**ANTH 129MG: Hunter Gatherers: FINAL Study Guide**

**Sexual division of labor**

* Mostly universal
* Almost every group- men are more involved in hunting, women in gathering, food processing, child care (generalization)
  + Exceptions: honey gathering- men
  + Shellfish gathering – women (depending how you think of it)
* **Kelly: Male contribution to diet varies**
  + Effective temp:
    - low temp, most hunting (can reach 100% of diet); male contribution to diet high
      * contribution- who is bringing food, killed, extracted, etc
    - high temp, less hunting (but never 0% of diet)- male contribution to diet at 30%
      * no population where male contribution is less than 20%
      * Whereas there are some where men are entire contribution
* **Kaplan et al 2000**: **Production of energy by men and women**
  + Protein based: majority of groups- almost all of it coming from men
    - But overall calories through protein: less than that (60-70-80%)
  + In almost all cases total calories split between men/women
    - Exception: Kung- honey, but Richard Lee drove them out there
  + In population where protein is higher % of diet: men contributing more than women
* Not all work is in providing food: so what is monetary value of labor in the house?
* **Relative energy expenditure**:
  + Energy expenditure is larger for males in general than women
    - Kung, Ache, Inuit
  + In non-human primates- much more even expenditure
  + Modern farmers: some populations men do less
  + HG: men do more
  + 🡪Men and women do different things
* Parental Investment:
  + Females: P effort > mating effort
  + Males: P effort < mating effort
* **Kelly: Showoff hypothesis:**
  + Men’s hunting as a signal of fitness
  + If men are spending so much time hunting, is this a parenting effort (dads) or trying to impress/make allies (other benefits) (cads)
* **Why do men hunt?**
  + Not all calories are equal
  + Less variation when sharing- sharing between sexes
  + Diff nutrients in diff food packages
  + One sex can’t necessarily acquire all resources that are needed
  + Long learning curve for proficiency:
    - Takes a while to be good hunter and/or gatherer
    - Specialization of duties = efficiency; then pool resources
  + Hunting: are there other benefit?
    - Social status, alliances, increased mating access (RS)
* Gurven & Von Ruden 2006: Good hunters have higher fertility, surviving offspring, good mates
* **Why don’t women hunt?**
  + Long days and excursions
  + Incompatible with child care and nursing 🡪 overall reduction of group efficiency
  + Cost of women hunting makes it not worth it
  + Men can’t get pregnant, can’t breastfeed
  + **Increased specialization 🡪 increased efficiency**
* Women who hunt:
  + **Mbuti pygmies & Aka:**
    - Net hunting, husband/wife pairs
  + **Ache, Tsimane, Yora:** 
    - Help spot game (increase encounter rates)
  + **Agta women:**
    - Use bow/arrow
    - Use dogs
    - Close to camp
    - Some women are post-repro or sterile: no repro burden
    - Increased rates of alloparenting
  + Men aren’t only hunting:
    - Hadza: honey
    - Ache: honey, palm larvae
    - Mikea: roots
    - Kung: fruit
* Is sexual div of labor favorable for M/F equally?
  + Possibilities:
  + Men/women marry in all societies
    - People marry to reduce M/M competition: property right (no benefits to women)
  + Families can still gain more meat from good hunter/father over long term
  + Choosing good genes (hunting as honest indicator)
* Men provide support to benefits household, not for advertisement
  + Provide care when mom is gone, occupied; when there is less help available (less older daughters); focus care towards older children
* Good hunters 🡪 higher fitness
  + Provisioning directly benefits spouse/kids 🡪 fertility and child survival
  + Social status promoted 🡪 more alliances, reduces variability in food
  + Extra marital mating
  + Help in child care
  + Trade, insurance
* Prestige for men’s activities:
  + Meat is valued in all known HG groups
  + Meat is widely shared
* When added together- men/women work the same, but on different tasks
  + Away from home:
    - M: hunting a LOT; W: fish, garden
  + At home
    - M: hunt very little, some manufacturing
    - W: a TON of parenting, food processing, household stuff
  + Men’s work gets counted more

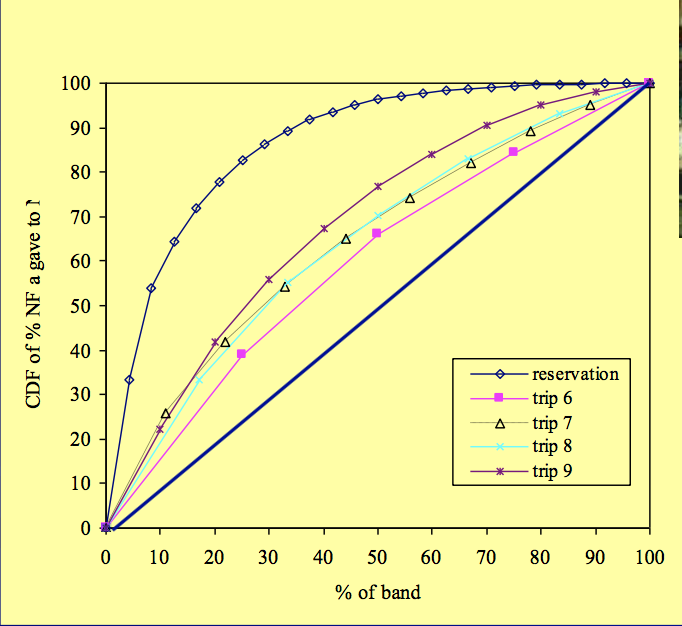
Hormonal indicators for men hunting:

* Provisioning vs signaling:
  + If it’s just provisioning, it doesn’t matter if you killed the animal or not- not gonna be an increase
  + If you’re interested in signaling, doesn’t matter if you killed/not, you’re trying to impress, increase
  + Large kill- show off, increase

**Original affluent society**

**Egalitarianism**

**Egalitarianism**: equality of opportunity, outcomes, health, resources, fitness

* Most primates are dominance hierarchy
* Unique – conditions that favors Eg. populations
* In HG: Big **pressure to redistribute**
  + Tolerated scrounging; demand sharing
  + Benefits of redistrib: in such a difficult foraging niche, it would make sense to redistrib
* Characteristics (**Kelly**):
  + Individual autonomy is central
  + Equality of access to resources
  + Usually no storage
  + Fierce of assertive egalitarianism
* Maintenance of Egalitarianism
  + Demand sharing – redistribution
  + Ethics of fairness
  + Ridicule of upstarts (!Kung); modesty (Ache); ostracism
  + Small, visible communities
* Ultimatum game/egalitarian sanctioning: in some pops- offers that were too high are rejected
  + If I take now, expected to give back
* **Boehn 1993**
  + Groups have different ways of dealing with upstarts – people who disrupt the egalitarian way
  + Execution for deviation from social norm
* Forest vs settlement:
  + Forest: some people net givers, others net receivers (loose sense of property)
  + Reservation: much more people who are net receivers (a lot of personal property, guarding)
    - Esp. for forest food (some people never go to forests); also for fields- some have, some don’t
  + Gov. issues to get people to farm-
    - Some grow all year, big harvest, everything gets taken away by family members/friends
      * Kills motivation- don’t want to do it all over again
      * Others wont do their fair share, you’ll have to give away a lot
  + **Ache**- formal meetings forcing people to farm next year!
* Farming: first place to do so was with complex HGs

Lorenz Curves (Gini index of inequality)

* The middle line is complete equality- 50% of people have 50% of wealth
  + Foraging trips- are pretty close to equality
* The farther away from the regression you get- the less equality you have
  + Reservation- 10% of the people hold 60% of wealth

**Ex. Gana**

* (Elizabeth Cashdan)
  + Unlike Dobe Kung that relied on short- and long-distance trades and social relationships for dealing with risks in a volatile environment…
* Gana had some agro to help with harsh environment
* Also engaged in storage- other ways of dealing with risk
* Notions of private property was allowed-
  + Accumulation of wealth
  + Appealing and praiseworthy
* Few people have many number of wealth items owned
* Much less reliant on sharing to reduce risk- limited to household members
  + Dobe Kung- sharing very common

If you can form a way to rely only on yourself, it shifts your society

* Accumulation of wealth
* Inequality
* Private property

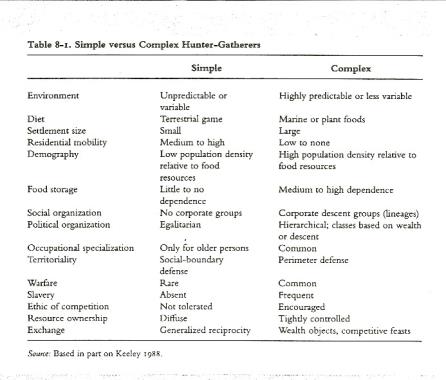
When you need to rely on others

* More difficult to shift away from egalitarianism

**Ex. Tsimane**

* Axes, machetes, shovels, livestock, chickens – subsistence instruments; many have these (more equality)
* Watch, radio- Luxury items- very few have (farther from the gini index curve) most inequality
* Not all resources are the same
* Social Status:
  + Community influence:
  + **Correjidor** – **the corrector**- and imposed leadership position
    - Didn’t really exist formally
    - Doesn’t have real power
    - This person will help run meetings
  + Measure social status: Who has influence
    - Top quintile- social support, bigger (physically), have more skills wealth, better personality, etc.
      * Causality? **What determines status, or what does status give you**
    - **Having allies** is the factors that gives you the most benefits: get your way, win dyadic fights, influence, respect
    - Even in the absence of formal leadership
* Female social status:
  + Women’s attractiveness vs. status
    - Women <25yo – usually high ranking in attractiveness
    - 25-40 – but some of these women are rated higher than women under 25, so physical attractiveness isn’t the only thing that influences social status
    - 40+ - same
  + Status, social support, attractiveness, give them better mates etc.
* Household wealth:
  + Age of household heads- percentiles
  + Wealth increases w age
* Inequality is highest in the poorest Tsimane villages
  + Gini index of Tsimane- varies- can be anywhere between to Sweden to Cuba
  + Only a few people have something, and everyone has nothing… makes for a lot of inequality

**Inequality and Psychosocial distress, independent of wealth**

* With inequality-
  + Depression increases
  + Blood pressure
  + Pulse pressure
* Lower White Blood Cell (WBC) w higher inequality
  + In Tsimane, WBC high usually
    - Lymphocytes in wealthy indivs and eosinophils usually lower
  + Difficult to make strong inferences

collective action problem

**Complex vs simple HGs** – complex: hierarchical

* Of the first to have a successful system of farming
* Complex usually happen in areas w very predictable environments
  + Less variability in likelihood of catch
  + More coastal
  + Ripe areas
  + Prime real estate
* Diet more reliant on marine, plant foods
* Settlements large
* Mobility- lower, more sedentary
* More food storage
* More hierarchy
* Slavery
* Occupational specialization
* More territorial
* Warfare more common
* Ownership
* Wealth, competition, competitive feasts (exchange)

Simple vs. Complex

**Scalar stress hypothesis**

* Abundant, predictable, localized resources 🡪 large population (life is easier) 🡪 increase conflict, “scalar stress”
* Sedentary
  + 🡪 No: Fission/fusion (diff times of year come together)
  + 🡪 Yes: Hierarchy, status (but for the most part, don’t want to go anywhere- there are good conditions)
    - conflict increases 🡪 need to deal w stress, benefits to high and low status
    - Low status:
      * less stress of anyone stealing from you
      * when you know your status, you aren’t consistently contesting for high status
      * less likely to win a contest- might suffer substantial harm
        + might as well be lower, and do “just fine”
        + most of the contest is within a social status grade, not between
        + lowest never competes with highest
    - knowing where you are- you can avoid some conflict
* Member/joiner conflict- those who first arrived have privilege access- longer history than later joiner who accept lower status
* Is hierarchy something that always follows without regard to the circumstances?

**Pacific North West – Shasta, Pupa**

**Tolowa of California**

* Marine resources and acorns
* Rich, predictable resource base
* Villages had headmen, leadership roles
* Wives brought in from neighboring tribes
* Polygyny sometimes
* Fishers
* Canoes
* Acorn- grind it to flower, meal
* Wealth accumulation
  + Engage in matches as status display
  + Ceremonial gala- more elaborate ceremony associated with these groups
  + Elite had more elaborate dialect than commoners
* NW California- resource abundant
  + Year-round villages
  + Sea lions, shellfish
  + Monetary system- dentalia (mollusk)
    - Strung into necklaces

**Ainu – Northern Japan**

* Autonomous indigenous population
* Lands taken from them
* Didn’t have notions of private property- so said “we don’t own the land”, so it was taken from them by Japanese
* 25,000 people
* Elaborate ceremonies
* “bear ceremony”
* Status symbols
* Storage- “Pu”, gathered vegetables
* Cultivated wild millet
  + Small scale gardening – mostly women
* More closely related to Tibetans than to Japanese

**Human life history**

Human adaptive complex:

* Humans have a long life span
* Long “childhood”, high dependency
* Large, encephalized brain
* Intergenerational provisioning
* Contribution of others to energetics of repro
* Long post-repro lifespan

**Gurven and Kaplan 2007: Ratio of HG to US 2002 hx**

* Early life: much higher mortality in HG than in US ages 0-5, then drops but still higher until age 15
* But still 14x higher mortality in HG
* By age 45: HG 7x than US
* **Most of the differences are early in life.**
* We all still have limitations
* Life expectancy:
  + At age 0: HG: 35
  + At age 15: live another 45 yrs
  + If you survive longer, your expectancy is longer
* Existence of older people isn’t an artifact of modern society, it has existed for a while; similar across populations

**Age of Death**

* Very few people are dying at early ages
* % that are dying past 55 increases, peaks at 72 for HG, 85 for USA

**Chimpanzee life history**

At age 0: expectancy 15, if survive, very few make it past 50yo

Allometric scaling of body with species

* take body size into account: given our body size, humans still have longer life spans than you would expect
* also, humans have bigger brain that you’d expect for our body

**Food:**

* Humans rely much more on hunted and extracted foods; chimps on collected
  + Humans: more difficult to acquire, but more nutrient dense and higher calorie value; package size larger
  + Chimps: easier to obtain, less nutrient dense, small packages
* Life history relies on what they are eating, how they are acquiring that
* **Humans:**
  + don’t directly consume foods with high fiber/toxins
  + process food to remove toxins, fiber and packaging
  + eat bigger, more calorie-dense prey
  + use more tools and tactics to disadvantage prey
  + use more tools to extract resources from packages
  + diets composed of foods acquired differently by indivs of varying age/sex/repro status and characteristics
* Feeding niche based on high-quality, large packaged foods
  + Food sharing
  + Lower mortality
  + Investment in **embodied capital**/lengthened development
    - Large brains
    - High adult productivity: provisioning
* **Lactating**
  + primates work more on feeding than traveling (increased effort)
  + humans work less in general (decreased effort)
* **Historical Hominin:**
  + **Bipedality** 🡪 freeing of hands for extraction, tool use, carrying, efficiency 🡪 new feeding niche
  + **Emergence of savannahs**: higher density of mammals and plant storage (roots) and repro organs (fruit)
  + Investment in **Embodied Capital**

**Embodied capital theory = increased investment in skill**

* **Kaplan et al 2000**: Age-specific production and consumption for human HGs and Chimps
* Age-specific Calories acquired per day vs expenditure
  + Chimps: Shortly after weaning- chimps can feed themselves; but no surplus (amount acquired= amount expended)
  + Humans: humans fall much short of their expenditure until they are ~15, but then can produce a lot more than expenditure until age 60. So there is a LOT of surplus.
    - That surplus allows for an **embodied capital**
    - Skill, knowledge, abilities to obtain income in your environment 🡪 increase fitness
    - Has to do with large brain
      * Return, in adulthood
    - Helps with sharing
  + Delayed maturity: reproductive and functional
* Shift to feeding niche coevolved with the complex (long childhood, long learning)
* Early life- brain growth priority; late life- body, embodied capital
* Humans as “**cooperative breeders**” – sharing, large surplus, etc.

Ache: by 15 make 50% in fruit collection as adult

* When there are no fruit, no one below 10 is getting anything; when there is fruit, even 6 y/o are getting a sig amount
* Skill increases w age; younger and much older people less successful
  + You are at your peak at 25, but some of the pursuit peak (skill) is at 40
* Return rates:
  + 50% of maximum at 20yo
  + only at 35-40 it is highest
    - it takes time to learn to do these things
* Expertise is delayed for most skill areas – music/oral; manufacture; childcare; hunting; fishing; tool use…
  + Experts are usually people older than 40
  + Oral tradition and singing is the most delayed >50
  + All skills begin to be acquired around age 12

The argument for studying HG

* Most on human history we lived as HG
* All major features of life history are present in extant HG groups
* Compared to other primates, human HGs have the most skill-intensive feeding niche
  + Niche requires human children have a long underproductive juvenile training period
    - = Human capital investment
* People begin to repro when they are just able to produce as much as they consume
  + But before they are capable of fully independent repro (~18yo)
* Early repro is supported by non-repro, older relatives
* Lifespans are long
  + b/c more resources are devoted to maintenance during repro period (than among other primates)
  + b/c feeding niche reduces mortality hazards
* Nat Sel favored increase in diversion of resources to maintenance because
  + Increased investment in skill (embodied capital) favors increased investment in longevity
  + The payoffs to post-repro investment increase repro value
    - more than they would if they were directed to own repro

**Infant mortality**

* high among HG 0-5
* not as high among USA 0-5

Total fertility rate (TFR)

**Grandmother hypothesis (Hadza, extracted roots, got berries)**

* humans evolved long post-repro lifespan because investment in offspring and provisioning of offspring increases their RS through descendants
  + does not explain **costly brain**, argues that long childhood is an artifact of long lifespan
  + ignores why **men have long lives**
  + ignores **large male contribution** to diet
  + GM are **not major food providers** in any HGs
  + GMH does not explain **age-trajectories of production**

**GMH vs Embodied Capital**

* Long childhood: GMH says it’s an artifact of lengthening lifespan; EC says that you need long childhood to invest in growing brain and learning
* GMH: childhood is waiting period to adulthood, no functional delay
  + Once you are physically mature, can learn appropriate skills quickly and effectively to become producer
  + Limitations on performance due to small body size
* ECM: human food production niche requires long developmental trajectory
  + Adult-level production limited more by skills: knowledge-based growth rather than physical constraints (strength/body size)

**Post-reproductive lifespan**

* Pool of grandchildren that you can help is much larger when you are 50-65, than when you are 40-45, so makes sense to live that long
  + Past 65 you kind of max out, so the pool of those needing care is declining so no longer needed
    - Costly to keep body alive, maintenance and repair past age 70 is hard
    - Benefits after 65 starting to decline
      * So human life span is about 65 in HG
* **Tsimane:** 
  + You stop investing in your own kids at 55, and increase care of grandkids
  + >70, net flow becomes negative (you are beginning to be a net consumer again; become expensive to maintain)

**Health and Disease**

**Gurven and Kaplan 2007**

* In U.S.- Infant Mortality Rate IMR 0.58%
  + E0 = 79
  + E15=65
  + Heart disease, cancer, respiratory, accident, stroke, dementia, diabetes
* In HG- IMR 20% (Same as Sweden in 1751)
  + E0=32 (avg. doesn’t mean everyone is falling dead- just high infant mortality)
  + E15=39
  + Illness (and/or infection), degenerative, violence/accidents, other
* Environmental change >> adaptive change
  + **Mismatch hypothesis**
    - Genetic adaptations and current environmental conditions
* Diet:
  + U.S. more fat, less protein (and saturated fats); less fiber, more sodium, more alcohol
  + HG less fat, more protein
* Diet affects different aspects of health
* HGs: Low-
  + Obesity
  + Hypertension
  + Cholesterol
  + Diabetes (non-existent)
  + CVD cardiovascular disease (rare)
  + Reproductive cancers (rare)
  + *Maximal oxygen intake (excellent)*
* **Mismatch**
  + Genetics and lifestyle factors influence likelihood of certain disease manifestation
  + There’s been a decent amount of genetic change since the Pleistocene
    - Diet particularly- changes in diet
    - Exposure to pathogens
    - Disease (immune)
  + But, there are plenty of changes within a few generations with exposure to certain diseases
* Immunological Evidence of past infections with various disease agents (**Brazilian Tribes; Black et al. 1975**)
  + Endemic diseases (high incidence, low mortality)
    - Herpes
    - Hep B
  + Enzootic (low prevalence over long time)
    - Yellow fever
    - Toxoplasmosis
  + Introduced (explosive, transient)
    - Measles
    - Mumps
    - Rubella
    - Influenza
    - Polio
    - TB
    - Malaria
* **Yanomamo**
  + Anemia- common in about all ages
  + Malaria- esp in young kids 1:5
  + Vivax- also in kids
  + Splenomegaly (big spleen)- about everyone
  + Over time- causes of mortality: Precontact 🡪 Postcontact **(Early and Peters 2000)**
    - Postcontact: infectious diseases skyrocketed
    - All the rest pretty low: Unknown, homicide, accident, non-infectious, infanticide
* **Tsimane** 
  + Proximity to markets- linkage to modern society
  + Longevity
  + Men:
    - At old age suffer from skeletal (osteoarthritis), some respiratory (chronic bronchitis and TB) and GI
    - At young age: mostly respiratory
    - More likely to be attacked by snakes than women, and more than they are likely to be attacked by other animal (increases w age, 1:5 by the time they’re old)
  + Women:
    - At old age: equally from skeletal, respiratory, some GI
    - Young age: respiratory and GI
    - More likely to encounter a snake than other animals, but less than men in general
  + Leshmaniasis – שושנת יריחו
    - Protozoan transmitted by sand fly
    - Treatment – heavy metal based
  + Skin infections
* **Parasites – Tsimane**
  + Hookworm, roundworm, whipworm
  + Fairly prevalent, often people have more than one type
  + Hemoglobin- assess anemia
* Infectious diseases – antibodies for these infections (past exposure)
  + Prevalence of Hepatitis A 95%
  + Yellow Fever 87%
  + Toxoplasmosis 84%
  + Rubeola 94%
  + Measles 91%
  + Leptospirosis 56%
  + H-Pylori- Bolivia much higher than U.S. (almost 40%)
* Tsimane have high WBC
  + If you’re fighting multiple infections, not surprising you have high WBC
  + High early in life, lower w age
  + Eosinophils account for 20% of their WBC (US: ~1%)
    - Associated w parasitic infections (intestinal in particular)
  + T-cells: naïve t-cells
    - Matured but haven’t been associated w any particular infections
    - You need these to deal w a new infection
    - Naïve t-cells decrease significantly w age- immunosenescence w age
      * So high exposure to pathogens
      * Over half the deaths in Tsimane are due to infection
* Inbreeding
  + High amount of congenital diseases
    - Cleft palate – breastfeeding issues, can be fatal (respiratory)
    - Extra toes
* Heart disease- mummies CT
  + PAD and Atherosclerosis
  + Heart disease was equally prevalent in many cultures across history
  + 4000yrs of history, across many regions in the world
    - evidence of atherosclerosis (Heart disease)
  + “the common assumption is that heart disease is a product of modern living, and that it could be prevented with adjustment; but our study finds that the cause of CAD is unknown and might be somehow an inherent process of human aging”
  + **Hypothesis**: aging of heart tissue and blood vessels occur in all populations, but active lifestyles and high rates of infections in the past may have prevented significant coronary artery disease capable of producing infarcts and affecting systolic function

Tsimane:

* Almost no evidence of any heart attacks (past or present)
* CAC by age, sex, population: much lower in Tsimane than any other group in the world
* In over 700 adults of age 40+, 85% of them had no Coronary Artery Calcification (CAC)
* Moderate CAD is 2.8% (Coronary Artery Disease)
  + Matched indivs in industrialized pops exhibit 10x as much
* Tsimane- healthiest heart in the world (no one ever studied Hadza hearts, they might be equally healthy)

**Tsimane Diet and Exercise:**

* Diet low in sugar and salt
* No trans fats or preservatives
* Low fat diet (14% of diet is protein, 14% fat, 72% carbs)
* High in omega 3 and fiber
* 4-7hrs of physical activity/day
* <10% of daylight hours sedentary
* Low levels of cardiometabolic risk factors
  + Obesity very low (although about ¼ of adults are overweight, just not obese)
  + Hypertension very low
  + No high cholesterol

**O’Dea 1984, O’Dea and Sinclair 1985, O’Dea 1991, Lee et al 1994**

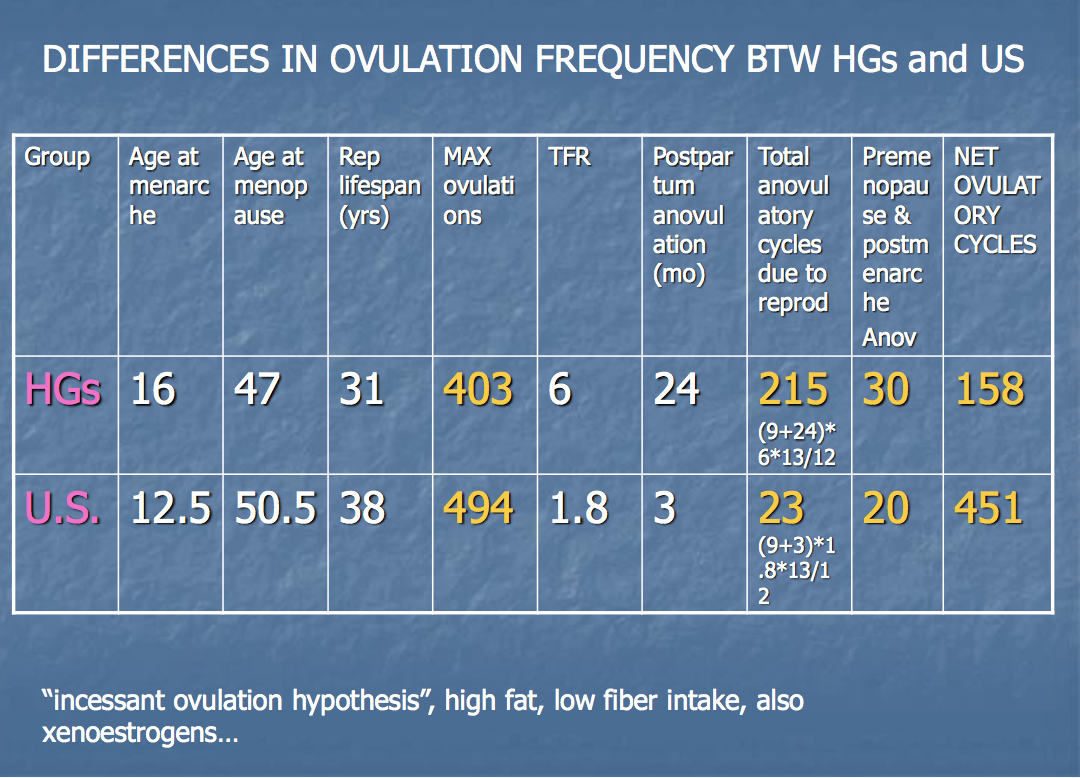
* Some indication that if westerners change their lifestyle to reduce fat, sugars, etc, and increase activity-
  + causes improved metabolism, weight loss, BP, chol, glucose tolerance greatly improved

**Pathogen diversity- “Old Friends” hypothesis**

* Intestinal helminths- host manipulation
* Co-infection, poly-parasitic world
* Immune dysregulation in modern “hygienic” environments
* With infections- in the absence of these parasites that our bodies expect early in life- our immune systems can be dysregulated later on
  + Modern environments are too clean, hygienic
* Helminths as anti-atherogenic
  + Decline in many diseases (Hep A, TB, Mumps, Measles…)
  + At the same time, incline in many auto-immune diseases, diabetes…
    - MS, chrone’s, asthma
* Decreased exposure early in life is throwing our immune system out of whack.
  + Ends up attacking itself

**Helminths and anti-atherogenic effects**

* Helminths are literally consuming some of the fats and cholesterol that we eat, so reducing our uptake
* Lower levels of cholesterol and LDL in people infected with helminths
* Cost of immune function- people infected with helminths had resting metabolic rate 10% higher than those without-
  + So spending more energy if infected
* Worms- anti-inflammatory effect
* If your immune system itself is less likely to react (or overreact) to buildup of junk in arteries
  + then your body isn’t contributing to the buildup
  + immune system itself is actively involved in process of buildup
* immune system is working differently; inflammation and anti-inflammation aren’t working regularly
* modulating immune fxn
* counter-balancing auto-immune effects
  + taking up some of the energy
  + multiple pathways in which helminths can assist in reducing heart disease
  + esp. in interaction with other factors (diets, activity)



Chagas and Valvular heart disease

* Kissing bug
* Transmitting trypanosome
* Buildup of large heart (enlarged)
  + Venezuela and Bolivia

Cancer

* HG: much less ovulations that USA women- net ovulatory cycles 158
* USA: much more ovulations- net ovulatory cycles 451
  + 3x more than HG
* What would this do to cancer reproductive risk?
* **Excessive Ovulation Hypothesis**
  + Rebuilding of endometrium- cell proliferation itself is cause of increased risk of cancer
* Using machinery in ways that would increase risk
* With each cycle- your hormonal exposure will vary
  + Surges in Estrogens and Progesterone
  + Cost of high estrogen is high risk of repro cancer

Hormone replacement treatment- can help with bone density issues upon menopause

* But at a cost of increased risk of repro cancer
  + **Breast cancer**
  + **Endometrial cancer**
  + **Ovarian cancer**

Not cervical cancer- probably unrelated, but higher risk with HPV

Relative risk of cancer: Early use of contraception

* Earlier levels of high hormones levels
* Use of contraceptive help reduce risk
* Higher risk of people who didn’t use contraceptives (U.S. is 240x Paleolithic)

**Machiguenga of Peru**

* Parasite load reduced, BP improved, all look better
* But when you ask people about aspects of well-being- people reported being a lot happier back in the 70s, than in the 90s
* Notions of health are not the same as the actual physical well-being
* Missionaries, oil companies, encroachment by other neighbors- all reduce the mental well-being
  + Subjective aspects of health are diff than objective indicators
  + WHO doesn’t think just life expectancy is a good measure of health
    - Just a single metric of many

**Depression among HGs 11/28/17**

* In the U.S.:
  + Decreased age of onset since WWII- once mid-30s, now mid-teens
  + **Major depression** takes enormous toll on
    - quality of life
    - functional status
    - productivity- affects sleep, eating, habits, jobs, relationships, thoughts, feelings and behaviors
    - associated w suicide and heart disease
    - depression as the “common cold” of mental illness
* **Functional explanation:**
* If emotions evolved by natural selection, they must have been important throughout all of human history, not just modern times
  + Randy Nesse’s (“evolutionary medicine”) theory of depression suggests a period of physiologically induced re-evaluation of strategies (and inactivity) following a failure
    - High modern rates were due to a pathological modern environment
      * But maybe a function of no-diagnoses in the past?
  + “Depression sets in after someone is prepared to suffer a failure or loss. It slows you down and makes you take your bearings” (Eric Klinger)
  + Increased pressure that people feel to ever-larger goals
  + Ancestral hominids may have striven to pick enough berries to last for a week
    - Modern humans want to look like supermodels, make a million dollars and produce flawless children
  + Our HG ancestors should also have experienced conditions eliciting depression often enough for the emotional state to have evolved
    - But HGs lives are much more oriented to sociality than WEIRDs. They are dependent on others for many things that we now purchase as services
  + **Loss of social support** is a universal problem

Ache and Tsimane

* So busy surviving, that they didn’t have the free time or luxury to “dwell” or overly self-reflect in ways required for deep swings in mood
* Generally happy because of limited goals and regularly attained
* Matches Nesse’s statement
* Largely focuses on material concrns

Hiwi

* Spent many hours in camp each day, not foraging, not making tools, not socializing, often sitting in hammocks, drugged
  + Gave them plenty of time to reflect and that appeared to lead to depression
* Their material goals were fairly simple, but the were not meeting them well
* The pop was under severe food stress, there were violent and hostile relations with neighbors, and mortality rates were high
* Hiwi did say they had difficult to achieve social goals- lack of respect by neighbors, looked down-upon
* People were concerned about keeping face in front of peers
* Social interactions led to what appeared to be “depression”

Yuqui (Ache) HGs

* had slaves that did most of subsistence work
* Unlike Hiwi, Ache seem to fit NEsse’s description-
  + They often smile and laugh, and always seem in a good mood
* But after spending much more time w Ache- did not keep up
  + Became moodier, esp women
* Ache had been through near extermination around contact, followed by enforced servitude
  + They still showed a lack of emotional distress
* Individuals who lost most of their family in contact epidemic never seemed to have periods of sadness, deep thought or depression
* “Happy-go-lucky” demeanor

These were all initial impressions…

Hill and Hurtado (KH and MH)

* After 5yrs work with Ache
  + No longer put up appearances
  + Deeper insight into their lives
  + As confidants, serious manifestations of anxiety and depression came to light

Examples (Case studies)

* Krypurangi – married to an older, smarter women of high status
  + She left him, he became distressed; drank ½ gallon of insecticide
  + Survived but serious health issues
  + **First case ever heard of a suicide attempt in Ache**
* One guy:
  + Popular in the group;
  + Heard buzzing in ears, couldn’t fall asleep
  + Headaches, nauseous
  + Suffered from depression and anxiety
  + Pessimistic view that his people were on the road to extinction
    - Responsibility of well-being of the people; couldn’t figure out way out of food stress
    - Avoided social interactions
  + Left the reservation, set up settlement in forest, reverted to traditional HG lifestyle
    - Soon after this, his personality seemed to come back
* Chapanogy
  + Talented guy; mother was Ache, dad was Paraguayan
  + Spent some time in Paraguay, but always came back to Ache
    - Social support
  + Really capable guy- electrical experience, motorcycle
  + Frequently unhappy
  + Tried to become chief, but since no one nominated him, he didn’t
  + Left, got a job at national park
    - Took this seriously- shot each poacher he found
  + Found his way into the army- rode a tank, commanding officer
  + Reality of racism: no Paraguayan employer wanted to hire him
    - “halfbreed”
  + depressed, drinking, gained weight, lost teeth
  + despair, regrouped, returned to Ache, studied bible…
  + didn’t work- went back to city became taxi driver
  + disappeared, killed or got involved with drugs
  + 🡪 goals he set himself that he was unable to achieve
* Kandegi
  + Teenage mom- envied the highest status wife
  + Her husband was passed by for office, and she got into a scandal, and publically shamed
  + Emotional tailspin
  + Still on medication
* Airagi
  + Problems w teenage daughter- daughter went to work in a brothel
  + Ache brought her back
  + Shaved her head
  + Continued to be trouble
  + Married guy, airagi no longer depressed
  + Other daughter ran away with husband of first daughter
  + Became depressed again
* Japegi
  + One of the most skilled hunters on records – “returns rates”
  + Tried to impress village members into giving him a political role
  + Given chance to be named in charge of animals (livestock)
  + He was given an opportunity to speak
  + Rambling, incoherently
    - Others interrupted, told him to sit down
    - He took this personally
  + Humiliated, depressed, never carried out his duty

Is this because more capable indivs develop high expectations, and can more easily fail and lead to realignment of strategies?

***Ache who are not too bright and not too ambitious rarely report depression***

High expectations 🡪 more likely to fail

Loss

* Loss of close kin and social support seems to be major cause of depression in HGs
* Failure in social competition is a very common cause of depression among Hiwi, Ache, and Tsimane
  + This problem is not unique to modern societies

Are HGs happier than modern Americans?

Nesse’s views about unique stresses of modern society suggests that depression should be less common in HGs

* There are two factors that seem likely to lead to higher depression in Americans
* 1. Mass media- causes everyone to believe they are failures on a relative social scale
  + none of us feel we are successful relative to our “TV peers”
  + prediction: those more exposed to this will be more likely to be depressed
  + Facebook: making you more depressed?
  + FOMO- fear of missing out
  + Replacement vs augmentation of networks?
  + Social comparison
  + Depends on personality
    - But breaking it down: Arroyo Bandera: most ethnographers would not observe severe depression without significant time in the field (and good linguistic knowledge)
    - Likewise, little depression would be observed if one spent less than a year watching 10-15 families
    - Prevalence- 11/55 = 20% in 2.5yrs
    - 1 case per 9 person-days (need a long time in the field to be able to observe it)
* 2. **Ache Kuaeme** philosophy – Kuaeme “don’t think about it”, “forget about it”
  + instead of treating depression- this cultural philosophy seems designed to decrease the incidence in the first place
    - what you would do with the death of a loved one
    - Adults who cried too much were ceremoniously beaten with sticks by others, and children were threatened that if they cried too much they would be buried alive with the deceased
    - Older kids often ran away to a distant area after their parents died
  + They were told “kuaeme”
  + It already happened- move on
  + **Tsimane**: version: “Paj mo’ ya”
* Tykuarangi
  + Internet porn- refused to look at it; those women are really attractive, but I can’t have sex with them, Kuaeme.
* Hiwi
  + Dwelled a lot on dead ancestors
  + More depressed than Ache; took drugs constantly

Tsimane depression score increases with deteriorating health (self-reported)

* Their depression score increases with age, and low energetic status
* Can go up to 65% prevalence in adulthood
  + The older you are, the less you are able to be an influential member of society, and the less you can produce and contribute
    - Associated with depression
* **Market proximity** is associated with depression
  + Closer to other influences can increase depression score

If you could change something in your life, what would it be?

* Obtain more modern goods/services
* Easier integration into market
* Return to traditional lifestyle

Conclusions

* HGs get depressed just like modern Americans
* This emotional state evolved in our ancestors and was probably just as common as fever and vomiting
* Most depression in HGs in about social aspirations and social failures
  + Loss of social support
  + Not a modern issue- you don’t need to fail to be a movie star to be depressed
* Unclear if modern life more stressful that that of our ancestors, but if we could identify characteristics of modern world that mimic the problems that were solved by depression in our ancestors, we would have a better set of solutions to the apparent recent increase in depression
* Modern comparison of the indiv to unreal role models (media created) may include feelings of failure more often than would have been the case among our ancestors
* Depression as signal to solicit support among kin, friends, could be greater in modern societies if current social connection are weaker of if people live in more isolated lives
* The use of drugs to alleviate a natural response to social failure should be carefully thought through
  + Analogy about drugs to reduce fever infection may not always be appropriate
  + Do you treat a fever? You’re combating your body’s own defenses
    - Reducing is helpful vs harmful

**Marriage, Mating and Divorce**

* Least known about HG mating behaviors

Fertility

* Low fertility?
  + Nomadic existence, strenuous lifestyle, limited food
  + **Kung** TFR = 4.7, IBI=4yrs (**Howel 1979**)
* All subsistence societies have similar fertility
* L15 (survivorship to age 15) pop growth curves – Pop growth and TFR
  + If survivorship is high, people can still afford lower TFR and maintain population growth
  + Most populations in the graph are above 0: in the (+) range
    - Some up to 3%
  + Fertility isn’t much different, but survivorship is higher- leading to higher growth rate
    - Along evolutionary time- this sums up to a huge amount of growth over time
    - Nn+1 = Nert
  + Some secondary sterility from STDs

**Marriage**

Frequency of marriage systems

* Monogamy 16%
* Polygyny 83% (usually occasional [vs common])
* Polyandry 0.5%
  + But pair bonds are universal

Phylogenetic evolutionary tree- which structure was ancestral?

* mtDNA to infer what marriage system our human ancestor had
  + Out of Africa- arranged marriages more common
  + Within Africa – not as common
  + Bride service- both within and outside of Africa
  + Polygyny- low in HGs
    - Consistent with generalizations we discussed previously
* Most are monogamous (but not for life; serial monogamous)
* Two extremes: Ache (up to 10 partners/life) vs. Hiwi (much fewer)
  + Ache promiscuous - (“Kuaeme”)
  + Hiwi- man can’t talk to woman who isn’t his wife; needs to look the other way and let everyone know their intentions
  + Polygyny relatively rare- why?
    - You need 2 partners to secure welfare of offspring
      * Man: more access to females, the better (if he doesn’t have access to a wife, something is wrong, there’s some limitation)
      * For women: would you rather be a 1st wife of a poor man, or a 2nd to a richer man?
      * Might make sense when there are properties to consider – when wealth is on the table.
      * As an HG, there is some difference in skillsets
      * But for the most part, because of sharing- are you going to be much better off as a second wife to someone vs. a first?
        + Probably not, **stick to monogamy**
        + So relatively little polygyny in HGs
    - From biological perspective, most human monogamy is still effectively polygyny
  + Fertility is different between the sexes –
  + **Reproductive Variance**: the biological explanation
    - If you were completely monogamous, repro variance would be the same for males and females
    - Effective polygyny- serial monogamy, would create differences between male and female fertility
      * That would create a like-polygynous system
    - In the US: After divorce, men are more likely to mare than women, and if they have more children later, then you could end up in a similar situation
* Ache:
  + Women cluster around TFR = 8 (range: 3-12)
  + Very few have no kids
  + Men: more variability
    - More that had none
    - But may go up much higher than 20 if he’s successful
      * No female can come close
  + Variability is typical of polygynous systems
  + But what looks like polygyny can really be serial monogamy
    - B/c of repro variance

**Polygyny Threshold Model**

* Women choose mate based on net available resources (not absolute wealth)
* **Kipsigi pastoralists**: women choose to be second wives of wealthy men
  + Because land became more limited in this area
  + You could predict who will marry who based on simple logic
  + Wealth was the predictor
    - But there is more than just wealth to being married, so some would choose to be first than second

**Cross-cousin marriages – all first cousins**

* Most common pattern among HGs (**Kelly**, table 7.5)
* Norm violation of marriage rules:
  + Flexibility: 17% of Gidjingali marriages fit rule
  + 11% of Gwi marriages fit rule
  + having flexibility is important (small pop density)- if rules were more rigid, you’d have to wait longer to find a partner
* **Yanomamo** men manipulate kinship categories to marry more women

Marriage arrangements between bride and groom’s families

* ***Absence of exchange most common 34%***
* Bridewealth
* Gift exchange
* Brideservice
* Token bridewealth
* Exchange of sisters
* Dowry

**Divorce**

* As a fxn of age- # of spouses as reported by women
* What constitutes as a spouse?
  + No formal ceremonies
  + So maybe “date” is the norm
  + But even with no formal marriages, there’s a recognition that you are paired with someone
  + High divorce rate
* Pair-bond stability:
  + What are the payoffs of staying with a partner vs deserting them
* **Male parental investment:** 
  + Pair-bond stability commonly modeled as a function of trade-offs between Mating Effort vs Parental Investment
  + What’s the impact of male parental investment vs. opportunity costs of staying around
  + Women are more committed to their offspring
  + Monogamy itself is not that common across mammals
    - So desertion is more accepted across societies
    - But divorce is not celebrated
* Reported Causes of Ache Divorce
  + Hill and Hurtado 1996
  + Men: wanted a different spouse
  + Women: spouse was stolen by someone else
  + Fighting, unhappy, sexual infidelity
* The longer a marriage exists, the less likely you will divorce
* **Hadza** – causes of divorce (**Marlowe 2005**)
  + Extra-marital affairs (both for men and women) are highest cause
* Jones and Marlowe (2001)
  + Quantified trade-off of PI vs ME
  + **Cost of desertion: “father effect” on child survivorship**
  + **Potential benefits** **for men**: # of repro-aged females per adult male
  + 1. Hiwi (1)- lowest divorce rate
    - 1.1x more likely to survive if dad was around (little effect)
  + 2. Kung (2)
    - if dad is around 1.3x more likely to survive
  + 3. Hadza (3)
    - if dad was gone, no more likely to survive than not
  + 4. Ache (4)- highest divorce rate:
    - if a father dies, there is a penalty that children pay in survivorship
    - Ache- when people die, often kids are thrown in with them
      * No one wants to take care of them
      * 1.6x more likely to survive if dad was around (high effect)
      * **highest divorce, but father matters the most**
  + Fertility units per male:
    - Highest for Ache
    - Lowest for Hiwi and Kung
* PI is high when fertility units per male are low, and vice versa
  + As a male, it’s smarter to invest in your offspring if there are not many females around for you to fuck around with
  + It pays for men to stick around more than to desert

Hookup culture

* 57:43 F:M nationwide public universities
* Unequal gender ratios at colleges are driving huckup culture
* When there is female bias (more than males): men have the leg-up in the game, it’s better for men to bounce around, less monogamy

**Aka – best fathers in the world**

* While other women hunt, men look after babies
* Let them suck on their nipples
* **Barry Hewlett – anthropologists**

**Other aspects of Sexuality**

* Homosexuality
  + A modern luxury? Product of western culture? Release from ‘constraints of reproduction’?
  + No systematic study of sexuality among HGs
  + Anecdotes of gay men
  + Few to no reports of gay women
* Onset of sexual behavior
  + Early, post-menarche, lots of teen sexual play
  + First marriages and births later (~17-19 in women)

**Sneaky f\*ckers**

* Secondary paternity
* Pregnancy is a result of multiple acts of intercourse often can involve multiple men
  + Sometimes known who “primary father” is, and who “secondary father” is
    - Amazonian groups mostly
    - Survivorship: 2 dads, better than one
      * But 3 is worse
    - Primary fathers have much higher fertility
    - But life-stage strategy
    - you’re more likely to be a sneaky fucker when you’re a young guy
      * when older, almost all of your paternity it from primary paternity
      * very little from secondary paternity

Coke bottle in the Kalahari

Fairness

Historical revisionism

Continuous vs. respecialized foragers