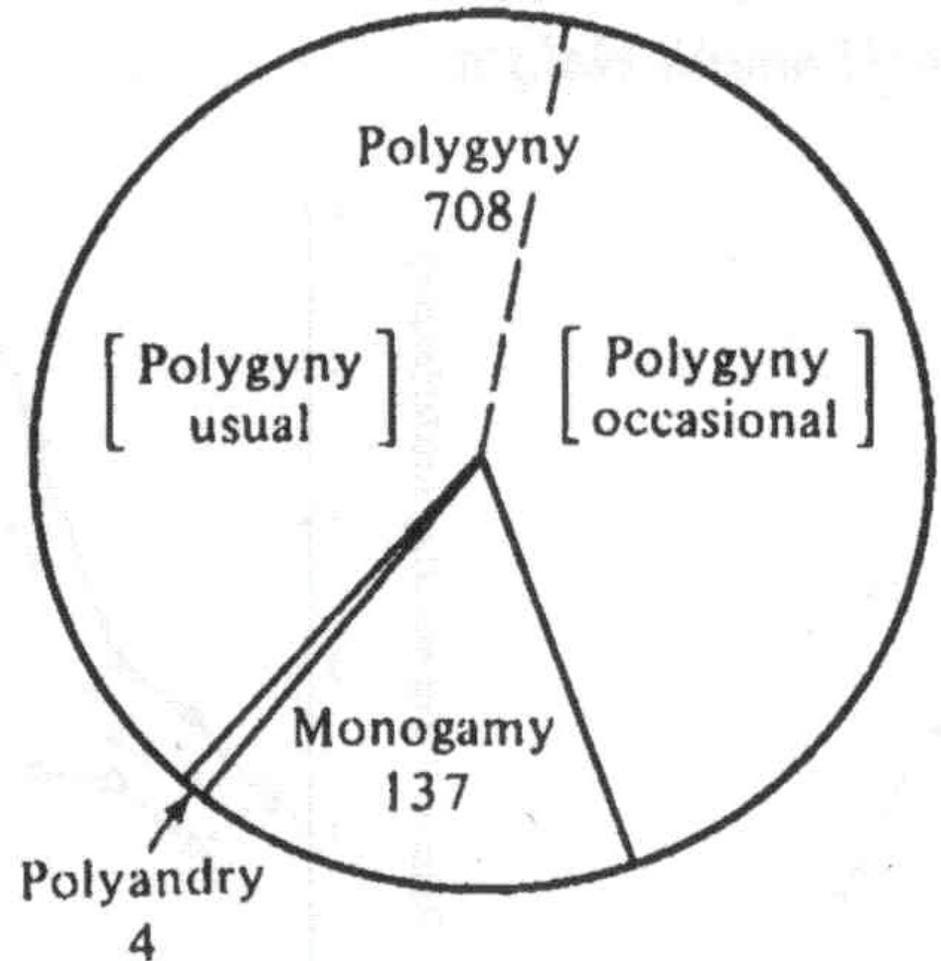


Human Behavior 3

- Natural Selection & Darwin
- The Sociobiology Controversy
- Adaptive Mate Preferences
 - Mate preferences
 - Human mating systems
 - Sexual conflict
- Adaptive Parental Care

Human mating systems

- What is our main mating system?
- Is monogamy the norm for humans?
- Evidence for polygyny or polyandry?
- Polygynous, monogamous, and polyandrous marriage practices in 849 pre-industrial societies



Human polyandry

Tibetans – fraternal polyandry



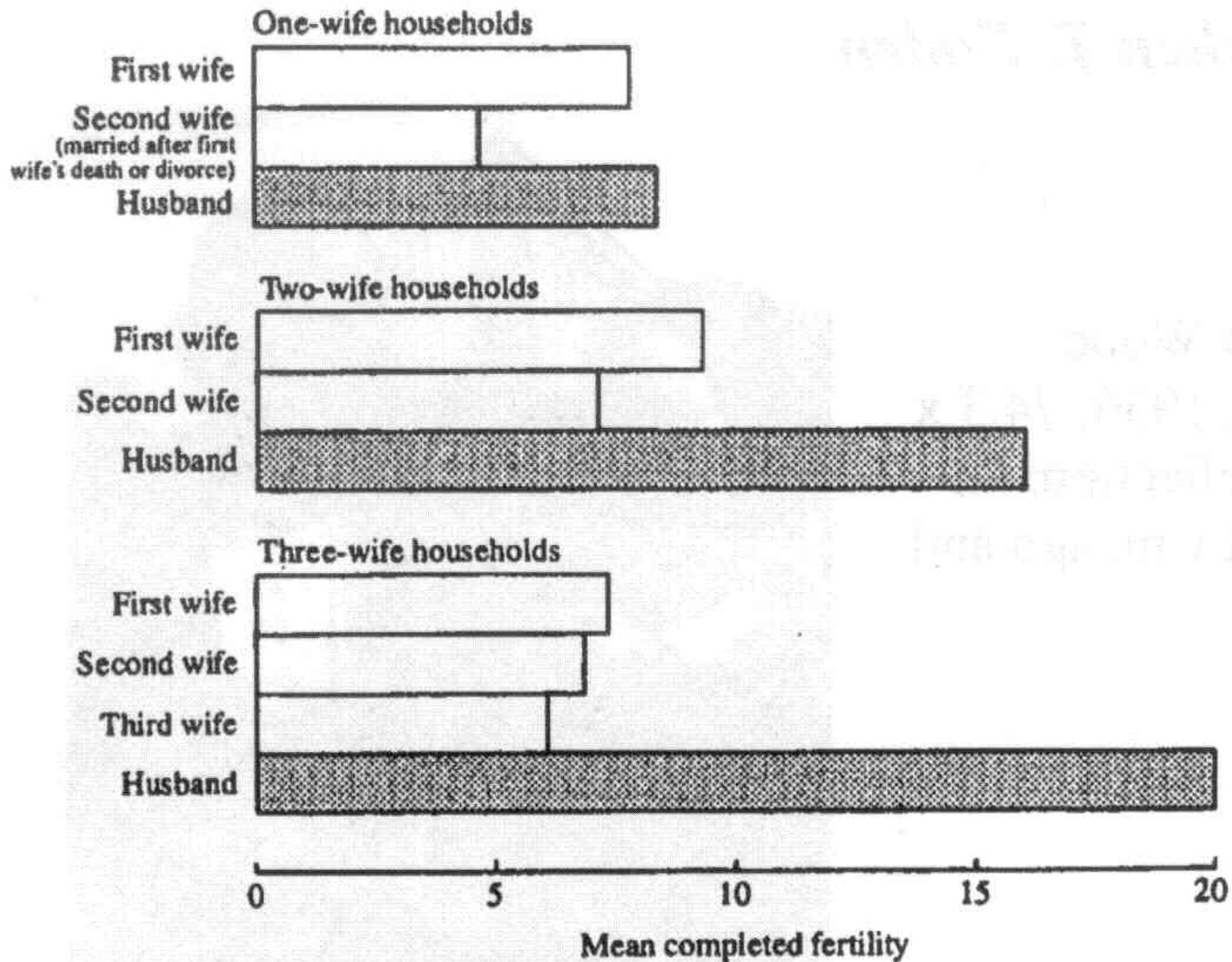
Other examples of polyandrous societies:

the Toda of India

the Sherpa of Nepal

the Marquesans of Polynesia

Shortage of land / labor to make a monogamous household viable might be one of the main reasons for polyandry.



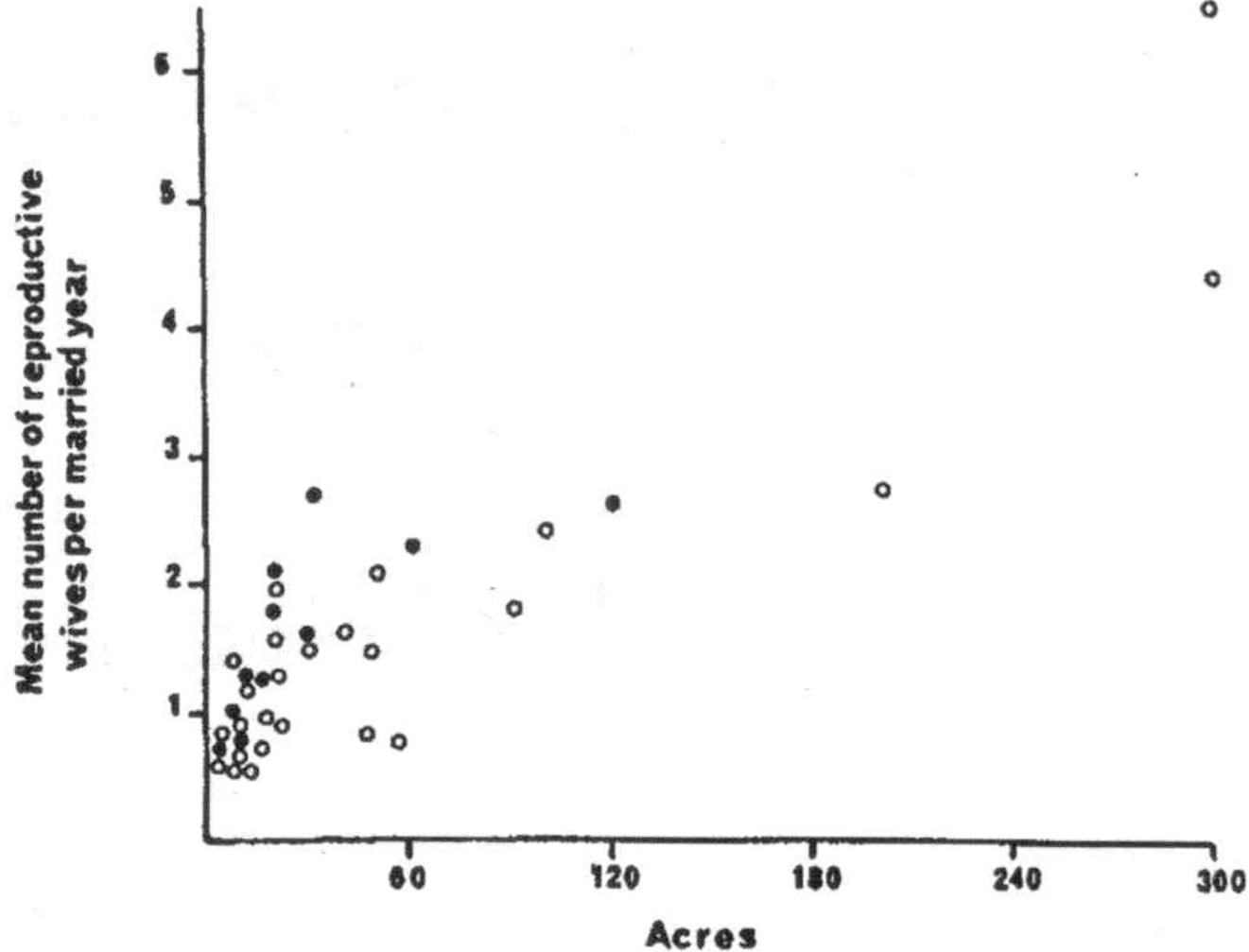
a. Polygyny and fertility among 19th century Utah Mormons

Human polygyny

Types of polygyny: which one applies?

- *Female defense* - males fight with other males to monopolize groups of females
- *Resource defense* - males defend resources that attract females
- *Scramble competition* - males rush to outrace their rivals to mate with receptive females
- *Lek* - males control small display areas to attract females

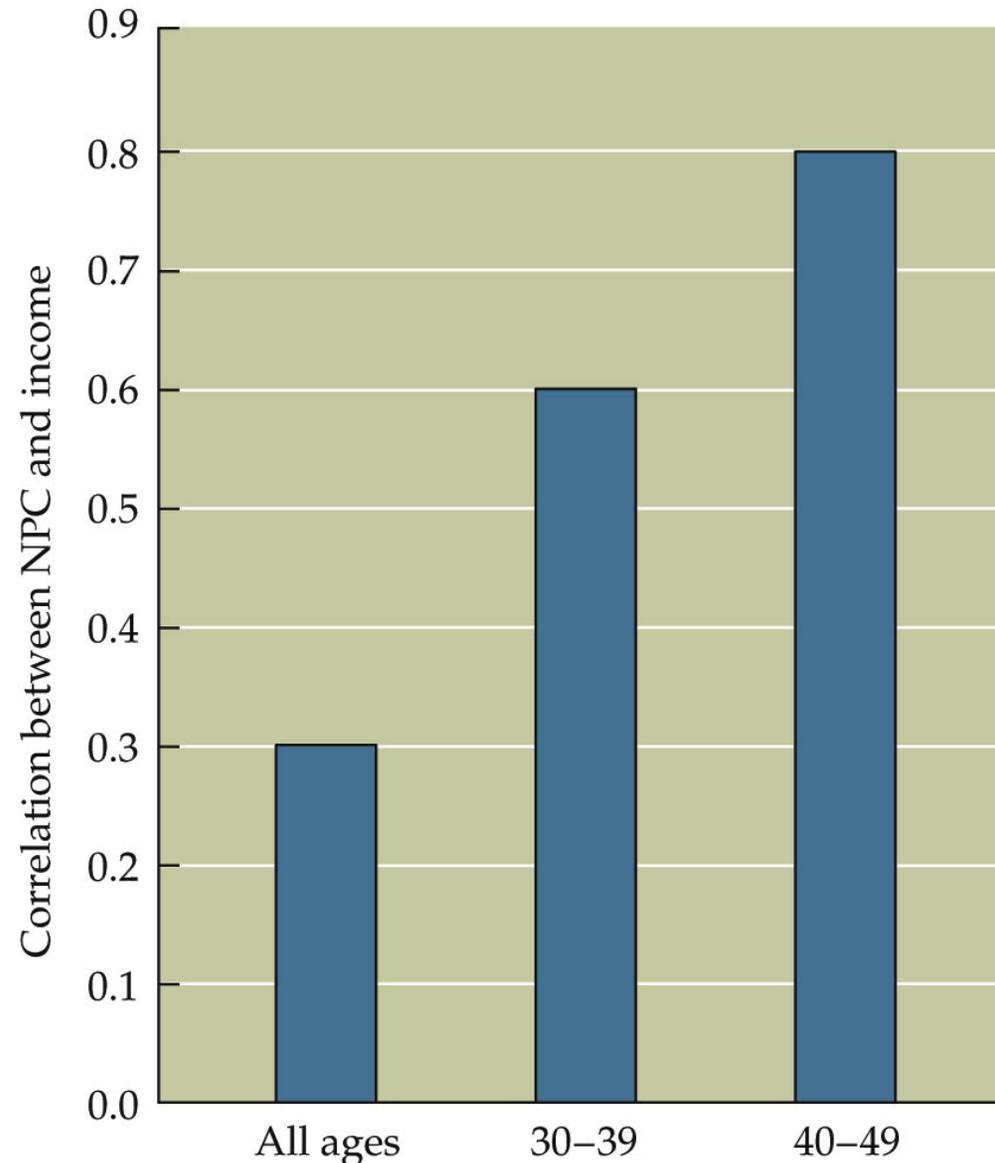
Human polygyny



Men with more land have more wives in the Kipsigis of Kenya

Income & male mating success

- Quebec
- How often people had sex with their sexual partners in the preceding year
- Estimated Number of Potential Conceptions (NPC)
- *If you pretend they did not use birth control*
- Male mating success was correlated with income, especially in older men



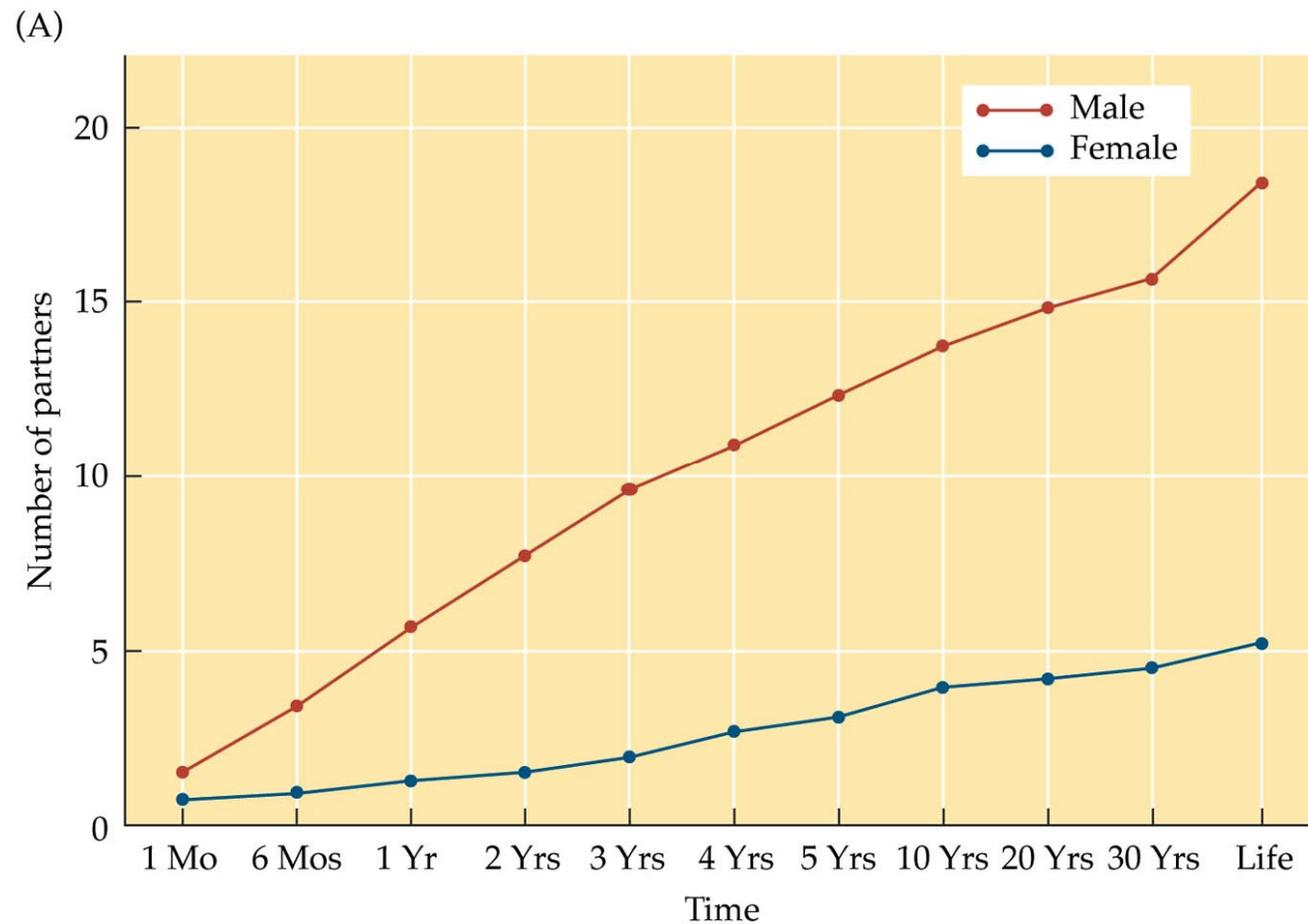
Outline

- Natural Selection & Darwin
- The Sociobiology Controversy
- **Adaptive Mate Preferences**
 - Mate preferences
 - Human mating systems
 - **Sexual conflict**
- Adaptive Parental Care

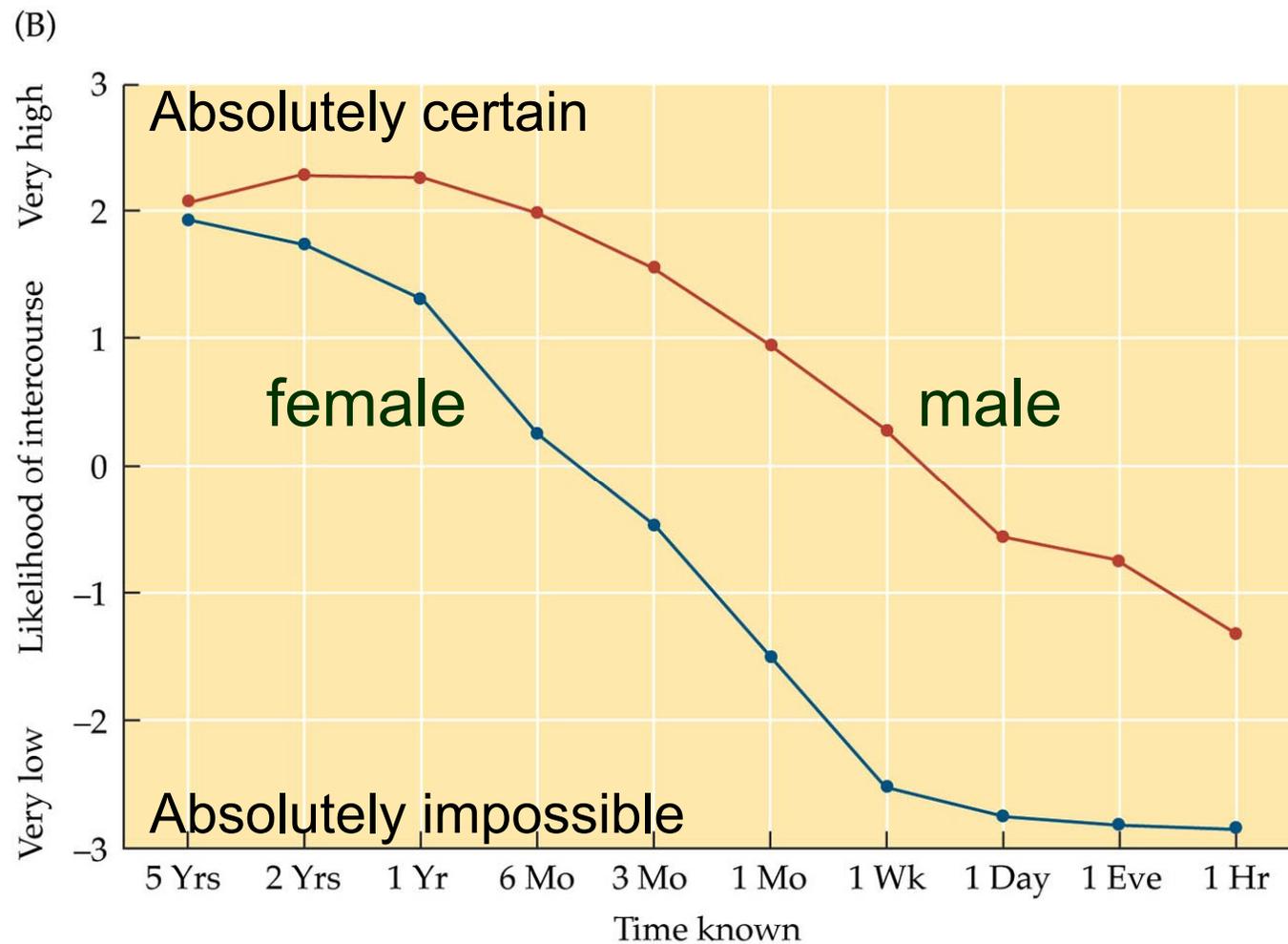


Sex differences in the desire for sexual variety

- College students
- “How many sexual partners would you like to have over XXX amount of time?”
- Limitations?



- College students
- “How likely is it that you would have sex with an attractive member of the opposite sex after XXX amount of time?”



Outline

- Natural Selection & Darwin
- The Sociobiology Controversy
- Adaptive Mate Preferences
 - Sexual selection & mate preferences
 - Human mating systems
 - Sexual conflict
- **Adaptive Parental Care**



Parental favoritism in humans

- E.g., step-parents and step-children
- Do biological children of human males receive more male parental care than step-children?
- Researchers tested this by looking at the Hadza in Tanzania (<1000; last full-time hunter gatherers in Africa).
- Polygynous marriages are rare but divorce is common, resulting in a high degree of serial monogamy.
- One-third of men with children at home have young stepchildren.

Parental favoritism in Hadza

- Sampled 32 men with 53 children by performing instantaneous scan observations, and also 30-min focal individual follow observations. To assay how much time men were spending near, playing with, communicating with, or nurturing their biological children and stepchildren.
- Instantaneous scan observations were made hourly from sunrise to sunset and used to measure the percentage of time (scans) men were near (within 3 m) of their children. 30-min focal follow observation periods consisted of 30 consecutive one minute periods where within each minute an act was scored as having occurred or not (maximum score of 30 per 30-min follow for each act).
- Each man received four 30-min focal follow observation periods each day. This type of observation was used to score the percentage of time men played with, communicated with or nurtured their biological children and stepchildren.
- They then compared the percentage of observed time men spent performing each of the acts with their biological children or their stepchildren.

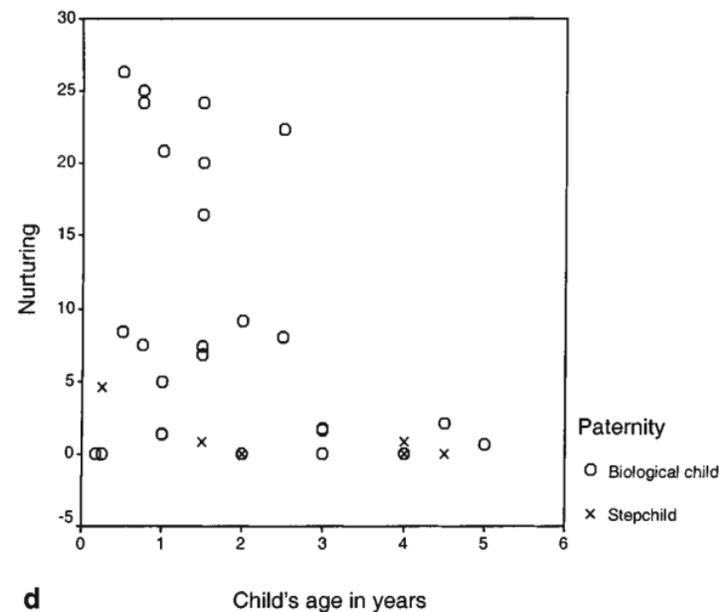
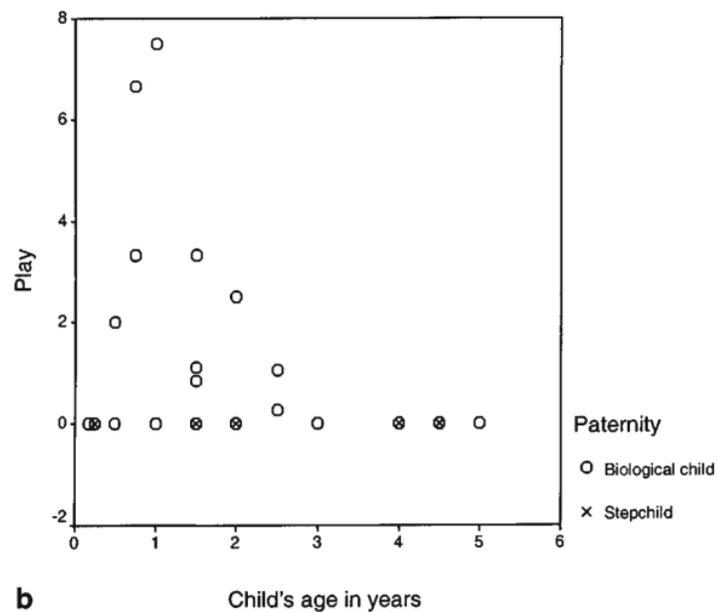
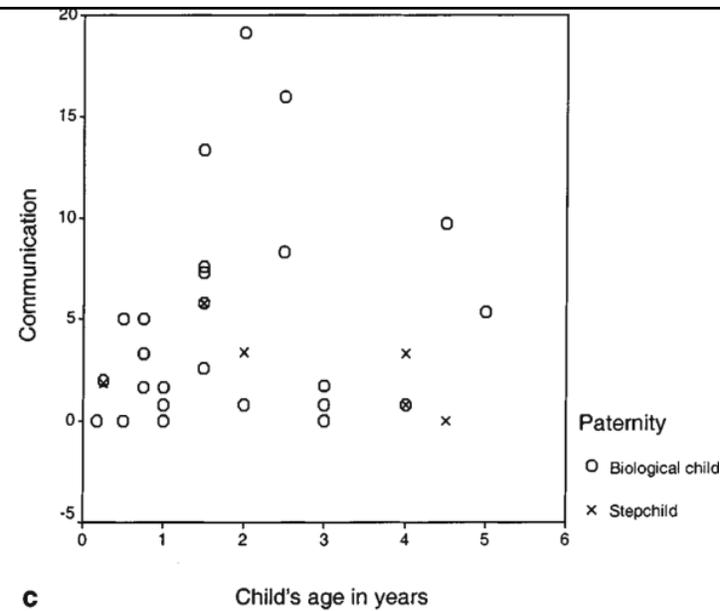
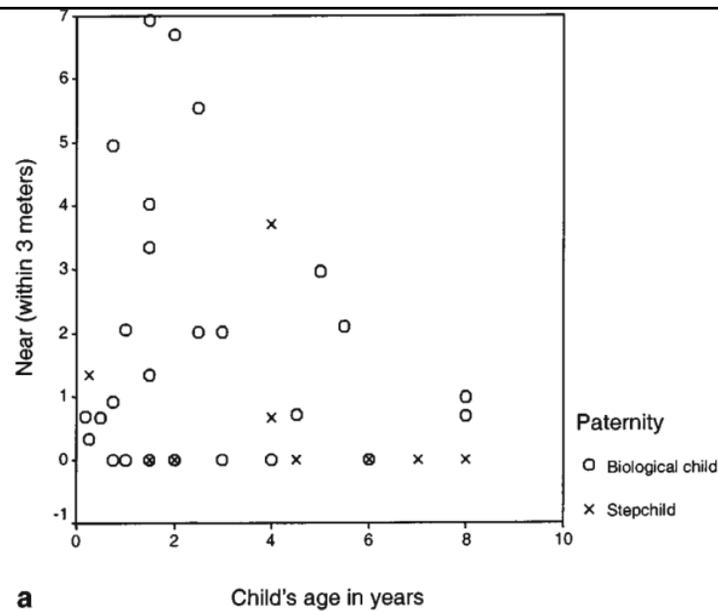
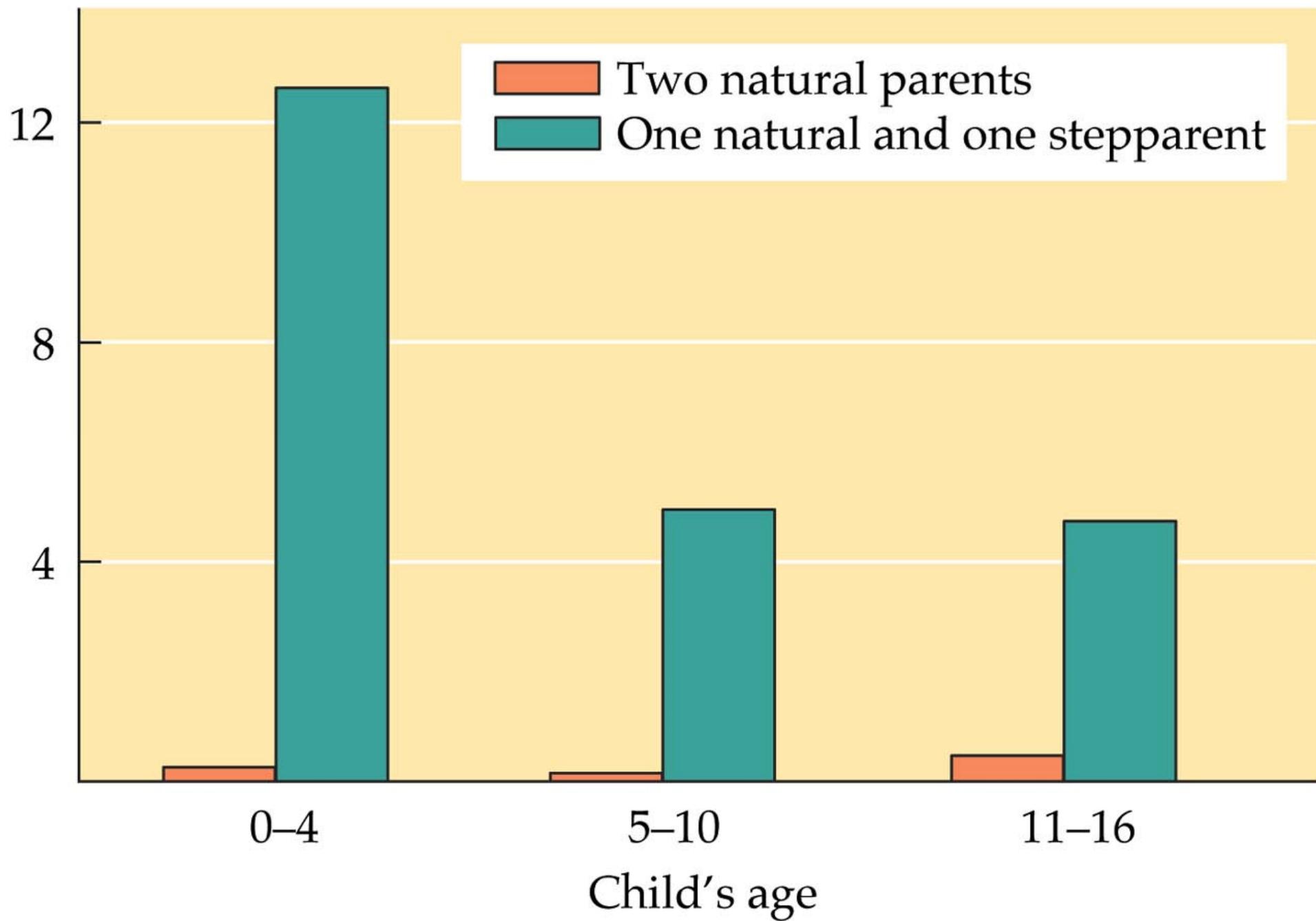


Fig. 1 **a** Percentage of time (daylight hours) men spent near (father and child within 3 m of each other) their biological children and stepchildren of different ages. Data taken from daily scans. **b** Percentage of time (in focal follows) men spent playing (e.g., bouncing, chasing, and wrestling) with their biological children and stepchildren of different ages. **c** Percentage of time (in focal follows) men spent communicating (talking, listening, or exchanging non-food items) with their biological children and stepchildren of different ages. **d** Percentage of time (in focal follows) men spent nurturing (carrying, holding, cleaning, feeding, or pacifying) their biological children and stepchildren of different ages.

Child abuse

- Are stepchildren at greater risk of being physically assaulted?
- Martin Daly and Margo Wilson
- Hamilton, Ontario
- Children: 0-4 years, 5-10 years, 11-16 years
- Overall, rates of child abuse (homicide) were very low
- But, children were more likely to be killed in families with a stepparent than in families with both genetic parents present

Victims per 1000 children



Final exam

- Apr 28
- 8:30 to 11:00 am
- ESB 1013

- Same format as midterm
- 50% of your course grade

- Cumulative, but very strong emphasis on second half of course

Final exam

- Short answer
 - 2 of 3 questions, 25 pts each (50 points total)
 - Each question has 5 parts, same as midterm
 - Be concise and thorough in your answers. No “filler” !
 - Slightly more room to write → more thorough answers than midterm
 - Write clearly, please!
- Multiple choice
 - About 50 questions, 2 pts each (about 100 pts total)
 - Use the right side of the Scantron form !

Final exam

- Use a pencil for multiple choice questions
- Use a pen or pencil for short answer (pencil is easier)
- Spread out. Do not sit next to each other.
- Put away everything except a pencil and a pen.
- No papers, no pencil cases, etc.
- In fairness to other students, please stop writing when the time is done.
- Much less time pressure than midterm

Final exam

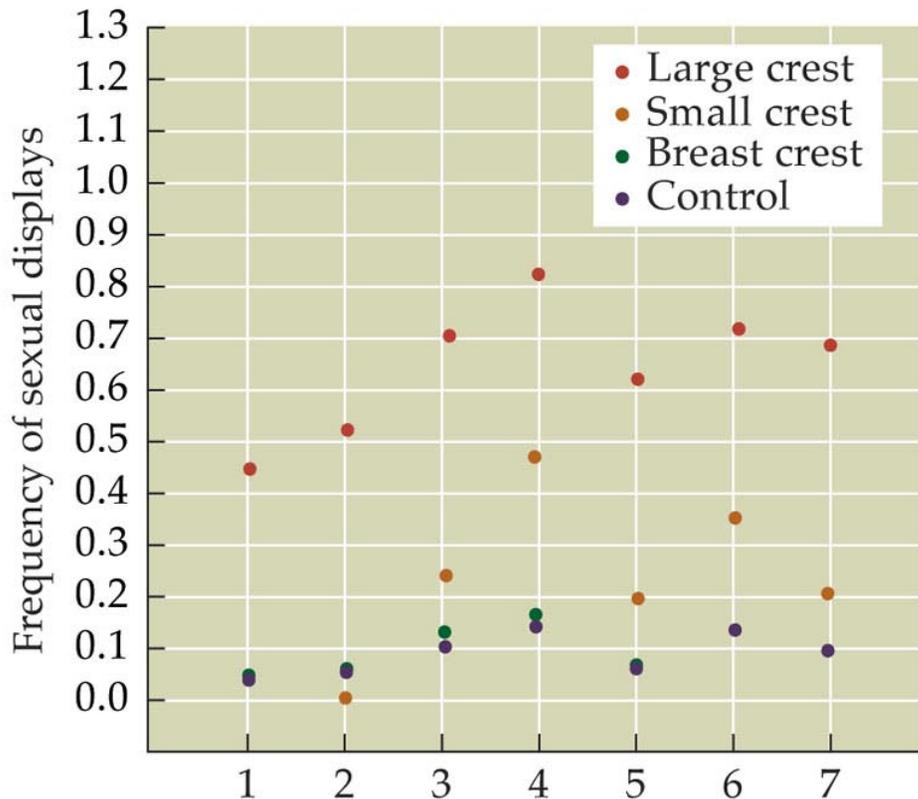
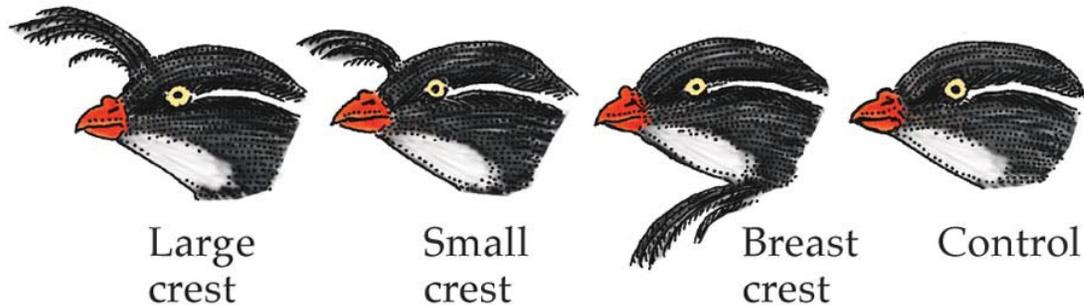
- For written answers, think before you write. Make sure you understand the question before you start writing.
- Short answers should be concise yet complete. Use only the space provided.
- Write legibly; not too small or too big or too sloppy.
- Academic misconduct will be treated very seriously.

Short answer questions

I'll state a hypothesis, describe a study to test the hypothesis, and give the results of that study.

- 1) What are the main conclusions from this experiment, in relation to the hypothesis? Explain. (4 pts)
- 2) What is one strength of the experimental design? Explain. (5 pts)
- 3) What is one weakness/limitation of the experimental design? Explain. (5 pts)
- 4) Describe one other study that has tested this hypothesis in the same/different species. Are the results of the two studies consistent? Explain. (5 pts)
- 5) Propose one follow up study to further test the same hypothesis in the same/different species (a study not described in lecture or textbook). (6 pts)
 - Include control groups and predictions.
 - Use your creativity.

Crested auklets have crests, but closely related least auklets do not have crests. Researchers tested the hypothesis that female least auklets have a pre-existing bias for male crests. Researchers added crests to male least auklets (using stuffed models, 1 to 7) and observed female responses. The results are shown in the graph below. The numbers along the X-axis refer to model number.

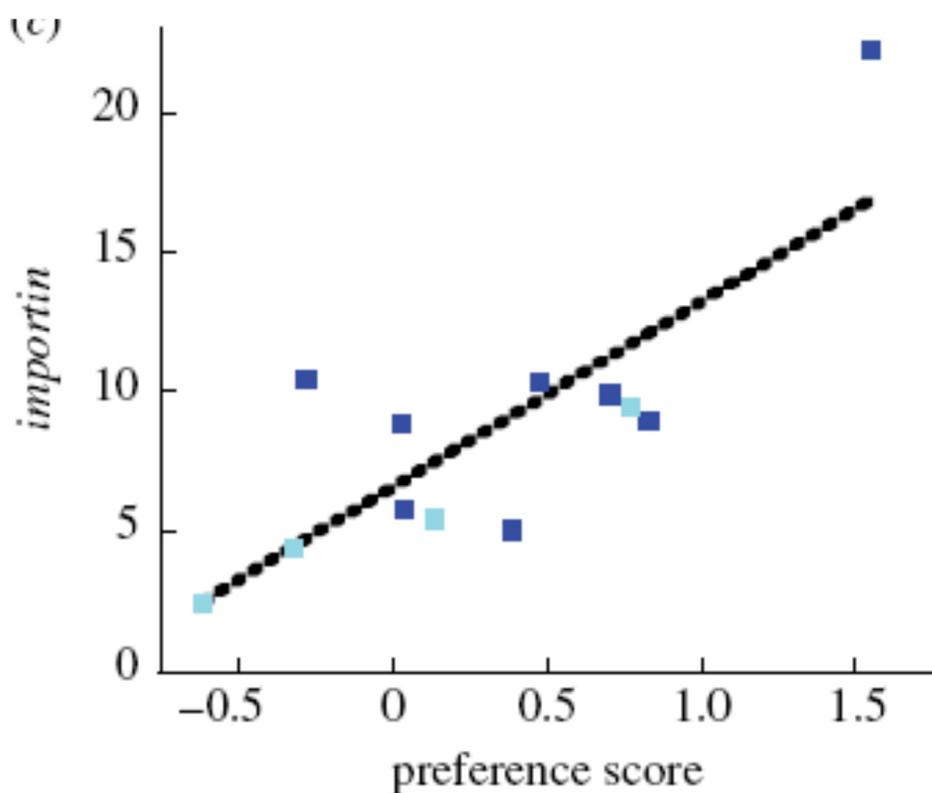


- 1) Main conclusions, in relation to the hypothesis? Explain.
- 2) One strength of expt'l design? Explain.
- 3) One weakness of expt'l design? Explain.
- 4) Describe one other study that has tested a similar hypothesis - in a different species.
- 5) Describe one follow up study to further test this hypothesis in the same species (a study not described in lecture or textbook).
 - Include control groups and predictions.

Researchers tested the hypothesis that female swordtails (*Xiphorus nigrensis*, a species of fish) show a preference for males with longer tail ornaments (“swords”).

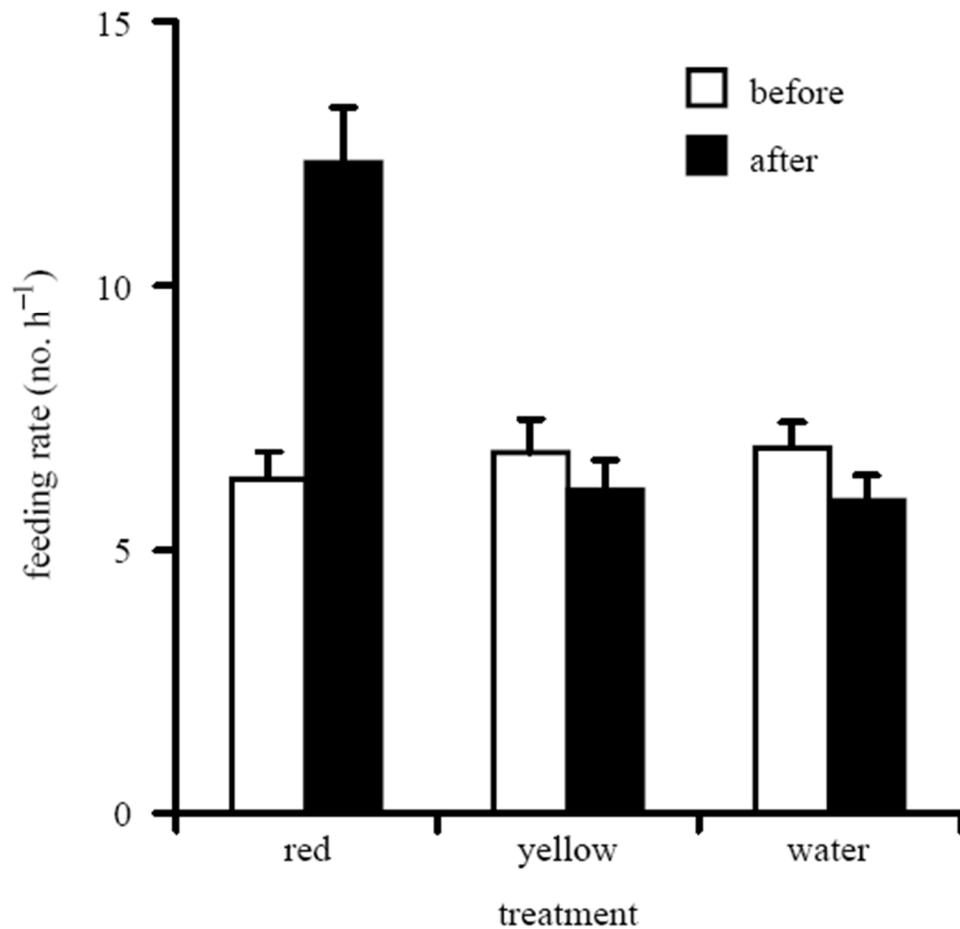
The researchers exposed female subjects (n=12 females) to males with naturally varying sword lengths (n=12 males). Each female subject was exposed to one male. The researchers measured 1) the mate preference of females and 2) thousands of different mRNA's in the whole brain of females using a microarray.

Females showed a greater mate preference for males with naturally long swords. In addition, the levels of some mRNA's in the female brain were correlated with preference scores. For example, importin mRNA level in the female brain was positively correlated with female preference score (see below; ignore the two different colors). The importin protein is involved in transporting molecules in and out of the nucleus of neurons.



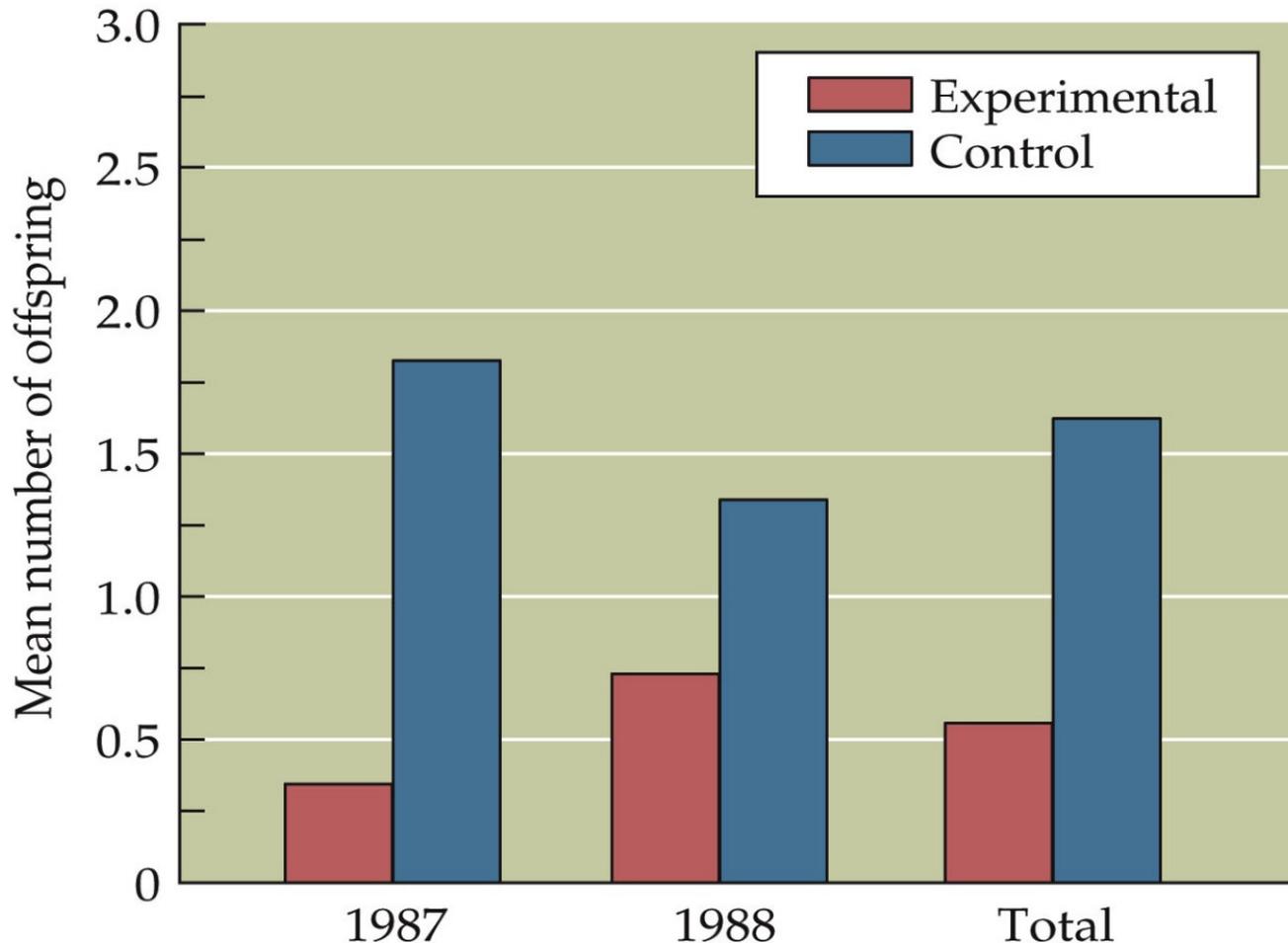
- 1) Main conclusions, in relation to the hypothesis? Explain.
- 2) One strength of expt'l design? Explain.
- 3) One weakness of expt'l design? Explain.
- 4) Describe one other study that has tested this hypothesis in swordtails or a similar hypothesis in a different species.
- 5) Describe one follow up study to further test this hypothesis in the same species (a study not described in lecture or textbook).
 - Include control groups and predictions.
 - Use your creativity.

Researchers tested the hypothesis that nestling gape color is an honest signal of health that is used by barn swallow parents in determining which nestlings to feed. The researchers placed two drops of red food coloring, yellow food coloring, or water on the gapes of nestlings. The researchers measured parental feeding rate of the nestlings before and again 15 min after treatment. The graph shows the results of the study.

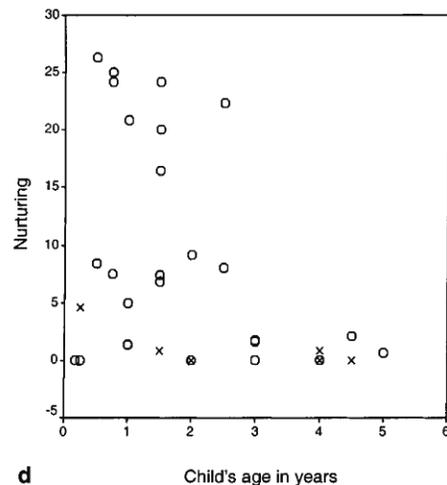
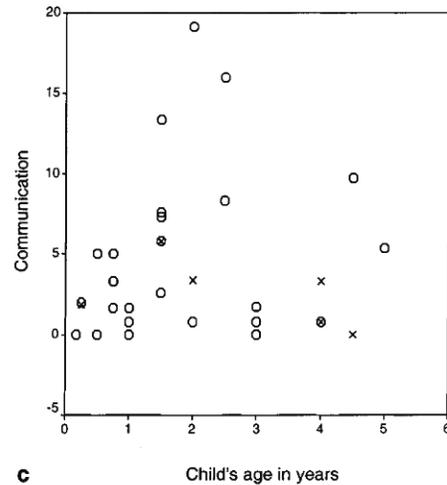
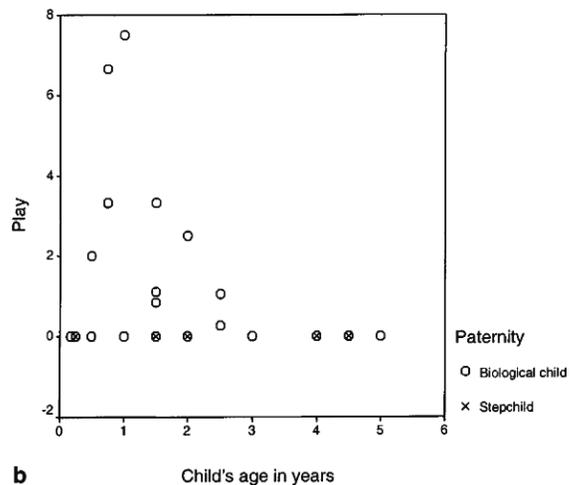
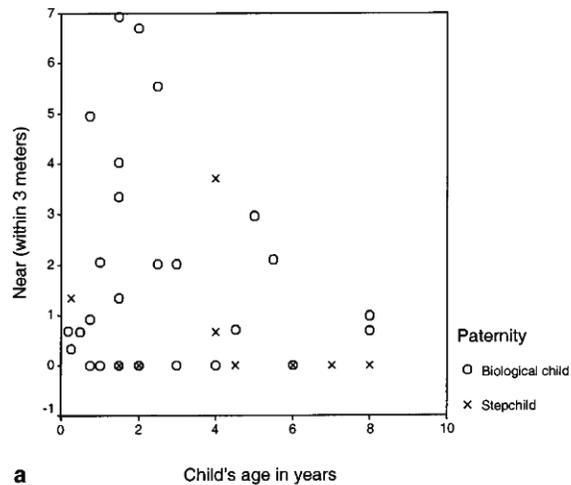


- 1) Main conclusions, in relation to the hypothesis? Explain.
- 2) One strength of expt'l design? Explain.
- 3) One weakness of expt'l design? Explain.
- 4) Describe one other study that has tested this hypothesis in barn swallows.
- 5) Describe one follow up study to further test this hypothesis in the same species (a study not described in lecture or textbook).
 - Include control groups and predictions.
 - Use your creativity.

Researchers hypothesized that Florida scrub jays increase their inclusive fitness by helping raise their siblings. They tested this hypothesis by capturing and removing the non-breeding helpers from randomly selected breeding pairs, while leaving other helpers untouched. They then measured the number of offspring alive at 60 days. They did this experiment over a 2 year period.



Describe the main conclusions in relation to the hypothesis. Explain. Etc.



The Hadza are hunter-gatherers in Tanzania. About one-third of men with children at home have young stepchildren. Researchers tested the hypothesis that the biological children of males will receive more male parental care than stepchildren. Over one year, researchers collected data while living in six Hadza camps ranging in size from 12 to 108 individuals. Researchers measured how much time men were spending near, playing with, communicating with, or nurturing their biological children and stepchildren. They studied a total of 32 men with a total of 53 children (36 biological children and 17 stepchildren) by performing “instantaneous scan” observations and also “30-min focal follow” observations. Instantaneous scan observations were made hourly from sunrise to sunset and were used to measure the percentage of time men were near (within 3 m of) their children. For 30-min focal follow observations, one subject was followed, and for each minute, an act was simply scored as having occurred or not (maximum score of 30 per focal follow for each act). Each man received a total of 4 focal follows. Focal follows were used to measure the percentage of time men played with, communicated with, or nurtured their biological children and stepchildren. Paternity was determined using several sources of information: by directly asking the children (if they were old enough to answer), indirectly questioning the parents, and asking the camp’s “records keeper” who recorded births. All these sources agreed with each other. The graphs below show the results of this study.

a. Percentage of time (daylight hours) men spent near (within 3 m of) their biological children and stepchildren of different ages. Data taken from instantaneous scans. **b.** Percentage of time (in focal follows) men spent playing (e.g., bouncing, chasing, and wrestling) with their biological children and stepchildren of different ages. **c.** Percentage of time (in focal follows) men spent communicating (talking, listening, or exchanging non-food items) with their biological children and stepchildren of different ages. **d.** Percentage of time (in focal follows) men spent nurturing (carrying, holding, cleaning, feeding, or pacifying) their biological children and stepchildren of different ages.

Which of the following explanations of birdsong is a *functional* explanation?

- a. The bird sings to communicate with his neighbor, for example, to define the territory boundaries and avoid unnecessary physical fighting.
- b. Western marsh wrens have larger song repertoires than eastern marsh wrens because of genetic differences between them.
- c. Song learning evolved early in the passerine bird lineage.
- d. In his first year, the young bird learns the songs of the older birds that he encounters in his neighborhood.
- e. Birdsong is produced by a hormone-sensitive neural circuit.

Which is the least likely explanation for why a female bird in a socially monogamous species with biparental care might seek out extra-pair copulations?

- a. she wants to increase her clutch size
- b. she wants more genetic diversity in her offspring
- c. she wants genes from a male that is more genetically different from her than her social mate
- d. she wants to hedge her bets, in case her social mate is infertile
- e. she wants to mate with a male with good genes