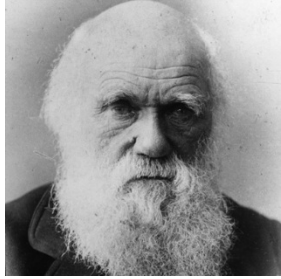
HEB 1330: Primate Social Behavior

September 24th 2020
Intersexual selection

Darwin's Theory of Sexual Selection



Variation in reproductive success due to access to other sex

Intrasexual selection

competition of individuals within a sex for access to the other sex

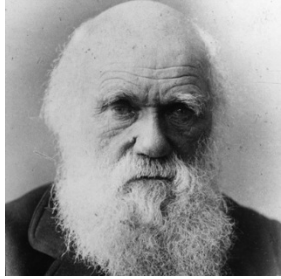
eg. male-male competition

Intersexual selection

differential preferences that one sex has of members of the other sex

eg. female choice…sexual coercion

Darwin's Theory of Sexual Selection



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Intrasexual selection

competition of individuals within a sex for access to the other sex

eg. male-male competition

Intersexual selection

differential access due to behavior against other sex

eg. female choice…sexual coercion

Overview

1)Male aggression against females
2)Infanticide
3)Female counterstrategies to infanticide

Reading: Roberts et al. 2012

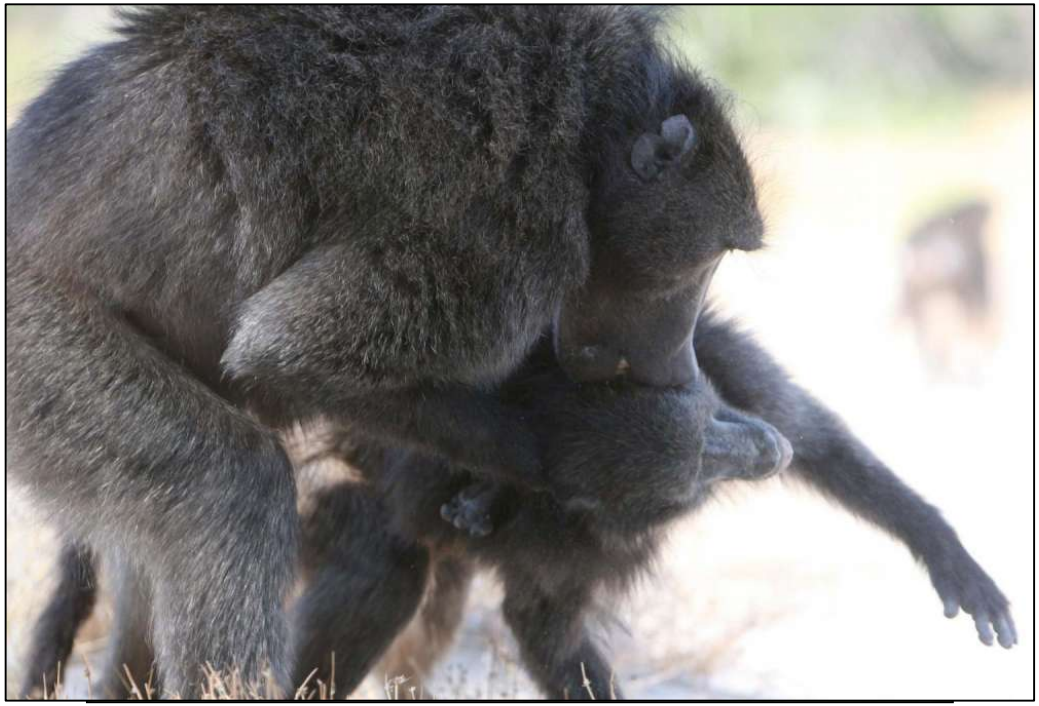
Word about content

Naturalistic Fallacy

Based on the unwarranted assumption that what is natural is good or morally acceptable.

Sexual coercion

"Aggression directed at a female that makes her more likely to mate with the aggressor or less likely to mate with other males at a cost to the female".



Smuts & Smuts 1993

Forms of Sexual coercion

"Aggression directed at a female that makes her more likely to mate with the aggressor or less likely to mate with other males at a cost to the female".

Direct coercion
(overcome female resistance)

- Forced copulations
- Harassment
- Intimidation

Indirect coercion
(restrict her mating with other males)

- Herding
- Punishment
- Sequestration

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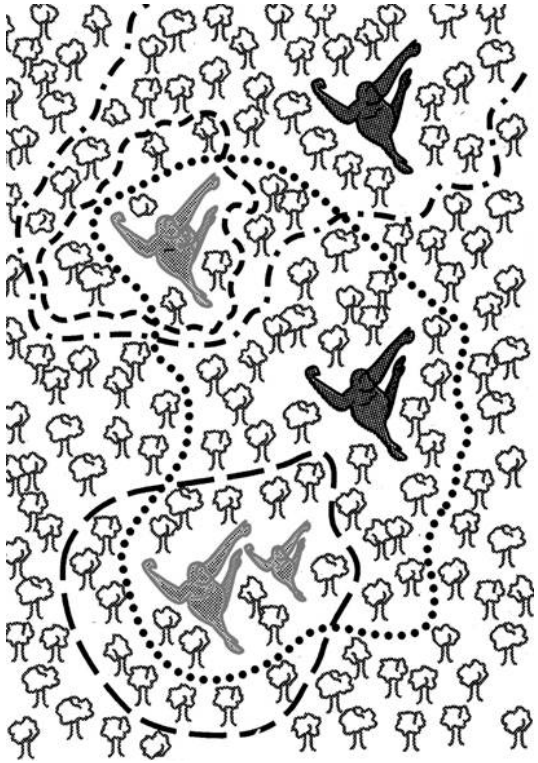
Forced copulations

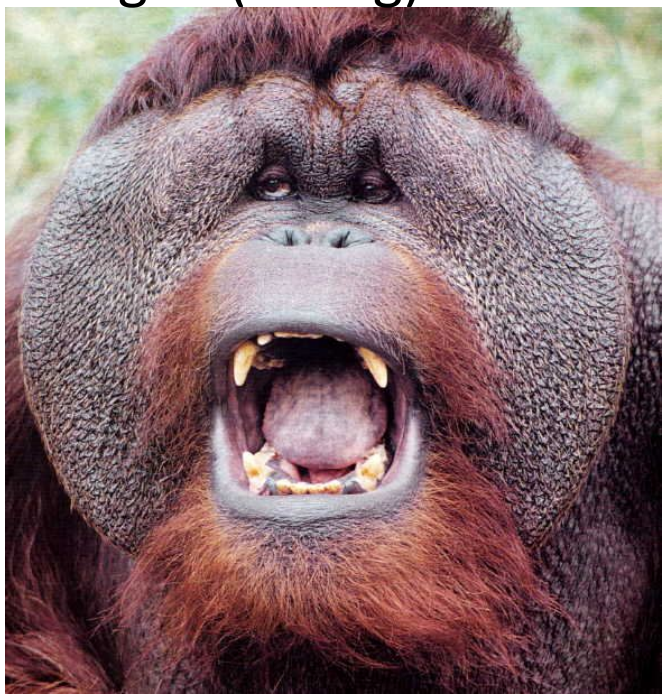
Orangutan

- High sexual dimorphism:
  - F~ 40 kg
  - M~100 kg
- Asian tropical forests



Different male ‘strategies’

Flanged (100kg)



Territorial no overlap with other flanged males' territory

Slow cannot chase females

”**Call-and-wait**"

Different male ‘strategies’

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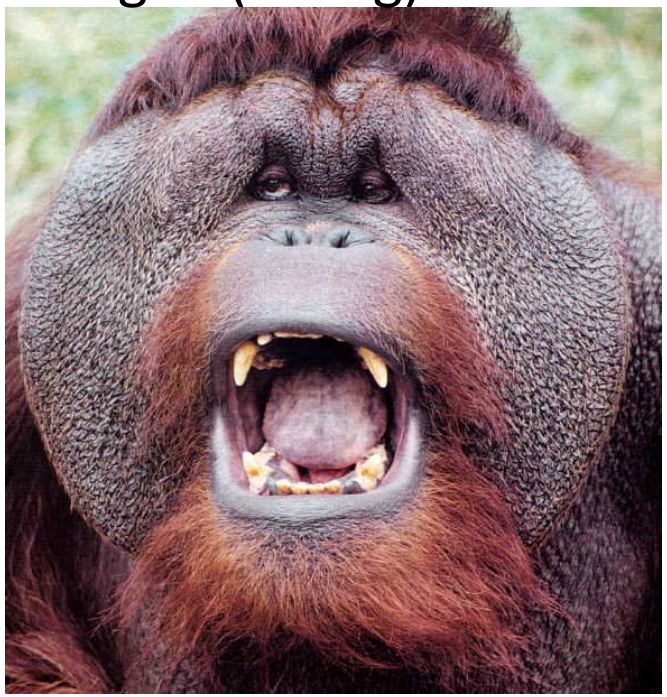
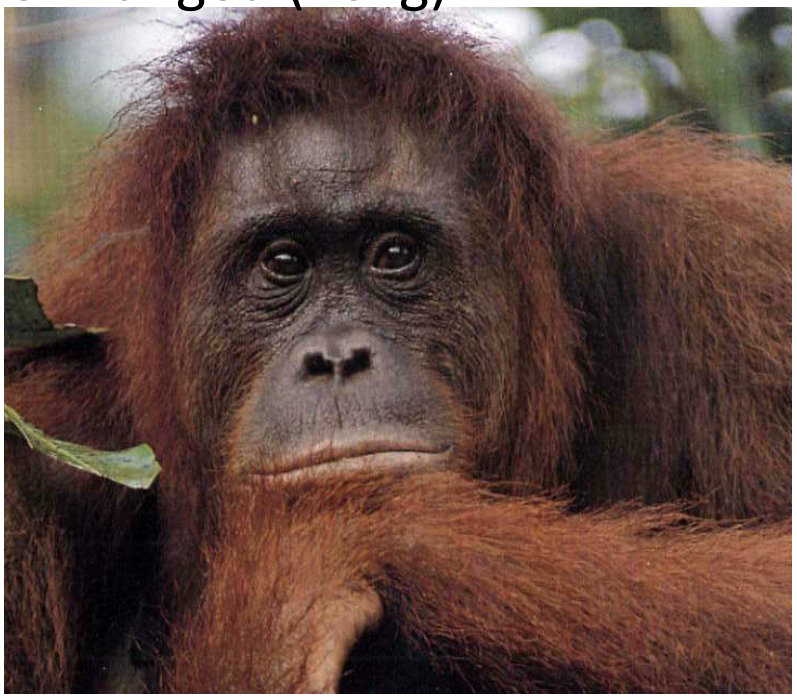


Unflanged (40kg)



Territorial no overlap with other flanged males territory

Slow cannot chase females

”**Call-and-wait**"

Not territorial

1) Males with arrested development

2) defeated flanged males

“**Sneak-and-force copulate**”

Orangutan Mating System

- No signals of estrus
- Low rate of copulation

Female preference

- Playbacks show that females orient or move towards the calls of flanged males
- Consortships up to several weeks - female could easily escape

Sexual coercion

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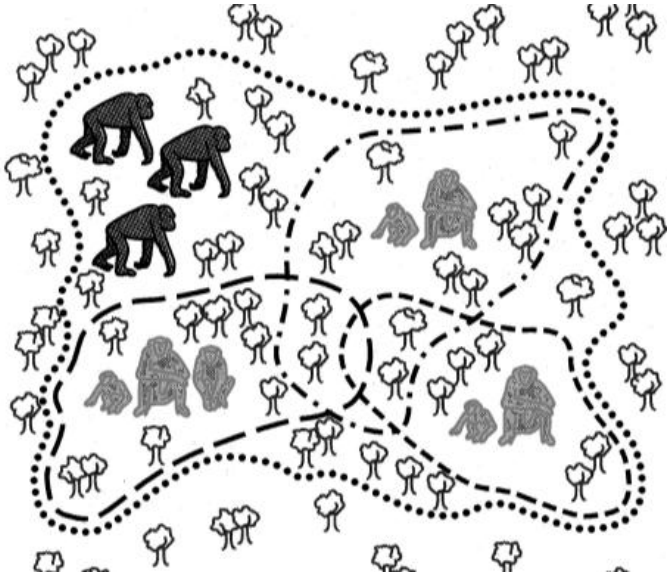
Smuts & Smuts 1993

Harassment and intimidation

Chimpanzees

- multi-male multi-female
- Female sexual swelling indicating the likelihood of ovulation



Male aggression to females is as frequent as it is to males - and just as violent

Sexual coercion

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Smuts & Smuts 1993

Consortship

Worksheet

In your workgroup (break-out-rooms) you will watch 3 videos showing male behavior directed at females and discuss the graphical outcomes of studies that have been conducted to look for evidence of different aspects of sexual coercion. You have approx. 10-15 minutes and we will check in to see how you are doing (if you have questions feel free to come back into the main room)

Orangutan Mating System

Reproductively relevant time

Reproductively un-relevant time

Percentage of Matings

100
90
80
70
60
50
40
30
20
10
0

Cooperative

50% Forced

Forced

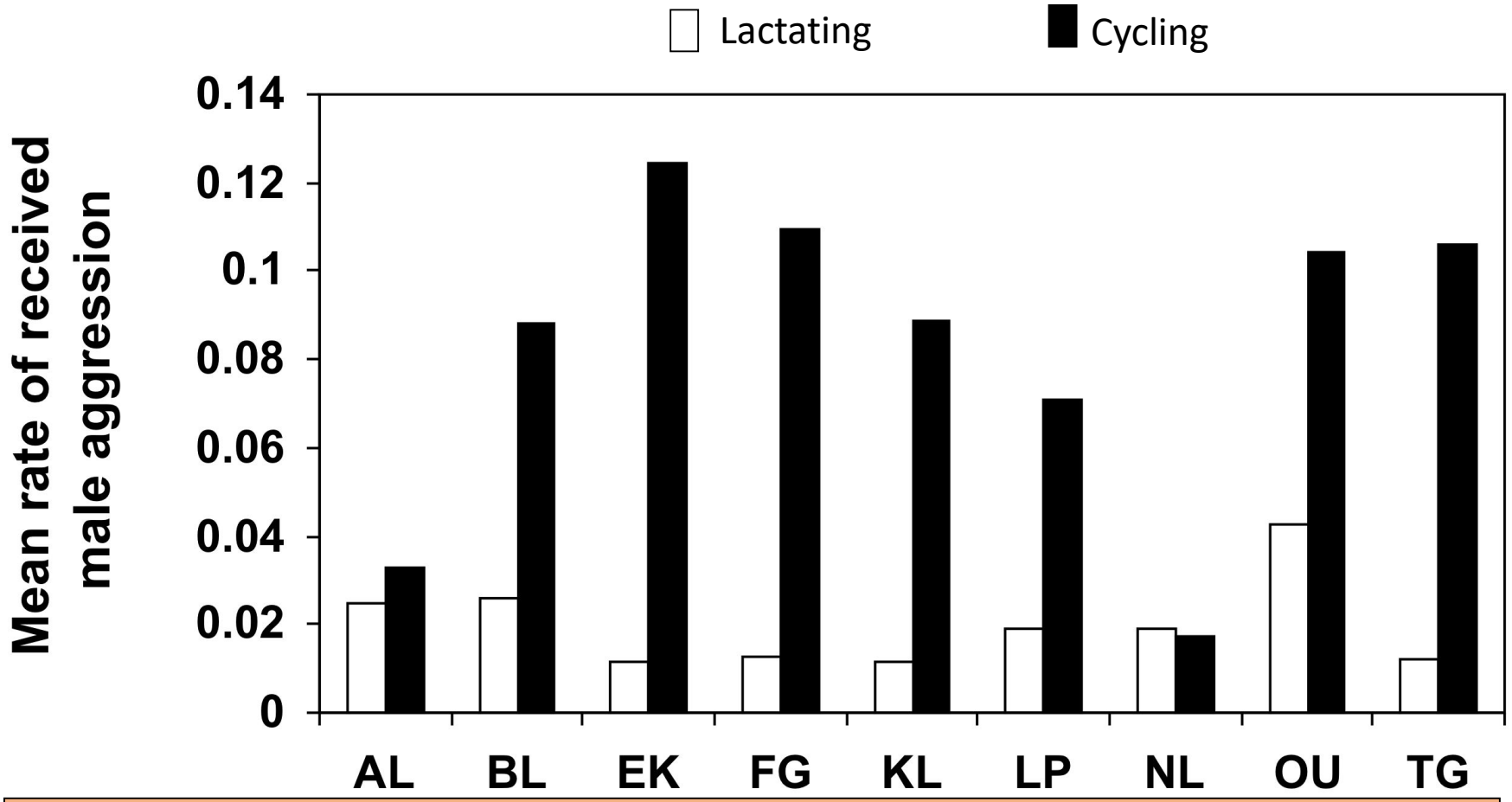
Ovulatory status determines which males mate

Unflanged

Prime Flanged

Past Prime Unflanged

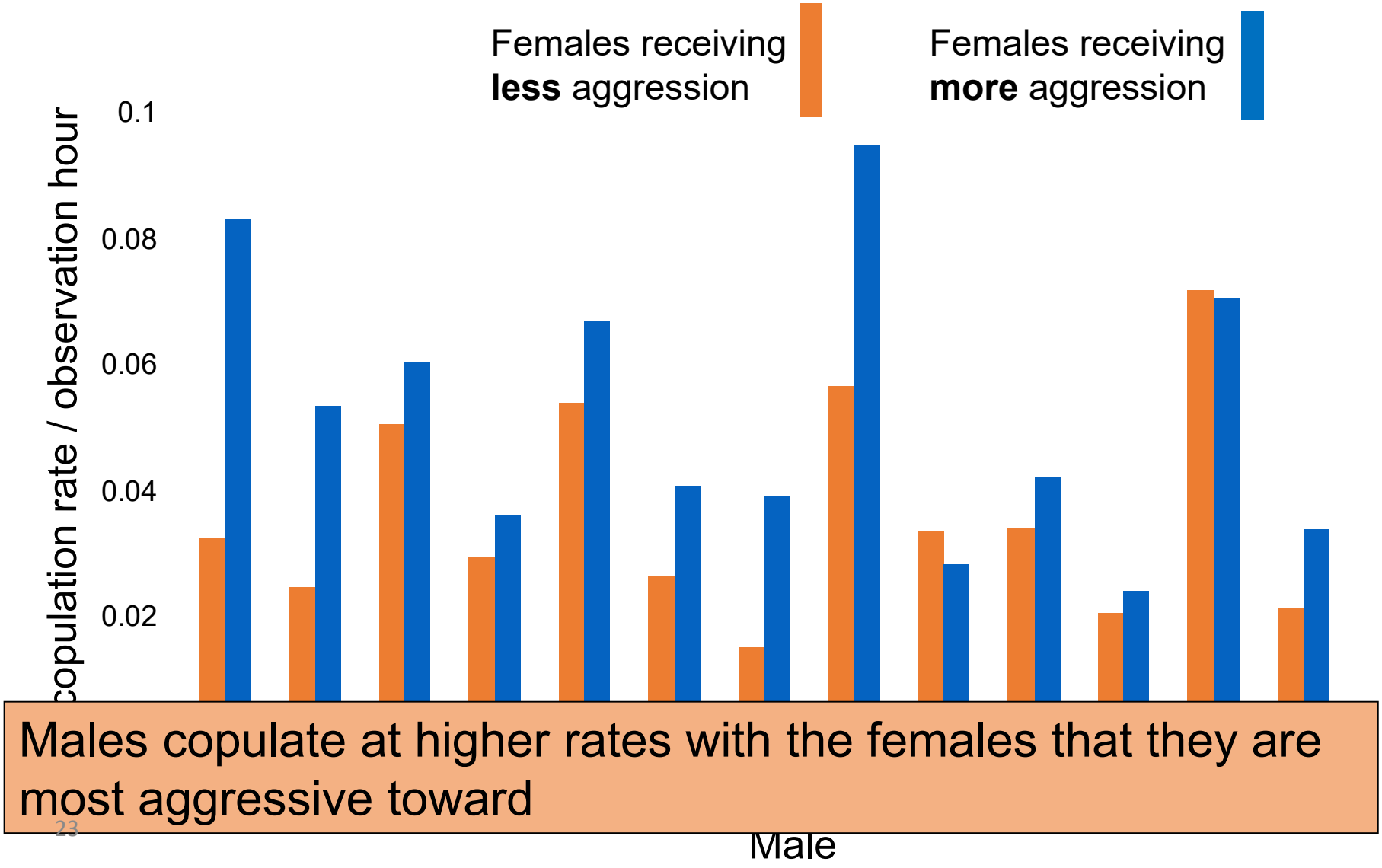
Sexual Coercion in Chimpanzees



Kanyawara chimpanzees:
Females receive more male aggression when cycling

Muller et al (2007) *PRoySocB*

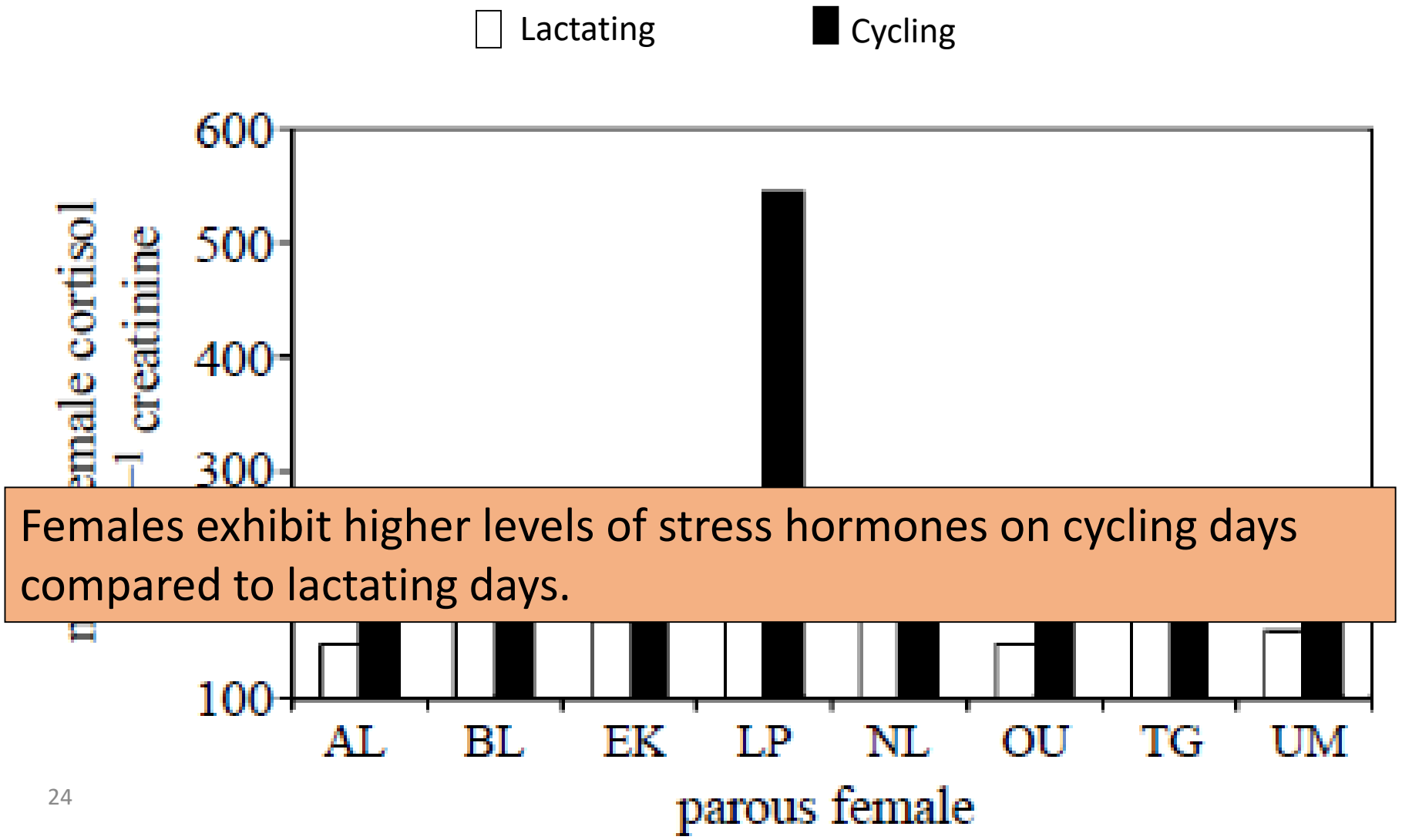
Sexual Coercion in Chimpanzees



Males copulate at higher rates with the females that they are most aggressive toward

Muller et al (2007)

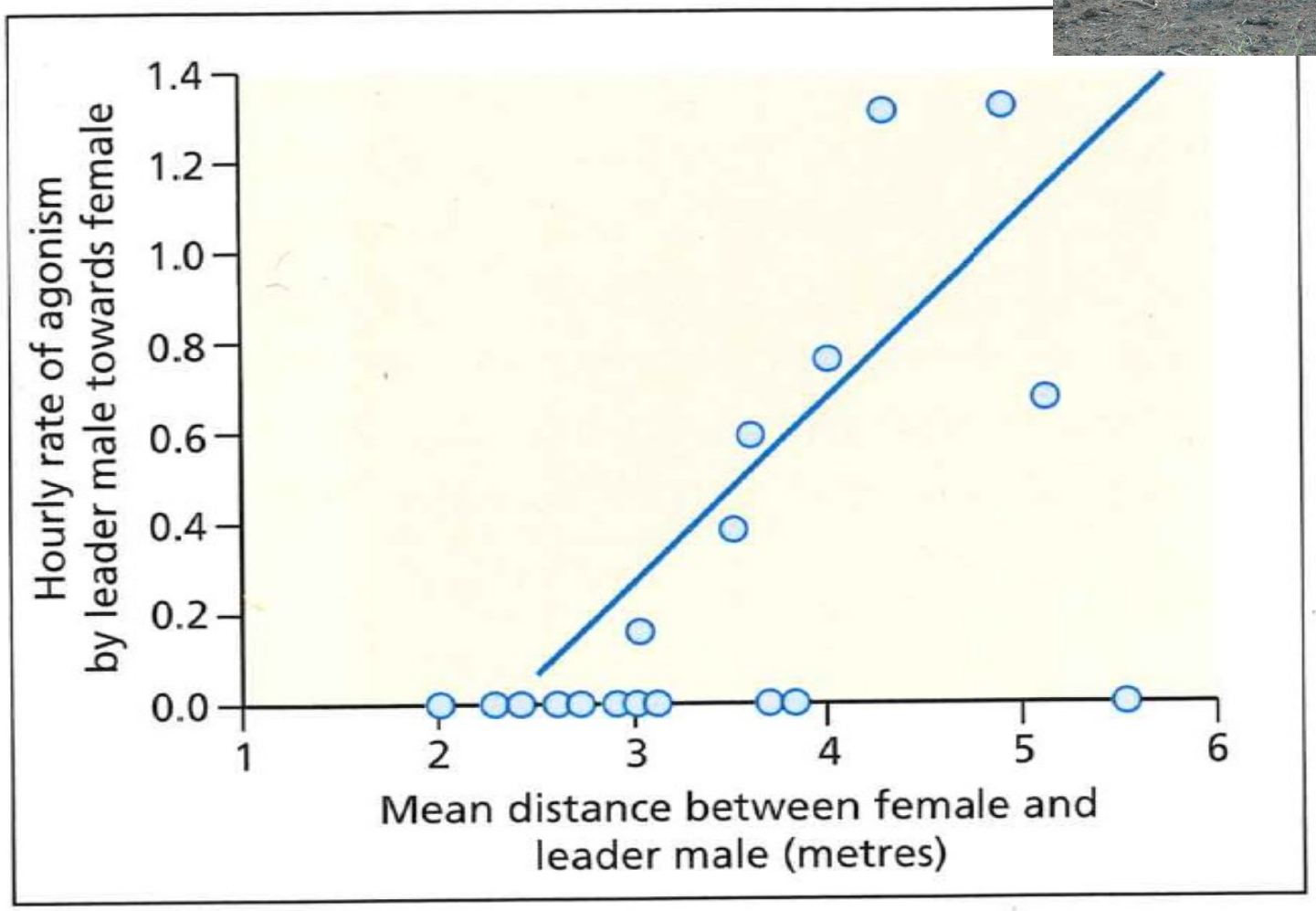
Sexual Coercion in Chimpanzees



Females exhibit higher levels of stress hormones on cycling days compared to lactating days.

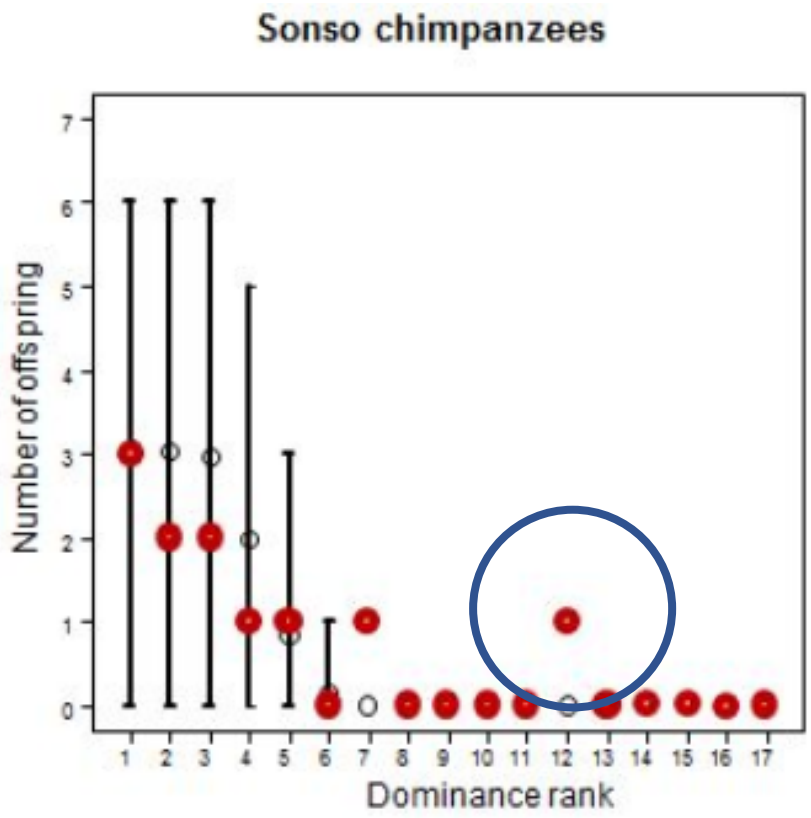
Muller et al (2007) *PRoySocB*

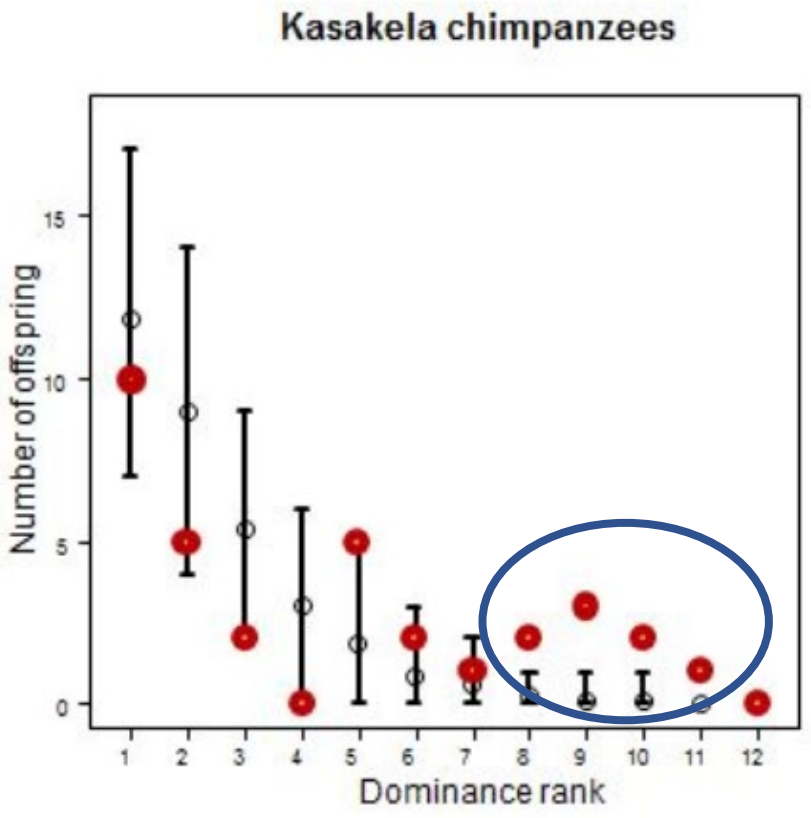
Herding


Hourly rate of agonism by leader male towards female
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
1
2
3
4
5
6
Mean distance between female and leader male (metres)

Consortship

Do you see signature of consortships in the distribution of paternities?





Overview

1)Male aggression against females

2)Infanticide

3)Female counterstrategies to infanticide

Reading: Muller et al. (2007)

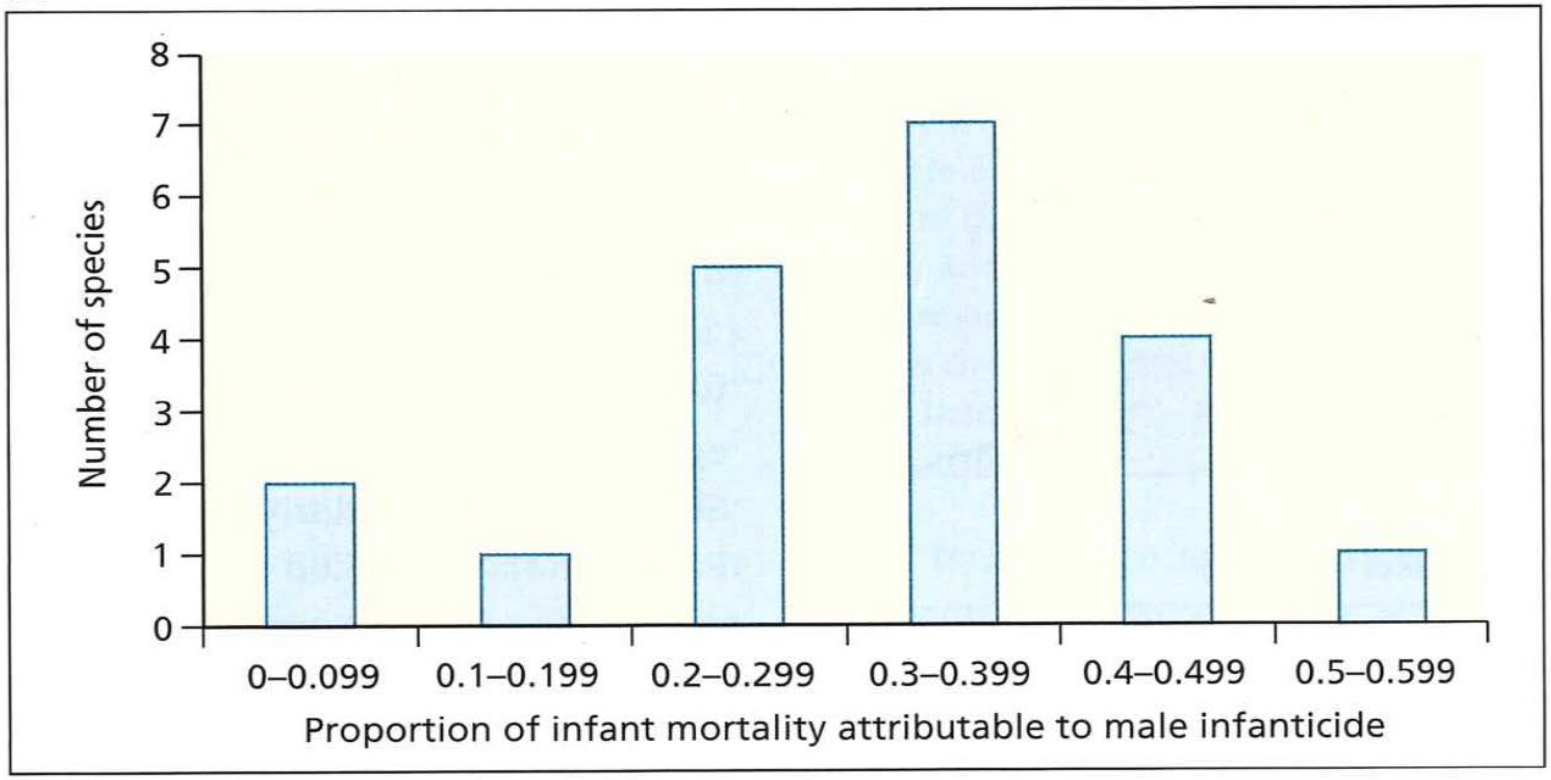
Infanticide

"Aggression directed at a ~~female~~ female's infant that makes her more likely to mate with the aggressor or less likely to mate with other males at a cost to the female".

Semnopithecus entellus
(Hanuman langur)

Infanticide

(a)



(b)

Infanticide

1970's, Sarah Hrdy → functional explanation:

Major challenge to

(1) social-science concept of (primate) group solidarity

(2) group-selection view of behavior as good for the group

Now: infanticide seen as

1. A classic case of selfish behavior favored by sexual selection
2. Widespread in animals
3. A pervasive force affecting social structure and behaviour

Infanticide as adaptive strategy

When is it beneficial for a male to commit infanticide to increase his own fitness?

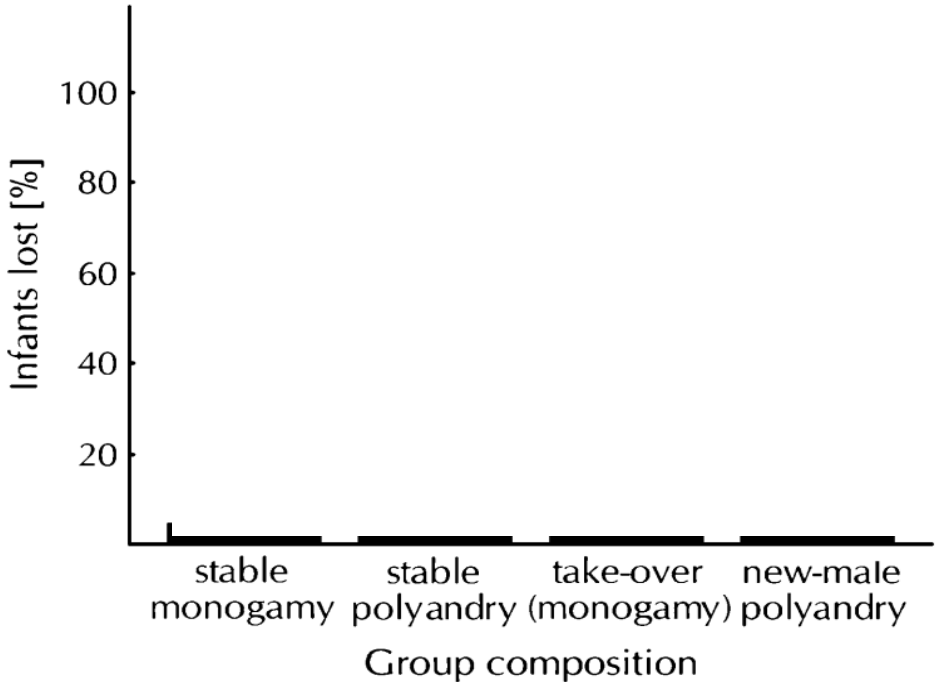
P1 offspring of others

P2 shortens time to next conception

P3 higher chance to sire next offspring

Infanticide as adaptive strategy

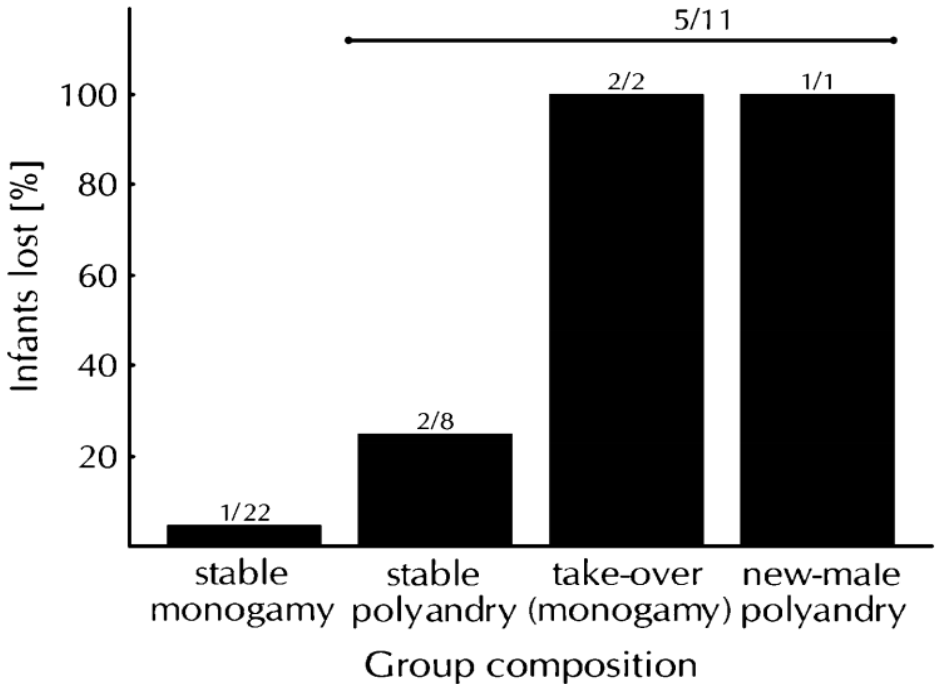
P1 offspring of others



Borries et al (2011)

Infanticide as adaptive strategy

P1 offspring of others



85% of infanticide in primates follows take-overs or rank-changes

Borries et al (2011)

Infanticide as adaptive strategy

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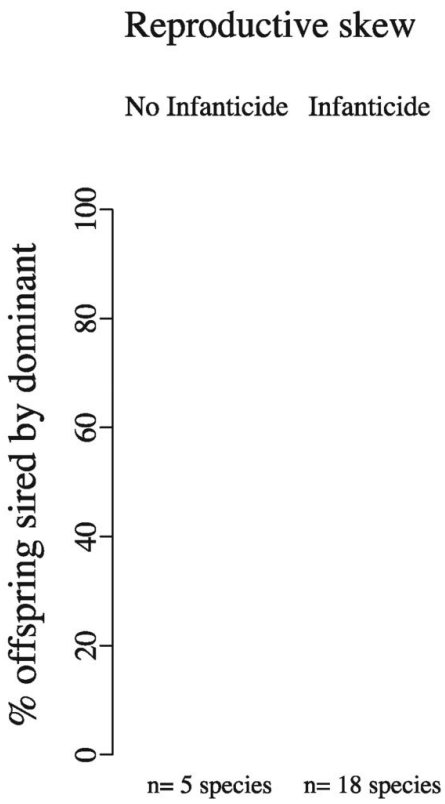

Lukas and Huchard (2014)

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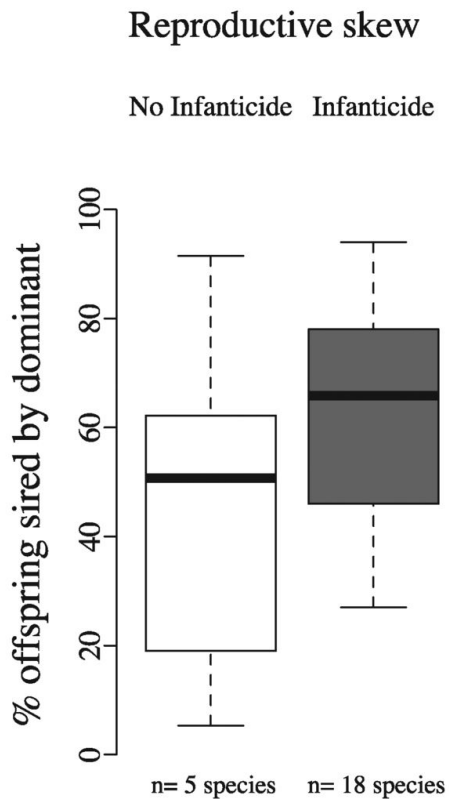

Infanticide more prominent in species with high reproductive skew

Lukas and Huchard (2014)

Infanticide as adaptive strategy

P2 shortens time to next conception

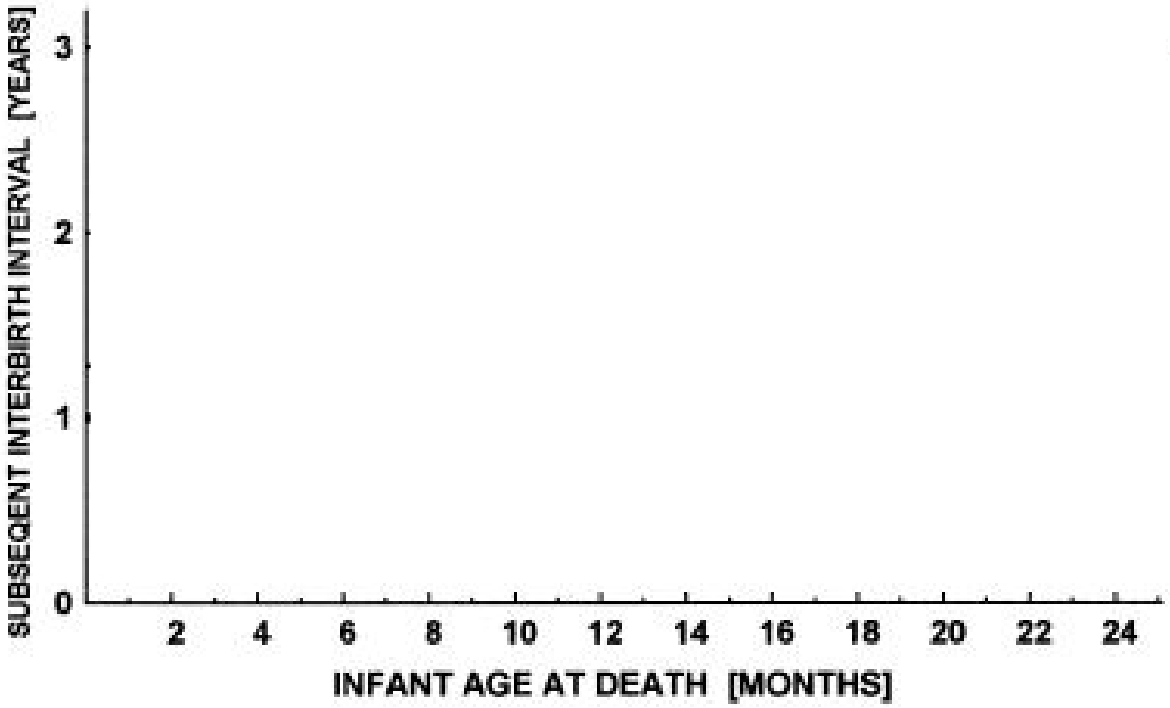

Fig. 1 Correlation between infant age at death and the subsequent interbirth interval of its mother

average IBI:
2.4 years

average male tenure:
1.8 years

Borries 1997

Infanticide as adaptive strategy

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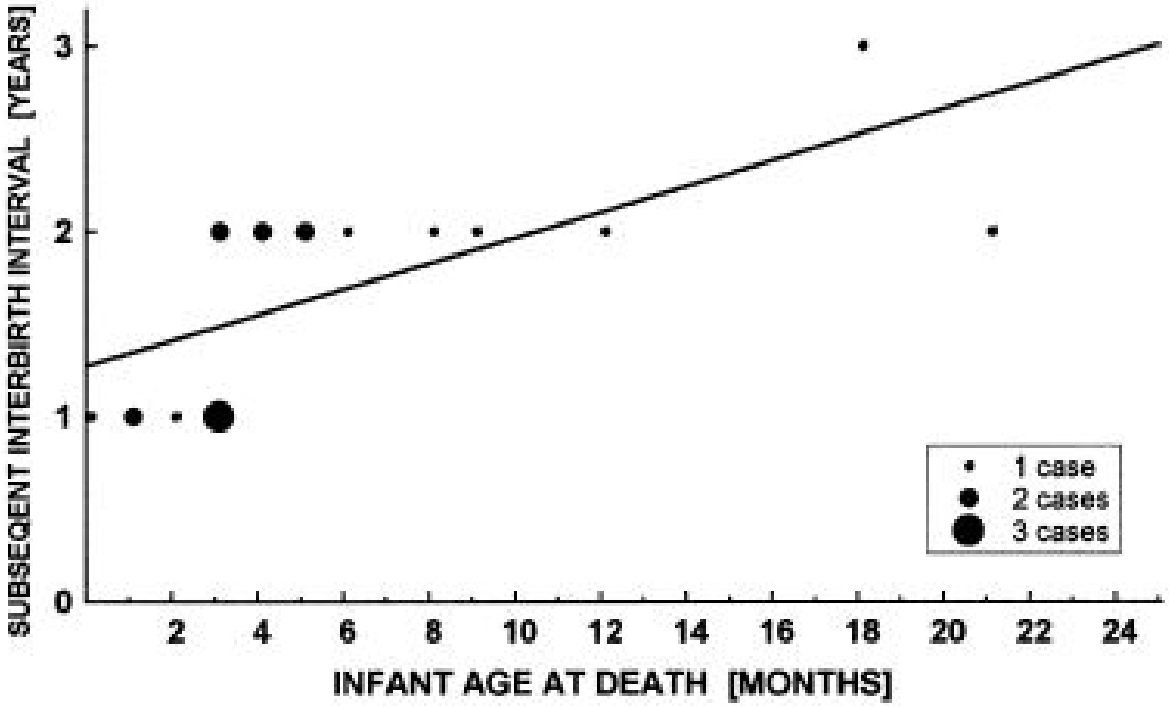

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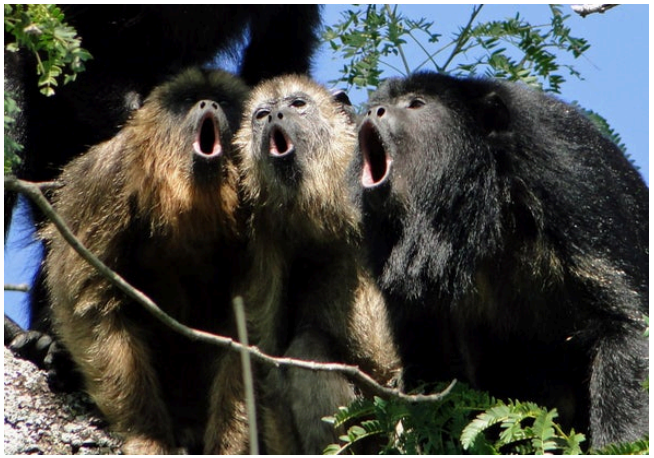

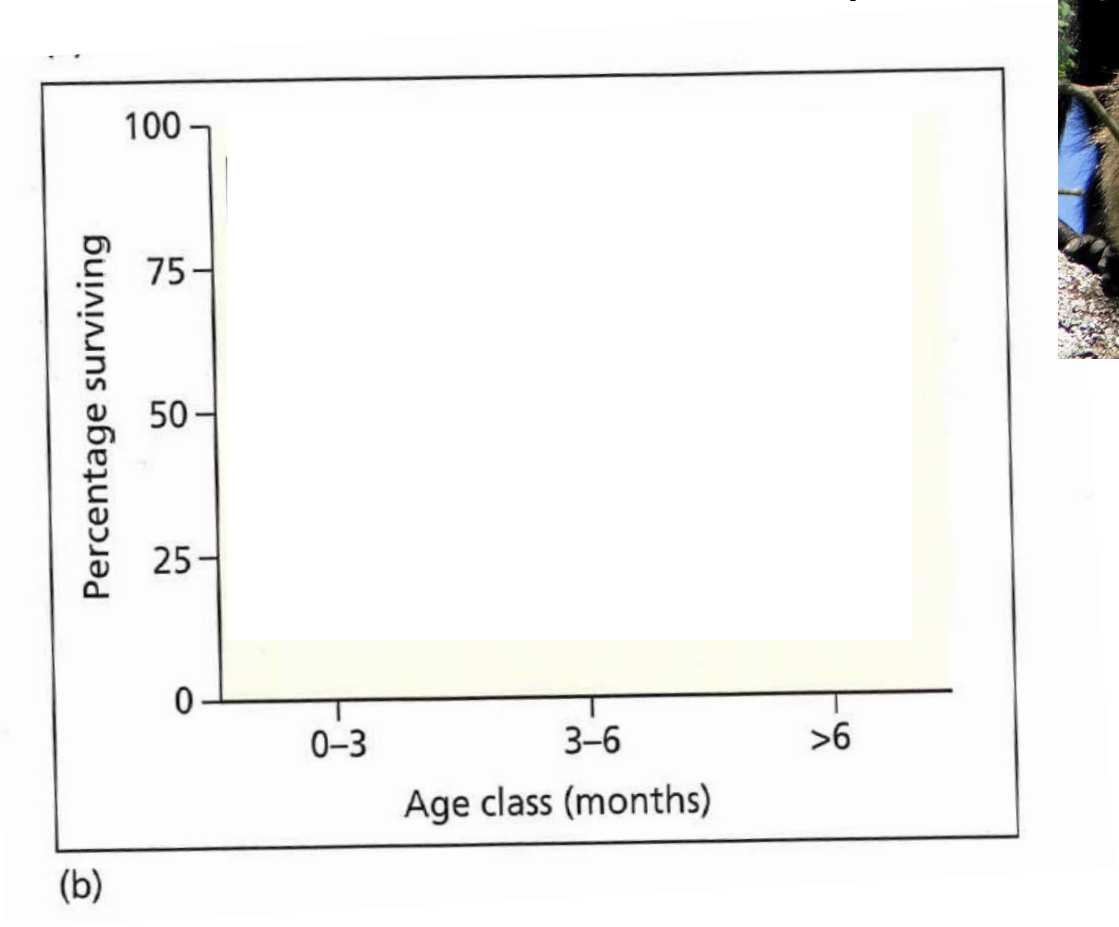

Borries et al (2011)

Infanticide as adaptive strategy

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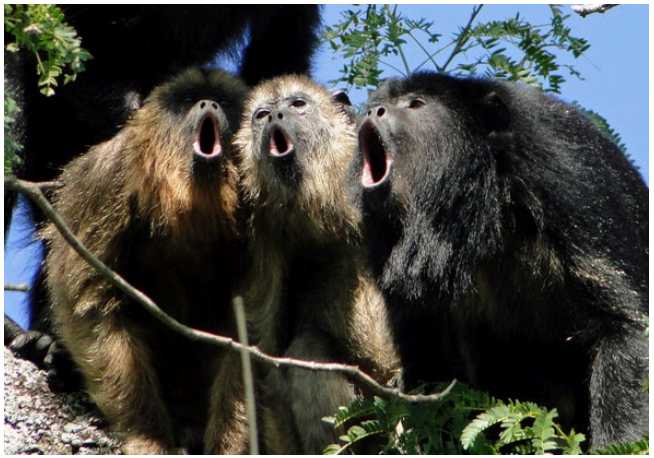

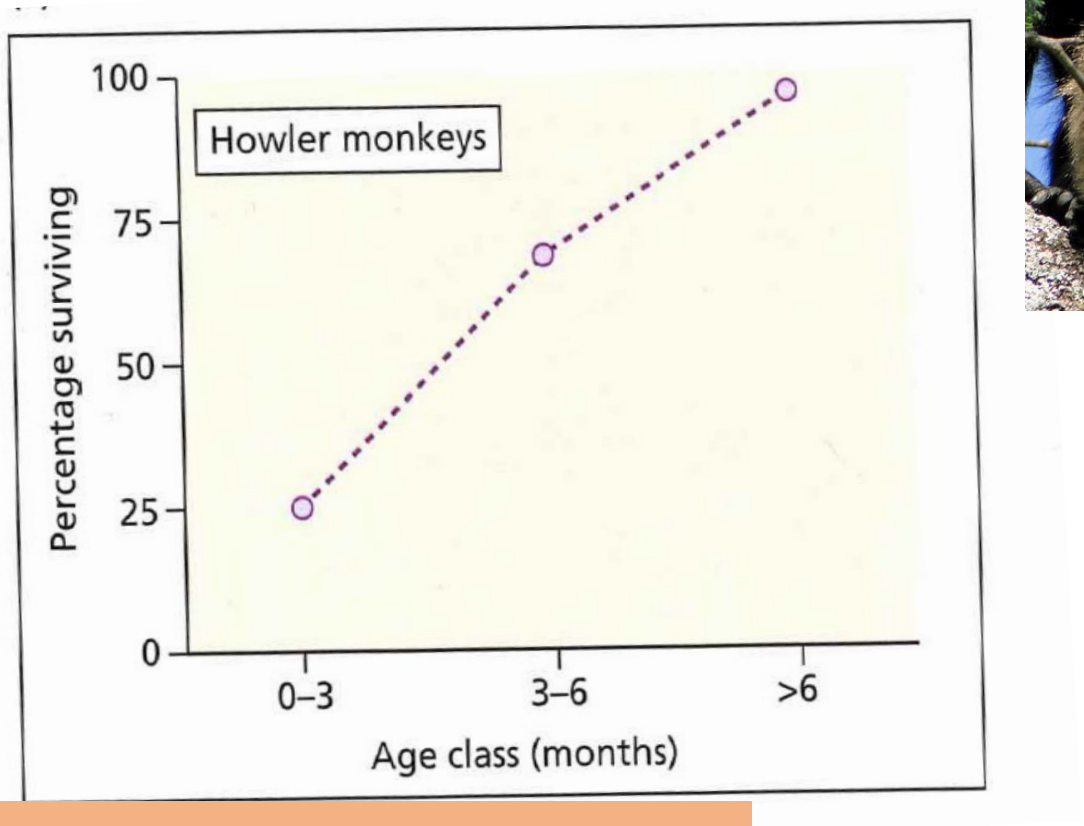

Target are the youngest offspring

Borries et al (2011)

Infanticide as adaptive strategy

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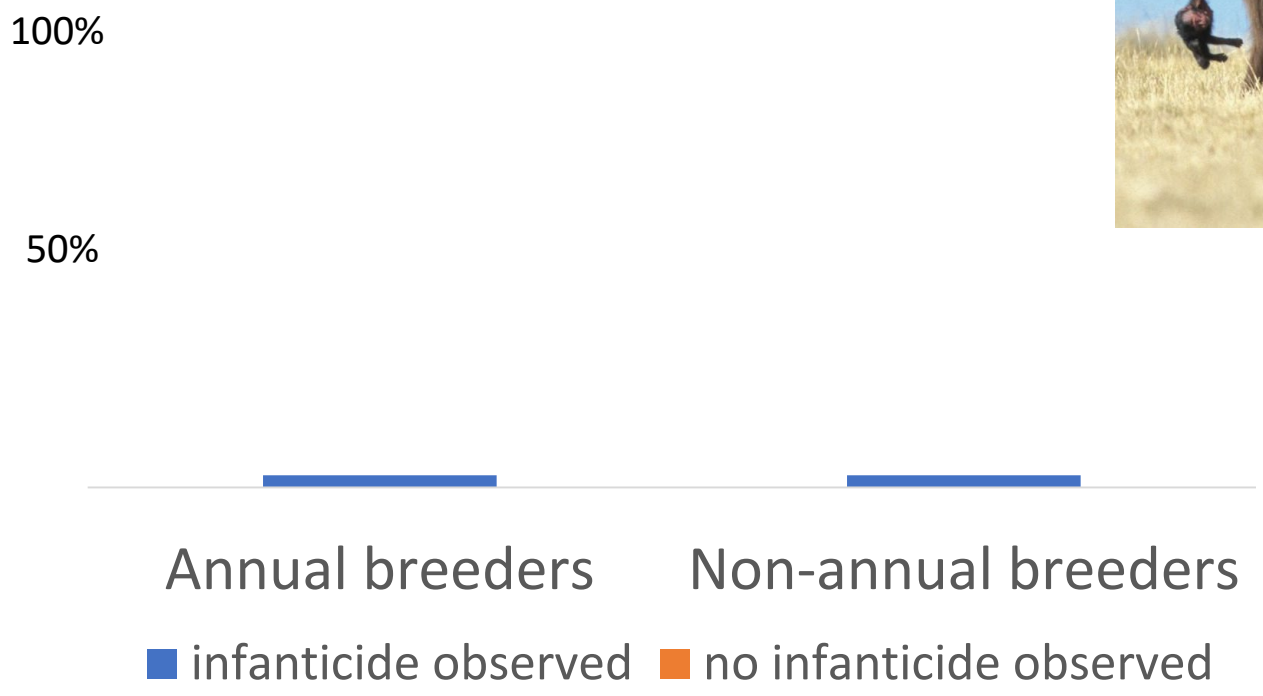

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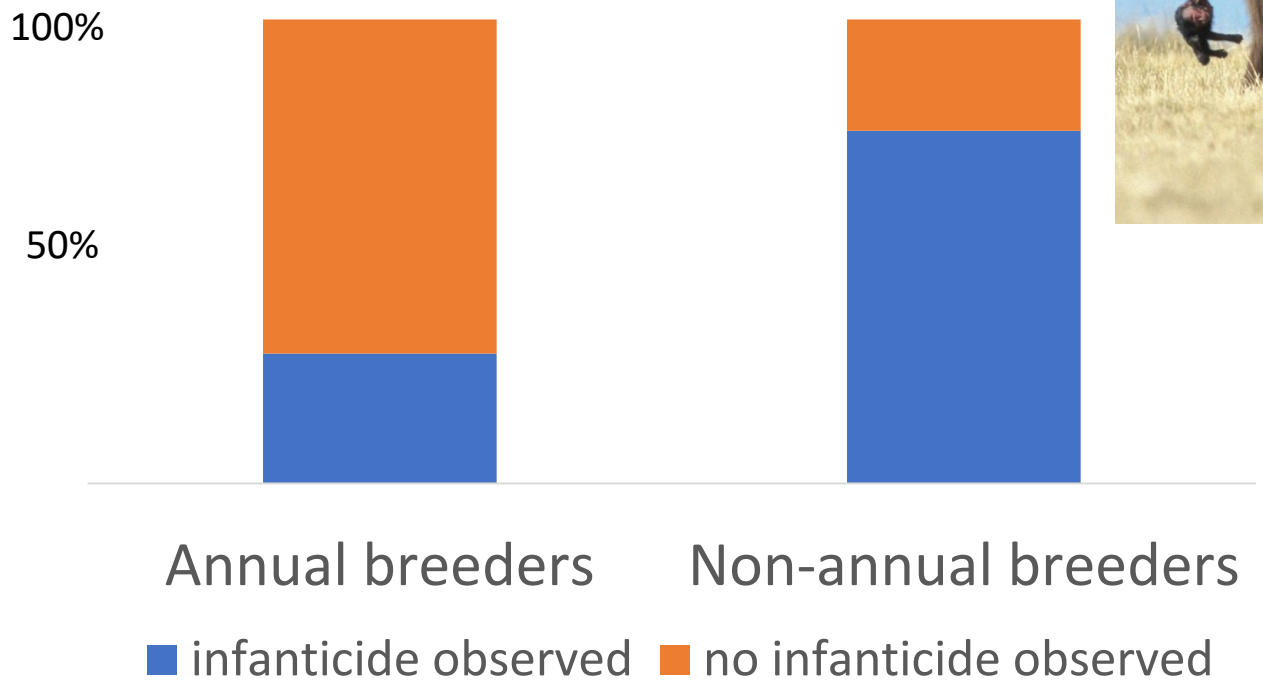

Particular prominent in species with non-annual breeding, because more effective in shortening time to conception

Lukas and Huchard (2014)

Infanticide as adaptive strategy

P3 higher chance to sire next offspring

In which social system most prominent?

◯ Male infanticide reported

social

solitary

monogamous

Lukas and Huchard (2014)

Infanticide as adaptive strategy

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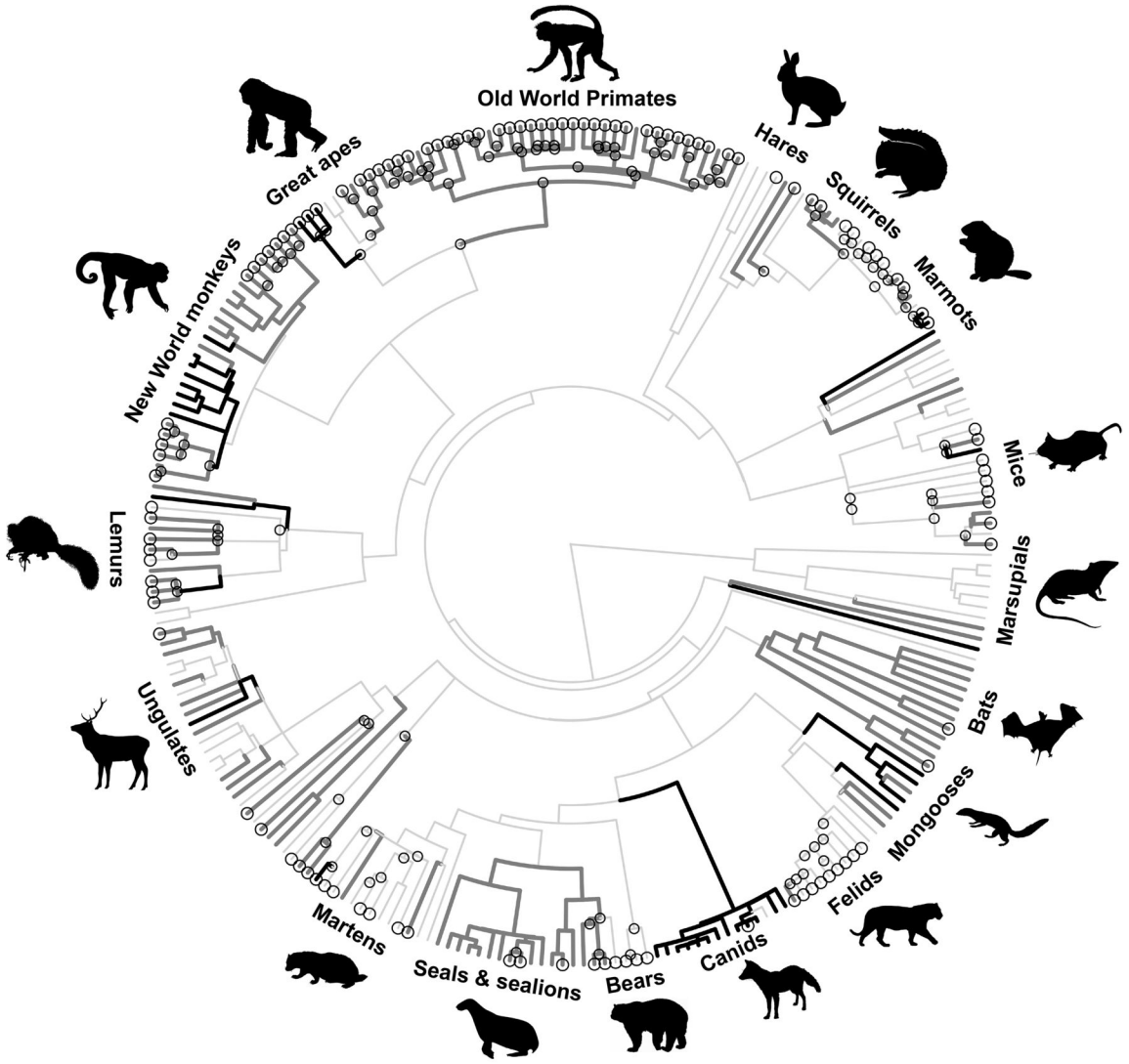

Male infanticide reported

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Overview

1)Male aggression against females
2)Infanticide
3)Female counterstrategies to infanticide

Reading: Muller et al. (2007)

Female counter-strategies to infanticide

A) Paternity confusion
- Promiscuous mating
- Sexual swellings

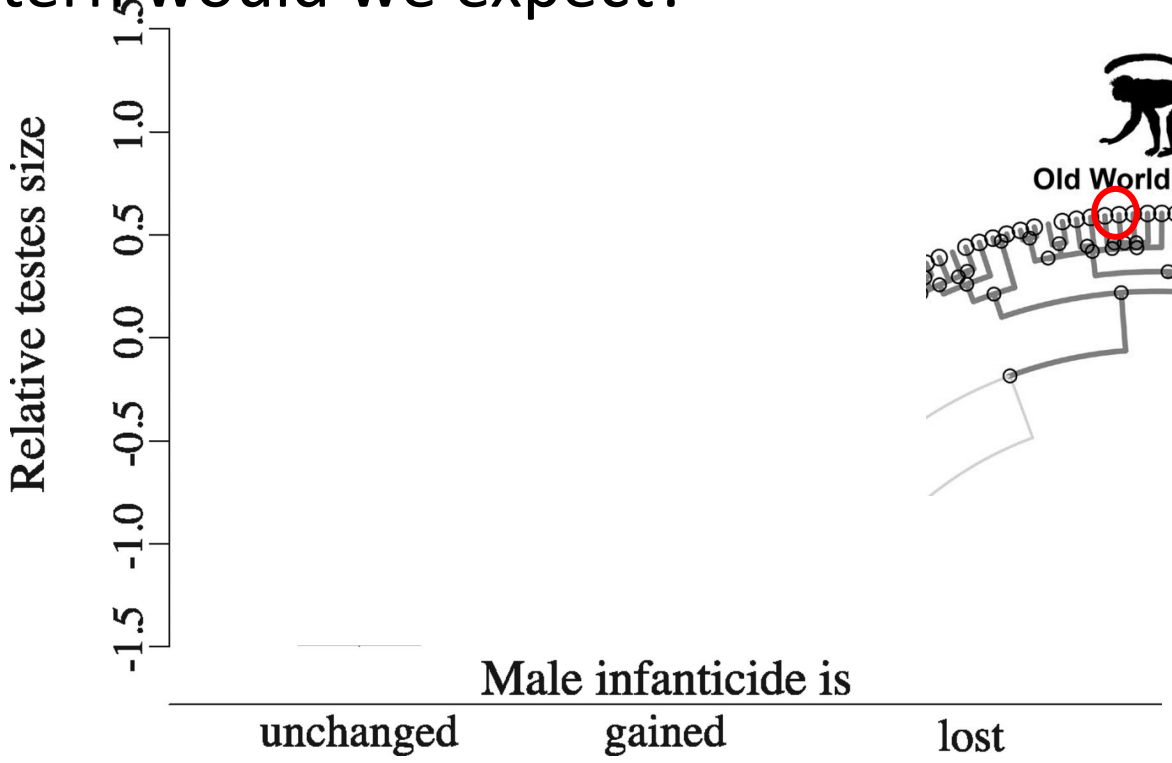
B) Manipulation of reproduction (Bruce effect)

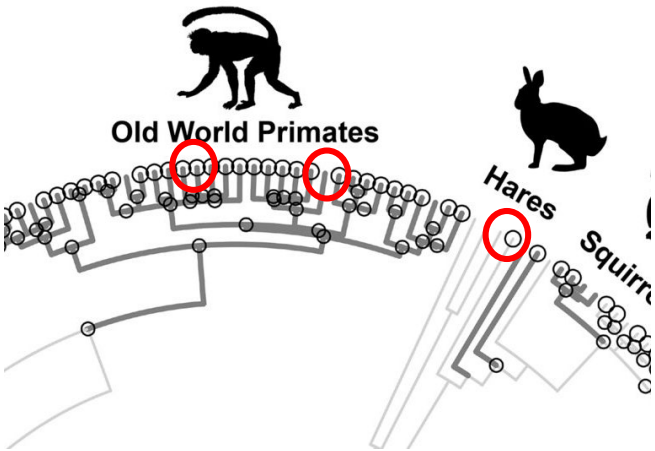
C) Female coalitions

D) male “friends”, ”hired guns”

Female counter-strategies to infanticide

A) Paternity confusion:
If promiscuous mating is successful strategy what pattern would we expect?





Lukas and Huchard (2014)

Female counter-strategies to infanticide

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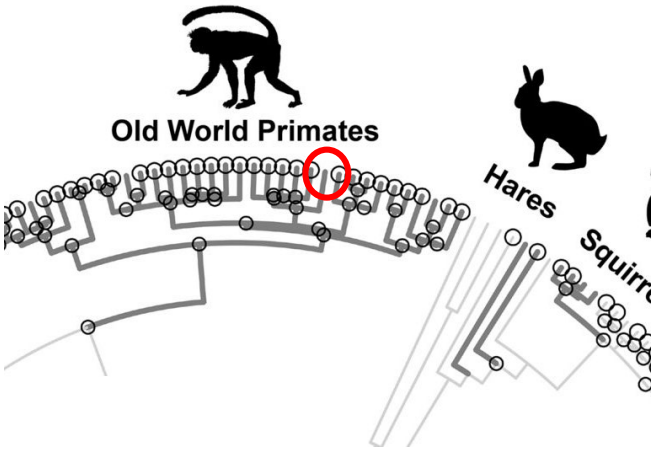
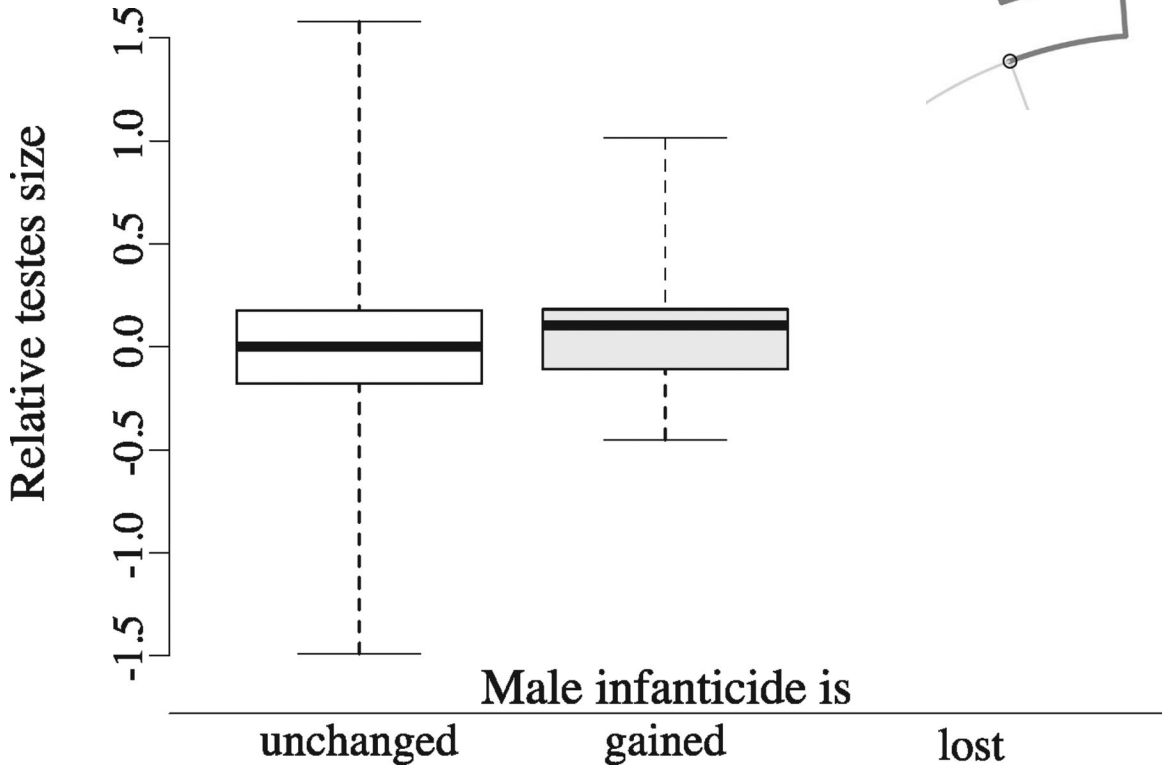
- promiscuous mating





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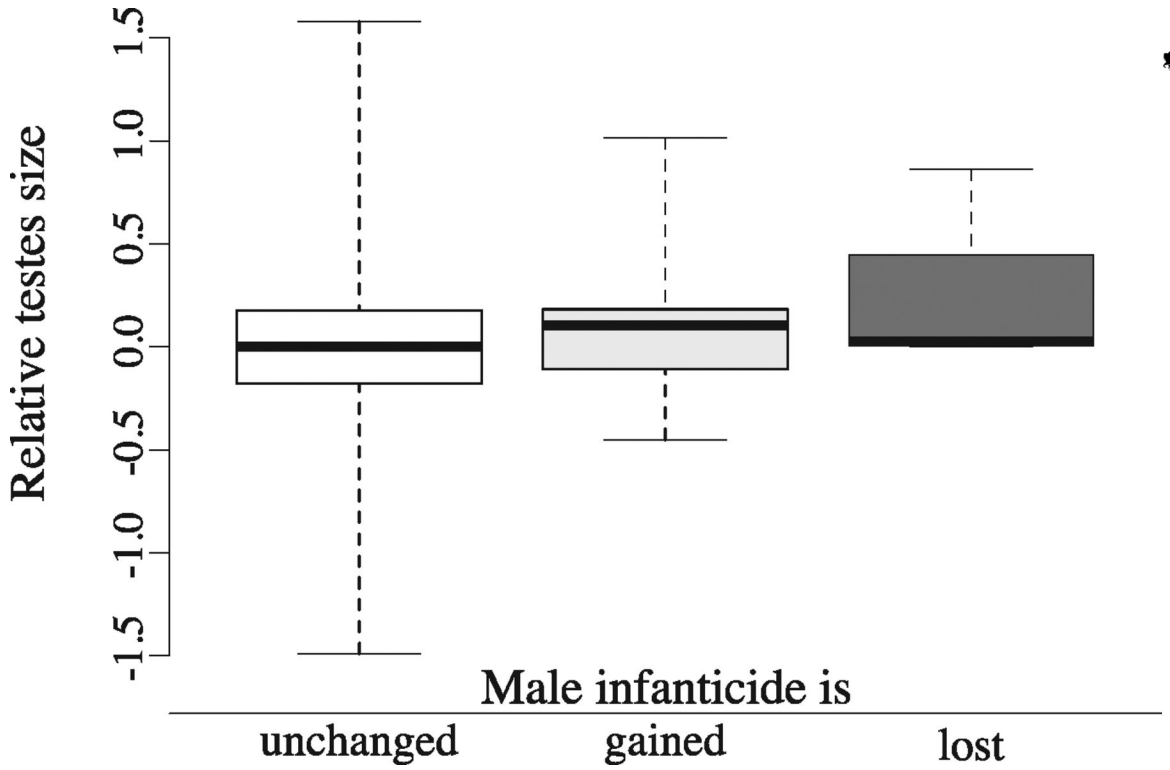
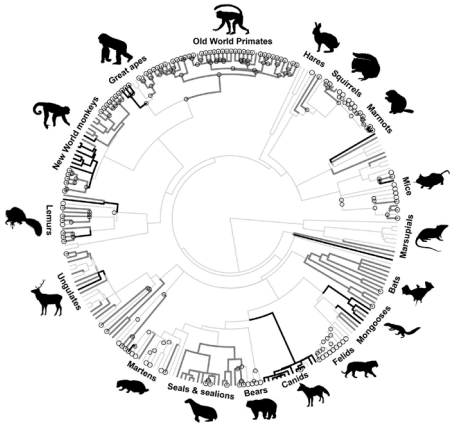




Lukas and Huchard (2014)

Sexual Swellings

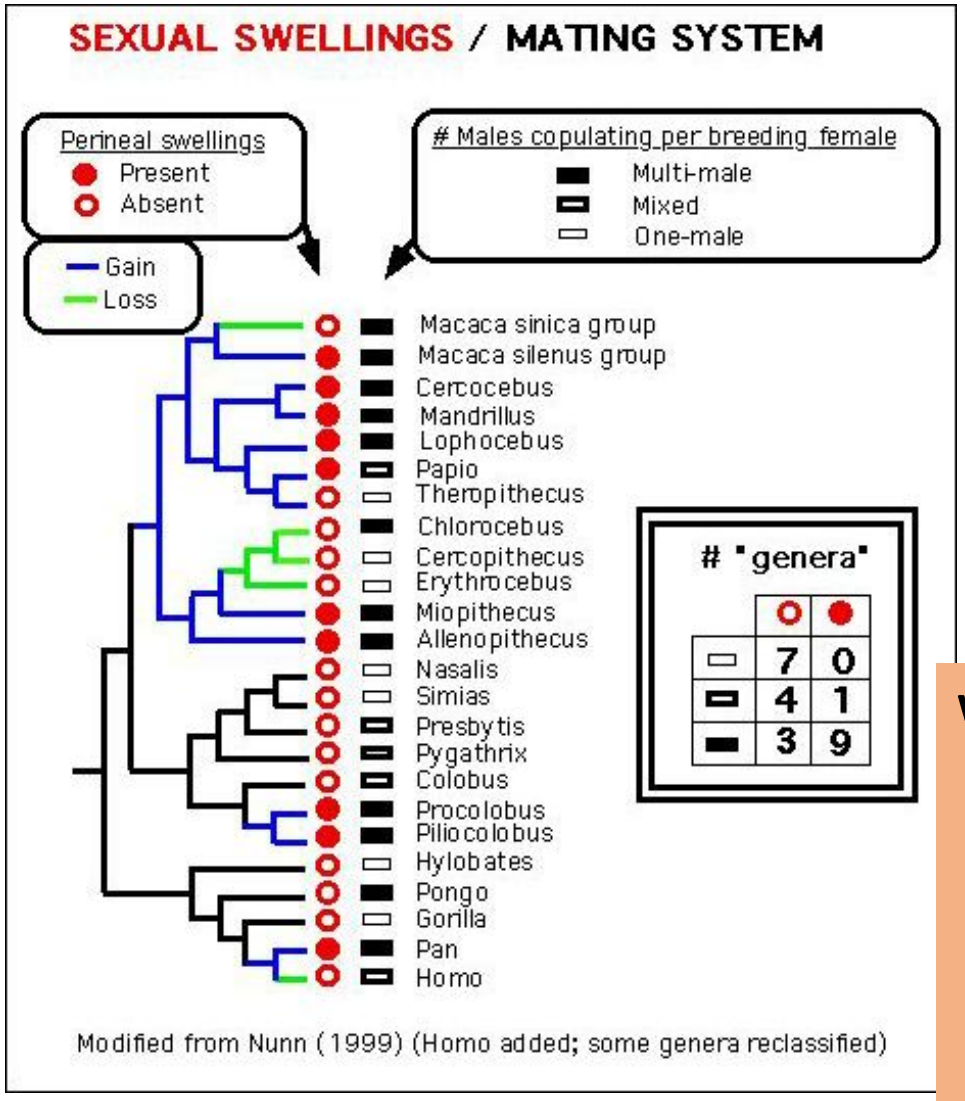
Sexual Swellings

Sexual Swellings

Labial tissues are sensitive to estrogen

Graham 1970

Where do we see sexual swellings

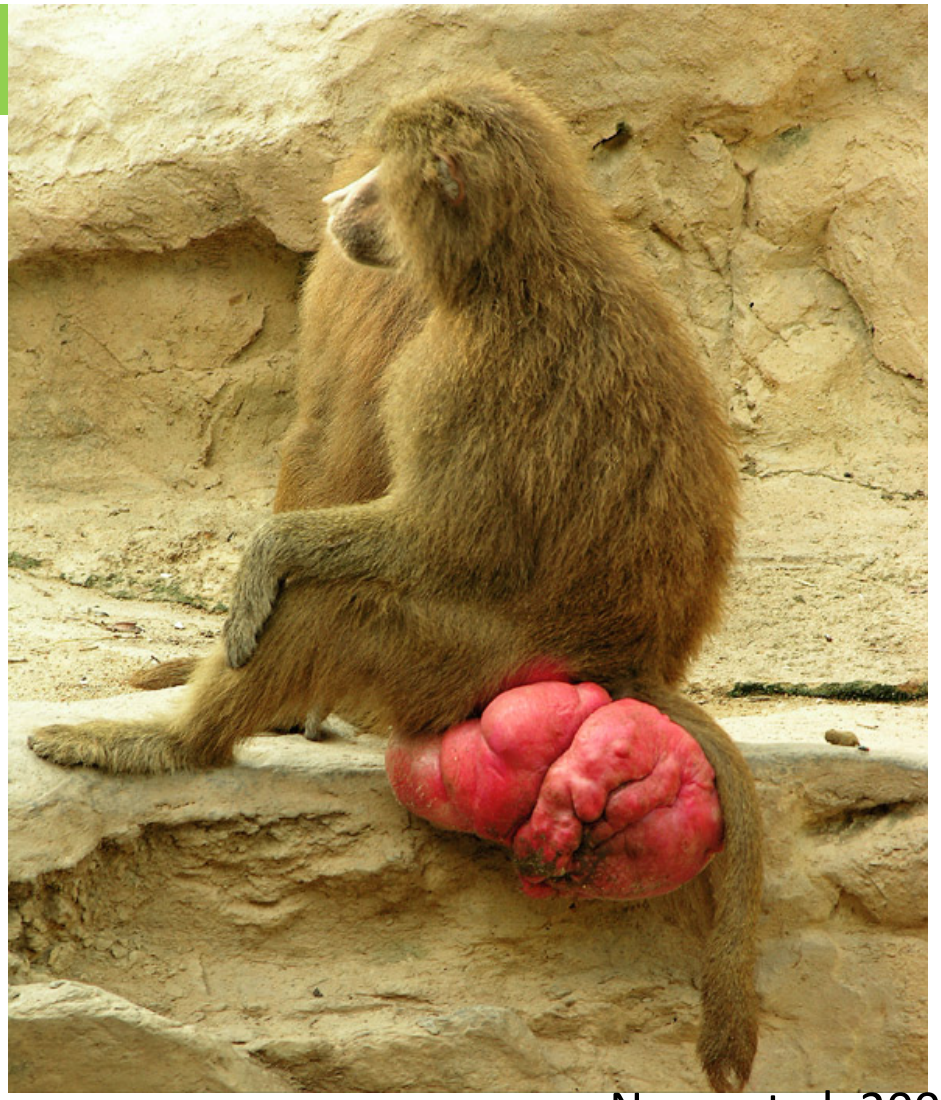


What is the function of exaggerated sexual swellings in species where females mate with multiple males?

Function of sexual swellings

Reliable Indicator Hypothesis

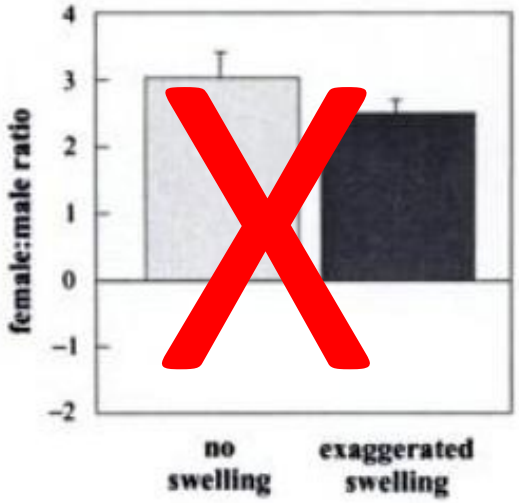
- Exaggerated swelling is an honest signal of quality
- Reversal of sexual selection with males choosing females of high quality
- Occurs when females are competing over males



Nunn et al. 2001

Reliable Indicator Hypothesis

P1 Exaggerated swellings should be present in species with a higher adult female : adult male ratio.

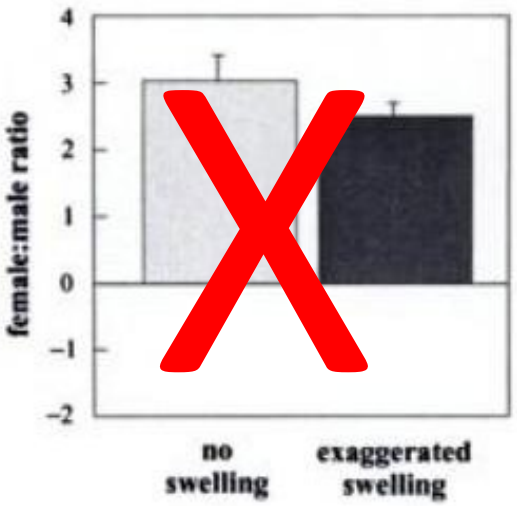


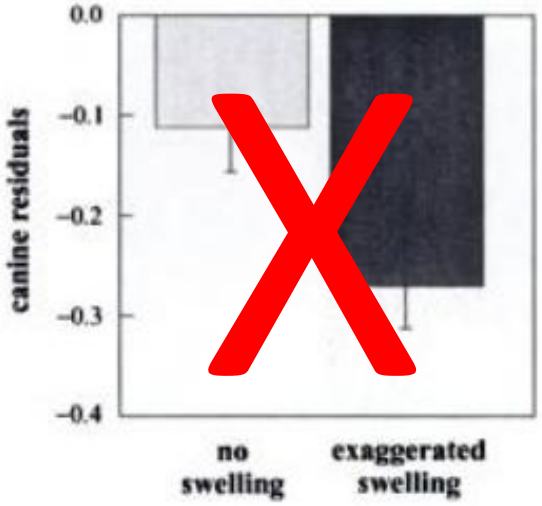
Nunn et al. 2001, Nunn et al. 2004

Reliable Indicator Hypothesis

P1 Exaggerated swellings should be present in species with a higher adult female : adult male ratio.

P2 Exaggerated swellings should positively correlate with female canine size.





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Reliable Indicator Hypothesis

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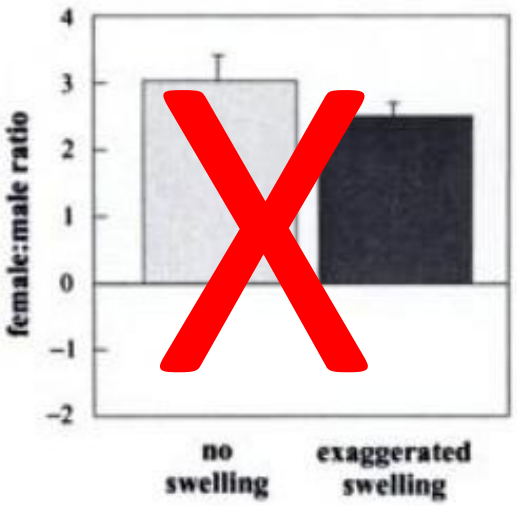
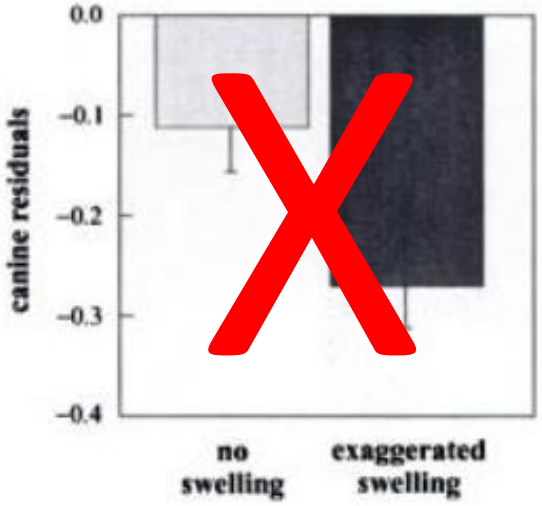
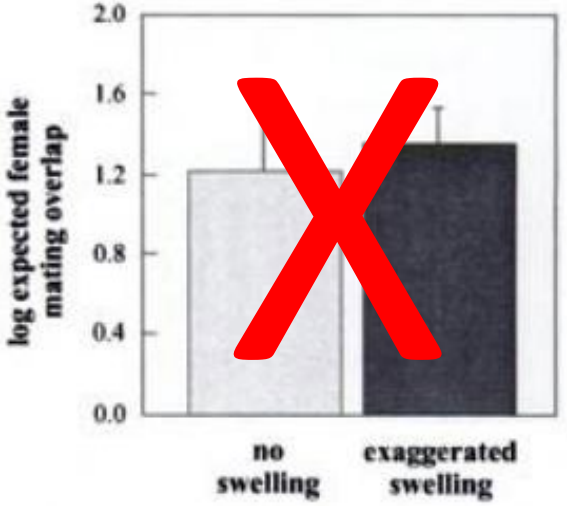
P2 Exaggerated swellings should positively correlate with female canine size.

P3 Exaggerated swellings should be present in species with more female synchrony.







Nunn et al. 2001, Nunn et al. 2004

discuss

- What could be potential consequences with sexual swellings as reliable indicator of fertility from what we heard in the lecture so far?

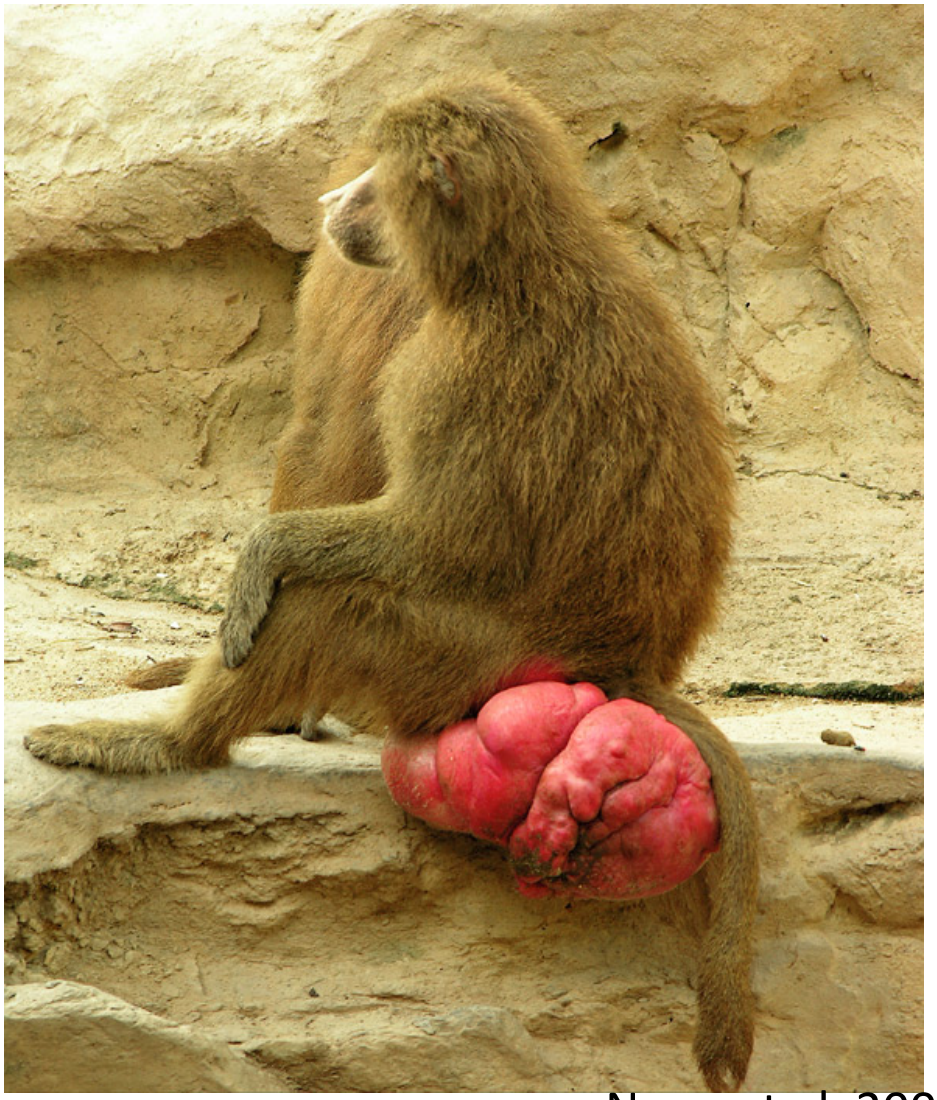
Function of sexual swellings

Graded Signal Hypothesis

- Swelling as probabilistic signal with highest likelihood of ovulation during maximal tumescence

- Dominant males can monopolize females when they are most likely to ovulate.

- Balance between mating with high quality males and confusing paternity to avoid infanticide



Nunn et al. 2001

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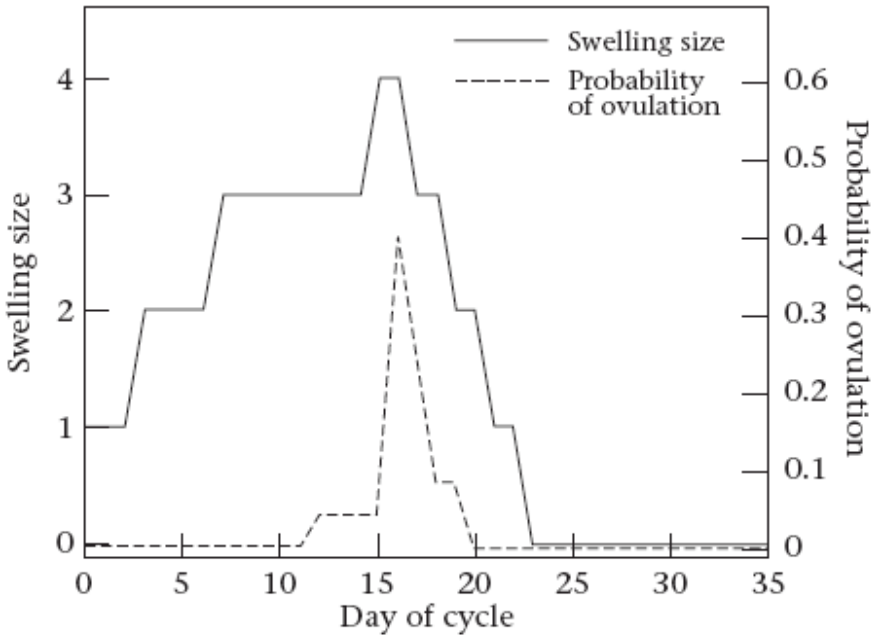


Nunn et al. 2001

Female counter-strategies to infanticide

A) Paternity confusion
- Promiscuous mating
- Sexual swellings

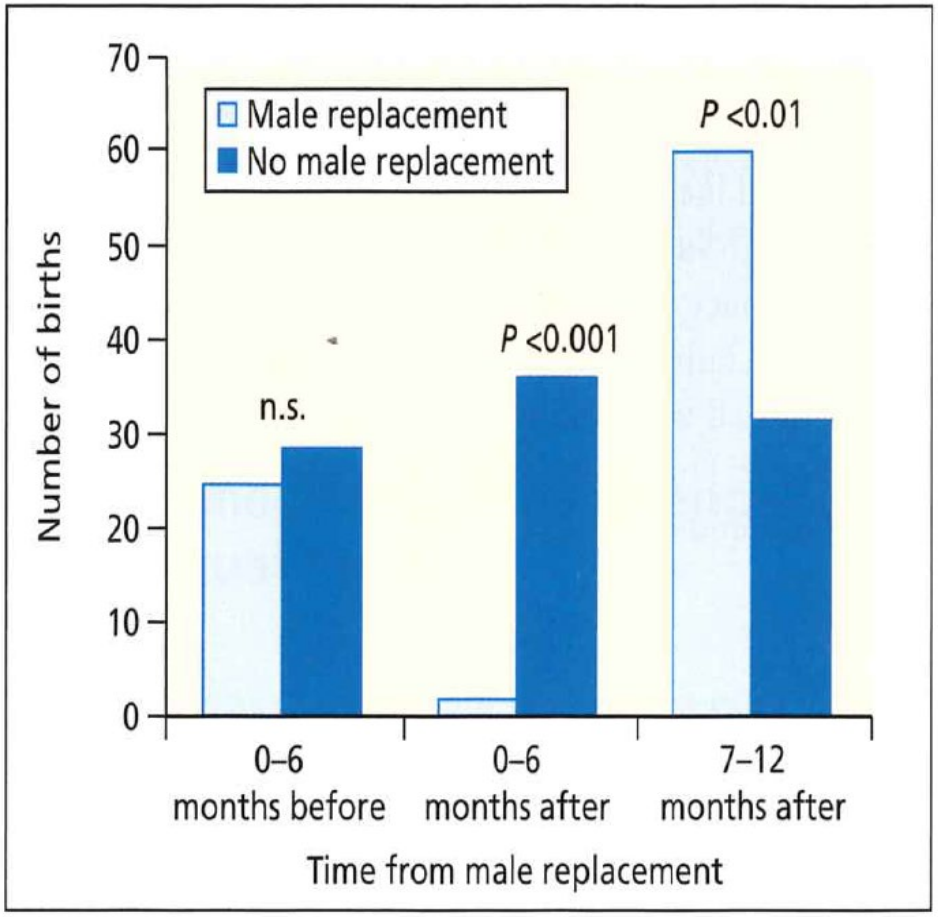
B) Manipulation of reproduction (Bruce effect)

C) Female coalitions

D) male “friends”, ”hired guns”

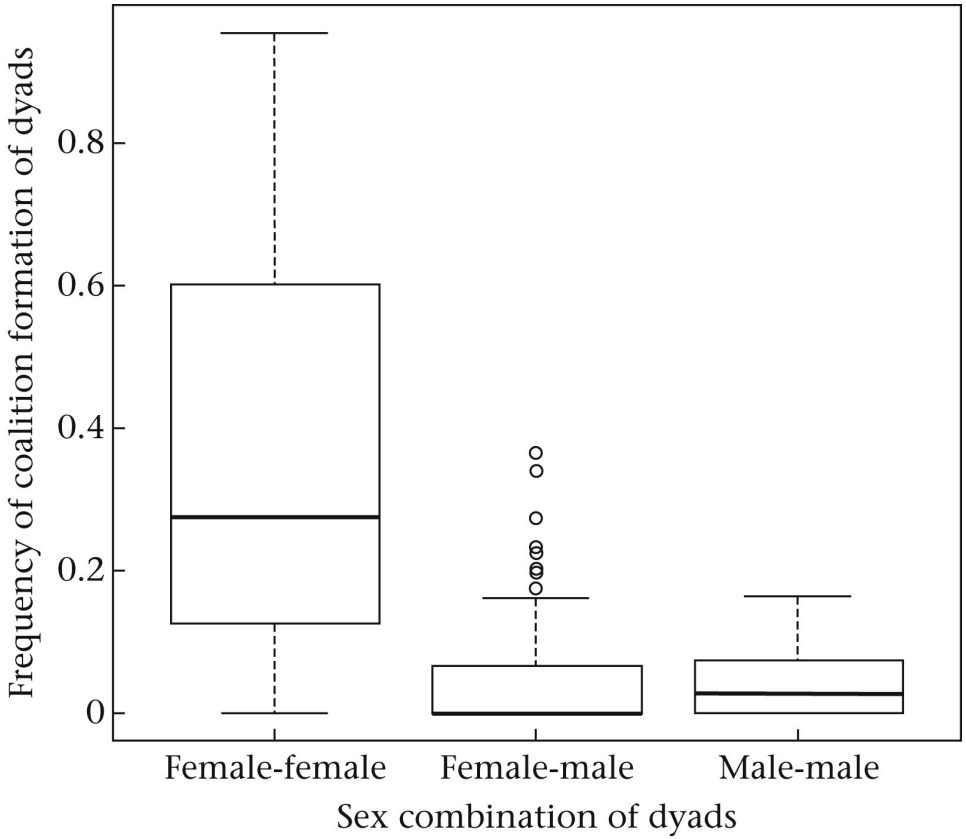
Female counter-strategies

B) Manipulation of reproduction (Bruce effect)



Female counter-strategies

C) Female coalitions



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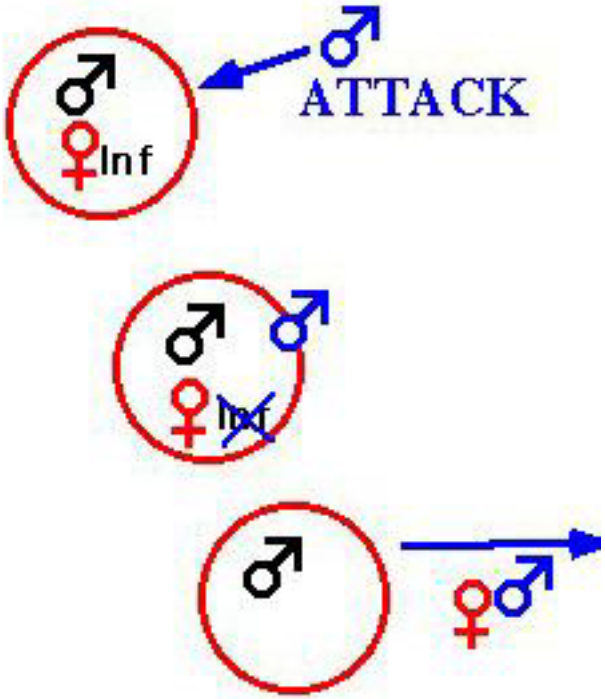

Gorilla: Male kills BEFORE having mating access to the female

→ Female may respond by joining the killer

Females might group with males for protection

Female counter-strategies

D) male “friends”, ”hired guns”

Gorilla: Male kills BEFORE having mating access to the female

→ Female may respond by joining the killer

Chacma baboons: Females may associate with potential sire of offspring

Females might group with males for protection

Summary

1) Male aggression against females
2) Infanticide
3) Female counterstrategies to infanticide

Reading: Muller et al. (2007)