of phenotypic quality**

  Absolute FA = Right – Left
  Relative FA = (Right – Left) / [0.5(Right + Left)]

- Body size: when average relative FA of four traits was compared with body size a positive correlation was observed for females and a negative one for males
- Since energy is needed to maitain symmetry those males who have "energy thrifty genotypes" are better placed to maintain a low FA

12.5.3 Averageness

- composite/average faces are more attractive than individual ones
- why would this be?
  - Because average of any trait would tend to be the optimally adapted for any trait since the mean of a distribution presumably represents the best solution to the adaptive problem
  - Protein **heterozygosity** highest in individuals with average expression of heritable traits

  → facial averageness correlates with attractiveness because averageness is an indication of resistance to parasites
- there are two variables at work: averageness and symmetry → both work independently to increase attractiveness

12.5.4 The Enigma of the Beard

- strongly dimorphic feature: facial hair
  - emerges at puberty, seems like prime candidate for sexual selection
    - no consensus on whether runaway or good genes sexual section has been at work
  - signal of maturity and social status

12.5.5 Other aspects of attractive faces

- men find "infantile" features on women attractive
    - perhaps to evoke the caring response that males feel towards their young
    - ideal of youth also explains preference for blond hair and hairless face

Attractiveness and Health

- studies differ in whether or not they show that average or highly symmetrical faces are also indications of a healthier or more fertile person
- sexual dimorphism in the face shape → possible to enhance femininity or masculinity of any face by manipulating features such as chin size and cheekbone prominence
    - female faces became more attractive if they departed from the average in a feminine direction, but when an average male face was feminized it too became more attractive

12.5.6 Female facial preferences: a potential hormone-mediated adaptive design feature

- expect female to desire both
    - (1) **dads**: a partner who is caring, cooperative, honest, loyal and would make a good parent
    - (2) **cads:** a partner with a good immune system, who will therefore provide a good set of genes for her children
        - testosterone can only be supported by men with efficient immune system since testosterone is immunosuppressant

  → conflict between these two sets
- cyclical changes in female preferences (depending on her menstruation cycle and whether she is at low or high risk of ovarian cycle)
    - women in high risk phase of menstrual cycle prefer more masculine male faces
    - **women prefer cads during their most fertile phase, and caring dad the rest of the time**

KEY WORDS AND DEFINITIONS:

Asymmetry: a measure of the departure from symmetry of features that could in principle be symmetrical, asymmetry is thourgh to be increased by poor conditions and stress

Body Mass Index (BMI): measurement of relative weight of individual taking into account height

Facial Averageness: averaged faces (by photographic/computer techniques) tend to be regarded as attractive → adaptive explanations but may not be optimally attractive

Fluctuating Asymmetry (FA): refers to bilateral characters for which the population mean of asymmetry is zero and variability about the mean is nearly normal; in individuals the degree and direction of asymmetry varies and tends to be

Fitness: number of offspring that an indivudal leaves relative to other individuals of the same species

- direct fitness is proportional to the number of genes contirbutesd to the next generation by production of direct offspring
- indirect fitness is proportional to the number of genes appearing in the next generation by an indivudal helping kin that also carry those genes
- inclusive fitness = direct fitness + indirect fitness

Pathogen: disease-causing organism

Heterozygosity: state of immune system in a potential mate

Alleles: particular form or variant of a single gene that exists at a given locus on the genome of an indiviudal

DEEP PARENTING

EHB 9

LECTURE NOTES

YOUR NAME: Devin Smith

LECTURE TITLE: Deep Parenting

THREE SENTENCE SUMMARY: Evolution selected for different sized gametes that do different things. From that came different sexes and their different behaviors (roamers vs. nurturers). Because of energy expenditure limits, reproductive effort was divided between the sexes (mating vs. parenting). Because females became a mating resource they, in turn, became choosy based on resources, territory, genetic quality, and parenting ability. There exists a conflict between mother and offspring and between siblings.

LECTURE NOTES:

- Evolution occurs through the process of differential REPRODUCTION and SURVIVAL
- Parental investment has reached an extreme in humans. The amount of time and energy we invest in children makes us unique amongst animals.
- Over time extreme gametes were chosen for (very large and very small) in order to derive benefits from the division of labor. One gamete must find another and one must grow into a sturdy and healthy zygote. It's better to have a small, fast finder and a large, nutrient-rich supporter (roam vs. nurture). Once there were different gametes, different sexes developed to house those gametes and different behavior ensued (roamers and nurturers).
- Females become nurturing specialists which enhanced offspring survival.
- Energy expenditures = somatic (maintenance) vs. reproductive (mating and parenting effort). Reproductive effort must also be split because it often becomes too costly to pursue both. Males become the mating sex and females become the parenting sex.
- Triver's hypothesis (see below)
- Which sex competes and which chooses has to do with which sex invests in parental investment.
- Females chose based on:
  - Resources/territory
  - Male genetic quality
  - Quality of parental care
- Cost-Benefit analysis of parental analysis
  - Benefit : the degree to which the investment increases an offspring's changes of survival and success.
  - Cost: the degree to which the investment deceases the parent's ability to invest in other offspring
- Parent Offspring Conflict: Children will tend to favor a longer period of parental care than parents are willing to give→ weaning is for the benefit of parents and the detriment of offspring
  - Sibling rivalry arises because too much parental investment in one offspring is disadvantageous to others

- Parental investment will be greatest in the sex with the highest prospects of reproductive success.
    - Differential treatment of daughters vs. sons occurs in polygynous and hypergynous societies as well as those with non-divisible heritable wealth

KEY WORDS AND DEFINITIONS:

- Triver's hypothesis = The sex that invests in offspring becomes "a resource" for which members of the opposite sex compete.
- Primogeniture : preference of first-born sons over later-born sons or daughters

READING NOTES

CHAPTER 9 – KIN SELECTION AND ALTRUISM

SUMMARY FROM END OF CHAPTER:

- Altruism is understood by kin selection and reciprocal altruism.
- There is evidence that our closeness to relatives and our altruistic inclinations towards them are moderated according to their coefficient of genetic relatedness.
- Game theory shows that strategies involving cooperation such as tit for tat could offer a model for the evolution of human morality.
- The undoubted importance of altruism and cooperation in the environment of evolutionary adaptation made it imperative that cheaters could be detected. The need to detect cheaters could have shaped our emotional life such as our sense of justice and our experience of gratitude and sympathy.

NOTES FROM READING:

- Hamilton's Rule = the more closely we are related to another individual (the higher the r value), the more likely we are to be kind to them.
- Kin identification comes from co-socialization and odor
    - Paternal investment is influenced by mate fidelity certainty and child resemblance to father
    - Grandparental Solicitude = Uncertainty comes with every male generational link, therefore grandparents will demonstrate more care for grandchildren by daughters than by sons (patrilocal residence can also play a role)
- Heritable wealth→ individuals will leave heritable wealth in this order offspring > siblings > close kin > kin
    - In rich families, males > females in terms of heritable wealth because wealth can be used by males to increase the number of wives/offspring (esp. in polygynous societies). Poor families show a female bias.
- Reciprocal Altruism = doing something for someone else in exchange for something
    - Conditions for reciprocal altruism:
        - ~ The donor must have a high likelihood of meeting the receiver again
        - ~ Both individuals must be able to recognize each other and detect cheaters
        - ~ Cost to donor/benefit to receiver must be low or the certainty of reciprocation must be high
- Mutualism = Symbiosis
- How do we account for the origin of cooperative behavior, given that in the very first interaction, it would pay to act selfishly?
    - Game Theory and the prisoner's dilemma

- ~ The **Prisoner's Dilemma** constitutes a problem in game theory. In its classical form, the prisoner's dilemma (*PD*) is presented as follows: Two suspects are arrested by the police. The police have insufficient evidence for a conviction, and, having separated both prisoners, visit each of them to offer the same deal. If one testifies (defects) for the prosecution against the other and the other remains silent, the betrayer goes free and the silent accomplice receives the full 10-year sentence. If both remain silent, both prisoners are sentenced to only six months in jail for a minor charge. If each betrays the other, each receives a five-year sentence. Each prisoner must choose to betray the other or to remain silent. Each one is assured that the other would not know about the betrayal before the end of the investigation. How should the prisoners act?
- ~ If we assume that each player prefers shorter sentences to longer ones, and that each gets no utility out of lowering the other player's sentence, and that there are no reputation effects from a player's decision, then the prisoner's dilemma forms a non-zero-sum game in which two players may each cooperate with or defect from (i.e., betray) the other player. In this game, as in all game theory, the only concern of each individual player (prisoner) is maximizing his/her own payoff, without any concern for the other player's payoff. The unique equilibrium for this game is a Pareto-suboptimal solution—that is, rational choice leads the two players to both play *defect* even though each player's individual reward would be greater if they both played *cooperatively*.

- Evolutionary Stable Strategy (ESS) = a strategy that, if pursued by a population, is resistant to displacement by an alternative strategy (because it is just as good if not better than any other option).
- Tit for Tat was the strategy that, when tested statistically, won out in game theory. The strategy is as follows:
  - Cooperate on the first move
  - Never be the first to defect
  - In the face of defection, retaliate in the next move but then cooperate if the other player returns the cooperation
- There are problems with 'tit-for-tat' when applying it to human behavior
  - It is not an ESS because there are other strategies that beat it
  - The strategy is sensitive to errors
- Game theory allows us to differentiate between mutualism and reciprocal altruism because in mutualism the rewards of cooperation exceed those of treachery (which is not realistic in the real world)
- Tragedy of the commons = a metaphor used to describe the nature of many environmental problems which are usually caused by defectors (people acting in their own best interest)
- Social dilemmas are prisoner's dilemmas where the cost of defecting affect the greater community
  - Ex. Not paying taxes, overgrazing, overfishing, releasing CO2)
- Reciprocal altruism and indirect reciprocity are important to human behavior. Trivers argues that reciprocal altruism is the root of human emotion and morality.

KEY WORDS (AS LISTED IN BOOK AND DEFINED IN MY SUMMARY):

- Evolutionary Stable Strategy (ESS)
- Game Theory
- Grandparental solicitude
- Hamilton's Rule
- Mutualism
- Paternity Certainty
- Patrilocal (social system in which a married couple resides with or near the husband's parents)
- Prisoner's dilemma
- Reciprocity
- Symbiosis
- Tit for Tat
- Tragedy of the commons

RECENT & MODERN PARENTING

Nisa 7-12

LECTURE NOTES

YOUR NAME: **Lexie Comstock**

LECTURE TITLE: **Recent and Modern Parenting**

LECTURE NOTES:

A human mother's dilemma

- Across the animal world, the mothers have only ONE dependent offspring, litter or clutch at a time
  - Human mothers have multiple dependent young, of different ages
    - This might be okay if kids of different ages required all the same kinds of food, but this is not so.
  - If kids require different things, one option is to have one child at a time
    - If we continue down the primate track of one dependent offspring at a time, we'd be in serious demographic jeopardy
  - Two dramatic solutions
    - Births intervals undergo reduction and parental care is extended deep into juvenility
      - Neither of these life history traits leaves a fossil, so we need to look for clues
        - On of these clues has to do with tooth eruption patterns, this suggests that the age at which the first molar erupts suggests that we probably had an ape like pattern in terms of early growth and development. By the time we get to homo-erectus, this suggests that birth intervals have undergone a reduction by this point.
    - Because we are the only animal that extends care into juvenility, in the past we would have been similar to other primates and animals.
    - Climate changes happened about 2 million years ago, certain types of fruits disappeared, etc. and so people were more reliant on tubers for food
      - This food was less accessible to juveniles, pushing adults to participate more.
    - Attributes of human juveniles that distinguish them from the young of other primates
      - Not self-feeders
      - Metabolic costs of growth subsidized throughout their development.
  - Many societies, there are rich folklores about rich wolf children
  - Street Children
    - Children are not living on their own under the age of 6, juveniles can survive under extreme circumstances
      - Under most circumstances, juveniles are not self sufficient until their late teens.
  - Three changes profoundly affect human parenting
    - Short birth intervals
    - Juvenile dependency
    - And one more

- Selection would not have favored big-brained large and costly offspring if there was little probability of their surviving
  - Some form of shared parenting had to be in place first to permit our ancestors to produce, costly, slow-maturing offspring
- Sources of help – male parental investment
  - Humans and nonhumans diet differ substantially
    - The human diet is rich in calories, protein and nutrients, skill dependent
    - Humans eat a lot more meat, a lot less collecting
      - Diet is focused on high quality, high fat protein resources
        - The human brain is demanding in terms of calories, these foods are necessary. Males contribute most of these calories to the diet
  - Male parental investment
    - Children benefit from two dimensions of male help, substance and social
      - Male foragers cover more distance than females, know about a much larger area in terms of resources
      - Arctic hunter-gatherer, you cover immense territory throughout your life, maybe ten thousand square miles, compare this to much much smaller areas that a chimpanzee covers
      - Fathers teach about technological, social, kin environment, hold their young a lot in some cultures
        - In the modern world, many studies have been done in respect to the amount of male parenting which has been done to the success of male children.
        - Father presence is positively associated with academic achievement, father play is correlated with the ability to regulate emotions, and social competence
        - Emotionally distant fathers are associated with precocious menarche in girls
        - Divorce is associated with aggressive behaviors, an earlier onset of sexual activity, and lower educational achievement in both sexes.
  - Why should males parents help out
    - Males can help children and females, but why?
    - Male parenting in most species is facultative - varies with environmental and social factors.
      - In many species, females can make it on their own, but there are a few exceptions, hornbills.
    - Intensity of male parenting in humans is related to
      - Affect on offspring survival and quality
        - In humans societies, there is a relationship between male investment and mortality rates, for example the ACHE
      - Risk of cuckoldry and paternity confidence
        - With high levels of female promiscuity, it is better to help out s sister's kid's because you are ¼ related, and not a kid who you may be ½ related or not related at all
    - Infertile sex
      - Most animals copulate only when females are receptive to conceive, for example, buffalo, so in many species of animals, females are only around males when the female can get knocked up

        - ♦ If human sex were only about fertilization, humans would have several days a month every several years
      - The human pattern, is this pattern of infertile sex, relations when there's no possibility of conception, although not unique to humans, infertile sex is suggested to be important in forming bonds between males and females.
    - Concealed ovulation
      - UNLIKE men with brightly colored genitalia, ovulation occurs in humans is very cryptic
        - ♦ Why don't human females make it obvious that she's likely to conceive, if males don't know, are they more likely to stick around?
- ❖ Some challenges to paternal investment theory
  - ➢ In many foraging societies males contribute little to the diet
    - Male resources, especially hunting, can be very unpredictable in its returns – a poor strategy to provision children
    - In many foraging societies, women are more strongly associated with female kin.
- ❖ Grandmothers
  - ➢ Hadza grandmothers allocate considerably more time to foraging tasks then younger women, so they are bringing home the bacon for the youngins
  - ➢ Pume grandmothers have higher return rates relative to body sixe than younger women
    - These roots are widely shared with younger women
    - Grandmothers also provide care to younger children, some challenges to this idea
      - In many demographic situations, there not time to be just a grandmother
        - ♦ Maya women, 42 years old, with 8 kids, by the time she gets to 60 she will have just finished taking care of her own child. There is overlapping periods in mother and grandmother stuff
        - ♦ In some situations, the probability of having a grandmother is slim, and in more northern environments, they just don't ad to the resource base
    - Grandmothers helping their daughters is a different topic than the grandmother hypothesis – importance of grandmother help as a selective factor in the evolution of reproductive senescence . Why does human life span extend past menopause or do women stop early?
      - You can do much better off in terms of fitness to not reproduce yourself, but instead help out your relatives.
- ❖ So what is the deal, fathers vs. grandmothers vs. siblings
  - ➢ Mothers are obviously number 1, fathers do help, grandmothers are highly variable siblings do a lot of childcare, along with aunts, etc.

READING NOTES

READING TITLE: **Nisa Chapters 7-11**

7-Wives and Co-wives-
!Kung men consider taking a new wife if he has proved himself to be a good hunter. Advantages-more children, new sexual partner, recognition in community and more powerful ties. Candidates-younger sister of current wife, wife of deceased brother.

Women's reaction-most do NOT like it, get mad at even the suggestion. Sexual jealousy, rivalry, favoritism all potential issues. It helps if the 2 wives are sisters, already used to close contact. Because of the potential issues, many men realize how hard this would be to maintain-"never any peace in a household with two women in it"
Nisa's thoughts on co-wives-thinks they're horrible. She tells the story of her father's second wife, her mom drove her out. Nisa's grandfather had many many wives. Nisa had another wife with Tashay, didn't like it, wouldn't even greet her and during that year didn't have sex with Tashay, Nisa finally made Tiknay(other wife) leave.
Chapter 8-First Birth-!Kung women figure out their periods by the moon phases. Various ways to abort pregnancy-cook food at someone else's fire, have sex with a man other than the baby's father(both superstitious) also chemicals made from plants. Women experience mood swings during pregnancy. Children are valued and women like having kids, but they understand the great toll it takes on their bodies. Pregnant women don't have any midwives or medical facilities, and solitary childbirth(giving birth completely alone in the woods somewhere) is preferred, though women often have help during their first pregnancy (friends/relatives). The !Kung think that being afraid of childbirth will kill, so very important to be brave and strong. Once the child is born, often given the name of a close relative. This birth also marks a woman's full entry into adulthood. She has proven herself. 20%of !Kung children die within their first year, and only 54%live to marry.
Nisa on childbirth-she watched her mother be brave and give birth, so she gave birth alone. She explains emotions, that the day the baby is going to be born you feel miserable, but then your heart is very happy. Nisa gets pregnant, realized when she threw up after she ate meat. Then Nisa gets into her many lovers-Kantla and Twi(her husband, Tashay's younger brother). Twi was stupid and would always just hang around and make the affair very obvious, Tashay noticed and said that he would come back earlier than expected one time and try to catch her, but Nisa figured out when he would do this and made sure Twi was gone so she regained Tashay's trust. Then Tashay went away for a long time and Twi continued to be her lover and she got pregnant. Tashay saw her when he came back and knew, but Nisa invented a lie about her using Tashay's blood that he had cut off before he had left and he believed this a little. Nisa had the baby alone and left her in the woods, but then ran back to get her when she heard the baby crying. At first Nisa called the baby her little sister, had to get accustomed to calling it her child. Tashay starts to get suspicious as the baby gets bigger and looks a lot like Twi. Then one day Tashay gets jealous and crazy and thinks that Nisa doesn't want to leave with him to go back to the village and starts to beat Nisa with a stick while she's carrying the child. The baby got sick right after this incident and died shortly after. Nisa blamed Tashay.
Chapter 9-Motherhood and Loss-Overall health of !Kung not good, major cause of death is infectious disease. They see the spirit world as the main cause of disease.
The culture encourages strong bonds between family members. Husbands and wives sleep beside each other, and when a member of the family dies, need to readjust a lot. Men more vulnerable to disease. !Kung encourage an intense but short(ish)mourning period. After mourning, expected to reenter society, widower is likely to remarry etc.
Nisa on Loss-The second time Nisa got pregnant, very obvious to Tashay that it had been with a lover, he got very jealous and obsessive. Nisa decided to kill the baby by doing the abortion rituals discussed earlier. She lost the baby. Her next baby, Bau, was a good pregnancy but died from a chest sickness. Tashay died and Nisa did a lot of mourning, she mentions how miserable she was, also says his parents blamed Nisa, so she leaves his village and returns home.
Chapter 10-Change-Changes in daily life due to changes in the environment-instead of playing or gathering food, children now care for herds of goats. Women who live more

sedentary lives now have shorter birth spacing between kids. The !Kung adopted this change with humor.

Nisa on Change-her cousin wants Nisa to become her husband's second wife. Nisa doesn't want to. Besa becomes her new lover, he first asked to marry her, but he just became her lover. Nisa also likes Kantla, her first lover, so she is lovers with both of them, this causes jealousy between the two men. Besa liked Nisa more than she liked him, finally she agreed to marry him, she learned to love him a lot. But problem-Besa always wanted sex, too much. She tells him to get lovers. Nisa has another lover and Besa caught them together. Because of this incident, Besa beat Nisa very badly. Only went back to living with him once her wounds had healed. She says Tsaa is one of her more important lovers, but he left her for another woman. The Besa Kantla saga continues, Nisa left to be with Kantla for a little, then she comes back to live with Besa. Besa finds out about her other lovers, gives her a deep gash that gets infected and she almost died, she wants to leave but Besa makes her stay.

Chapter 11-Women and Men-In !Kung society, men and women almost have equality, but men do have the upper hand. Women are seen as very important in family and economy. Males in !Kung society provide more care than in most other places, but still less than mothers. Sons and mothers are very close, kids sleep together for a long time. !Kung boys isolated only during the Choma male initiation ceremony when they experience extreme hunger, cold thirst and other really uncomfortable sounding things. Mothers play a huge role in marrying their children. Often arrange marriages for daughters to older men. Women are seen as the primary economic provider, gather veggies/the daily diet. She chooses how much food to give away and to whom. Men, however, do provide the women with basic gathering tools, so they do play a part. Decision making in !Kung is hard to grasp, no formal leaders, some people just carry more weight than others. Men are generally more vocal. !Kung culture does downplay many attitudes that encourage male dominance in other cultures like boastfulness, ranking etc. In short, !Kung women have a higher status than most women in agricultural and industrial societies.

Nisa on Women and Men-Nisa's father dies, she goes home to mourn with her family, stays there a while. Then she leaves, but comes back when she hears her mother is dying. Her mother correctly guesses the exact time when she will die. Nisa gets very sick right after her mother dies, sees this as her mother's sickness entering her. Healers help her get better. Nisa becomes friends with a European woman who helps her with Besa problems. Besa soon after leaves Nisa and "leaves her hanging" She gets pregnant again, loses the baby. She and Twi start to live together, Besa gets jealous, wants her back. Tribal hearing says she doesn't have to remarry Besa. We then learn about Bo, the man who Nisa is married to now. A lot of conflict between Bo and Besa, but Besa finally gets the picture after the headman said he couldn't have her. She and Bo got married after that.

DEEP AGGRESSION

EHB 10, Demonic Males 7-11

LECTURE NOTES

YOUR NAME: **Nini Moorhead**

LECTURE TITLE: **Deep Aggression**

SUMMARY
Aggression is actual or threatened physical violence; it is a behavior, not an emotion and it differs from predation. There are four theories of aggression: frustration/aggression; endogenous drive (routine cycles of aggression); catharsis theory (release aggression through violence); and adaptive aggression (aggression is a strategy attuned to context). Females and males tend to display aggression over different things; men fight over status, and women fight over resources and sometimes mates.

NOTES

What is aggression?

- Behavior, not emotion
- Not the same as predation (falls under separate neural control in carnivores at least)
- Actual or threatened ('display') physical violence

Bonobos: no infanticide, adult killing, or bullying of females
Chimps: infanticide by males and females; adult killing; coercion of females
So, how does selection affect the degree of aggression?

Conventional wisdom: aggression is rooted in cultural ideologies, not genetic differences
However, we see sex differences in homicide rates and age differences. (Peak of aggression is in early 20s for men).

Impact of step parenting

- Increased risk of negative discrimination (EX: a child's risk of being killed by a stepfather vs. a genetic father is 100x greater).
- Step parenting is the strongest predictor of male partner violence towards women.

Theories of aggression

1. Most popular theory in social sciences: Frustration leads to aggression, especially in certain contexts (social scientists: when particularly unpleasant; or biologists: when it pays).
2. Endogenous drive (Konrad Lorenz, "On Aggression"): Aggression drive is constantly rising and needs to be spent harmlessly (through sports etc). Explains cycle of wars. WRONG: Aggression does not arise spontaneously.
3. Catharsis theory (Freud): Aggressive behavior reduces aggressive tendencies. Suggests that hitting punching bag will reduce anger. WRONG: In fact, it causes more anger, not a release. Among primates, fights tend to generate more fights.
4. Adaptive aggression: Aggression does not arise spontaneously, but is adapted to context.

Adaptive aggression

- High pay-off leads to aggression (does not necessarily need to be perceived by aggressor, can be evolved). EX: Infanticide among the gelada red tail monkeys. When a male takes over through aggression, he will most often kill the infant so that the female will come into oestrus sooner and be available for mating.
- Strategy of adaptive aggression
    1. Offensive
    2. Attuned to context
    3. Pay-off is high, though can be long-term and unpredictable

However, more aggressive strategies are not always superior. EX: strategies to become breeding male among gelada:

1. "Fighters" – breed early, risk failure, but more females
2. "Waiters" – join group as subordinate male, survive better, inherit female partners, breed longer

Two groups have same RS, so both are evolutionarily stable strategies.

Left-handedness puzzle: is it adaptive?

- More common in males than females
- LH tend to be shorter, lighter weight, lower life expectancy
- But also tend to do better in sports because of frequency dependent polymorphism (In a RH world, those who fight left-handed are using an unfamiliar strategy and benefit in one-on-one fighting).

Aggression is attuned to context: use asymmetries to determine how hard to fight.

- Resource-holding potential (RHP) – size, weapons → winner will be the bigger or bigger-appearing one
- Resource value relative to fighters → winner will be more motivates (or better bluffer) EX: hungry fighter vs. satiated fighter in struggle for food

Violence: not necessarily adaptive
EX: rapes followed by murder, rapes of post-menopausal women make no sense from a contraceptive perspective.

Aggression & gender

In animal world, female-female competition is generally over resources more than mates.
EX: spotted hyenas – there is usually equality between mother and daughter in social status.

Sarah Blaffer Hardy: females will compete in subtler interactions than males.

Women and men equally aggressive against "annoying" pedestrians, but "road rage" (when intentionally injures or kills another driver or pedestrian) is 13x more likely in men.

Severe, violent interactions more likely among men. Model American homicide (and worldwide) is caused by an altercation or other relatively trivial origin. Out of proportion today, but evolutionarily, when men's status threatened, they react. Women, on the other hand, tend to commit violence over resources, safety, men.

KEY WORDS AND DEFINITIONS

Aggression: Actual or threatened physical violence
Frustration/Aggression Hypothesis: Frustration leads to aggression in some contexts.
Endogenous Drive Theory: Aggression drive is constantly rising and must be spent.
Catharsis Theory: Aggressive behavior reduces aggressive tendencies.
Adaptive Aggression: Aggression is adapted to context and is offensive, not responsive.
Evolutionarily stable strategy (ESS): A strategy that cannot be beaten by any other strategy because of equal pay-offs for alternate strategies.

READING NOTES

Reading Title: Cartwright, Chapter 10: Conflict Within Families and Other Groups

Parental altruism
Parents will donate help b at a cost c to themselves if: $b/c > 1/r$, where r = coefficient of relatedness between parents and offspring.

Parent-offspring conflict and sibling rivalry
- The law of diminishing returns dictates that further care to one child will bring fewer benefits than investment in a new child at a certain point. However, the child is 1.0 related to itself and only 0.5 related to a sibling, so this asymmetry will naturally cause the child try to divert care to itself.
- EX: young chimps often try to interrupt their parents' copulations. EX: at its extreme, this asymmetry may result in siblicide.

Maternal-fetal conflict
Fetus and mother do not carry identical genes, so fetal genes could be selected to draw more resources from mother than optimal for her health or for distributing resources among current and future offspring from her POV.
1. Glucose supplied to fetus
2. Decision to miscarry
3. Blood supply
4. Parturition

[SINCE MATERNAL-FETAL CONFLICT WAS NOT MENTIONED IN LECTURE, I'M NOT GOING TO GO INTO DETAIL HERE].

Human violence and homicide
1. Infanticide:
- May have been an adaptive strategy to maximize the lifetime reproductive value of women in the environment of evolutionary adaptation. Greatest increase in reproductive value would have occurred in first year, so filicide rate should fall after that.
- Children's reproductive value to parents increases as they reach puberty, so filicide rates should fall as age of child increases from zero to adolescence.
- However, the decline in child homicide also applies with step parents, who have no interest in reproductive value, suggesting other factors.
- A child living with one or more step-parents is much more likely to be fatally abused by child of same age living with biological parents.

Human sexual conflicts
- Risks of infidelity more serious for male than female, and this predicament is reflected in laws dealing with male response to partner infidelity. Often given lesser sentence.
- Also leads to males guarding sexuality of partners. EX: veiling, chaperoning, purdah. Foot binding. Genital mutilation.

- An experiment found that males are more concerned with the sexual infidelity of a partner, which is explained by the risk of parental investment to non-biological offspring, and women are more concerned with emotional fidelity, which would be explained by the threat of lost resources to herself and her offspring.
- Men often cite infidelity in divorcing; women cite cruelty. Women often divorce earlier than men – perhaps because they have a shorter reproductive span. The opposite is observed for men who tend to remain fertile longer and can seek a second family with a younger wife.

KEY WORDS AND DEFINITIONS
Cuckoldry: A mating strategy in which a female obtains genetic material from one male and resources from another.
Infanticide
Maternal-fetal conflict
Parent-offspring conflict

Reading Title: Demonic Males 7-11

Demonic Males

CH. 7: RELATIONSHIP VIOLENCE
Introduction
- Description of "chimpanzee politics": cycle of alpha male being deposed by alliances of subordinates
- Aggressive behavior patterns among our primate relatives: frequent and fierce fights over territory and status and fights between rival males in a social group. Aimed at domination, not killing (Distinct from chimpanzees' "lethal raiding").
- Chimps and humans differ in their deliberate killings, incl. political murders, beatings, and rape. Also exists in other great ape groups.

Orangutan Rape
- Small males (anomaly: adult males who have appearance of adolescents) routinely rape females.
- "Fertilization tactic" hypothesis: small males are unattractive to females because they don't make long calls and can't protect them in the same way big males can, but they can keep up with females because they're the same size and use this advantage to try to impregnate the females and increase their RS.
- "Sexual coercion" hypothesis: rape is a strategy to assert control, increasing a female's responsiveness to sexual activity with the male in future and potentially leading to fertilization.
- Perhaps so common among orangutans because females live alone as opposed to gorillas, for instance, who live in harems with the "silverback."

Chimpanzee Battering
- When a chimp male reaches sexual maturity, he will begin to systematically dominate the females in the group through violent behavior.
- Males may initiate "consortships" through repeatedly attacking a female after isolating her from the group. Key factors are not just male's superior size but also vulnerability (again).

Gorilla Infanticide

- Gorillas live in harems of one silverback and three to four females. This pattern leaves a lot of non-mating males who form "bachelor" groups. But the silverback dies and females and their young are temporarily unprotected, often infanticide occurs. The advantage of infanticide for the killer is that very often the mother will join his troop and mate with him. The logic of violence dictates that her current mate is no longer able to provide adequate protection for her infants and she chooses the killer as the more well-equipped protector

Conclusion

The three styles of male violence make sense within particular contexts:

1. For orangutan rape, the advantage to small males is unclear, but it seems likely that females are likely to be raped because they are vulnerable as they move through the forest alone.
2. For chimps, battering makes sense because it allows the male to get his way, esp in circumstances when females are alone or without allies.
3. For gorillas, infanticide is a demonstration of female vulnerability by males.

These patterns are not the result of an ancestral trait, but are expressions of apes' relatively high cognitive intelligence.

CH. 8: THE PRICE OF FREEDOM

- Discussion of the female-run "gangs" among spotted hyenas that often attack members of other groups; infanticide among lions.
- Protection against infanticide in various species: bonding with a strong male, extreme promiscuity within a group, females banding together, mothers hiding their infants
- Deliberate killing has logic across species: attack what is easiest. That's why infanticide is most common form of violence. Explains seeking out of isolated individuals. Attacks in such a way that minimizes injury to killers (such as: lions surrounding and slowly tearing away at victim). Take-away point: Safety in numbers.
- Fighting among honeypot ants: they are equipped with pincers but very thin shells so violence is costly to both sides involved, therefore it is avoided in most situations despite the possibility of large gains through conquest. But ants will attack if there is a massive imbalance of power.
- "Party-gang" species (coalitionary bonds, variable party size): killing a neighbor is cheap and at the least, reduces competition over resources. Among these groups, territorial gains have different impacts on the sexes – more important for dominant sex whereas subordinate sex can emigrate. In male-dominant chimpanzee community, gaining territory means larger foraging area but also more females. For female-dominant hyenas, new land means more hunting grounds, but no new females or males are absorbed. But what a fight achieves doesn't matter. In these societies, killing off neighbors always pays.
- Implications for humans: coalitionary bonds among males, male dominion over expandable territory, variable party size → killing neighbor is worthwhile and often safe. Because of hyena example, we can see that human male violence "doesn't stem merely from maleness."
- Why do we form party-gangs and not stable troops? And why are we male-bonded instead of female-bonded or both?
    - "Cost of grouping" theory: grouping size constrained by resources. Party-gang species cannot afford to live in permanent troops year-round. These groups tend to rely on foods like fruits, nuts, roots, and meats that are

variable and require constant travel. Chimps and humans rely on these food groups. Whereas gorillas, for instance, live on leaves, allowing them to form stable troops.
- Male-bonded because females carrying infants are slower and have more responsibilities so less time to bond as males do.

CH. 9: LEGACIES

- Example of muriqui as "pacifist": displays very little aggression and that is reflected in absence of sexual selection for aggression (little sexual dimorphism). Competition is expressed through quality and quantity of sperm.
- Examining our biology in terms of sexual selection for aggression:
  1. Males have no canine teeth. Argues that can be effective fighters without them because we fight with fists and arms.
  2. Males develop dimorphic upper body strength at puberty, pointing to its role in male-male competition for mates.
- Instinctual aggression vs. reasoned aggression
  - Fratricide among hyena babies vs. fighting among female hyenas for top spot after death of alpha female
  - Power struggles among chimps – upstart junior male vs. established senior male (guided by assessment of immediate context)
  - Damage to particular location in brain (ventromedial part of prefrontal cortex) – victims are able to reason effectively, but cannot take initiative or make decisions. Take-away: "Reason generates a list of possibilities. Emotion chooses from the list." So differences in reasoning ability between primates species may not change the essential structure of decision-making.
- So what causes aggression?
  - Pride is chief emotion underlying violence and is legacy of sexual selection. Ex: male chimp organizes his life around issues of rank with intention to dominate his peers 9not to gain land or more matings).
  - Wars tend to be rooted in competition for status.
  - Ingroup-outgroup bias: makes groups more effectively aggressive.
  - Deindividuation: incorporation of individual identity into the group mentality of "Us"

CH. 10: THE GENTLE APE

- Bonobos probably descended from a chimpanzee-like ancestor between 1.5 and 3 million yrs ago. Physical differences between two species not huge.
- No rapes, battering of adult females, or infanticide among bonobos.
- Same basic social community as chimps, same level of sexual dimorphism. But sexes are codominant in bonobos. Females cooperate with one another in ways males do not, and mother-son bond is closest bond between males and females. Female cooperation is not result of kinship, but through grooming and genito-genito rubbing.
- Male-male competition for dominance among bonobos is much less severe than among chimps and usually involves displays. No male alliances are formed. Reasons: influence of female coalitions, less competition over mating because of concealed ovulation. Use sex to make friends, calm tension, reconcile – often homosexual sex or sex with infertile infants. Female bonobos able to control male aggression through concealed ovulation.

- When two groups meets, friendliness is initiated by females who sometimes copulate with males from the other group (no jealousy is incited in their home group, surprisingly).
- Unlike chimps, bonobos do not eat monkeys. Why? 1. Cultural variation, rather than evolved and inheritable pattern. 2. Males became less aggressive toward each other during evolution and lost urge to kill monkeys , too.

CH. 11: MESSAGE FROM THE SOUTHERN FORESTS

- Why did bonobos diverge from ancestry with chimpanzees?
- Recap: Power of female alliances explains why bonobo males rarely brutalize females. Also explans why females have evolved a hypersexuality. Reduction in male-male violence stems from males' inability to dominate females, perhaps from concealed ovulation. Why did this develop? Other question: why is intercommunity violence (e.g., lethal raiding in chimps) repressed?
- Answer: party size. Bonobos move in larger, more stable parties, whereas chimps live in small, widely fluctuating groups (can be simply individuals or mother-child groups traveling alone).
- Cohesive parties depend on low cost-of-grouping. Bonobos eat THV (like gorillas) as well as fruits (like chimps). Herbs are so common that presence of others in group does not reduce food supply substantially. This THV is available to bonobos because they live in area not inhabited by gorillas whereas chimps share territory with gorillas.
- Bonobos must have evolved in area after ancestral gorillas had left because of drought. Party stability produced female power through mutual support networks as they spend more time together. Stable party size also eliminates power imbalance which causes intercommunity violence in party-gang species. Raiders will not find vulnerable loners among bonobos.
- Evolution of humans around 2 million years ago: possible that same drought that created bonobos in the forests also pushed humans to the savannas and imposed new selection pressures. Brain expanded, teeth shrank, skeleton became committed to terrestrial locomotion. Diet of meat, fruits, nuts, honey, and roots would have demanded constant fission among population, so females could not effectively restrain males, imbalances of powers continued among party-gangs and resulting in aggression similar to chimpanzees.

KEY TERMS AND DEFINITIONS

"Chimpanzee politics": cycle of alpha male being deposed by alliances of subordinates
"Lethal raiding": Practice of chimpanzees deliberately attacking members of another community with the intention of killing them.
"Fertilization tactic" hypothesis: Explains orangutan rape as an attempt by a small male to inseminate an unwilling female.
"Sexual coercion" hypothesis: Explains orangutan rape as a strategy to assert domination over a female, potentially resulting in her willingness to copulate in future encounters.
"Silverback": Adult male gorilla who is at head of a harem.
"Consortships": Compared to honeymoons; practice among chimpanzees in which a couple will travel on its own. Has proven to be a period during which fertilization is most likely since copulations are frequent and therefore is hotly fought over and often coerced by male chimps.
"Party-gang" species: Species with coalitionary bonds and variable party size.

"Cost of grouping" theory: Dictates that grouping size is constrained by resources and can explain the differences in chimpanzee and bonobo social groups.
Ingroup-outgroup bias: The development of an "us vs. them" mentality, effective in stimulating aggression.
Deindividuation: The sublimation of individual identity within a group.
Genito-genito rubbing: Practice among female bonobos to form bonds and coalitions.

RECENT AGGRESSION

Demonic Males Ch 4-6

LECTURE NOTES

YOUR NAME: **Kiahana Brooks**

LECTURE TITLE: **Recent Aggression**

Hunter-gatherer background

We want to determine if HGs (hunter-gatherers) today are representative of our evolutionary human set-point/natural state

- This is complicated by recent changes… presence of neighboring farmers to HG settlements, incorporation of some agricultural foods into diets of HGs, more diseases among HGs (thus lower pop density), and presence of dogs & horses (not sure how this is involved, skipped over it in lecture)

Current debate is: were ancient HGs peaceful?

- *Beyond War* by Fry argues that they were peaceful
- *War Before Civilization* by Keeley argues they were not
- So who is right?!

Well, Fry's argument is useless b/c he doesn't distinguish between HGs living next to other HGs vs those not living next to other HGs

- This complicates things b/c HGs are often less able to fight non-HG groups b/c they have less weapons, etc
- Wrangham distinguishes between:
    - Hunter groups: nomadic, 25-40 camps, tribes of 100's, egalitarian
    - Fisher groups: sedentary, 100's camps, tribe of 1000's, hierarchical

Several case studies of modern HG groups:

- Tribal territories of California: tribes very close and dense; relationship b/w tribes was very uniformly hostile
- Northern Ache, Paraguay: neighbors shot on sight
- Andamanese, India: external war (b/w tribes) was unrelenting perhaps b/c each tribe has unique language & internal war was more off and on (sometimes hostile, sometimes peaceful)
    - Between groups: unrelenting hostility, opportunistic attacks, raids, rare & unplanned battles, low death rate
    - Within groups: war-peace hostility, raids, planned battles, low death rate
- Hunter-gatherer 'tribe' – based on Tasmania, applies worldwide
    - Tribe = agglomeration of bands
        - Continuous estates (totaling a shared territory)
        - Common language or dialect
        - Same cultural traits (eg burial customs, art)
    - Bands = residential groups, 25-40 people, fluid membership
        - Intermarriage b/w bands
        - Habitually met together
        - Peaceful relations typical
    - Hostile relations or war outside the tribe
- Asmat (fisher-foragers): endemic warfare, opportunistic attacks, raids often with allies, few & mostly unplanned battles, high death rate

Complex HGs—enough time for humans to have evolved from them; remember that Nisa only represents one group
Overall conclusion: humans were definitely not always peaceful

Between-group aggression

Key concepts: imbalance-of-power hypothesis & bonobos vs chimps

What behaviors do humans share with other primates? (possible causal, adaptive parallels; positive evolutionary continuities)

- Infanticide
- Rape
- Gang killin
- Conditioning aggression
- Peace-making within group
- Do NOT share (uniquely human, we think): gang rape, slavery, lethal battles, 'wife-killing,' peace-making b/w groups

Social animals- claustrophobic (all habitat is occupied) and thus resources matter

- There's a false belief that HGs used to have tons of space, but in fact they always lived in very densely populated conditions

Characteristics of chimp battles

- Multiple fighters on each side, non-lethal
- Prolonged interactions (>45 mins)
- Mutual call, display, charge; little/no contact
- Repeated individual retreats/approaches
- High tension; much coalitionary behavior
- Ends in one or both parties withdrawing
- Larger party tends to win (we think)
- Often a group of chimps will be on look out for lone male wandering on edge of his territory… attack him and kill him

Imbalance-of-power hypothesis

- Explains why there are coalitionary kills
- Steps: ecology → fission-fusion grouping → imbalances of power → low-cost lethal aggression→ increased inter-group dominance → increased access to resources + mates
    - Fission-fusion = when members of a species stay together in a group or split up depending upon availability of resources (eg, if food source is limited or spread out over large area, might fission so that each individual finds small amt of food on own; if lots of food in one place, group can stay together)
- What evidence supports this explanation?
    - Males in small parties avoid edge of their territory
    - Probability of approaching stranger's call depends on # of males in your party and his party
    - Attackers rarely seriously damaged, males participate without immediate rewards, targets of intergroup aggression are usually males (even male infants are killed more often than female infants)
    - Also, a bigger territory equals higher reproductive success!!!
- Why are there coalitionary kills?
    - Incorrect hypotheses: generalized tendency (towards aggression), individual personality (one chimp may be more aggressive and egg on

others to attack), mate competition, ecological stress (lack of resources), food contest
    - Correct hypothesis: rival removal!

Chimps vs. Wolves

- Chimps more often target males, especially alpha males b/c males do not migrate b/w groups—thus, they cannot be replaced (females migrate and so can be replaced)
- Wolves target both alpha males and females b/c neither males nor females can be replaced
- In both, absence of alpha individual weakens the strength of that group and makes the group more likely to be taken over by attacking group—thus, more mates for the attacking group!

Military horizon

- What is this? Basically, it's the threshold above which there are commanders and below which there are not
    - Commanders are individuals that can order others into battle
    - Without commanders, each individual is allowed to decide for himself if he would like to fight
- Above this horizon are modernized humans that have political aspirations (destroy enemy army, subjugate them) and use command and discipline to ensure cooperation
- Below this horizon are forager humans that have anarchic cooperation and use aggression for revenge & primates that also have anarchic cooperation (and whose use of aggression is not yet proven)

External HG war is very predictable, internal is much more variable

- HGs usually kill one or two males, then retreat—follow the imbalance-of-power hypo.

Humans vs. chimps

- Chimps: group size matters; surprise/stealth
- External war for foragers: group size matters; surprise/stealth & nighttime attacks; tactics, weapons, time
    - Imbalance-of-power is huge here; shoot-on-sight; out-group seen as different moral community; plausible model for evolution of war psychology
- Internal war for foragers: same as external characteristics + deceit (ensnare by guilt) + treachery (betray trust)
    - Staged battles; intermittent peace; NOT well explained by imbalance-of-power (calculated activity, benefits matter b/c of intergroup ties)

Overall, killing potential of humans is much higher though basics of aggression are similar to a chimp's

- Human males are more likely to take risks b/c likelihood of reproductive benefits (cultural rewards, more mates, morality, honor) is higher

Bonobos vs chimps

- Bonobos – cranial reduction, paedomorphic crania, limb gracility, dental reduction
    - Overall, much more like domesticated animals
    - Unique & derived among great apes
    - Appear causally linked to reduced aggression
    - Bonobo morphology is evolutionary derived—is their behavior also?

(we don't know!)

- Chimps – large head; thick limbs
- Why might this difference exist? Absence of gorillas made bonobos have to scramble less for food → fewer power imbalances & more gregarious females → no raiding, female-female alliances, concealed ovulation

Within-group aggression

Key concepts: females- real things, males- status + things

Sexual violence:

- Primates: multiple males control female sexuality (herding, consorting)
- Humans: same (sexual jealousy, possessiveness)
- Overall, male sexual coercion is routine

Gentle societies rely upon teaching to reduce aggression

The rates of fighting (unsanctioned physical aggression) are LOW within all human societies)… lots of cooperation, fighting rare, little hierarchy, most conflicts verbal

- Rates of physical aggression are much higher in chimps

Thus, one might say that humans are bonobos at home and chimps abroad

READING NOTES

DEMONIC MALES 4-6

Chapter 4: Raiding

We share aggressive tendencies with our ancestors the chimps—but how can we compare aggression in chimps with aggression in humans?

The Yanomamo tribe is the human society that best allows for comparison

- 20,000 people living in southern Venezuela and northern Brazil
- "Still the largest tribe on earth that has not yet been pacified, acculturated, destroyed, or integrated into the rest of the world."
- Each village exists alone, subject to no common ruler
- Famous for their intense warfare

Yanomamo villages deal with each other thru trading, intermarriage, and formal creation of imperfect political treaties—and by inspiring terror through an implacable readiness for revenge

Many degrees of violence, but two main combat styles:

- *Nomohori*- hosts invite neighboring group over for feast, get them drunk etc, and then hosts (cowardly bitches that they are) attack guests
- *Wayu huu*- raid of 10-20 men on neighboring tribe

Raids improve social status (if a man ditches, he'll be shamed)

- Objective of raid is to kill one or two men and perhaps to abduct a woman (abducted woman will be raped by all men in the raiding party, then taken back to the village and raped by all other men there, and then assigned as wife to member of village… yikes)

Why take part in this when risks are pretty high?

- "Unokais (military heroes) have more than two and half times the average number of wives as other men, and more than three times the average number of children. Lethal raiding… gives raiders genetic success."

Compared to chimps

- Yanomamo follow similar patterns of deceit, trickery, and lethal raiding…

"appetite for engagement, the excited assembly of a war party, the stealthy raid, the discovery of an enemy and the quick estimation of odds, the gang-kill, and the escape" (71)

- They're diff b/c humans have more resources to collect & protect

Also bring up the example of the Mae Enga tribe of New Guinea that fight in a more complicated, obscure way involving more ritualized battles
General trend towards less warfare and tribes become more modernized or have increased contact with modernized societies… perhaps b/c of laws, disenabling, etc
Human culture complicates all of this!!! Chimps do not have the potential to have such culture so we must ask ourselves what culture can do and how it can teach us to behave

Chapter 5: Paradise Imagined

"Paradise Imagined" = "at once the quest for a real place and a journey to distant islands of the mind, places representing the potential for human perfection"
Humans have been obsessed with the idea of a paradise forever—many artists/authors/anthropologists (Gauguin, Melville, Mead) portray the vision that the evils of human nature are the product of our weaknesses—if we could all just figure out how to be good, then things would right themselves and paradise would be achieved—stimulates us to do good, and to maintain hope

- All imagined visions of paradise, funnily enough, are places without men… example of Gauguin's and Melville's views of a perfect South Pacific
    - Melville's paradise is disrupted by the men in the scene

Humans often wonder: Where do we come from? What are we? Where are we going?
Researcher Mead studies Samoan girls/adolescents… claims that it's easy to learn the ways of a primitive society in a short amt of time

- Concluded that "American-style adolescence was not a universal and inevitable consequence of biologically driven feelings, passions, and behaviors, but rather an unnecessarily painful production of a sexually repressive Western culture."
- For Samoan women, adolescents was a time of worry-free, lighthearted, delightful sexual promiscuity… to the benefit of the entire society… women never frigid, men never impotent, no suicide
- Basically, almost everything that Mead reported was horribly wrong… there is definitely war, rape, etc amongst these people

Honestly, I think this chapter is really irrelevant and redundant… and I would definitely not recommend reading it since it's boring, but the main message is: there is no paradise and never has been… "To find a better world we must look not to a romanticized and dishonest dream forever receding into the primitive past, but to a future that rests on a proper understanding of ourselves" (107)

Chapter 6: A Question of Temperament

Temperament = the emotional element of personality; an individual's emotional rxns to situations in the real world
Certainly males are known to be violent, but what about women?
The Amazons

- Dahomey women of West Africa, known to be vicious warriors and often thought of as independent women
- In fact, they are the property of the king, often recipients of clitoridectomy; king only has sex with a few of them, if any others get pregnant, they're killed
- Often the Amazons embrace this tradition of sexism

"Among traditional peoples using primitive weapons, it is easy to explain why there were so few women warriors. Men are on average more than four and a half inches taller than women and carry on a frame of denser bones a greater ratio of muscle to fat tissue. Modern weapons, usually powered by a chemical explosion, tend to eliminate the significance of human physical differences in upper body strength" (111)

- Women have often participated in modern warfare (eg, WWII)

Men, on the whole, are more likely to be involved in violent behavior/crime and in nonviolent crime
As overall violence in society increases, so does violent acts by women
In multiple societies around the world, of all levels of development, it has been shown that probability of same-sex murder by a man, not a woman, ranges from 92-100%
Feminists often approach the study of this phenomenon in the wrong way b/c they blame male behavior on the patriarchal aspect of society, and on culture more generally

- Patriarchy is clearly widespread and occurs in all cultures (see pg 119 for examples of this), but if patriarchy is purely a cultural construction, then logically you should be able to find places and times when it didn't exist

No anthropologist has to date been able to find a matriarchal society (in which women actually rule in a system that mirrors patriarchy)
Friedrich Engels explains his opinion…

- Before humans were tormented by civilization, they were egalitarian. But with civilization came marriage and wealth—men want to ensure that they are passing on their money to their real sons so they control their wives (stop them from sleeping around)
- Thus, patriarchy is born

Gerda Lerner argues…

- Started out with relatively egalitarian societies, which was then transformed into highly structured societies in which both private property and exchange of women were common

The authors suppose that, in societies with no system of writing or accumulation of wealth, there may be fewer petty tyrants
The !Kung, often thought to be egalitarian, are actually far from it

- Women participate in many of the same activities of men, are said to be multifaceted, competent, assertive, nurturing, and cooperative
- But when it comes down to it, they do much less talking and fighting than men, and are more often raped and beat than they are often thought to be
- Example from Nisa on pg 123

Some feminists today have taken the evolutionary standpoint that patriarchy may in fact be part of our biology—but just b/c its natural does not mean it's right (naturalistic fallacy)

- There is too much evidence to suggest that patriarchy is NOT cultural, and instead is part of our biology (like in chimps)
    - Perhaps b/c men need to control women and to have solidarity with their fellow men in competition with outsiders
- But women give in to it too often—if women more often refused their husbands, they could effect change; but they don't so patriarchy continues
- "Patriarchy has its ultimate origins in male violence, but it doesn't come from man alone, and it has its sources in the evolutionary interests of both sexes"

"Patriarchy is not inevitable… emerges not as a direct mapping of genes onto behavior, but out of particular strategies that men (and women) invent for achieving their emotional goals. And these strategies are highly flexible, as every different culture shows."

Human violence often resembles that in chimps (and often differs from that in other species) so we should look to compare the two species
Also, it's important to remember that violence is a product of both nature and nurture!

MODERN AGGRESSION

Demonic Males pp 131-159, 346-351

LECTURE NOTES

YOUR NAME: **Lucy Baird**

LECTURE TITLE: **Modern Aggression**

1. Genes vs. the Environment
    a. Nurture did it!
    b. Nature did it!
    c. The Law and Deviancy
        i. The M'Naghten test
            1. At the time of committing the act, the party accused was laboring under such a
        ii. Model Penal Code
            1. A person is not responsible for criminal conduct if at the time of such conduct as a r
    d. Norm of reaction
        i. Magnitude of trait vs. environment
    e. Biology and responsibility
        i. Twinkie defense
            1. Dan whites' murder of Harvey Milk
        ii. Localizing neural and genetic causes
            1. Parental environments childhood maltreatment
                a. Measure degree of anti social behavior as teens
            2. Genetic variants that regulate MAOA involved in regulating serotonin
            3. If you have been abused , you are more likely to be antisocial
            4. If you had severe mal treatment as a child and you have the high expressing form of the gene – you have low anti social form
            5. Those with lower levels of serotonin are more likely to have antisocial behavior
            6. Anterior cingulate
        iii. Sex Differences and Cultural Variation
            1. Between cultures inconsistent
            2. But with in a culture – yes variation
            3. Are they culturally driven
            4. Turning on out-group psychology
                a. Disgust
                    i. Core on through contagion
                b. Even abstract ideas can be disgusting
            5. Nisbett and the asshole expt:
                a. Bumps into them or says asshole and keeps moving
                    i. BIG FOOTBALL PLAYER
                        1. People from the north and south different

2. Insulted vs. not insulted
    a. The southerners moved when no insult
    b. But when insult they didn't
    c. Testosterone levels higher

ii. Cultures of honor
1. Established a no tolerance attitude toward challenges or disrespect
2. Respond to insults/threats by threats of violence

iii. Organs of south north difference
1. South settled by Scottish/Irish herds people north by German/Dutch farmers
2. No laws in either place but herds can be stolen crops cant
3. South developed law of retaliation

iv. The traits are maintained culturally and genetically

iv. Crimes of passion and honor
1. Background
    a. Women as property thus no rights
2. Triggers
    a. Loss of property via infidelity
    b. Insufficient dowry
    c. Tarnish family image
    d. Prior sexual involvement
3. Mechanism
    a. Impulsive emotional and defensive
4. Cultural
    a. West- men responsible
    b. East women's family
    c. Both exhibit sex asymmetry and see killing as morally obligatory
5. Law
    a. Recognition of emotion, self defense, prototypical human reduced sentence

v. Could impulsive be adaptive?
1. Yes payoffs in many careers and human interests
    a. Combat soldiers and extreme sports
    b. Iron chef and the mad scientist

vi. Impulsive aggression
1. Recurrent episodes of verbal or physical aggression to people, animals property and self
2. 2 outburst per week, not premeditated

vii. Serotonin and impulsivity
1. Ex blocks serotonin transporter
2. Clears inhibitory control
3. Serotonin, rhesus and risk taking
4. Leaping through the canopy

        a. Percent of long leaps vs. serotonin
        b. More likely to leave your group earlier in life the lower your serotonin
        c. The percent of men surviving, the low guys are not making it.
    5. Serotonin in humans
        a. Low s
            i. Impulsiveness
    6. Low s in action
        a. Hot sauce task
2. Psychopath
    a. Very clinical checklist
    b. Neurochemistry of psychopath
        i. Heightened dopamine
    c. Lacking inhibition and lacking moral emotions
        i. Reversal learning one deck is 20…you can keep the money
        ii. Psychopaths stick with the previously rewarded deck
    d. Brain activity in murders
        i. More impulsive also hippocampus diffs btw success and unsuccessful psychopaths

READING NOTES

Moral Minds, pp 131-159; 346-351

Macho Cultures

1. The best predictor of violence in a culture is the number of unmarried men
    a. Societies with Polygamy are most vulnerable
        i. Factors that affect violence include: age, material and social status, marital status, parental status, sex ratio, polygamy, cohort sizes, ecological factors, life span.
    b. Cultures of honor
        i. The north south asshole example we discussed in class
    c. Life expectancy effecting violence – those with lower are more likely to be violent
    d. Also differences in incomes among families – where inequalities are most prevalent there is violence
    e. Shock test
        i. "teacher" and "learner"
            1. When the learner answered wrong the teacher was requested to shock them with increasing power
            2. Some "teachers" shocked up to max power despite requests from the learner
            3. It was a experiment in authority, by shocking so high the teacher subjects did not deify authority \
2. Slay the one you Love
    a. Difference between acts of passion and premeditated acts
        i. Cultures of honor and women
            1. Honor killings
                a. Can be punished for merely talking to another man
                b. Pakistan

c. These crimes are premeditated
d. These killings are often without punishment
e. A threat to the families honor is the trigger
f. Women as property

2. Honor killings and crimes of passion show parallel psychological signatures
    a. Supported by culture
    b. Sexual asymmetry
    c. The difference lies in the premeditation of honor killings, crimes of passion are an act that is based in sudden rage

ii. Crimes of passion
1. Based in the belief that emotions can't be controlled
2. Darwin's evolution
    a. Female choice and male completion
3. Legally the difference comes down to murder or manslaughter
4. A man killing a women when he sees his wife in bed with another man is manslaughter
5. But when a woman kills a man after he has been abusing her is often called murder because people think it is premeditated
6. What is a normal response?

3. Nature's Counsel
    a. Judgments
        i. If an action is permissible then it is potentially obligatory, but not forbidden
        ii. If an act is obligatory, it is permissible and not forbidden
        iii. If an action is forbidden, it is neither permissible nor obligatory
4. Domesticating Violence
    a. Dominance Hierarchies, unwritten rules of territoriality and property ownership most of the time control aggression
    b. The serotonin discussion- nothing new, see lecture notes

RECENT COOPERATION

Becky Dillaway
Recent Cooperation Notes

Evolution of Human Birth

- Treetop delivery births are unusual for humans but not for other primate species.

- Human beings are the only primate species that regularly seeks assistance during labor and delivery
- This is best explained by the difficult and risky nature of human birth
  - Humans have exceptionally big heads relative to the size of their bodies
- The opening in the human pelvis through which the baby must pass is limited in size by our upright posture
  - A baby born facing backward, with the back of its head against the mother's pubic bones, makes it difficult for a human female to guide the infant from the birth canal without assistance
- Humans seek assistance during labor and delivery b/c the assistant can help the human mother do all the things the monkey mother does by herself
  - In contrast to the twisted birth canal of modern humans, monkey's birth canals maintain the same cross-sectional shape from entrance to exit
    - Monkey babies are born facing forward and this is an advantage for an un-assisted birth
- Because they are born facing forward, it is possible for the monkey mother to reach down and guide the infant out of the birth canal. She can also wipe the mucus form the baby's face in order to assist its breathing.
  - Though rare exceptions do exist, assisted birth comes close to being a universal custom in human cultures
    - The complicated configuration of the human birth canal is such that laboring women and their babies benefit from the assistance of others
- It has also been shown that having someone help (even if it's a stranger) reduces the rte of complications during the birth.
  - In modern humans, both bipedalism and enlarged brains constrain birth in important ways and created enough difficulty that human mothers benefited from assistance during birth
  - A recent hypothesis states that the pelvic anatomy of the early *Homo* may have limited the growth of the human brain until the evolutionary point at which the birth canal expanded enough to allow a larger infant head to pass. This assertion implies that bigger brains and roomier pelvises were linked from an evolutionary perspective.
  - The triple challenge of big-brained infants, a pelvis designed for walking upright, and a rotational delivery in which the baby emerges facing backward is not merely a contemporary circumstance.
- This is why we suggest that natural selection long ago favored the behavior of seeking assistance during birth because such help compensated for these difficulties.

Mothers and Others

- Most apes give birth to an infant after a long gestation and in most cases suckle it for years.
- New evidence from surviving traditional cultures suggests that mothers in the Pleistocene may have had a significant degree of help, from men who thought they just might have been the fathers, from grandmothers and great-aunts, from older children.
- Cooperative breeding as a strategy that permitted our own ancestors to produce costly, slow-maturing infants at shorter intervals, to take advantage of new kinds of resources in habitats other than the mixed savanna-woodland of tropical Africa and to spread more widely and swiftly than any primate had before.
    - But this lifestyle is only an option for creatures capable of living in groups
    - Flexibility is also a criterion for cooperative breeders. Helpers must be ready to shift to breeding mode should the opportunity arise.
- Evolutionary logic predicts that an animal with poor prospects of reproducing on his or her own should be predisposed to assist kin with better prospects so that at least some of their shared genes will be perpetuated.
- One primate strategy is to lie up extra fathers.
- Humans solve the problem of enlisting help from several adult males by other means.
    - Partible or shared Paternity
    - Help from older children
    - older matrilineal kin
- At various times in human history people have also relied on a range of customs, as well as on coercion to line up allomaternal assistance (ex: slaves or wet nurses)

- But these helpers are only useful if they are motivated to protect, carry or provision babies. This motivation arises in 3 main ways:
    1) Through the manipulation of information about kinship
    2) Through appealing signals coming from the babies themselves
    3) From the endocrinological and neural processes that induce individuals to respond to infant's signals
- Males as well as immature and non-breeding females can respond to infant's signals
- Hormonal changes during pregnancy and lactation are of course indisputably more pronounced in others than in the men consorting with them but both sexes are surprisingly susceptible to infant signals
- From birth, newborns are powerfully motivated to stay close, to root in search of nipples which they instinctively suck on.

- Within minutes of birth, human babies cry and vocalize just as other primates do but human newborns can read facial expressions and make some of their own.
- Babies ability to babble
- If humans evolved as cooperative breeders the degree of a human mother's commitment to her infant should be linked to how much social support she herself can expect. Mothers in cooperatively breeding primate species can afford to bear and rear such costly offspring as they do only if they have help on hand.
    - It is the baby who sense how available and how committed its mother is.
- In terms of developmental outcomes, the most relevant factor might not be how securely or insecurely attached to the mother the baby is but rather how secure the baby is in relation to all the people for him or her.

- Studies have shown that both maternal and hired caretakers' sensitivity to infant needs was a better predictor of a child's subsequent development and behavior than was actual time spent apart from mother. The critical variable was not the continuous presence of the mother herself but rather how secure infants felt when cared for by someone else. (i.e. so long as the caretaker acted like committed kin)

MODERN COOPERATION

ULTIMATUM GAME

Are we purely self-interested? – depends on society/ecology

- Machiguenga (Peru) = subsistence, non coop → offer mode of .15, with .05 rejection
- Ache (Paraguay) = highly cooperative → offer mode of .50, with NO rejection
- Au/Gnau (Papua New Guinea) = gift exchange, expect recip → offer mode of .35 w/ .40 rejection

All societies have same concept of fairness (offers b/w 15% and 50%)

Kids are sensitive to fairness—will reject if its not fair

- See rejections at age 4—narrow moral focus
- See acceptances at age 7/8—more moral

PUNISHMENT

Game: one-shot game; allocator with 100 tokens, recipient with 0 tokens, 3rd party observer with 50 tokens; all 3 know about each other

- Allocator gives to recipient; observer decides whether or not to punish—every token paid to punish takes 3 tokens from allocator
- The less the allocator gives, the greater the punishment

Large-scale cooperation only possible in system where cheaters are punished AND punishers who don't punish are punished

TRUST

Trust game:

- A & B start w/ $10 each
- A can pass all or none to B
- If A passes all, bank quadruples, so now B has $50
- B can pass back half ($25) or none to A
- A is given $20 to punish B (for every $1 used, $2 taken from B)
- Four conditions =
  - Cost- A pays to punish, B loses (high + striatum response)
  - Free- A doesn't pay to punish, B loses (high + striatum response)
  - Symbol- no cost to either A or B, symbolic (low – striatum response)
  - Random- random number generator determines how much A pays & thus, how much B loses (high – striatum response)

Caudate nucleus (within striatum) reacts when you've successfully punished someone (receive reward)

- The more you pay to punish, the greater the activation
- Response doesn't change based on whether or not the punisher must pay a cost to punish or not

LOGIC OF CHEATER DETECTION

Five main characteristics:

- We are not natural logicians
- We are natural social specialists (Trivers, reciprocal altruism)
- Abstract logic (if p then q) in social language of thought
- Cheater detection as module of mind

Search for dedicated circuitry
Orbitofrontal cortex = reward area, temporal lobe = social exchange, amygdala = emotional activity
Wason Selection Task (see reading notes)
Cheater detection circuitry:
Patient RM—bilateral damage to orbitofrontal cortex, temporal lobe, and amygdala
Tested on Social Exchange vs Precaution Rules
Social exchange: if you take the *benefit*, then you must satisfy the *requirement*
Precaution: if you engage in a *hazardous activity*, then you must take the *precaution*

PATIENCE
Animals can't delay gratification—reciprocity is hard for them
Phylogeny of delayed gratification
Time delay affects species' reward experience in this order (greatest effect to least): pigeons, tamarins, rats, marmosets, humans
Great ape experiment- 2 things now or 6 things later?
At what time is there a 50% chance of picking 2 vs 6 → chimps wait the longest! Then bonobos
Humans wait less than chimps!
Rather would wait no time for small reward than long time for big reward
Money looks diff than food
Kids experiment
Kids who waited longer had more stable marriages, more often anorexic (vs. bulimic), higher SATs, less likely to be delinquent
More patient = non-smokers, non-alcoholics, non-heroine, non-gamblers, higher SAT
Men less patient
Food/juice > actual $$ > hypothetical $$ in encouraging quickness/little patience

"The Economics of Fair Play" by Sigmund
Ultimatum Game= $100; one person is the proposer and the other the responder—proposer gets one chance to make an offer to responder, and the responder can accept the money offered or reject (neither gets any money)

- 2/3 of offers are 40-50%
- only 1/25 offer less than 20%
- rationally speaking, though, responder should accept any offer at all
- lots of variation from one culture to the next

"Real people are a cross breed of *H. economicus* and *H. emoticus*, a complicated hybrid species that can be ruled as much by emotion as by cold logic and selfishness."
Emotional components of ultimatum game…

- In pairwise encounters, don't adopt purely self-centered viewpoint but take account of co-player's outlook (compare ourselves with the other)
- E.g., if proposer is chosen based on performance on quiz, lower offers are tolerated (proposer earned a greater share)
- E.g., if proposer's offer is chosen randomly by a computer, very low offers are accepted b/c proposer isn't choosing to jip the person

"Humans could have evolved the emotions at work in these situations during the millions of years that we lived in small groups. Such emotions prompt us to behave in ways that would have benefited either us or our group in the long run."
Why not accept the unfair options?

- Don't really recognize that it's a one-shot game
- Emotions aren't finely tuned to interactions occurring under strict anonymity—expect that people we know will see and judge
- Reject low offer to maintain self-esteem, an internal device for acquiring a reputation

Public Goods Game= each of 4 players starts with $20; each can give part or all of money to common pot that will then be split evenly amongst the other players

- Often, people start off giving about half of their money; after several rounds, give very little any more
- But now if you introduce punishment possibilities for those that don't contribute, contributions go up until >80% invest all of their money
- People often more invested in punishing cheaters than in improving what they've got

"Social emotion such as friendship, shame, generosity and guilt prod us toward achieving biological success in complex social networks."

Moral Minds:
Ch. 2

Richard Dawkins wrote *The Selfish Gene*, which argued that genetics determine evolution of altruism, violence, parenting, deception, sexual conflict… though he got a lot of backlash
The main struggle Hauser will try to solve in this section is: "intuitive judgments versus consciously reasoned policy, innate capacities and acquired values, the common man's intuitions versus the educated man's reasoning" (61).
Analyzes two cases (see pgs 61-64 for deets) and realizes the following basic principle: "If we can directly prevent, with a high degree of certainty, something bad without sacrificing anything of comparable significance, we are obliged to do it."
John Rawls

- Justice as fairness (fairness is justice)
- A moral sense, a sense of justice that was designed on the basis of principles that "determine a proper balance between competing claims to the advantages of social life"
- Unconscious principles (not emotions) drive our moral judgments
- Four features: strategic (explore fairness as you explore a language); we often pronounce a judgment about what's fair/unfair w/o knowing why; attempt to unite the unconscious but operative principles w/ those expressed when we reflect on our actions (past or future); original principle & veil of ignorance
    - Veil of ignorance would lead people to choose: all society members get equal right and access to basic liberties; distribution of social and economic goods would be unequal but skewed to favor the underdog

For a long list of types of fairness, see pg 75 (e.g., equality of distribution, equality of opportunity, procedural distribution
Tragedy of the Commons = there is some public resource that everyone is free to use, and thus potentially overuse
Only way to guarantee stable, cooperative societies is by ensuring open inspection of reputation and providing opportunities for punishing cheaters
Self-reciprocity = predisposition to cooperate with others and to punish those who violate the norms of cooperation, at personal cost, even when it is implausible to expect that these costs will be repaid either by others or at a later date

- Not selfish, but strategic

- Only cooperate those you can trust; nail those that are untrustworthy b/c they have cheated (in order to exclude them from the group)

Fairness is a universal principle w/ potential for parametric variation and constraints

- Cultures set parameters based on particular details of social organization & ecology
- These settings constrain what are optimal forms of exchange & distribution
- Overall, each society expresses some sense of fairness, but societies vary with respect to perception of inequity & willingness to punish by means of rejecting offers

Justice as fairness = freedom of choice + discussion of principles

When we consider the value or utility of a resource, we do so in reference to our current state & extent to which obtaining the resource will significantly change this reference state

We tend to pay more attention to beginning and end of an experience (not middle bit)

Most notions of fairness focus on normative principles—loosely, rules that dictate what one ought to do—independently of their consequences for an individual's well-being

Social norms = rules & standards that limit behavior in the absence of formal laws

- Complicated rules that dictate which actions are permissible
    - Operate automatically and often unconsciously
- Although social norms often exert an unconscious hand of control, we do sometimes violate them
- They emerge spontaneously in different societies and, ultimately, come face-to-face with a govt or more formal legal body that may adopt a different take on what is fair, just, sensible, or stable

Scarlet-letter punishments = very clearly visible "branding" of troublemaker; alert society to presence; instills shame in the individual

Fairness & the law:

- When legal system intervenes and imposes penalty on crime, its ineffectiveness depends in part on whether the public puts faith in the law & its analytical treatment of the offense
- Also, if punishment is high enough, people will deter

pp 251-263

William Golding's *Lord of the Flies*

- In a challenge to the standard self-interest models in economists, emotions can often override selfish instincts, forcing a cooperative hand in the face of shame or guilt at breaking a commitment
- Ralph is initial leader, but he's scared of forest so Jack starts new tribe with offer of meat from forest! Jack's tribe eventually wins out
- Cooperation crashes in Ralph's tribe as the temptation to defect rises, and trust grinds down—supporting Ralph may have appeared to be the right thing to do, but in the face of external demands, our moral faculty's judgment collides with our moral behavior, fueled by alternative motivations and temptations

According to Trivers, reciprocity will evolve and remain stable if:

- Small costs to giving & large benefits to receiving
- Delay b/w initial and reciprocated act of giving
- Multiple opportunities for interacting, with giving contingent upon receiving

Counting fair play:

- Development of large precise number system doesn't depend on language in general but on words for numbers specifically; development of a numbers system is intimately tied to moral sphere

- Young children divide stuff up in equal way without being able to explain why clearly—kids are equipped with mechanisms that enable them to rapidly & unconsciously evaluate outcome of distribution in terms of fairness, but don't have access to these mechanisms, & thus come up with after-the-fact rationalizations for current outcome
- Individuals like to play with others that play like them (sympathy)
- Trust is very important in stable, cooperative relationships

Conclusions about children:

- Children's sense of fairness is in play as early as 4 yrs old, probs earlier (sense of fairness is intuitive, based on internal logic)
- Young children are more selfish than older children, even though young kids have some sense of equitable sharing when there are no constraints on distribution of resources; also, initial conception of fairness is more likely to follow model of *some* distribution of resources, as distinct from *equal* (beliefs come into play)

"the underlying competence mediating our sense of fairness is no different in children than it is in adults. What differs among children and adults lies outside the moral faculty. What grows in the child, and interacts with her moral judgments are systems of self-control, emotion, numerical computation, & memory that allow for more accurate bookkeeping records"

pp 272-296

Wason Selection Test = tests the "if P then Q" principle

- Rule: if there is a D on one side of the car, then there is a 3 on the other side of the card."
    - Given cards with "D," "F," "3," and "7," what do you pick?
    - Pick D & 7 b/c "if P then Q" and "if not Q then not P" are the two truths
- Rule: if a person is drinking beer, he/she must be over 21 yrs old
    - Given cards with "20 yrs," "beer," "24 yrs," and "coke," what do you pick?
    - Pick "20 yrs" & "beer"

Social-contract condition = if you take the benefit, then you meet the requirement
Precaution-rule condition = if you take a risky action, then you take a precautionary action first
Patient RM (damaged to the circuitry connecting the base of the frontal lobes through amygdala) is normal on precautions condition but falls 40% below normal on social contracts
Psychology of the agent

- By about 3 yrs old, kids recognize that if an act causes harm, but the intention was good, then the act is judged less severely than when the intention was bad & designed to harm
- Early sensitivity to underlying psychology of agent, as opposed to surface-level features of his behavior

Compassionate cooperation

- Envy = strictly triggered by an inequity or disparity in possession of valued resources; evolved in response to perceived inequities, capable of fueling competition in order to reestablish balance
    - May be catalyst to reduce inequalities
- Jealousy = triggered when one individual poses a threat, imagined or real, to an established relationship

Commitment requires trust, which requires evaluative machinery that can detect cheaters; detecting cheaters requires not only logical inference, but a method of reading emotions
Guilt = emotion we feel when we harm someone in a social setting that is characterized by mutual concern;

- Often triggered when we cheat & recognize the consequences of our act
- May also play stabilizing role, reversing instability caused by deception

People are more willing to trust those who look like them—trust & kinship are correlated!

- May feel more positive and willing to take risks w/ those who share genes with us

Brain responses

- Only mutual cooperation activated orbitofrontal cortex
- Reciprocating a partner's previous cooperation increased activation in areas involved in reward assessment as well as conflict resolution
- When reciprocity fails or offer is unfair, anterior insula is activated—known to play role in negative emotions of pain, distress, anger, disgust
- In altruistic punishment (punishment of cheater), caudate nucleus (reward center) is activated

Norms

- All societies have at least 2 norms of altruistic behavior:
    - Help people who can't help themselves (social responsibility)
    - Return favors to those who've given in the past (reciprocity)

'We are equipped with grammar of social norms, based on principles for deciding when altruism is permissible, obligatory, or forbidden. What experience does is fill in the particular details from the local culture, seeing parameters, as opposed to the logical form of the norm and its general function"
People can perceive difference between precautions and social contracts, but not b/w social contracts and social conventions

SOCIAL ECOLOGY

Social Ecology
EHB Ch 5 Demonic Males Ch3

- Diet as key to adaptation
  - as a source of energy
  - Liems paradox- species that are adapted for certain things dont always do what they are adapted to do
  - energy is important for difference in reproductive success
    - more energy is more growth and better reproduction
      - better offspring survival means passing more genes to the next generation
  - more food makes obesity – provisioning
    - possible for animals to get fat but not often
  - more food makes bigger populations
    - experiment- 1952- 100 macaques
    - 1999 were 2000 macaques
    - once food taken aways
      - decline in condition of females, growth rate, pop density
      - higher age first birth
      - higher inter birth interval
      - higher infant mortality
    - shows when energy taken away it leads to decreased fitness
      - when a lot of energy is increased fitness
  - Food and conception
    - 5% more rip fruit- 4 month quicker to conceive
  - Calorie restricted diets
    - paradox – lab animals live longer when starved than when fed to obesity
    - calorie restriction helps
    - but animals on these diets live in the lab and are protected from disease
      - when starved the immune system is not running well
      - if these starved animals are exposed to disease than they have reduced lifespans
    - humans people who are starving are vulnerable to diseases
  - feeding adaptations
    - in all animals to maximize energy gain
    - primates hands
    - carnivores- sharp teeth
    - intestines
  - Gause clause – two species competing or the same resource cannot co exist
  - Liems Paradox
    - species often prefer not to eat the foods which they are specially adapted food
      - Gorilla have big guts, big chewing muscles and thin enameled teeth adapted to eating leaves-but prefer fruits to leaves
      - niche differentials is not obvious when food is abundant
        - Chimps and gorilla live in the same forests
        - both prefer ripe fruit

        - differentiating between two types of fruit the preferred and the fallback
            - preferred when abundant and when scarce fall back
            - preferred is fruit when abundant for chimp and gorilla ,
            - when fruit is scarce- chimp still eat fruit and gorillas eat leaves and stems when it is not
                - natural selection is strong
                - can really see niche differentiation when there is scarcity
            - Scarcity of fruits cause chimps to break into small parties an travel in small groups of one or two
                - must walk far for food
            - Gorrila adapt to leaves and dont have to walk far but need more robust jaws and larger intestines to deal with their new dies
    - Solution to leim paradox
        - Adaption are to fallback food
        - reason some foods are preferred is because you don't need to be well adapted to them, they are easy to eat
        - when preferred resources are available that are eaten
        - feeding adaptations are most designed for when the food is scarce
- Socioecological model
    - how social system comes about
    - environmental risks and resources--> female ecological strategies---> male mating strategy
        - female counter strategy male coercion
    - females may choose to live in groups for food
    - males must design their strategy to compete for females
        - live in group, conquer an area
    - impact of male mating strategy may effect how females react
        - to minimize the negative consequences for females
            - I.e if males will be infanticide, the females need to set up a protection thing
    - problems
        - predation; competition for food
            - where predation is common- group sizes are larger
            - larger groups reduce risk
            - competition for food
                - not necessarily aggression
                - reduced feeding efficient due to other individuals
                    - two types of competition that impact social relations
                        - scramble competition-
                            - resource not worth fighting over but it is important to be a efficient as possible small numerous items
                                - resources end up divided equally
                                - obtained by individual improvement in efficiency- social dominance important
                                - social consequences are on group size
                            - pinata strategy
                            - example
                                - mangabeys- eat fruit diet

        - red colobus – leaf eater
            - fruit tree density is low while leaf tree density is high
            - if in big group mangabey have to travel farther
            - make intense scramble concentration
            - red colobus have relaxed scramble because do not have to travel far
        - therefore managabey live in smaller groups to reduce the scramble competition
            - the larger the group- the farther they must travel
        - red colobus no matter the group size – they do not have to travel far
            - therefore have larger groups- predation
    - contest competitions
        - resource is monopolozable
            - rare
            - item density is low
            - resources are divided unequally resources are obtained by dominance
            - this effects social relations and allies
        - success depends on fighting ability
        - various effects social relation not the size of the group
        - alliances chimps
            - travel in groups when can afford- when food abundant
            - spend time in long term coalition relations
                - will support them in aggression toward other
                - can win battle with neighbors in bigger groups
                - larger territory leads to higher fitness
                - use to get higher rank '
                - to get mate which is a monopolizable resource
        - mating in chimps is scramble competition (sperm competition form multimale mating in the female) and contest competition (when the females are nearest to ovulation there is competition among males to sex that female and keep other males away)
- competition for males
- infanticide, herding, harassment
- female choice, willingness, pair bonding

- Great ape social systems
    - Orangutans are arboreal
        - fruit specialist
        - large so awkward to go in trees
        - females on own because food scarce so would have to travel farther for food
            - females compete for best territories
            - overlapp a little
        - males set up large areas for selves- laso on wown
            - larger (flanged) males chase away small males to get large area

        - small males size are inhibited from growth by the presence of large males
        - they stay small till a large male dies and then it grows
        - no two males come together without fighting
      - within their territories males search for females
      - small males mostly force copulation
        - they are the same body weight as females
        - they are faster so they can find females before the large males
      - large males form a protection from the females
  - Chimpanzee
    - fruit specalist
    - females on own
      - competing for the best territory
      - can overlap more because terrestrial
      - fallback travel alone , sometime when a lot fruit in groups
    - multiple males protect the female area
      - danger on the border from clashes
      - females avoid those area
    - males compete for females
  - females with better core areas have better fitness and their offspring have fitness
    - contest competition among females for these core area
    - young chimpanzee fight fr these core areas
  - males fight for ovulating females
    - larger territory make better RS
    - group defend access to shared community territory
- Gorilla
  - fruit and leaves and stems
  - non contest competition for food
  - always gregarious- in groups
    - can get to 40-50 in group
  - females not competition for food
    - come into groups for protection from males
      - males try to intimate females and sometimes commit infanticide
      - therefore fems get into groups so that males can protect the group
- Human Evolution
  - human bodies have changed little over 1.9 million years
  - Homo erectus goes to Asia
    - in Africa becomes homo heibergensis to H. Neanderthal to Homo Sapiens homo sapien did the third migration
    - Human brain has been increasing
      - body changed little
  - Australopithocine
    - 6-1 mya
    - chimp size
    - 25-35 kg
    - bipedal
    - large molar

        - adapted to fruits and leaves- allowed to survive the dry season

Demonic Males Chapter 3

- when the rainforest bared much fruit life was fine
    - But drought came and food was scarce
    - Bipedalism evolved (hallmark of hominids)
        - no known why new apes evolved to be bipedal
        - but it allowed them to travel faster and father to better food sources than chimpanzees
- Today chimps live only in places where there are several km per chimpanzee
- New apes colonized the woodlands
    - had to exploit a new food source
    - roots
        - needed enamel on teeth
    - also ate meat, seeds
- Pygmies
    - hunt eat but only see meat as a luxury
    - Carbohydrates are food
    - kakbas- woodlands in the Rainforest
        - allow to farm yams
        - some roots are found here
        - found in cracks
- roots are not typical for primates though
    - since most live in Rainforest where there are no roots
    - but in the woodlands roots are logical foods
        - fossil records show early apes had teeth badly made for leaves but good for roots
- Tongo Apes
    - in Rainforests but there are no rivers
    - utilized moss in tree hole to extract water
    - lower ranking males lose competition for water and die
    - these ape dig for roots for food during drought
    - when drought over go back to eating fruit and leaves
- Our ancestor crossed from being Rainforest apes to woodland
    - became bipedal
    - brains expanded

EHB Chapter 5- The evolution of Homosapiens

- taxon- category of organism in a classification system
    - Lin eaus created taxonomy
    - hominins are the genus homo
    - three debates about classification
        - phenetics- morphological and anotomical similarities
        - cladistic- concentrates on branching points and common ancestors to rely less on morphology which is subjective
        - hominids- humans chimps gorilaas and their ancestors to 15 million years ago
    - primates
        - grasping hands
        - fingers and toe nails

- stereoscopic vision with eyes in front
- diminished olfactory
- precocal- young born mature – most primates
- altricial- young born immature – humans

- species- can interbreed
  - species can give rise to other species
    - speciation occurs when reproductive isolation occurs
      - islands, mountains
    - incomplete speciation makes subspecies
- origins of hominims
  - great rift valley formed
    - 20 million years ago
    - east Africa was separated fro the res of Africa
    - apes isolated – allopatric speciation occurred
    - caused forest to shrink and fragment
    - good place for primates to live and evolve
    - border between open savannah and rainforest caused divergence of chimps ad gorillas
  - colling event occurred in miocene epoch
    - made new species with larger bodies
  - Bipedalism
    - evolved to allow prolonged tracking of an animal
    - biped could detect predators and evade them
    - allows females to gather – free hands
    - reduces sunlight exposure
- Phylogeny of Hominoidea
  - use DNA to link living species
    - amino acid differences
    - molecular structures
  - scales difference to time
  - early homonins are Neanderthals
    - in Neader valley
    - fossils of others found in Africa
    - Homo Floresiensis
      - mini humans
      - island of Flores
      - small brain
      - tools nearby
- Important feature s of Hominim Evolution
  - Body size
    - neanderthal were larger
    - australopithocines is smaller
    - not a gradual increase in body size
    - size correlate with ecological changes
    - based on volume to surface area ratios
  - Brain Size
    - brains grew larger than expected increase for body size
    - human spends 22% of basal metabolic rate
  - reduced sexual dimorphism

            - premature birth required social system to support immature young
            - male care was necessary
        - Altricality
            - mothers give birth to young with brains half the size of the final brain
            - helpless young
        - Female exogamy
            - females left their groups to live in their males camps
    - Out of Africa hypotheses
        - single origin of homo sapien in Africa and spreading
        - most support for this theory
            - lack of fossils in Europe and Asia
            - DNA of Neanderthal suggest that is a distinct species instead of intermediate between H. erectus and H. sapien
            - human DNA is homogeneous
    - Multiregional
        - several populations of homo erectus evolved simultaneously in different parts of the world
- Mitochondial Eve and Y chromosome Adam
    - Eve
        - mitochondial DNA have their own genome
        - mutations in MDNA happen more
        - MtNA is only inherited from the mother
        - MTDNA has no recombination from sexual things
        - found that MTDNA had descended from one female in Africa 200000 years ago
            - but were many other women alive at the time
            - she just happened to be the one wit an unbroken line
            - there are descendants of other women around
    - Adam
        - Y chromosome form Father
        - most Y is junk DNA with no purpose
        - all living men can trace their history to a man living 80000 years ago
            - reflects variance in the reproductive success of some men

DEEP AND RECENT DIET

NAME: Tessa Lyons-Laing
LECTURE TITLE: Deep and Recent Diet

DEEP AND RECENT DIET LECTURE NOTES

Modern Diet

We always like sugar/starch and fat → energy storage

Ernergy preference is cross-cultural, meat and honey are the favorite foods of hunter-gatherers

Diet in human evolution

Meat

Meat provides 50-95% of calories

Meat and honey are favorites of chimpanzees but both are hard to obtain (maximum < 5% of diet)

Nutritional significance

- Calorie dense
- Fat
- Well balanced

Ecological significance

- Large packages
  - But dangerous (needs males)
  - Questions of distribution (source of conflict)
  - Unpredictable supply

Earliest evidence of meat beating

- *Oldowarn Industry ~2.5mya*

Meat Eating Hypothesis of Human Origins

- **1950s onward**
  - Shift 2 million years ago
    - Australopithecines (little meat)
    - H. Erectus (meat critical)
  - Meat led to big brain, running, toll-use, cooperation
- **1990S (HABILIS first evidenced ~2.3mya)**
  - 2.6 million years ago we move from little to more with scavenging
  - 1.9 million years ago we go from scavenging habilis to h. erectus hunting

Meat eating as a prime mover → scavenging/hunting

- **more calories**
- **social skills**
- **technical skills**
- **high-quality package**

Wrangham's alternative → looking at Pigmees and Chimps (similarities and differences in same environment)

Honey, roots, meat

Observed that humans are COOKING their foods

Cooking

Cooked evening meal universal in hunter-gatherer societies

Significance of cooking → energy *this is where Wrangham differs from previous hypothesis that argued cooking was to kill bacteria/toxins*

<u>Raw diets → Low Energy Gain</u>

Cooked BMI much higher for cooked eater than raw eaters

Does meat eating have an effect → not in cooked group
In raw foodists the amount of meat eaten is also seen to contribute
no variance
50% develop amernorrhea
Raw Foodists → poor reproductive performance
High processing → blending, grinding, high-quality food
Low activity compared with the wild

<u>Cooked Diet → Net Energy Gain</u>

starch gelatinized
cooked starches exposed to relevant enzyme has vastly greater hydrolyzed percentage than raw
digestibility
cooking increases the ileal digestibility of many starches
protein denatured
denaturation exposes protein to action of digestive enzymes
the only in vivo assessment of the effect of cooking on protein digestibility in humans
texture softened
soft diet → reduced cost of digestions
% of energy digested → matters because the softer your food, the less energy you spend on digesting it
measure % change in BMR (metabolic rate)
hard diet has greater increase in BMR
soft diet were heavier than hard diet → 5% heavier, 40% more body fat

<u>Raw Diets → Low Energy Gain</u>

Weigh loss → amenorrhea
Raw diet = high quality

<u>Cooked Diet → net energy gain</u>

Starch gelatinized
Protein denatured
Texture softened

So why are we adopted to cooked food?

Think of small human mouths and teeth → suggests need for high density food and soft diet
Observe drop in tooth size between Habilis and Erectus 1.9 million years ago
Small human gut → adapted to low-fiber diet (small large intestine)
Reduced gut thought to be signal by reduction in flaring shape of rib cage, occurs first with homo erectus

Fire record is long but ambiguous: no threshold

Fire used for at least 400,000 years

Humans are Biologically adapted to eat cooked food → signals of adaptation to cooked food start with homo erectus → cooked food responsible for homo erectus

Food processing Hypothesis for Human Origins

Raw: australopithecines → little meat, mostly fruit/roots, etc
2.5 million years ago
Pounded: Habilis → game meat, roots, etc (literally pounded to enable chewing and digestion)
1.9 million years ago
Cooked: H. Erectus → game meat, roots, etc

Graph indicating diet quality and brain evolution → cooking hypothesis

Why is camp safe?

Fire appears dangerous to predators and may provide good deal of nocturnal protection

Major changes with hominization (1.9 mya)

More energy, less digestion, sleep on ground, expand range (into Asia)

Human Pair-Bonding

Long term affiliation of two individuals including a sexual relationship
Elemental in human social organization
Publicly recognized
Variable stability
variable exclusiveness

Why marry (form pair-bond)? **Important dynamic is sexual competition**

Provisioning
- Women get more meat
- Mean increase RS by providing food to their offspring (**Washburn**)
  - Hunting/meat makes provisioning possible
  - PRO: meat important for RS, men provision family
  - CON: alternative food is needed when no meat is obtained, raw foods impractical for evening meal (need 5+ hours of chewing)
    - Humans spend 5% of time chewing versus 40% for apes

Mating effort
- Women are protected from coercive men (rape)
- Men monopolize women's reproduction (**Hawkes**)
  - Group living enables males to control (use language to control)
  - PRO: fits sexual selection theory, men's fights are mostly over sexual infidelity
  - CON: sexual division of labor weakens mate-guarding, marriage important even when there is substantial promiscuity or polyandrous

Economics
- Women protected from food theft
- Men monopolize women's food giving (Collier and Rosaldo)

PRO: Men suffer without wives to cook for them (hungry, thin, low status because they cannot entertain other men)
CON: sexual attraction more important than domestic skill?
Wives cook for husbands
In simple societies worldwide all men have a strictly economic need for a wife and hearth
Wife stealing → to perform domestic services
Tiwi: 90% to women much older
Why does a woman feed a man
Cooked food makes them vulnerable to theft but she allies with the male and she gets protection and he gets food
1st sexual division of labor female cooks, male protects
2nd SL: gendered foods

SUMMARY

Meat and food processing underlie human evolution
Meat and cooking promote contest competition → sexual relationships

READING TITLE: "Cooking as a biological trait" by Richard Wrangham and Nancy Lou Conklin-Brittain

ABSTRACT: No human foragers have been recorded as living without cooking which suggests that cooking may be obligatory for humans. A raw-food lifestyle does not supply enough calorie, is too rich in fiber, and often hard to chew. Human biology must have adapted to the ingestion of cooked food in ways that no longer allow efficient processing of raw foods. Cooking has been practiced for ample time to allow the evolution of such adaptations. Adoption of cooking has also had effects on life-history, social behavior, and evolutionary psychology. Cooking is key feature of human EEA (environment of evolutionary adaptedness).

1. Introduction

Four biologically significant differences between diets of hunter gatherers (HG) and other great apes

1. Humans eat more meat than chimps
2. Roots are more important for humans
3. Foraging populations tend to specialize on a narrow diet breath
4. Humans employ food-processing techniques to improve food quality

→ these 4 traits suggest an evolutionary commitment to diet of high-calorie items

5. Wrangham and Conklin-Brittain propose that cooking is the 5th important feature, much remains to be discovered about *how* humans have adapted biologically to cooking

2. Distribution of Cooking

- Cooking: applying heat to improve nutritional quality of food
- **No human populations are known to have lived without regular access to cooked foods**

- Other than deliberate raw foodists (among contemporary agricultural populations) there is no current or historical example of people living for more than a few days without access to cooked foods
- Most notable inclusion of raw meat is Inuit peoples consumption of raw blubber

3. The Antiquity of Cooking

- cooking often viewed as irrelevant to human evolutionary biology → assumption that is has been practiced for too short a time to have had any impact on biological evolution
  - current evidence does not support this assumption
- **typical duration of a speciation event is considered to be 15 000 – 25 000 years and mammalian species can evolve in as little as 5000 years**
  - cooking is undoubtedly older than 5000 years → **widely accepted back to at least 250 000 years ago**
    - evidence in Israel of cooking grains 60 000 to 48 000 years ago
    - evidence of burnt bones in New Mexico around 1300 AD
    - evidence of use of fire 250 000 years ago in various Middle Easter and European sites
    - oldest date for adoption of cooking is 1.9 millions years ago → marks origin of modern human body form, rise in dietary quality, and shift towards human ppatern of life history

    → THE IMPORTANT MESSAGE: cooking is clearly ancient compared to the time require for biological adaptation to occur
    - without the use of cooking most plant foods are not sufficiently digestible and most meat foods are not sufficiently tender

4. Effects of a Raw-Food Diet

- refers to study of urban Germans who have adopted raw-food lifestyle (believe it is morally sound and has health benefits)
  - findings: **a strict raw food diet cannot guarantee adequate energy supply**
    - 31% of those who followed a 100% raw diet were judged to suffer from Chronic Energy Deficieny
    - negative effect of inadequate energy supply was indicaed by women's reproduction performance which worsened steadily with larger amounts of raw food

5. Theoretical Problems with a Raw Diet

5.1 Plants

- Wrangham lists 5 ways in which foods are improved or softened by cooking
  1. Breaks down physical barriers (skins/husks)
  2. Bursts cells making contents more easily available for digestion/absorption
  3. Modifies physical structure of proteins/starchs into forms more accessible for digestion

4. Reduced chemical structure of indigestible molecules into smaller forms that can be fermented
5. Denatures toxins or digestion-reducing compounds

→ these changes caused by cooking increase the rate of energy intake per minute of eating, and hence the likely rate at which energy can be gained per day

- it would be difficult for a woman on a raw food diet to consume enough energy to maintain a regular menstrual cycle
    - without raw meat: she would need 5kg of fresh food a day which represents 9.2% of her body weight
        - seems unsustainable but hard to test because literature on human gut capacity is incomplete
        - this diet also contains a fiber content of 51 g which is twice as high as recommended level → higher fiber increases passage rate which reduces nutrient absorption (there are a number of calculations given here to describe the breakdown of how much a female raw foodist would need to eat, they assume an all plant diet)
            - **there is no evidence that humans could survive on such a high fiber diet and W/CB suggest that it is not possible in view of that adaptations of humans for diets of high caloric density**
    - if we introduce raw meat: she would need to eat 5.4% of her body weight to satisfy daily energy requirements which is more reasonable but there is still the fiber issue, plus raw meat cannot be chewed at a satisfactory rate
- **THE IMPORTANT MESSAGE: a raw-food diet would present constraints of time and energy for a HG**

<u>5.2 Meat</u>

- Importance of de-frosting large kills
- most significant effect of cooking on meant eating is tenderizing
    - **cooked meat is easier to eat than raw**
        - with no data on how rapidly humans can ingest raw meat of wild animals we estimate with date from chimpanzees → the cases are given which all indicate that it takes HOURS to eat raw meat and that often only the soft parts of the animal are eaten and the tough meat is left on the carcass
    - **from chimp estimates we can determine that an upper bound for the rate of energy intake is 400 cal/hour**
        - since energy requirements for Homo erectus female are estimated at 2269-2487 per day, at 400 cal/h the female would have to chew raw meat for about 6 hours a day to satisfy her daily energy needs
        - **IMPORTANT MESSAGE: raw meat appears difficult for a hominoid to eat**
- These calculations imply that for meat to have become an important part of the diet one of three conclusions is necessary
    1. pre-cooking humans might have spent much longer chewing their food than any contemporary populations do
    2. unrecognized differences in mastication efficiency between chimps and pre-cooking humans might have allowed the later to chew meat more efficiently

3. **humans must have had some system for tenderizing meat →** this is the most likely solution and from it W/CB suggest that an important technique that enabled humans to tenderize meat was cooking

- **IMPORTANT MESSAGE: humans are poorly adapted to eating raw mean, the adoption of cooking facilitated the increased use of meat as a food source**

6. Discussion

6.1 Cooking and the digestive system

- **Cooking makes food easier to eat so no special adaptations are required to process cooked food**
- But evidence suggests that humans are capable of living on raw food only under unusual circumstances, such as a relatively sedentary lifestyle in a well supported urban environment
    - what accounts for the obstacles to living on raw food in the wild?
        - Low digestibility of much raw plant food
        - Toughness of much raw meat
- **IMPORTANT MESSAGE: Human are evolutionary constrained to eating foods that are so digestible and easily chewed that cooking is normally obligatory.**
    - After cooking was adopted humans lost the ability to survive on raw food (perhaps because some of the characteristics needed for eating raw food were unnecessarily costly)
    - ***Although adoption of cooked food imposed no new dietary restraints, it created opportunities for humans to adapt by using diets of high caloric density more efficiently which led to inability to survive on raw-food diets in the wild***
- What limits the human ability to utilize raw food?
    - Reduction in tooth and jaw size (starts around 100 000 years ago)
    - Evolution of oft parts of the digestive system is harder to reconstruct because no fossil record
- little is currently known about differences in digestive physiology between humans and other apes

6.2 Cooking and Human Evolution

- cooking is one of the largest ever improvements in dietary quality, food distribution and availability
- beyond digestive system various evolutionary influences of cooking are expected
    - life history
        - human weaning occurs 30-40% earlier for humans than expected for a primate of our body mass → early weaning and short birth interval is facilitated by adoption of cooking which made raw foods soft enough for juveniles to chew
        - cooking may also have contributed to evolution of reduced mortality if superiod diets have enabled humans to maintain more effective immune system
    - social behavior

        - cooking necessitates collection of food into piles → generates new forms of social behavior adapted to regulating new pressures of feeding competition
            - created form of food distribution with novel implication for regulation of social behavior (ex. sexual division of labor)
    - evolutionary pyscholgy
        - new forms of social behavior would be supported by modifications in psychological tendency

CONCLUSION

- cooking is universal with sufficient evolutionary history to have affected human biology in various ways
- while cooking gave humans dietary flexibility, it also constrained our species into being creatures adapted to diets of high caloric density prepared around food piles and committed to control of fire and social relations that were therefore necessitated
- **cooking has fed back into our biology and created constraints that shape and define our evolutionary biology**

SEXUAL DIVISION OF LABOR

Monday, April 13, 2009

LECTURE – SEXUAL DIVISION OF LABOR
READING NOTES

DAUGHTERS OF THE FOREST – Estrioko-Griffin (1996)

- Secondary title of article: Agta women of the Philippines hunt large game animals and still raise their children
- "When males hunt and females gather, the results are shared and given to the young, and the habitual sharing between a make, a female, and their offspring becomes the basis for the human family."→ Agta women are different
- The Agta live in a rainforest environment in extended family groups of parents, grandparents, and children→ all men hunt and game is plentiful although plant foods are less readily available (Agta dig wild roots only in times of real hardship)
- Men are solo hunters (often hunt with dogs) while women are team hunters→ women find hunting enjoyable also→ men are the more frequent hunters of the Agta community although women actively participate in bringing home game
- The author of the article recounts hearing the stories a of a female hunter (chasing a deer with her sister and a pack of dogs, finding a boar, getting swarmed by bees and stung, deciding not to use bow and arrow for fear of killing one of her dogs and eventually stabbing the boar to death and cooking it and eating it right then)
- Girls learn to hunt before puberty→ another story about a young girl following her mother on a hunt and being chastised for getting tired (the mother kills a deer and a boar with the help of the dogs by stabbing it→ they butcher and cook the animals right then)
- Story of an Agta woman hunting with a baby on her back and getting annoyed because the baby was noisy during the hunt
- Meat provided: 43% by men only, 35% by mixed hunting groups, and 22% by women only→ men stalk their prey, use large bows, and bring home bigger game, on average
- Male hunters see a smaller return rate (17%) than female hunters (31%) and mixed hunting groups (41%)→ the use of teamwork and dogs yields the highest kill ration
- Two different hunting tactics include: Stalking and ambushing vs. chasing
- Spear-fishing is also big in Agta society→ everyone spear-fishes
- Even though women are in charge of gathering plant foods, shellfish, honey, etc. men also take part in these activities→ only women and children dig roots
- Between 33 and 50% of Agta children die before puberty→ children are included in all Agta activities (even as babies and even during hunts) and this constant exposure contributes to the illnesses that kill them
- Lots of alloparenting in Agta society
- A division of labor by sex DOES exist in Agta society, however, it is very flexible and subject to individual needs and preferences

COOPERATION AND CONFLICT. THE BEHAVIORAL ECOLOGY OF THE SEXUAL DIVISION OF LABOR. – Bird (1999)

- Long standing explanation for the sexual division of labor is that men and women pair up to provision offspring and specialize in subsistence activities in order to maximize household productivity.

- "Cooperative provisioning"
- We see SDOL in many societies
  - Agta
  - Hiwi of Venezuela (men hunt by canoe and women forage)
  - Ache (men spend all day hunting while women follow and collect fruit, roots, etc.)
  - Hadza of Tanzania
  - !Kung of Botswana
- Why SDOL?
  - By specializing in different forms of resources acquisition, men and women are able to maximize consumption benefits to the household which in turn maximizes reproductive success. ("Lack Hypothesis")
  - Some believe this explain why monogamous mating systems were found in 90% of bird species.
  - When resources are not abundant or hard to locate, SDOL makes sense
- Further research showed that monogamous mating did not often benefit both sexes equally→ males rarely benefit from a reproductive strategy involving cooperative parenting
  - Where variability in male RS is higher than variability in female RS we predict that males benefit more by having multiple partners than by providing food for offspring
  - When fathering reduces mating pay-offs the temptation to mate elsewhere often lures males away from fathering
  - In order for SDOL to occur, males must derive more RS from provisioning than from more matings→ 3 predictions
    - Gender specialization should increase the amount of food that comes home
    - Resource sharing by men should favor their household over others
    - Men should have high payoff for fathering children
- Perhaps the trade-off between contact-care and foraging in women and the absence of this trade-off for men constrains women from hunting
  - Women who succeed in avoiding this trade-off (alloparents, environment, etc.) do not hunt more
- Male hunting often proves unsuccessful ("risky resource")→ why don't they forage?
  - Cooperative nutrient complementarity (men find protein/fat and women supply carbs) fails as an explanation for the SDOL
  - Big game is often shared too widely (and fails to provide adequately for the household that made the kill)
  - HOWEVER, big game hunting is attractive to men because it supplies large packages that can be distributed down many reproductive avenues (feeds children, wives, attracts other women, helps build friendships, etc.)
    - Meat as currency→ sharing your meat often ensures that when you aren't successful in a hunt you will still eat (from someone else's meat with whom you shared previously)
  - Large game meat is often distributed widely with little attention paid to the recipients or return benefits→ puzzle of human seemingly unconditional generosity
  - If men do not hunt to share then why do they hunt?

        - ~ "Costly Signaling Theory"→ shows they have skill
- Conclusions
    - Assumptions
        - ~ SDOL = men hunt and women forage/raise kids→ there are exceptions (ex. Agta)
        - ~ The function of the SDOL is to maximize labor efficiency for the household in order to provision all members optimally→ big game hunting is highly variable
        - ~ SDOL originated from constraints on women, namely children
    - The conflict of sexual interests might explain the SDOL

LANGUAGE

Wednesday April 15 – Language Jesse Ge

Hauser et al. (2002) *The Faculty of Language*

Introduction

1. Metaphor – language is like DNA. On one hand, the basic building blocks form limitless combinations of species/languages. On the other hand, there is still clarity and consistency within each species species/language.
2. Important to distinguish between questions concerning language as a communicative system, and questions concerning the computations underlying this system
3. The THREE BIG ISSUES concerning debate on evolution of language:
    a. "shared w/ other species vs. unique to humans" – we share some basic communication skills with animals (like birds singing, chimps grunting), but also have much more sophisticated abilities unique to humans. How did we get these unique abilities?
    b. "gradual vs. saltational" – did the evolution of language occur smoothly or by jumps?
    c. "continuity vs. exaptation" – did language evolve from pre-existing communication systems (continuity), or did it evolve as a by-product of other adaptive functions such as numerical reasoning and social scheming (exaptation)
4. We agree that human language diverged about 6 million years ago, but why? What were the changes? What did we inherit from ancestors? Need an interdisciplinary approach.

Key Definitions

1. "Faculty of Language (BROAD sense)" aka FLB
    a. includes: faculty of language (narrow sense) + sensory-motor system + conceptual-intentional system + other possible organism-internal systems
    b. basically, all organism-internal systems that allow humans to master language without explicit instructions (besides obvious, such as memory, respiration, digestion)
2. "Faculty of Language (NARROW sense)" aka FLN
    a. part of FLB, core function is recursion (applying linguistic rules)
    b. only the abstract linguistic computational system
    c. pass information to sensory-motor interface using phonological systems (words)
    d. pass information to conceptual-intentional system using semantic system (meanings)
    e. creates infinite combinations/sets of expressions and phrases

<<check out chart on 1573 for examples>>

Comparative Approach

1. Hard to study evolution of language b/c no fossil records of speech, etc
2. Must use comparative method
    a. Use empirical data from living species to draw inferences about extinct ancestors

3. Can use common traits between humans and non-related species to learn about evolution of language
    a. i.e. birds learn songs best when young in critical period – after that, they can't learn to sing properly, parallel to humans
4. <u>THREE HYPOTHESES about the Evolution of the Faculty of Language:</u>
    1. FLB is strictly homologous to animal communication
        a. Everything we use to process language evolved from traits found in animals
    2. FLB is derived from a uniquely human adaptation for language
        b. Language in humans evolved independently from other species via natural selection
    3. Only FLN is uniquely human (**view of the authors**)
        c. Humans share FLB in common with many animals, but FLN is unique to humans
        d. When humans diverged from chimps, both had FLB, but humans evolved FLN
        e. These unique aspects of FLN may have been evolutionary by-products of other traits
        f. FLN developed as most efficient way to link sensory-motor and conceptual-intentional

Comparative Evidence

1. <u>Example #1: Speech/sensory-motor system</u>
    a. BASIC IDEA: does not seem to be very unique to humans in the broad sense
    b. perception: many animals can distinguish human speech sounds, even languages
    c. production: bird and primates can naturally produce own species-typical vocalizations
        i. due to descended larynx (speech as side effect, example of pre-adaptation?)
    d. imitation?: dolphins, parrots, other songbirds are able to do vocal imitations
        i. but humans can do it much better & faster (i.e. learning)
        ii. since monkeys can't do it, perhaps imitation isn't a common core skill?
2. <u>Example #2: Conceptual-intentional systems of non-linguistic animals</u>
    a. Studies show that animals have rich conceptual representations (tool, color, geometry, food, number, possibly even a theory of mind)
    b. <u>FIVE</u> findings of research regarding animal communication:
        i. Individuals produce acoustically distinctive calls for certain contexts (food, danger)
        ii. Acoustic morphology of sound is distinctive enough to allow listeners to interpret sound without other contextual information
        iii. Number of signals/sounds is small (no evidence of creative production of new sounds for new situations)
        iv. Acoustic morphology of sounds is fixed early in development
        v. No evidence of theory of mind when making these calls
    c. BASCIALLY: animal calls and sounds use same FLB mechanisms, but do not show any FLN traits (allowing for syntax, complex meanings, etc)
3. <u>Example #3: Discrete Infinity and Constraints on Learning</u>
    a. No species besides humans can recombine meaningful units into unlimited variety of larger structures, each differing systematically in meaning
        i. Humans must have some type of universal grammar
    b. Case study: NUMBERS

i. Animals can learn numbers, even meanings, Arabic numerals, addition
ii. BUT: human children learn to use an open-ended "system" and get progressively faster (after learning addition up to 4, rest is easy)
iii. WHILE: chimps take equally long to learn each increment (they don't develop an open learning system)

c. Case study: CONSONANT-VOWEL (CV) PAIRS
i. Both animals (tamarins) and children can distinguish more common CV combinations from less common ones with practice
ii. But whereas humans can develop rules and draw implications for new rules at higher levels (CV phrases instead of CV words), tamarins lack this ability to move up a hierarchical rule system of language

Concluding Points

1. Interdisciplinary approach is needed from linguists, biologists, psychologist, anthropologist
2. While it seems that FLB is shared while FLN is unique to humans, this hypothesis needs to be tested further
3. Comparative approach is the best way to get more evidence, and can be used to see if aspects of language evolved specifically for language or as a by-product of other functions

Pinker (1999) *Horton Heared a Who*

- Children often say verbs incorrectly – particularly irregular verbs
  - Example: "hold" as "holded" instead of "held"
  - These mistakes tell us a lot about the development of language
- Regulars and irregular show language has two parts (rules and words)
  - Regulars show RULES: add an –ed to make it past tense
  - Irregulars show WORDS: just have to memorize the past tense of bring is brought
- Because irregulars depend on pure memorization, they can die out if not used often:
  - "chid (from chide)" is now "chided"
  - "wrothe (from writhe)" is now "writhed"
  - "smote," "slew," "throve," and "forsook" are technically correct, but are now fading
- Neuro-imaging shows different parts o the brain are activated for regular and irregular verbs,
  - backed up by patients with specific brain damage that impairs words, but not rules
    - so they will say "holded" instead of "held," just like a child would

Hickok et al. (2001). *Sign Language in the Brain*

- BRAIN:
  - Left hemisphere is the "verbal" hemisphere
    - Broca's Area

            - In left hemisphere, near motor cortex, associated with speaking
        - Wernicke's Area
            - In left hemisphere, near auditory cortex, associated with listening comprehension
    - Right hemisphere is the "visual" hemisphere
        - Damage to it causes "aphasia:" visual-spatial problems
- SIGN LANGUAGE: perfect lens to discover what differences exist in brain functioning
    - Very complex with rules and syntax, same as any other language
    - Different countries use different sign languages
- 1. Left hemisphere is dominant for sign language (just as it is for spoken languages)
    - damage to Broca's area usually = trouble speaking, w/ deaf patients = trouble signing
    - damage to Wernicke's area normally = poor comprehension, same problem with deaf
- 2. Right hemisphere does not significantly influence sign language
    - Right hemisphere damaged (RHD) vs Left-hemisphere damaged (LHD) patients
    - Even though RHD can't draw well, they sign much better than LHD
    - Because right hemisphere is responsible for motions and special perception (but has no major effect on sign language), it seems that the way language is perceived and produced does not affect organization of the brain for language
- 3. More complicated: IDEA that left-hemisphere focuses on comprehension and production of words and sentences (local level), while right hemisphere focuses on longer, extended discourses (big picture, global level)
    - NOT proven by studies
    - Conclusion is that typical spatial/visual processing has little effect on language
- **TAKE HOME MESSAGE: *Sign language involves both linguistic and visual-spatial processing – two abilities supported by distinct neural systems. But contrary to belief, neural organization of sign language is more like that of spoken language than that of visual-spatial processing.* Why?
    - Modularity: we have a module in the brain for language, so even visual sign language cues are translated into the language module and processed, then translated back to motor skills and produced as hand signs
    - So sign language and spoken language share this module and lots of higher-level brain systems regarding language processing (as shown by fMRI)
    - BUT, since the actual displays are different, they differ in the peripheral functions like signing and reading signs vs. speaking and listening

Horgan (1995) *A Sign is Born*

- STORY: Deaf Nicaraguan children create their own sign language
    - Deaf Nicaraguan students put in a big school, but only provided with hearing teachers who knew no sign language
    - They created their own pidgin sign language (Lenguaje de Signos Nicaragüense/LSN)
    - As new kids came in, they made LSN into a "rich" language, complete with complex and consistent grammar (Idioma de Signos Nicaragüense/ISN)
    - ISN is now the standard sign language of the country
- LESSSONS:
    - 1. Validates Noam Chomsky's theory of language as an innate human trait

        - The kids had no lessons, a poverty of stimulus, but naturally created language
    - 2. Needs to be minimum amount of linguistic exposure to develop complex language
        - Older kids (first ones) only signed in pidgin LSN
        - Younger ones, because they had exposure to LSN, were able to create complex language of ISN

MORALITY

***Moral Minds*, by Marc Hauser**

Ch. 1: What's Wrong?

-Hauser's thesis: "moral judgments are mediated by an unconscious process, a hidden moral grammar that evaluates the causes and consequences of our own and others' actions."

Ill Logic
Kantian creature
- Kant's categorical imperative
- "We arrive at our ultimate moral judgments by conscious reasoning, a process that entails deliberate reflection on principles or rules that makes some things morally right and others morally wrong."

Passion's Way
Humean creature
- "We alight on moral judgments by calling upon our emotions" and "equipped with an innate moral sense that provides the engine for reasoned judgments without conscious reasoning

Moral Instincts
Rawlsian creature
- "All humans are endowed with a *moral faculty* – a capacity that enables each individual to unconsciously and automatically evaluate a limitless variety of actions in terms of principles that dictate what is permissible, obligatory, or forbidden."
- Draws on "deep similarities between language and morality, including especially our innate competences for these two domains of knowledge" to prove his point.
- Must ask three questions about the language faculty and by extension, the "moral faculty" Hauser advocates
    - What is it? "The kind of processes of the mind/brain that are specific to language"
    - How does it develop? "The child's path to a mature state of language competence"
    - How did it evolve? "Which components of our language faculty are shared with other species and which are unique?" Ex: vocal imitation is not unique to humans, though primates show no evidence of it.

A Grammar of Action
- "The Rawlsian creature's ethicality judgments would emerge from a universal moral grammar, replete with shared principles and culturally switchable parameters. From this perspective, each culture expresses a specific moral grammar."
- Three models:
    - Humean: PERCEIVE EVENT → EMOTION → JUDGMENT
    - Kantian/Humean: PERCEIVE EVENT → EMOTION OR REASON → JUDGMENT
    - Rawlsian: ACTION ANALYSIS → JUDGEMENT → EMOTION OR REASON
- Road map for the book (see pg. 53 – summary).

CH. 3: GRAMMARS OF VIOLENCE

Permissible Killing

- This section explores the "omission bias" in our moral reasoning through the two trolley dilemmas (flip a switch vs. push a large person onto the tracks)

Macho Cultures

- This section looks at the phenomenon of "cultures of honor," using the bumping experiment on American Southerners (from lecture) as an example. Cultures of honor illustrate how cultural norms regulate violence, such as:
    - The notion of "discounting" (giving into the immediate temptation of killing a competitor who has threatened one's resources as opposed to waiting for a nonviolent solution) in an environment where the prognoses for future success is poor (ex given of inner-city neighborhoods in Chicago
    - Authority, dominance hierarchies, and obedience (ex of the Milgram experiments in which test subjects delivered shocks to an experimental "stooge")

Slay the One You Love

- This section is about premeditated acts of violence using honor killings and passion crimes as examples.
    - Biology used to assess these acts: triggering action → permissible counteraction → anger → rage → permissible killing
    - "Honor killings and passion crimes illustrate the power of social norms to both set the principles and parameters of permissible killing and to convert them from descriptive to prescriptive principles."

CH. 4: THE MORAL ORGAN

- Chapter discusses the moral development of children. Uses language analogy: "all normally developing human children are born with the capacity to map sounds to meaning. Their native environment provides the lexical ingredients for building a massive vocabulary."
- Three positions on "moral universals":
    - "Nativist": Puts precise moral rules or norms in the newborn's head.
    - Other end of spectrum: "Our moral faculty lacks content but starts us off with a device that can acquire moral norms… There are no rules and no content, only general processes for acquiring what nurture hands us."
    - Middle path: "We are born with abstract rules or principles, with nurture entering the picture to set the parameters and guide us toward the acquisition of particular moral systems" (Hauser favors).

Great Expectations

- Deals with how children's behavior should be assessed. "We must not rely on their patterns of action or explicit behavior as the sole metric."

Event Full

- Goes through a number of experiments that show that infants have a built-in capacity to "generate expectations about objects classified as agents, to attribute intentions and goals to such agents, and to predict patterns of affiliation based on actions assoc. with neg. or pos. emotions."

Reflections on Self

- Explores the emergence of "theory of mind" in children and emphasizes that "self-recognition and self-awareness are not inextricably linked."

Yuck!

- Disgust emerges from a biological substrate that may be both unique to our species and unique among the emotions we experience.
- Role of "core disgust" in in-group/out-group interaction and incest avoidance.

Out of My Mind

- Discusses the emergence in children of "knowledge of what others know or believe."

Gratifying Patience

- The capacity to wait, exert patience, and fend off temptation is a core part of the support team associated with our moral faculty – as an innate personality trait.
- Key to reciprocity

Clockwork Orange

- Two areas of brain that appear to be directly involved in moral judgments – pinpointed through brain imaging studies
- Circuitry that is not only involved in moral judgments but restricted to that domain

Brain-Damaged Utilitarians

- Focuses on experiments on patients with damage to the frontal lobe: "lack emotional checks and balances on their actions" so they lack "some of the relevant competencies when it comes to simply judging the moral permissibility of an act."

Guilt-Free Killing

- Psychopaths – show differences in size of hippocampus (regulates aggression) but also when evaluating moral dilemmas, show "reduced activation of areas involved in attention and emotional processing."
- "Failure to bind emotions with a theory about which actions are right or wrong" as distinct from merely bad.
- "The fact that people are able to associate different kinds of social transgressions with diff. kinds of emotion suggests an imp. link between the intuitive principles underlying moral judgment and our emotional responses."

CH. 5: PERMISSIBLE INSTINCTS

Fetal Attractions:

- Conflict between fetus and mother over allocation of resources
- Baby crying as honest signaling

Of Lords and Flies

- "Veil of ignorance" problem surrounding social interactions
- Idea of self divided between selfish- and group-oriented interests
- Reciprocity dependent on capacity to quantify costs and benefits of an exchange, compute the contingencies, inhibit the temptation to defect, and punish those who fail to play fair."

Counting Fair Play

- "We are born with two quantificational systems, innate machinery that enables infants to compute small numbers precisely and large numbers approximately." (Cites several studies on infants using blocks).
- Children have an intuitive sense of fairness that computes payoffs and generates a permissibility judgment. Young children are more selfish than older children and are more likely to follow the model of *some* distribution of resources, as distinct from *equal* distribution.

Baby Lies

- Studies children's ability to be deceptive. Recognizes underlying developmental milestones as "joint attention", pretense, and theory of mind.

Pinocchio's Nose

- Human mind has evolved efficient reasoning abilities for specific kinds of problem (uses example of experiment that showed that we're better at assessing an "if P, then Q" in the context of social contracts and systems of exchange – in this case, underage drinking at a bar - cited in lecture).
- Problems involving social contracts (and detecting cheaters) tap a specialization that is present in all humans – a system of thought that operates unconsciously and automatically.

Compassionate Cooperation

- Envy motivates achievement and alerts us to inequities, fueling competition to correct the balance.
    - "In highly egalitarian hunter-gatherer societies, numerous mechanism has evolved to maintain equity. Feeling envious and paying the costs to destroy someone else's reputation would be one way of alerting others to the start of a potentially volatile situation… Envy may therefore act as a catalyst to reduce inequities."
- Emotions are important in stabilizing cooperative relationships and anchoring commitment. Emotions provide an involuntary mechanism for creating the equivalent of a binding contract.
- If selfishness if the winning psychology, then selection should favor immunity to emotions that might compel one to act otherwise. In contrast, if emotions play a more powerful biasing role, and there are advantages to feeling good about cooperation and bad about defection, I should feel guilty about reneging.
    - Creates a conflict between selfish drive to defect and emotional attachment to stable cooperation.

Navigating Norms

- Children judge other's altruistic behavior more consistently across age groups when compared with their own altruistic behaviors in the same context → Demonstrates that competence in judging altruistic behavior shows one signature whereas behaving shows another → We are equipped with a grammar of social norms, based on principles for deciding when altruism is permissible, obligatory, or forbidden. What experience does is fill in the details from the local culture, setting parameters.

Going Native

- Three different phenotypes for the Rawlsian creature:
    - Weak Rawlsian: "has the capacity to acquire morally relevant norms, but nature hasn't provided for any of the relevant details"
    - Temperate Rawlsian: equipped with a suite of principles and parameters for building moral systems, lack specific content but operates over the causes and consequences of action but local culture gives these principles content. "Every newborn child could build a finite but large number of moral systems." (Hauser favors)
    - Staunch Rawlsian: "equipped with specific moral principles about helping and harming, genetically built into the brain and unalterable by culture."

RELIGION

WRAP-UP

Last Class Notes

1. Question: Cooperation,
    a. Animals cooperate, what kinds and what constraints
    b. Kind of cooperation that is rare in non human animals is reciprocity
    c. The jay experiment, mutalistic game – payed when cooperate cooperate game
    d. Prisoner's delema did not work with the jays
2. Question: Disease and survival
    a. Disease, survival effected by it?
    b. We evolve in connection with diseases
    c. Differential reproductive success
    d. Different patterns happening worldwide
3. Question: Source of race differences – genetic differnences between the races
    a. Hot topic
    b. Gentetic differences exhist but we are more the same than different
    c. Much debated topic – people have different genes by definition
4. Question: Is meat necessary to the Diet of humans and primates
    a. Teeth are adapted for meat but not necessary to eat
    b. Selected for, or correlated with the change? Meat is a source of the change.
    c. Selected for those with smaller guts
5. Question: Moral and emotional thinking
    a. Both involved in thinking and play off each other
6. Question: Adaative theories of language evolution
    a. What does it mean to have a little bit of syntax
    b. Valuable to have a few words
7. Question: why is there so much cultural variation?
    a. Inveneting tradition
    b. Ecology and intergroup competition
8. Question: hunter gathers frozen in time?
    a. No
    b. Comes in during the upper pealoglithic

Moral Minds- Epilogue

This did not really have any new information than the book, if you have looked over summaries from the study guide from the other chapters you are fine, there is not really any new information here

Demonic Males – Chapters 12 and 13

Chapter 12- Taming the demon

- Patriotism is male defense of the community
    - Present in humans and apes
- Contrastingly to the rest of the animal populations who would most likely create matrionism or love and respect of the motherland
- Men share the power in ape and human societies
- Alpha males in societies have multiple wives
    - This is an example of the political power men use to spread their genes

- Sexual selection favors males who put themselves in high risk high reward situations
- Female power
    - The concept of "Herland" a utopian society of all women run by women.
    - Without men and fear of men women are free to reach their full potential
- Male power is loved and celebrated, the football player, the war hero
- Women are attracted to the violent powerful aspects of men
- How do we remedy and control male violence
    - Morality?
    - Politics?
    - Rules?

Chapter 13- Kakama's Doll

- Kakama's is a young chimp that the authors studied
- He had a log that he carried with him all the time
    - He did this while his mother was pregnant with her next child, possibly creating a doll for practicing having a little sibling
- Apes are caught between human and not human consciousness
- Intelligence is deeply linked to aggression, intelligence allows males to create new forms of aggression
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