Problems of survival

Outline of this lecture:

1. The “EEA”
2. Sources of mortality among hunter-gatherers
3. Food preferences

1. The EEA

Environment(s) of Evolutionary Adaptedness:

- Environmental properties in which adaptations evolved
- Varies with the trait (some traits ancestral; some still evolving)
- Global variation

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Extant hunter-gatherers are not a “snapshot” of our evolutionary past.

But because we evolved as hunter-gatherers, those conditions have special relevance. How is that life different?

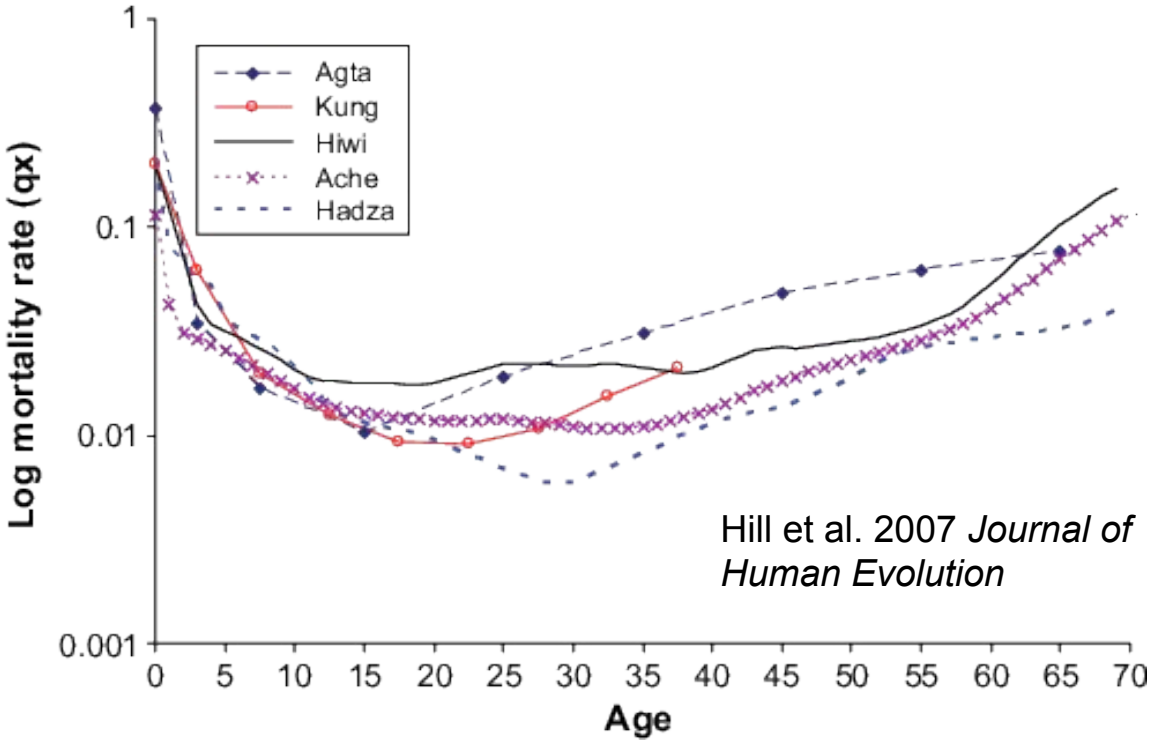
2. Mortality in hunter-gatherers

!Kung Bushmen had an “expectation of life at birth” of 32 years.

What does that mean ?

(It **doesn’t** mean that lots of people die in their 30s and there are few old people)

Mortality in hunter-gatherers: Age-specific rates



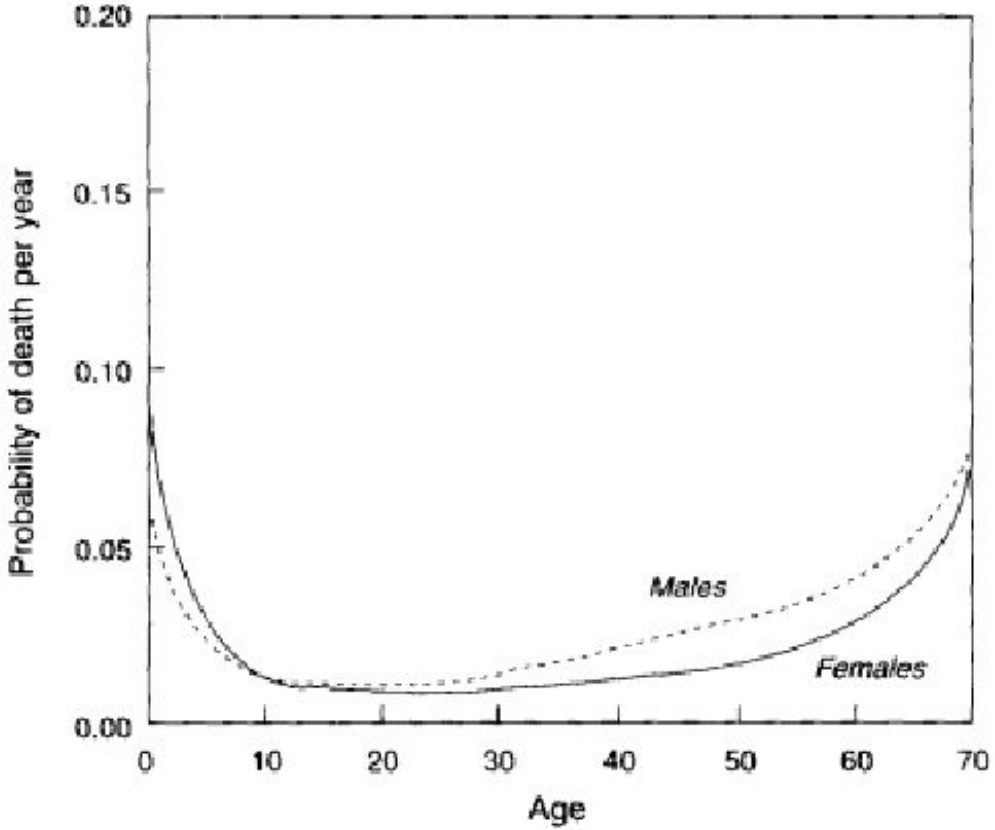
Hill et al. 2007 *Journal of Human Evolution*

High infant & child mortality:

On average, only 57% of hunter-gatherers survive to age 15

(Gurven & Kaplan, 2007. *Population & Development Review*)

Ache age-specific mortality



Mortality in hunter-gatherers: Causes of death

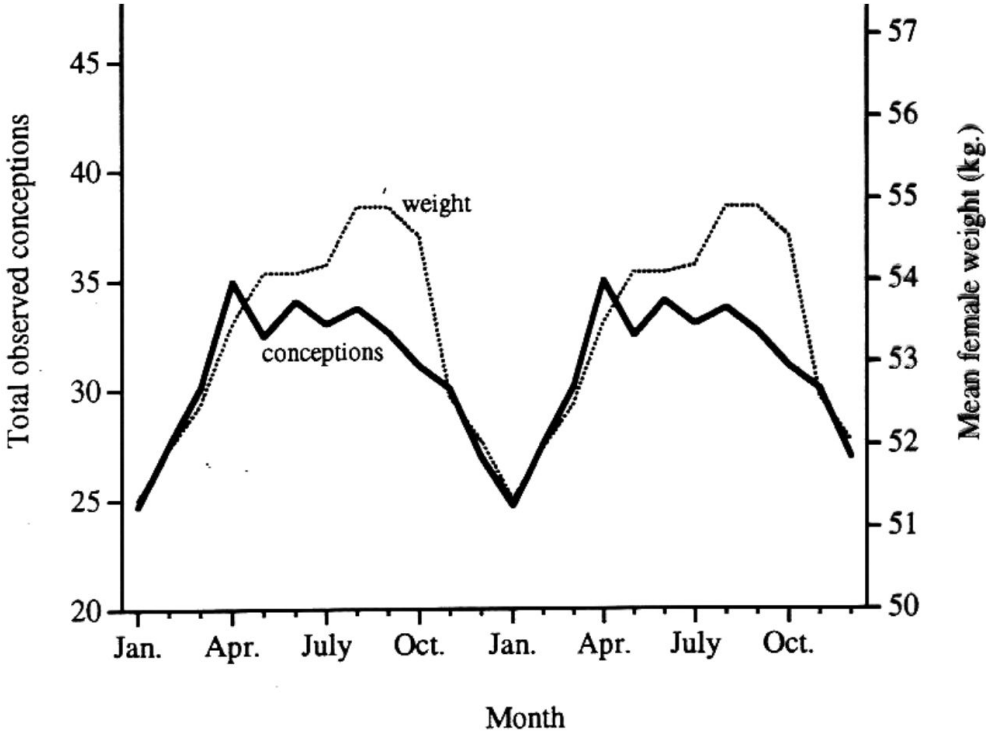
- Infection: !Kung (N. Howell)
  - infection and parasites 70-80% of deaths
- Trauma: Efe (Bailey)
  - 63% health complaints concerned trauma
- Violence: Ache, 15-59 years (Hill & Hurtado)
  - violence: 46%,
  - illness: 28%,
  - accidents: 23%,
  - degenerative: 3%

Nutrition in hunter-gatherers

- The good:
  - no micro-nutrient or protein deficiencies (mobile, foraging !Kung)

    low in sugar, low in saturated fat, plenty of fiber
- The not-so-good:
  - calorically marginal (!Kung, Ache)
  - costs in illness, work
  - costs in fertility

Diet and fertility in hunter-gatherers



Traditional !Kung (1970s) lost about 10% of their body weight seasonally

More !Kung children were conceived when food was abundant (E. Wilmsen)

Implications for Evolutionary Psychology

Staying alive long enough to reproduce was a challenge.

Strong selection for:

- avoiding infection
- avoiding trauma (from animals, weather, accidents)
- coping with violence
- finding calorie-rich foods

3. Food preferences: What was the real paleo diet?

Dietary percentage of foraged foods in hunter-gatherers:

	Hunter-Gatherers									
	Onge	Anbarra	Arnhem	Ache	Nukak	Hiwi	!Kung[1]	!Kung[2]	Gwi	Hadza
meat	79	75	77	78	41	75	29	68?	26?	48
roots	19	8	19	0	0	15	6		37?	30
seeds, nuts	0	0	0	0	0	0	58		0	0
fruits	0	4	0	1	40	5	6		37?	15
other plant	0	0	0	9	0	2	0		0	0
invertebrate	2	12	3	11	20	3	0		0	6

Kaplan et al. 2000. *Evolutionary Anthropology.*

Take details with a grain of salt (varies seasonally & geographically; fish, honey important)

- ➢ Hunans are omnivores and forager diets vary by habitat
- ➢ Meat is an important part of the diet, and highly desired
- ➢ Fat is hard to get

The omnivore’s dilemma

- which foods are toxic?
- which foods are most nutritious?
- how can we know?

Solving the omnivore's dilemma: Sweet & bitter tastes

- newborns react more positively to sugar solutions than to water
- most infants dislike bitter and sour tastes

Reaction to the taste of sugar

Reaction to the taste of lemon juice

Reaction of a two-week old baby to taste of sugar and lemon juice. Why?

Solving the omnivore’s dilemma: plant toxins

- What foods does your child refuses to eat?
    - 46% vegetables, 8% fruits (my data)

Solving the omnivore's dilemma: plant toxins

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- Toxins (leaves, tubers, bark) deter herbivores, taste bitter. Often used as medicines
- Young rats (& people?) less able to detoxify; (exposure increases detoxifying enzymes)
- Infants reluctant to touch plants (A. Wertz)

Solving the omnivore’s dilemma: Social learning

Rats:

- young rats prefer foods mothers ate when pregnant and nursing
- young rats forage where adults are foraging
- adult rats prefer food if have smelled on other rats

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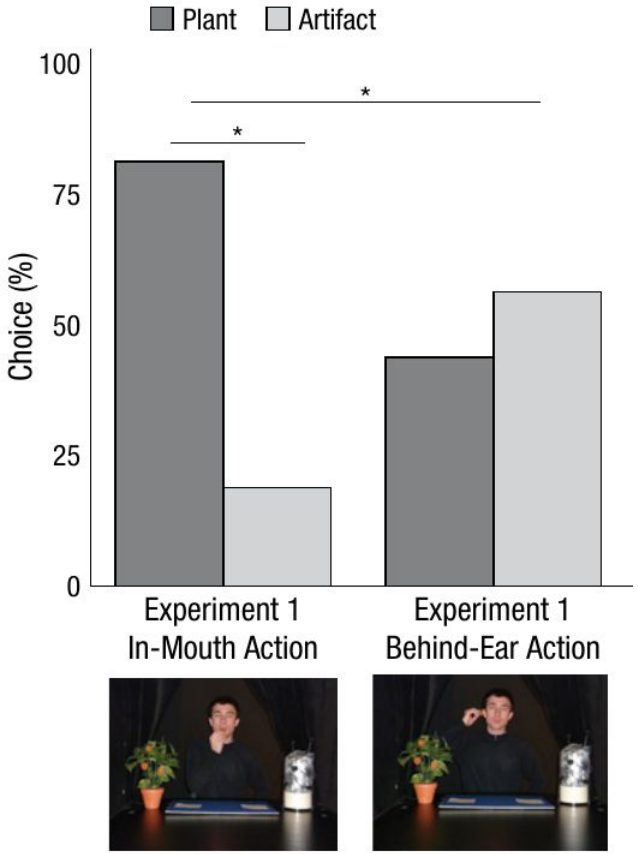
Human infants:

- more likely to take novel food from mom than stranger
- more likely to take novel food from stranger if stranger eats first
- choose food eaten by actress speaking their own vs other language

Solving the omnivore's dilemma: Social learning

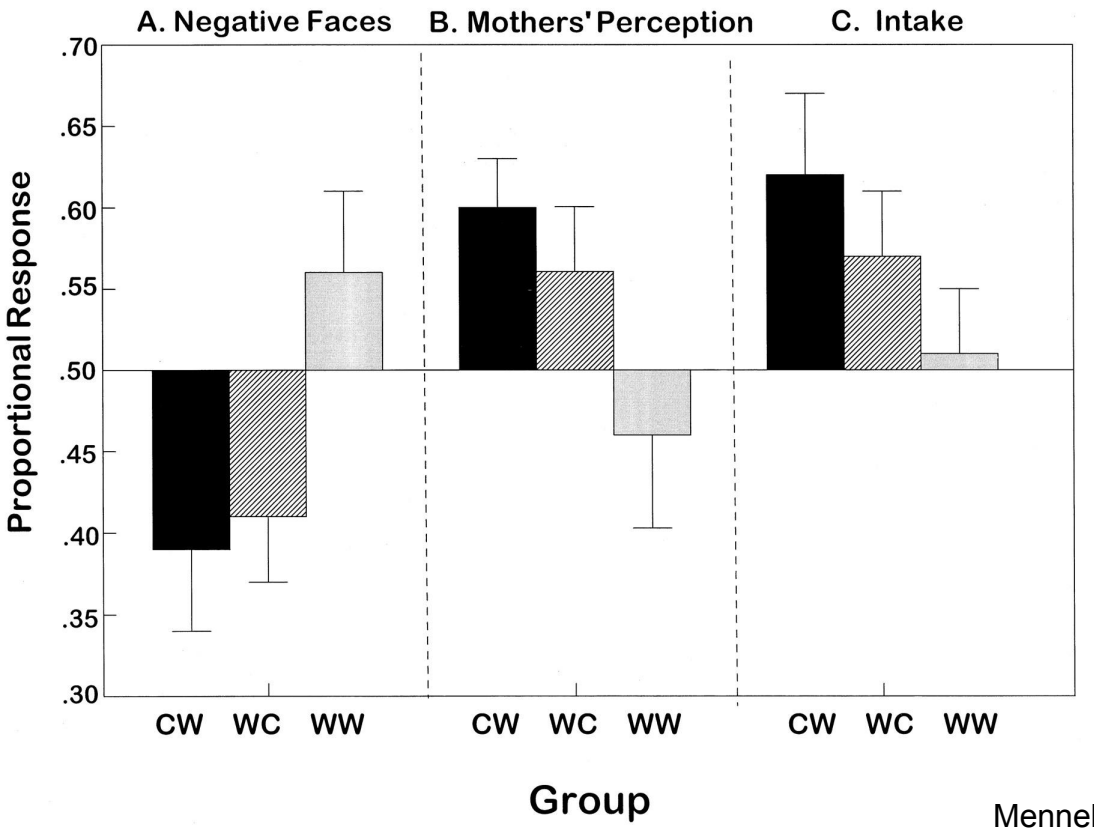


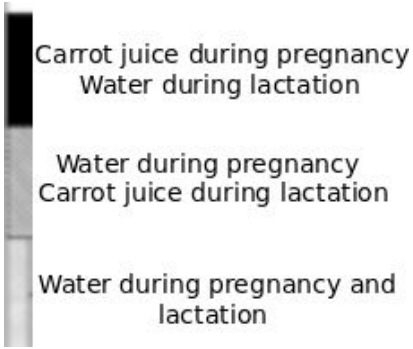
Human infants (18 mos) preferentially attend to "food-relevant" social cues:

Infants reach for fruit more than for non-fruit artifact after seeing mom put in mouth, but not after seeing mom put it behind her ear.

Wertz & Winn, 2014. *Psychological Science*

Social learning starts in utero

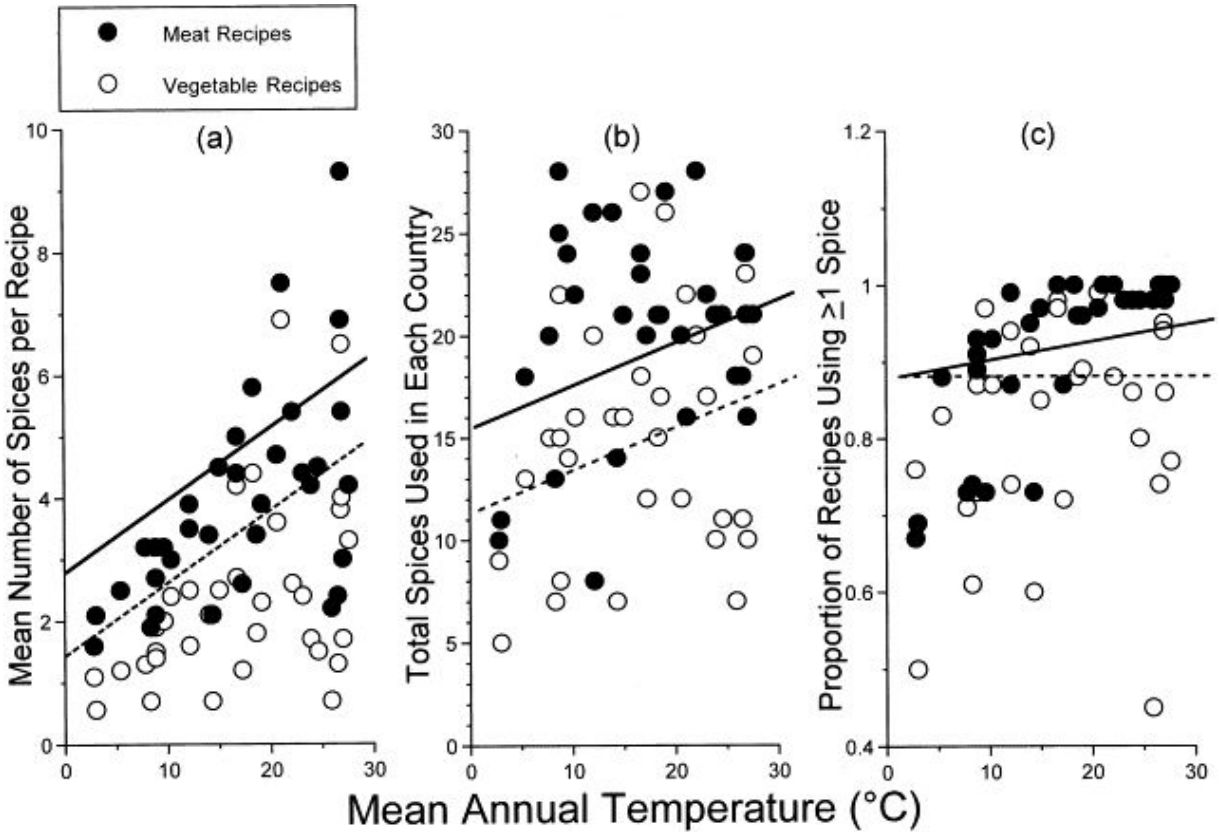




Moms who drank carrot juice when pregnant & nursing had babies who ate more carrot-flavored cereal! (1 mo post-weaning)

Mennella et al. 2001. A*mer. Acad. Pediatrics*

Food preferences: Cultural learning



Sherman and Hash 2001. *Evol. Hum. Behav.*

Solving the omnivore’s dilemma

- Content biases
  - sweet and bitter tastes convey information
  - caution toward plants, vegetables when young
- Context biases
  - Infants attend to relevant, not irrelevant, social cues
  - Infants more likely to take food from mother, native speakers
  - Learn safe flavors even in utero
- Culture (antibacterial spices, food modification, cooking)