

Reproduction

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Babies

Two types:

Altricial: born undeveloped

- long post-hatching period for brain to develop
- competitive ecological niche that requires skill
- low juvenile mortality

Precocial:

- born immediately able to move, eat, etc after birth
- abundant, low-skill food (eg chickens)

K-selected species: fewer offspring with long-term care (K = limited by carrying capacity)
R-selected species: lots of offspring that are not specialized (R = limited by reproductive rate)

Humans are highly altricial

Egg Hyp. not enough energy

- brain 30% of adult size
 - 9mo gestation period vs 18-21 for other primates
 - many years of development after birth
 - primary limitation: energy needed from mother - unable to sustain >9 mo
 - underdeveloped baby only able to survive w/ help from others (cooperative breeding)
 - selected for by unpredictability of environment, predators
 - present in other species (Wolves, eagles, meerkats...) → cooperative breeding
 - Hamilton's Rule $rB > c$: helping others' offspring beneficial for survival of genes
- Starlings only cooperative in pairs (unpredictable)
Little Mama lived to 75 yrs old

Obstetric Hypothesis: (disproven) pelvis size is limiting factor for why humans are so altricial

Life History Theory

Why do humans live so long?

- even without medicine, forager societies are very long-lived (excluding infant mortality)
- women live far more than reproductive life, compared to chimpanzees

Expensive Brain Hypothesis

The following changes are required to support a large brain:

- Energy turnover ↑ - cooking, fire
- Locomotion ↓ - bipedalism, running
- Growth ↓ - decreased muscle mass
- Reproduction ↓ - cooperative breeding
 - ↳ reproduction critical for survival: cooperative breeding allows us to reproduce faster, so we don't die first
 - recent development of nuclear family in industrial times is maladaptive

Role of Others in Reproduction

- big variation of role of men in different societies
 - ex. Aka pygmy men highly involved, hold babies 20% of time in camps
- 'Hrdy Hypothesis': alloparents (not direct parents) necessary for raising children
- 'Grandmother Hypothesis': postreproductive females (grandmothers) care for

post-reproductive females (grandmothers) and ...

children, teach skills

- selection for longevity: increased inclusive fitness
- daughters decrease birth intervals → increase individual fitness
- ability for children to have a long childhood - collective supports education
- also present in 4 species of whale: more unpredictable food supply → increased cooperation
 - post-reproductive grandmothers have larger effect
- grandmothers don't reproduce since they don't want to compete w/ daughters

Yanomamo - independent male hunters

Orcas are matrilineal