PRIMATE SOCIAL BONDS

1 October 2020

TODAY

1. Quiz

2. Harlow's experiments

3. What is a social bond?

4. Who forms social bonds?

5. Why are social bonds important?

6. What is the psychology underpinning social bonds?

QUIZ 3

1.High levels of the hormone testosterone are associated with behavioral traits enhancing male reproductive success.

a) Please give an example of such a trait and state how it increases male reproductive success (1 sentence) (1.5p)

b) Why do not all males maintain high levels of testosterone if it seems associated with increased reproductive success? (1p)

2. Snyder-Mackler et al. (2012) explain that while gelada groups are characteristically one-male units, approximate 1/3 of groups have two males, and, in some instances, the subordinate male even sires offspring in the group. Briefly characterize the two models—the 'concession model' and the 'limited control model—that they provide as potential explanations for this and put a star next to the one for which they found support (1-2 sentence each model). (2.5p)

3. Males use multiple types of behaviors to sexually coerce females.

a) Which criteria do we use to categorize these behaviors into direct and indirect coercion? (1p)

b) Give an example for each category including the species name. (2p)

4. Chacma baboons form differentiated social relationships between males and females called friendship. What are the benefits for females and what are the benefits for males of these observed friendships? (2p)

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HARLOW'S EXPERIMENTS

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- Monkeys kept in 'Pit of Despair' for:
  - 3 months
  - 6 months
  - 12 months

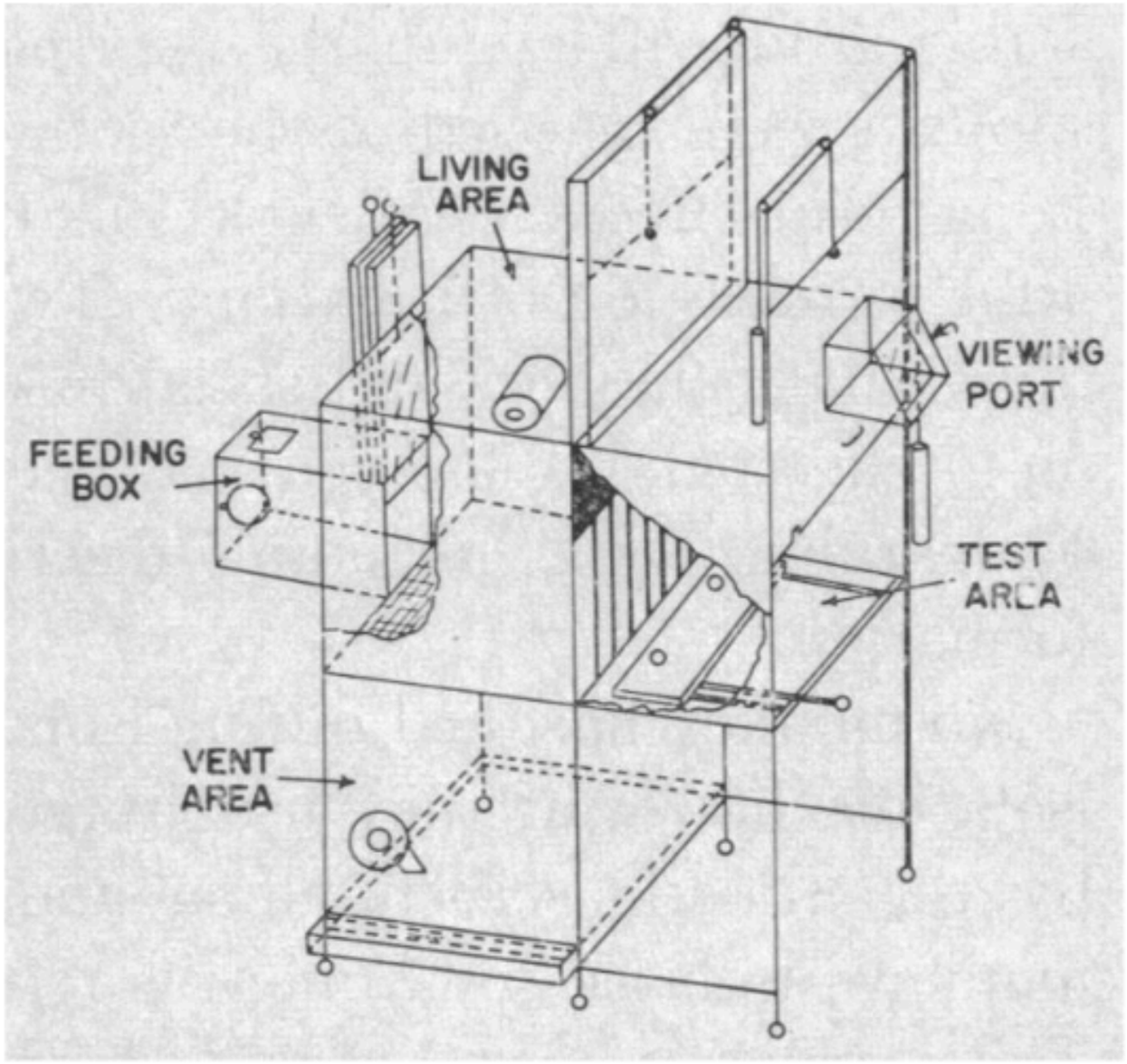

FIG. 2.—Total social isolation chamber.

HARLOW'S EXPERIMENTS

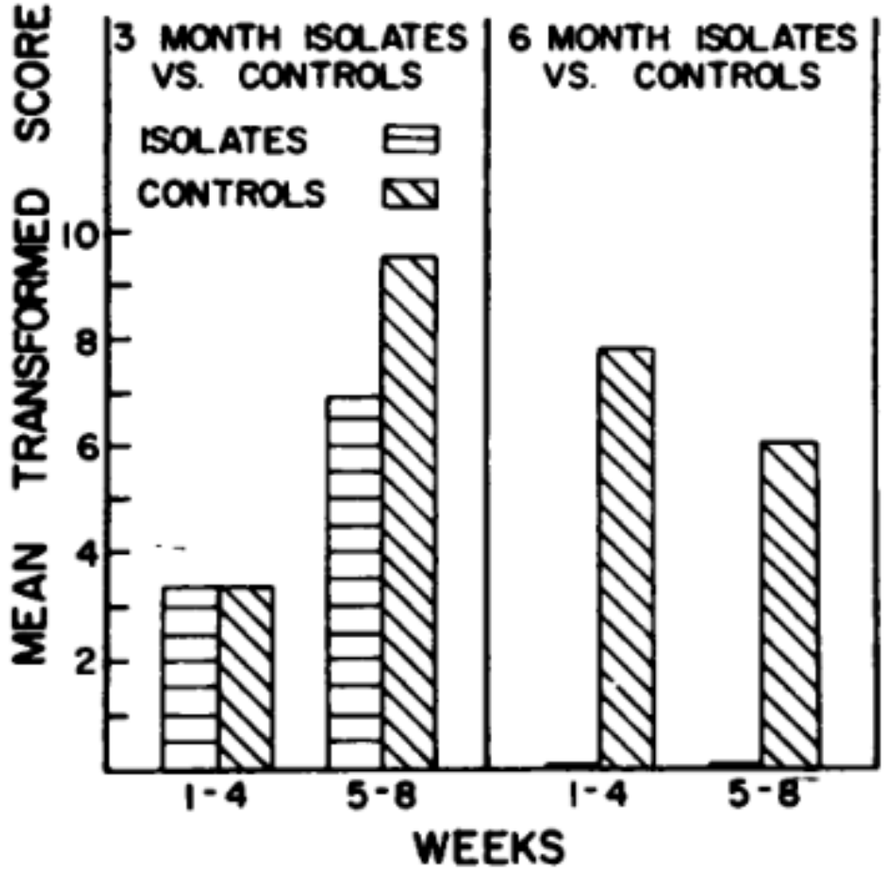

FIG. 8.—Incidence of contact play.

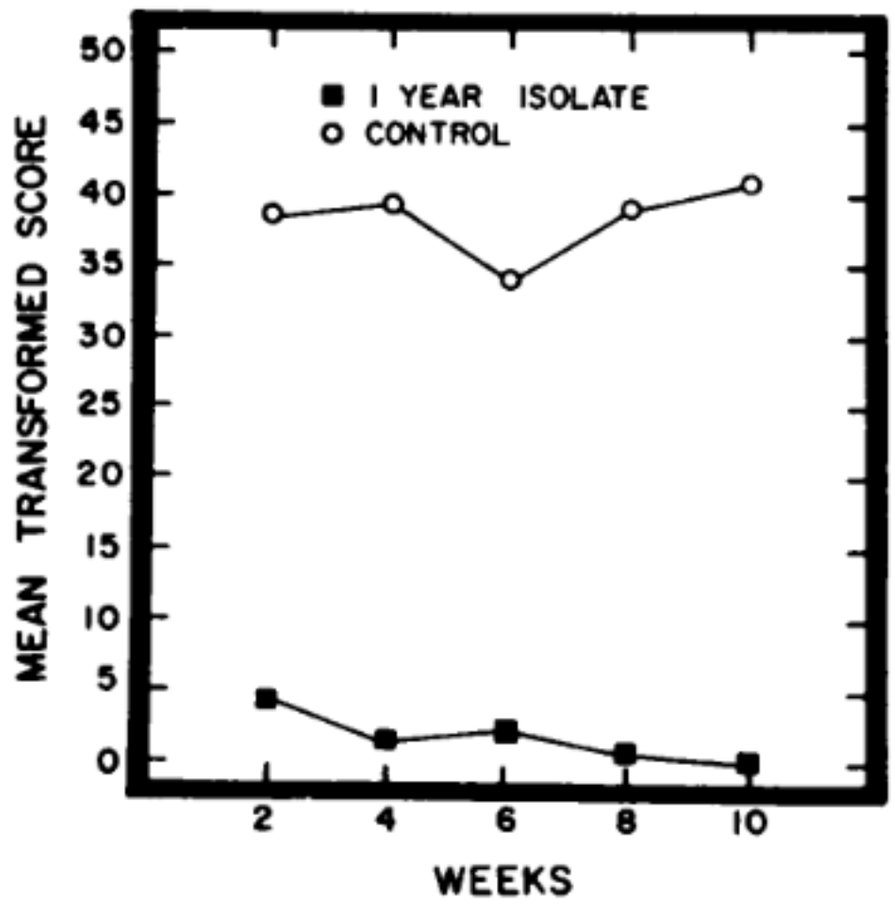

FIG. 10.—Activity play of 12-month isolates.

HARLOW'S EXPERIMENTS

- Cruel demonstration of importance of social relationships and physical touch
- Absence of social bonds detrimental

WHAT IS A SOCIAL BOND?

SOCIAL BONDS

- Which behaviors might indicate the existence of a social bond?

SOCIAL BONDS

- Measured by:
  - Proximity
  - Grooming
  - Coalition support
  - Food sharing
  - Aggression
  - Reconciliation

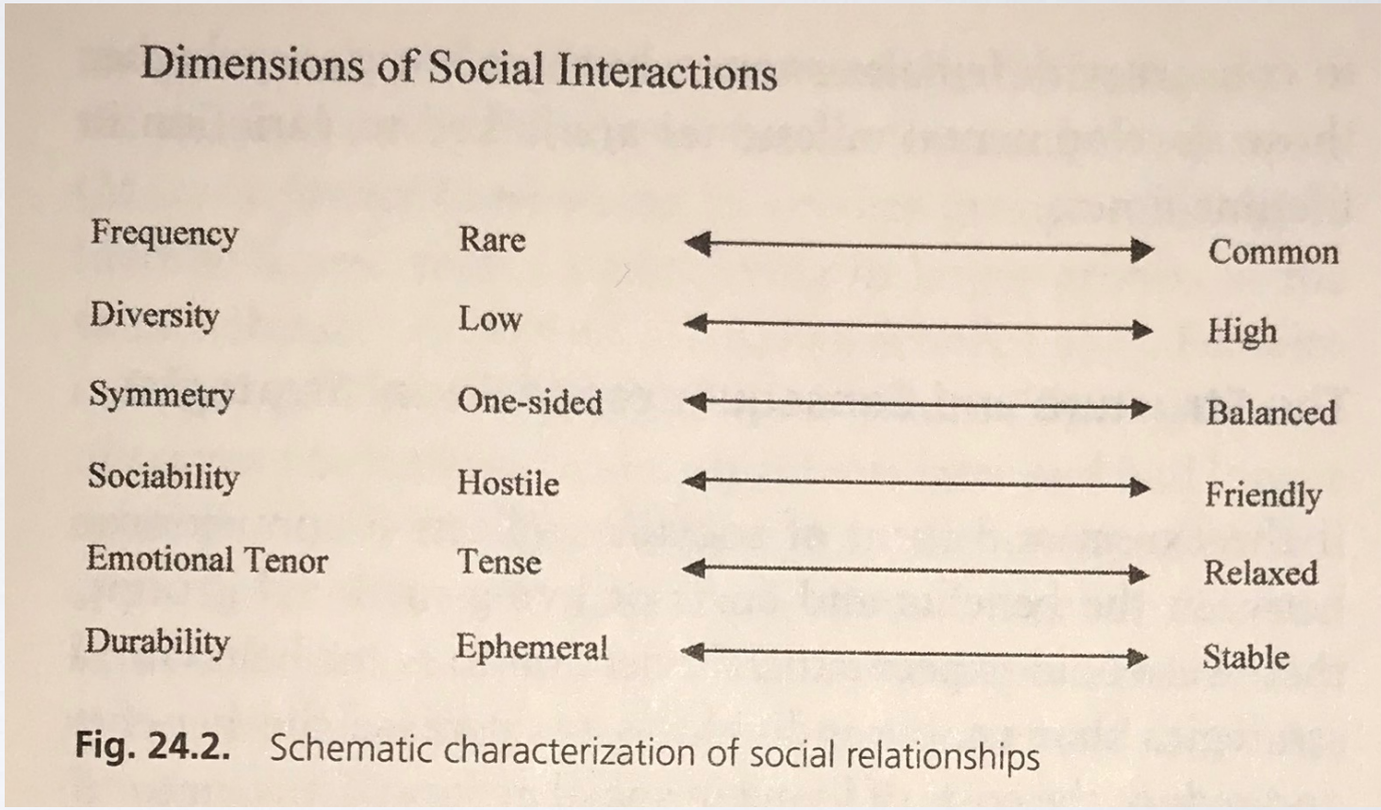

Fig. 24.2. Schematic characterization of social relationships

SOCIAL BONDS

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  - Aggression
  - Reconciliation

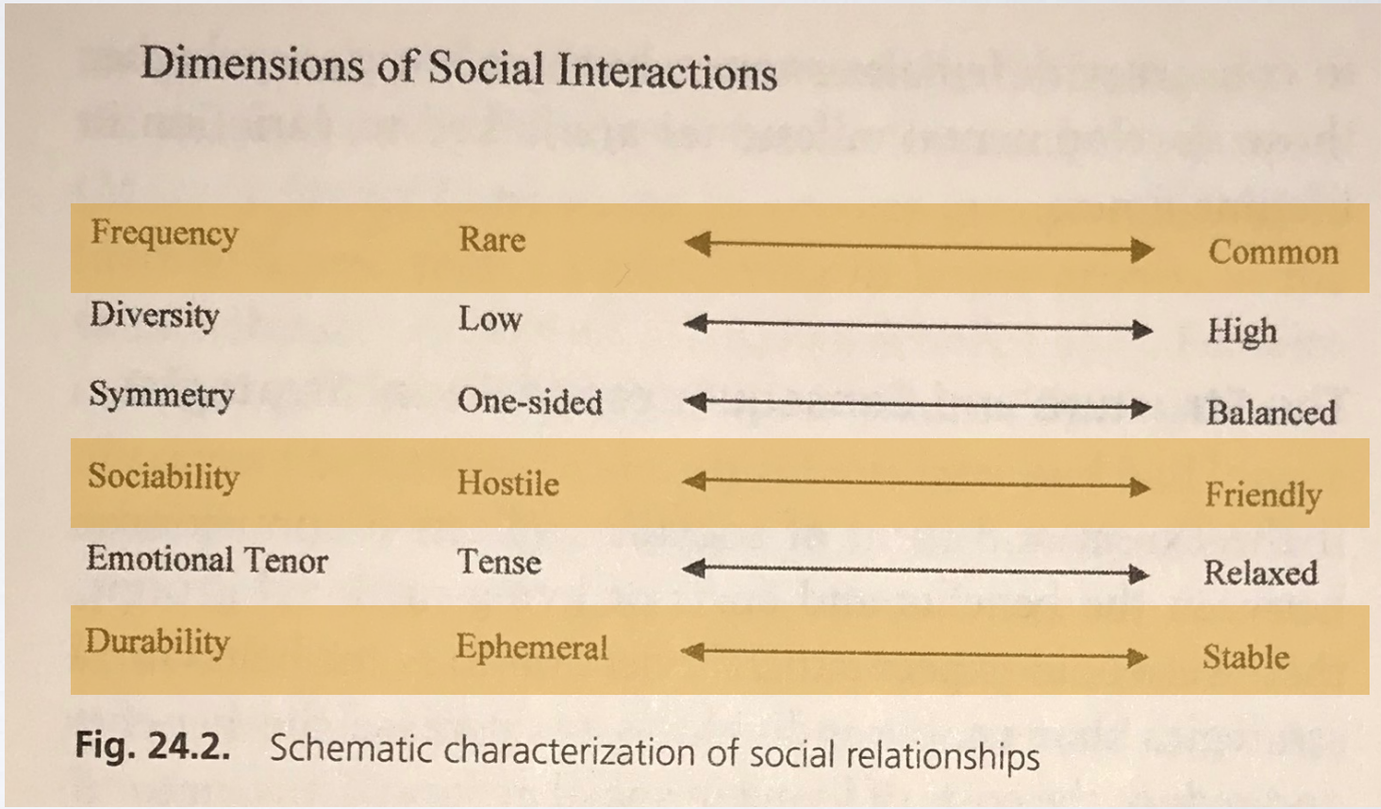


Fig. 24.2. Schematic characterization of social relationships

FREQUENCY OF INTERACTION

- Most dyads interact and groom relatively infrequently

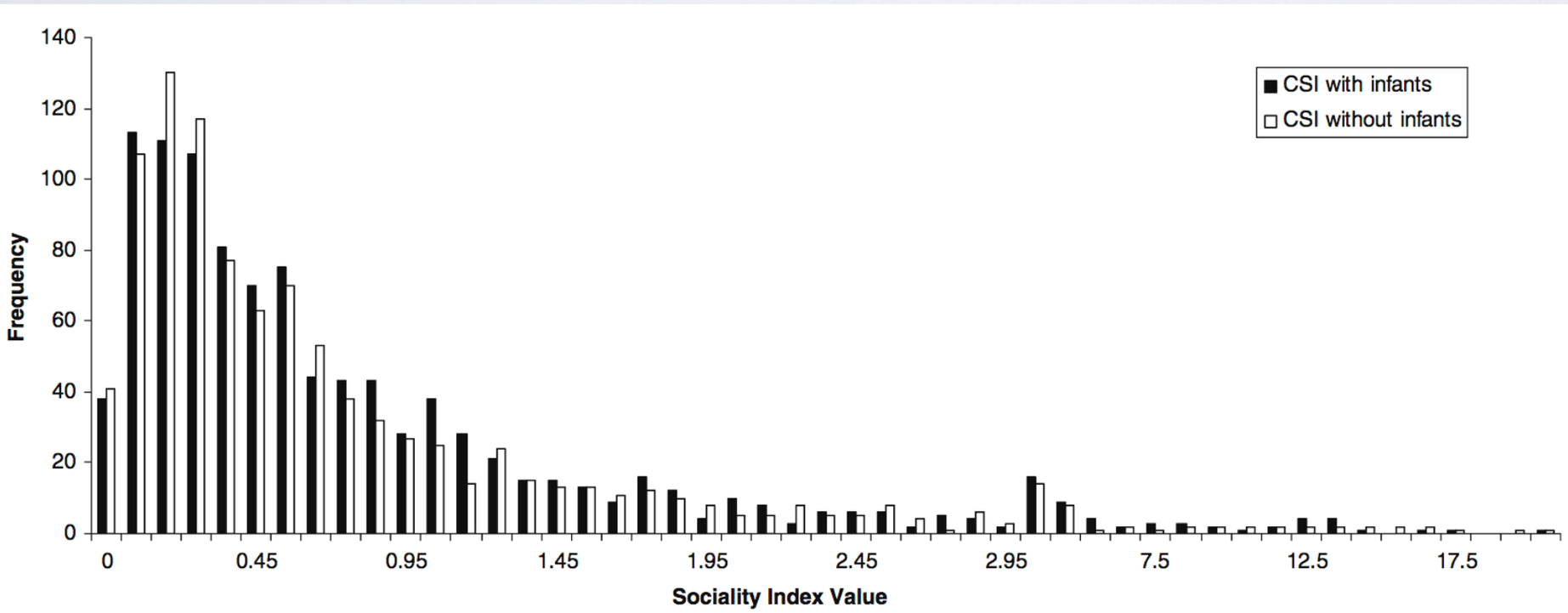
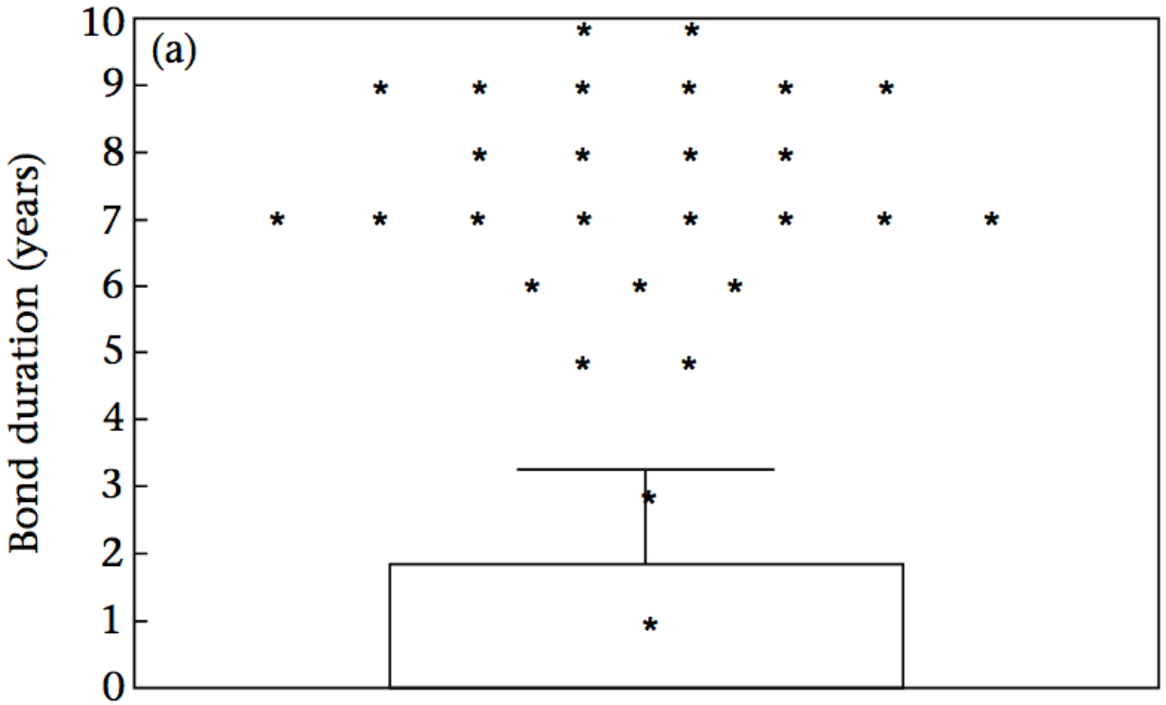


Fig. 2 Distribution of composite sociality index values. The J-shaped distribution indicates that most pairs of females interacted at relatively low rates and had low CSI values, while a small number of dyads interacted at particularly high rates and had high CSI values. *White bars* are based on data collected when females did not have young infants. *Black bars* are based on all data collected. All analyses reported here were based on data collected when females did not have young infants


Smithsonian
CHANNEL

DURATION OF BOND



Mitani 2009

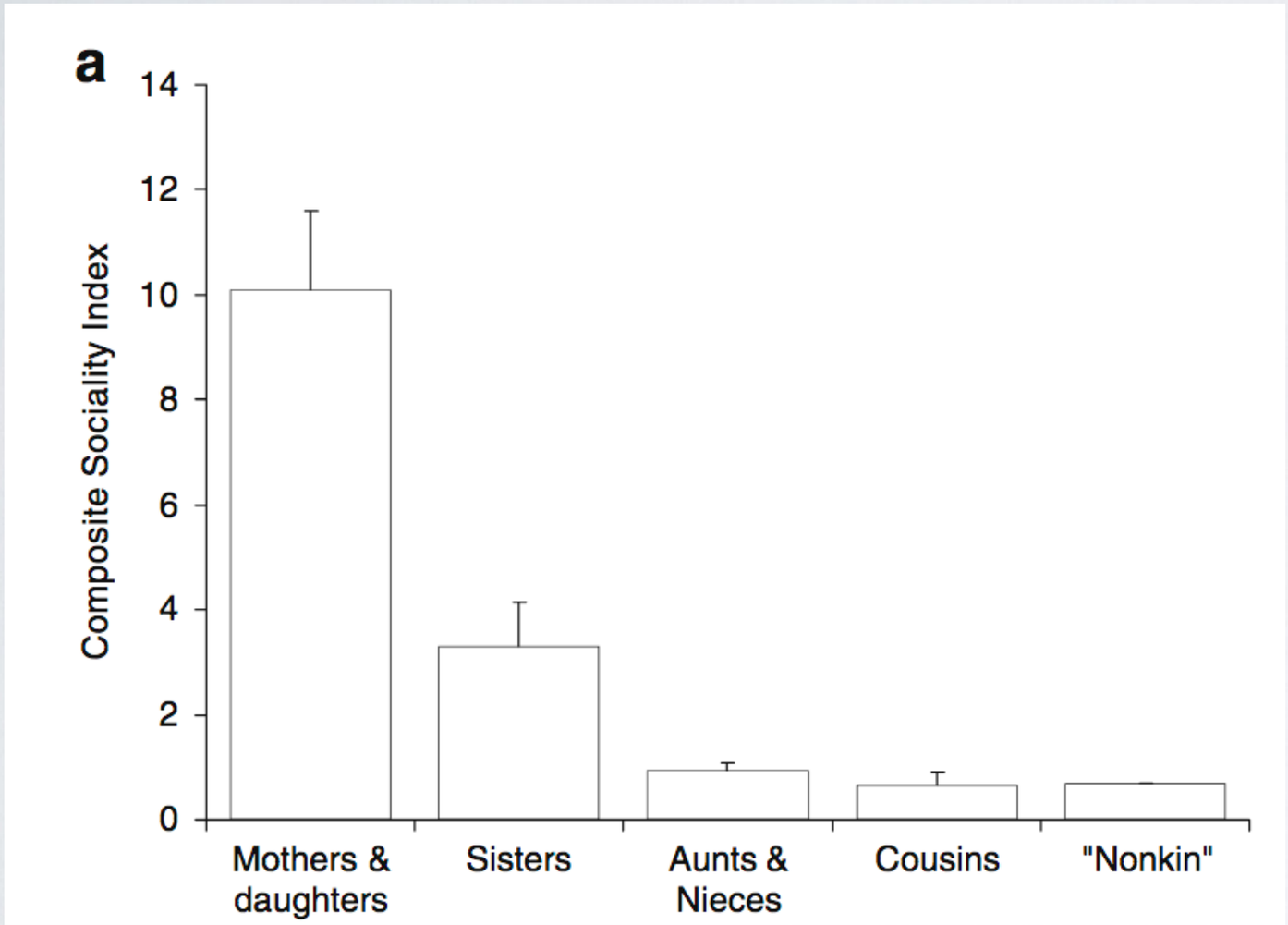
- Nearly all chimpanzees have at least one long-term social bond

OUR DEFINITION

High frequency of affiliative interactions over an extended period of time

WHO FORMS SOCIAL BONDS?

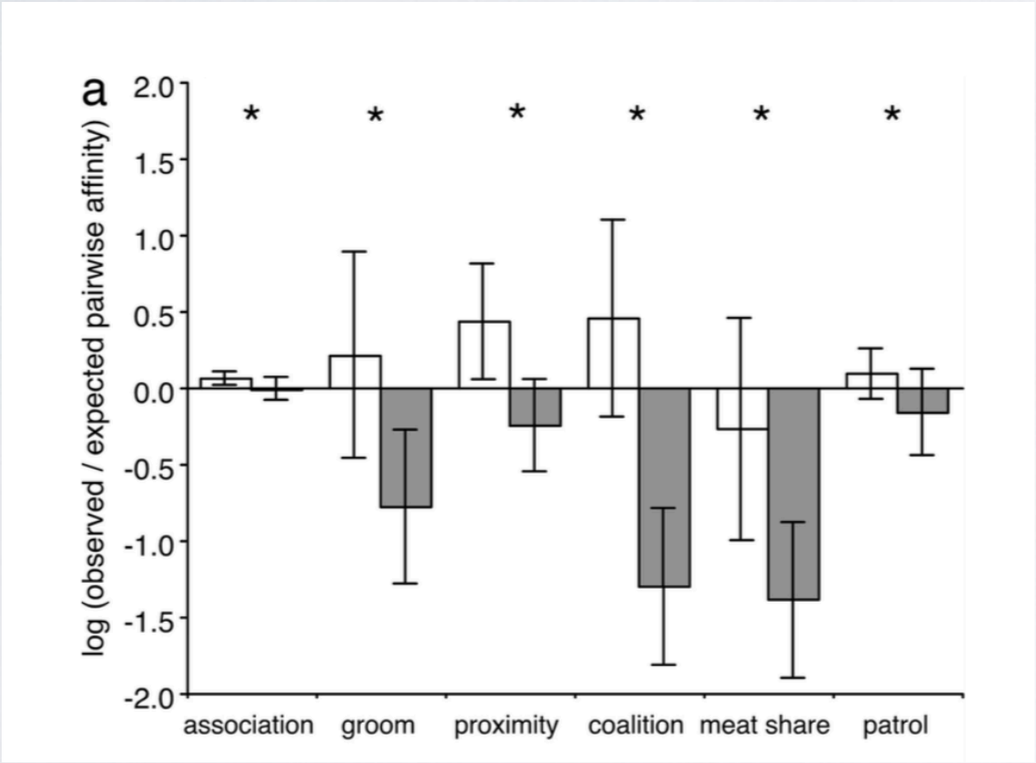
MATERNAL KIN



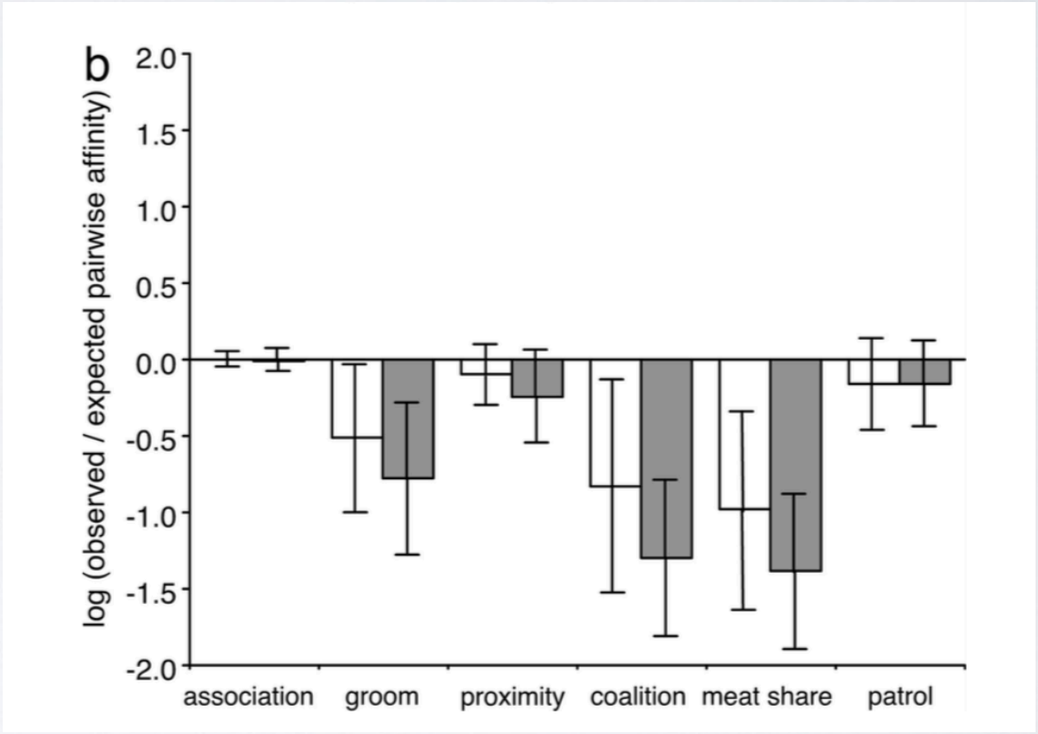
Silk et al. 2010

MATERNAL KIN

Maternal siblings



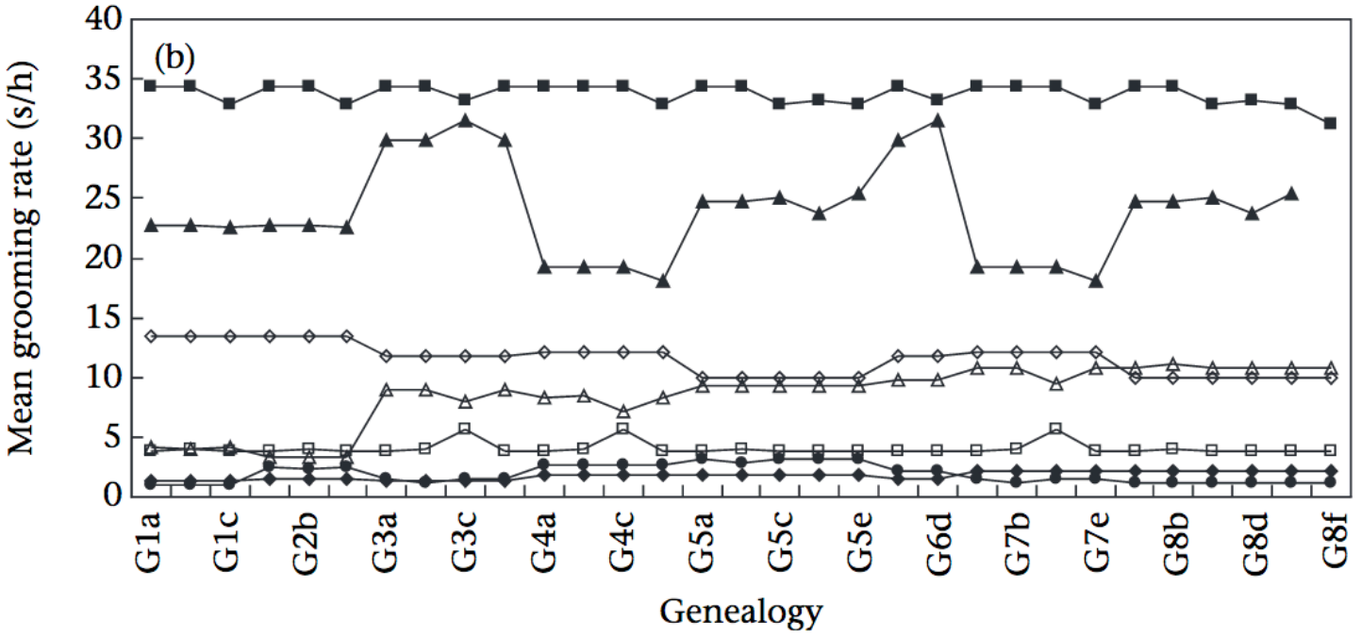
Paternal siblings



Langergraber et al. 2007

MATERNAL KIN

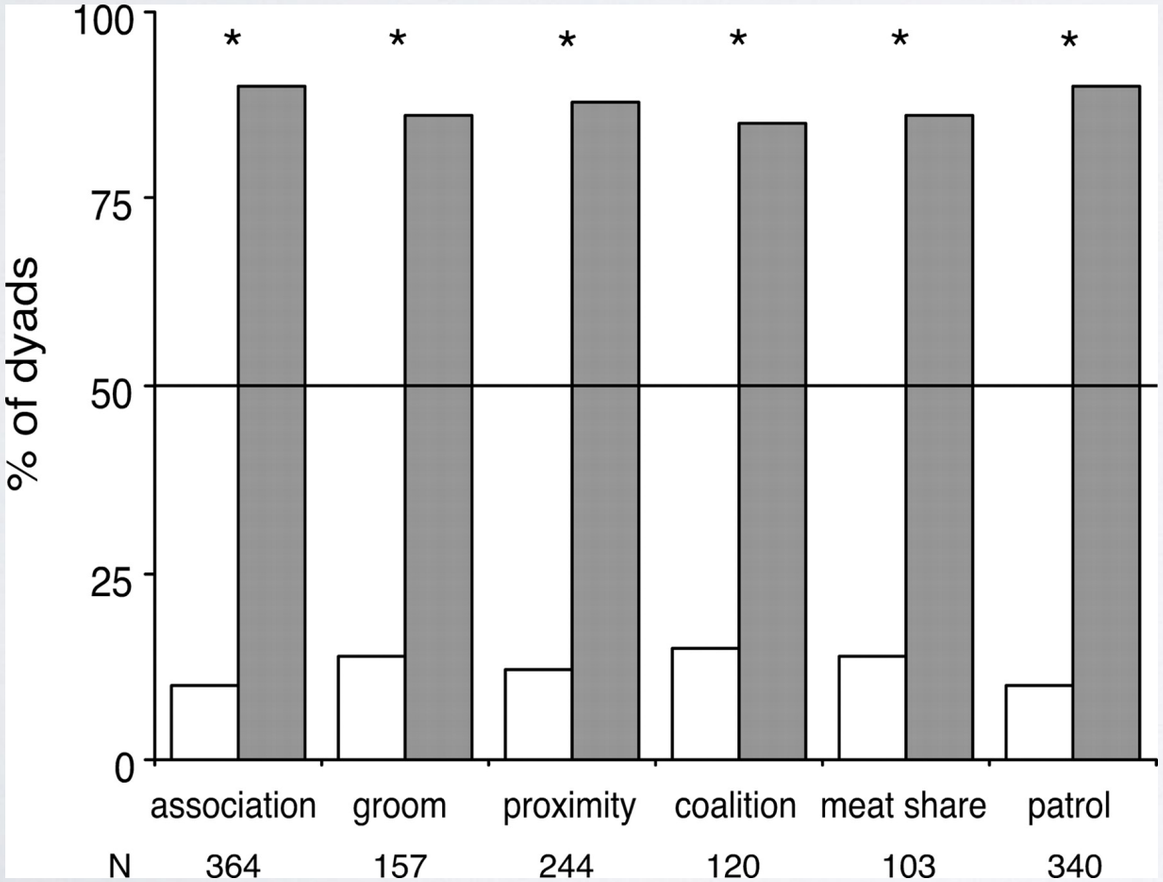
Perry et al. 2008



Dark square=full sisters
Dark triangle=maternal sister
White diamond=mother-daughter
White triangle=aunt-niece
White square=paternal sister

NON-KIN

- 22/28 chimpanzee males formed longest, closest bond with an unrelated individual
- More likely to form bond with maternal siblings, but most bonds are with non-kin

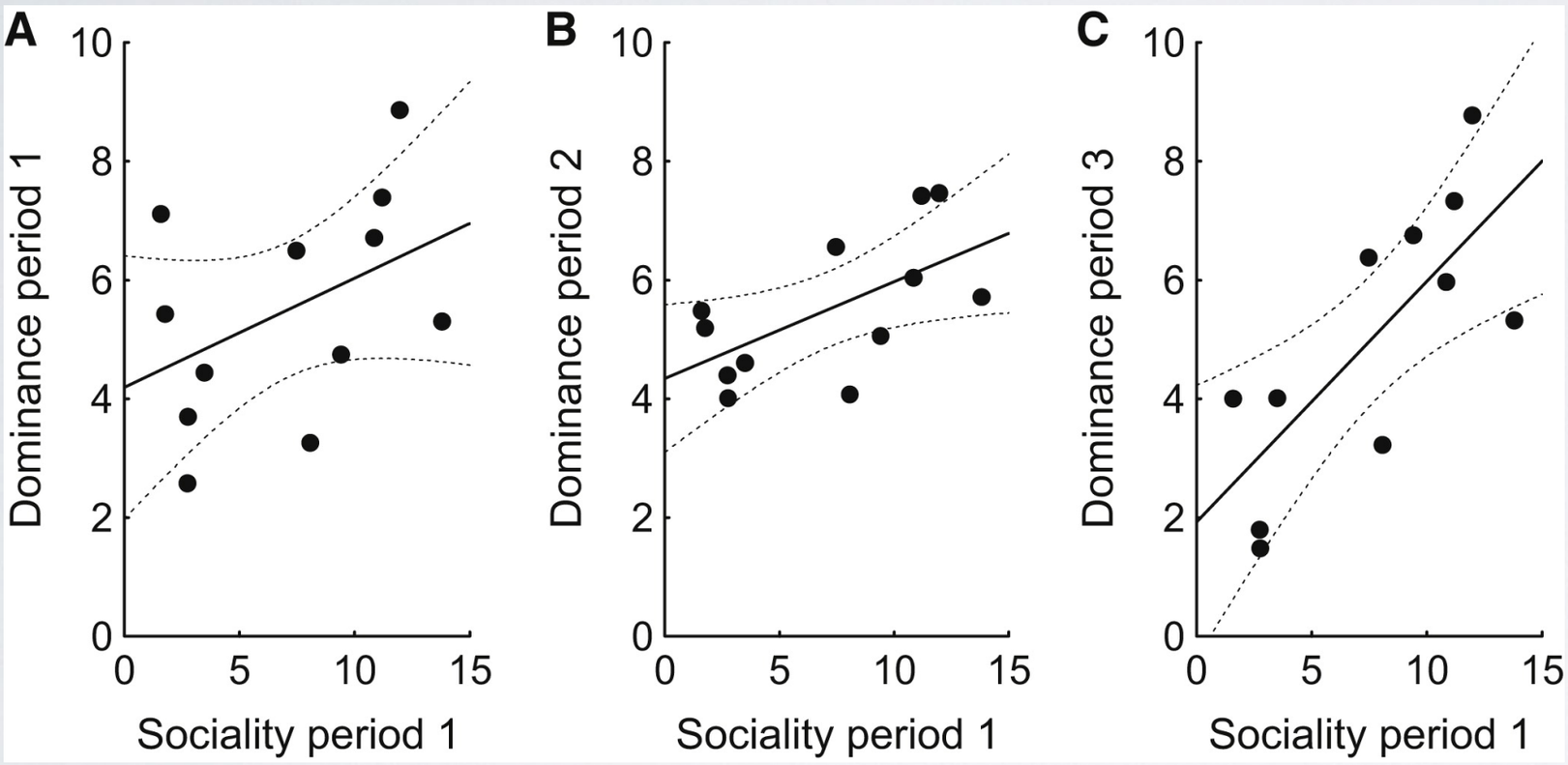


NON-KIN

- Nearly all female baboons have unrelated male friends

WHY ARE SOCIAL BONDS IMPORTANT?

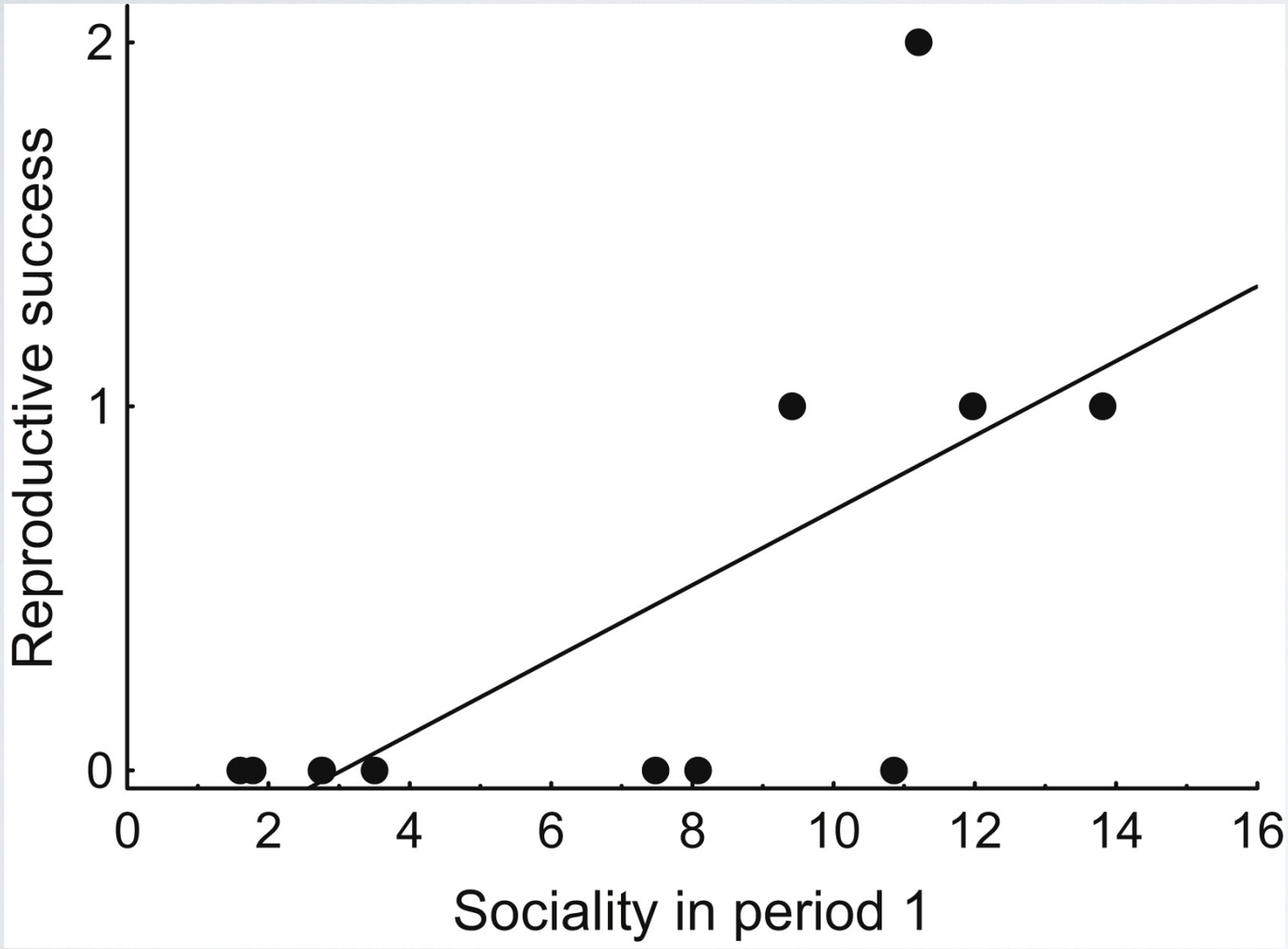
SOCIAL BONDS AND RANK



Schulke et al. 2010

Assamese macaque

SOCIAL BONDS AND REPRODUCTIVE SUCCESS



Schulke et al. 2010

Assamese macaques

SOCIAL INTEGRATION AND INFANT SURVIVAL

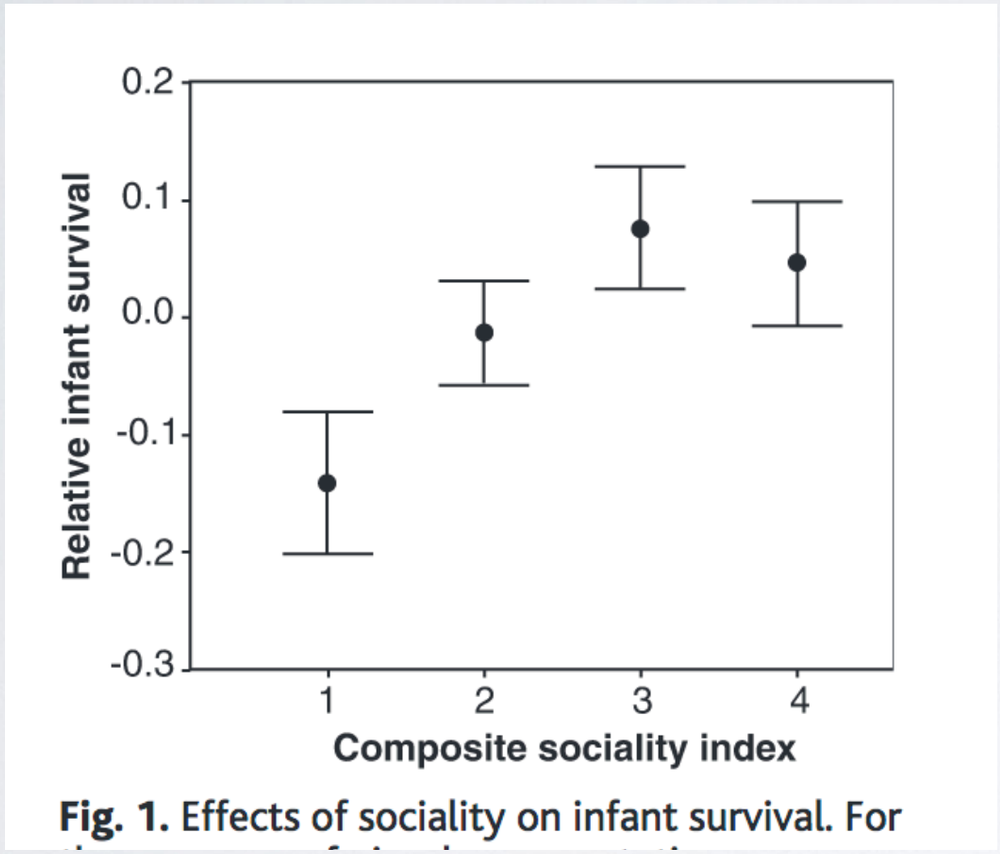
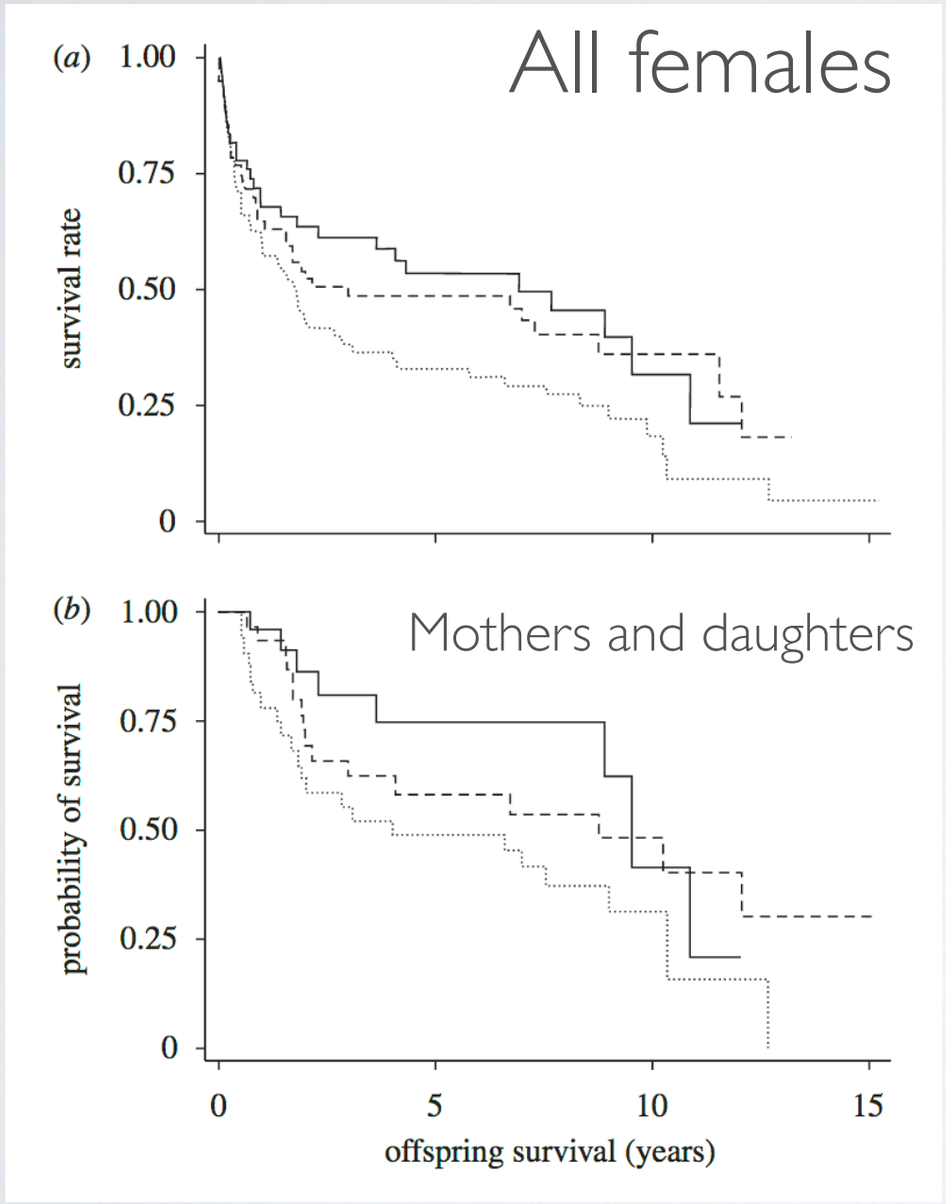


Fig. 1. Effects of sociality on infant survival. For

CSI based on proportion of time an individual is
(i) in which an adult conspecific is with 5 m
(ii) being groomed by other adults
(iii) grooming other adults.

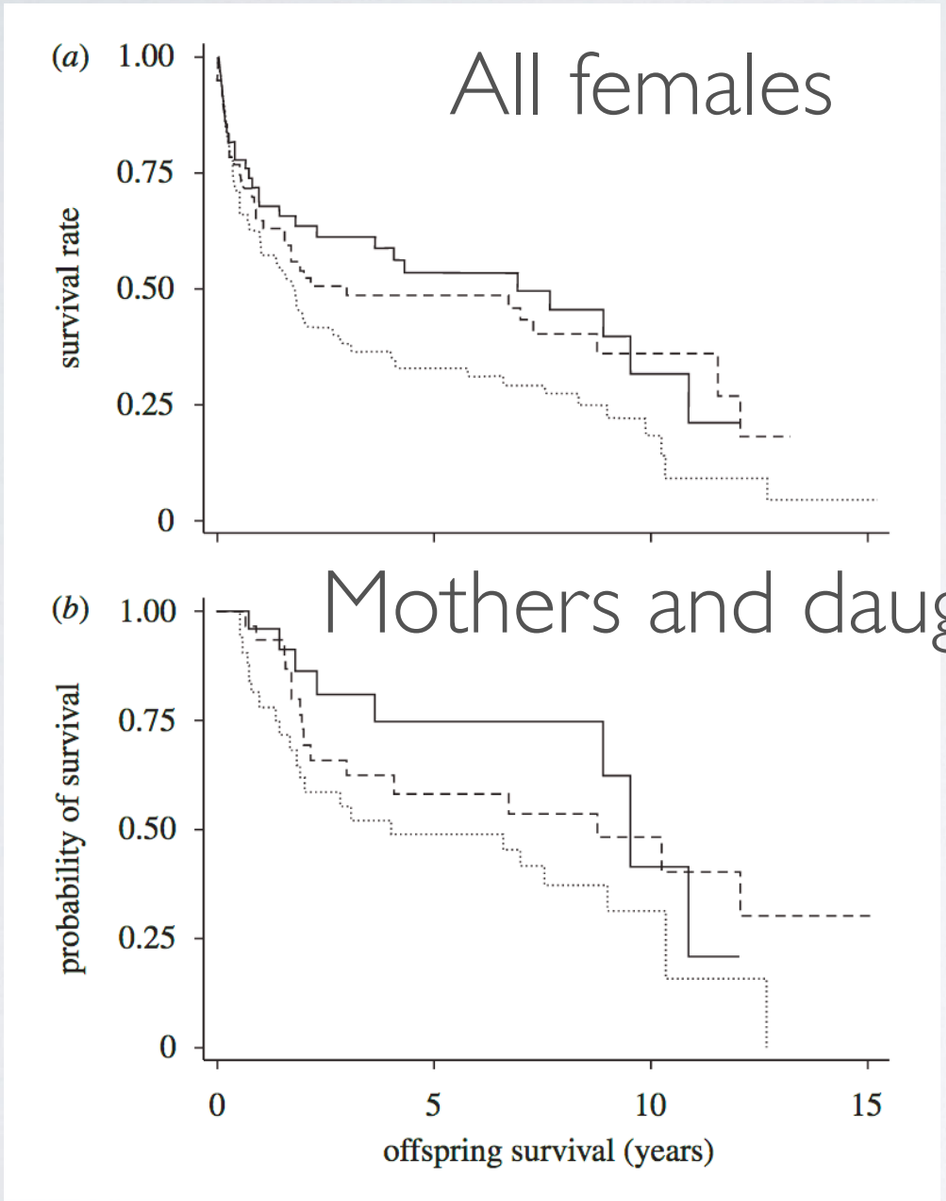
Silk et al. 2003

SOCIAL BONDS AND INFANT SURVIVAL



- Effect is independent of male friends
- Mechanisms unknown
- Possibility: More integrated females are surrounded by allies who can provide benefits such as increased access to resources and decreased harassment

SOCIAL BONDS AND INFANT SURVIVAL

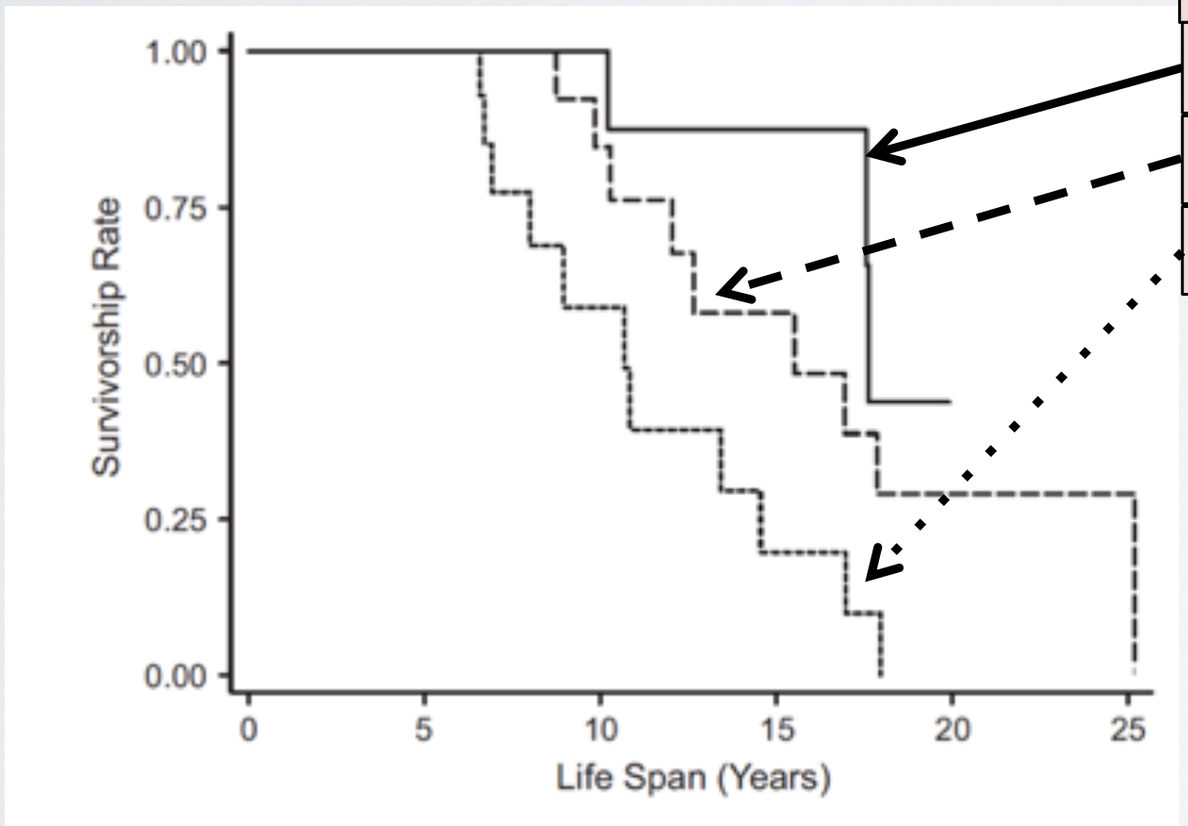


Females with strongest bonds have higher rates infant survival

Silk et al. 2009

SOCIAL BONDS AND LONGEVITY

Female baboons, Okavango
Effect of relationship quality on longevity



Females classed by "relationship quality"

Top third live longest

Middle third intermediate

Low third die youngest

Silk et al (2010) *Current Biology* 20: 1359-1361

SOCIAL BONDS AND LONGEVITY

- Mechanisms unknown
- Parallels studies of human health
- Social bonds buffer against stress and disease

SOCIAL BONDS SO FAR

- Certain dyads interact in affiliative manner more frequently than expected by chance
- These dyads are often formed of maternal kin, but non-kin form social relationships as well
- Grooming is enjoyable and may be traded for other forms of support
- Social integration and quality of relationships impact fitness

WHAT IS THE PSYCHOLOGY UNDERPINNING SOCIAL BONDS?

WHAT IS THE PSYCHOLOGY UNDERPINNING SOCIAL BONDS?

Or

Is talking about social bonds in primates just an anthropomorphic projection of the idea of human friendship on to monkeys and apes?

BREAKOUT ROOMS

- What psychology/emotions underpin human friendship?
- How could you provide evidence for the existence of this psychology solely through behavioral observations?
- Come up with a theory that accounts for positive social interactions that doesn't rely on the concept of friendship you sketched out above.
- How could you design a study to provide evidence for this non-friendship theory of positive social interactions?

TWO THEORIES OF SOCIAL BONDS

- Biological Market Theory
- Friendship Theory

BIOLOGICAL MARKET THEORY

- Individuals exchange services to meet current needs
- 'Prices' fluctuate according law of supply and demand
- Grooming is a currency
- Long-term emotional bonds unnecessary to explain 'relationships' seen in most primates
- Concept of non-human 'relationship' is an anthropomorphic projection

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FRIENDSHIP THEORY

- Relationships are composed of past dyadic interactions
- Emotion-based book keeping
- Individuals have *implicit* knowledge of their own and others relationships
- Relationship is 'real' because it affects how a dyad behaves

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- Emotion-based book keeping
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Love you
so much

BABOONS LOVE INFANTS

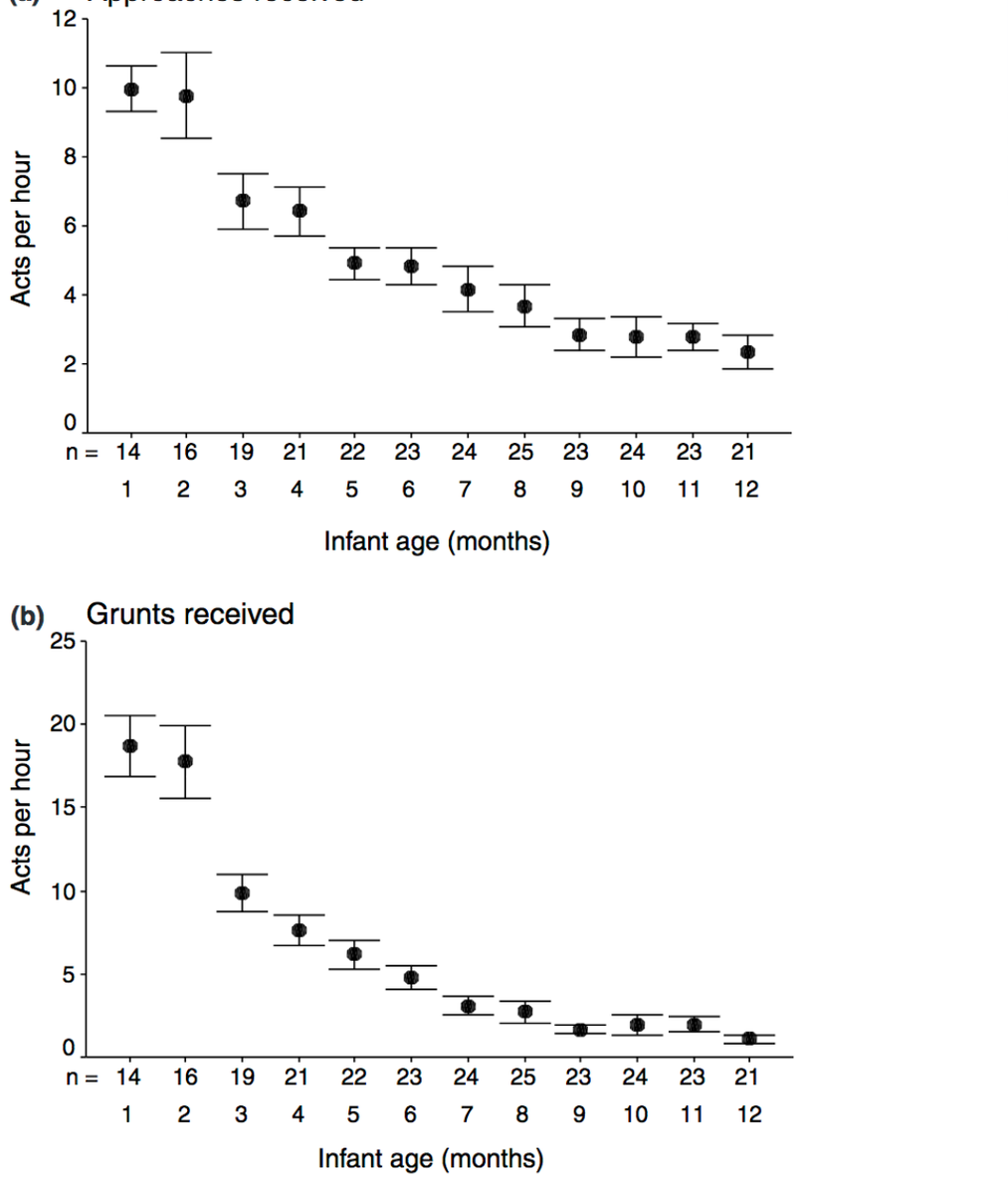


Fig. 1: These figures show the rate of approaches, vocalizations, and grooming interactions received by mothers and the rate of handling directed toward their infants at different ages. Means and standard errors are shown; the number of mother–infant pairs observed at each age is shown below the x-axis

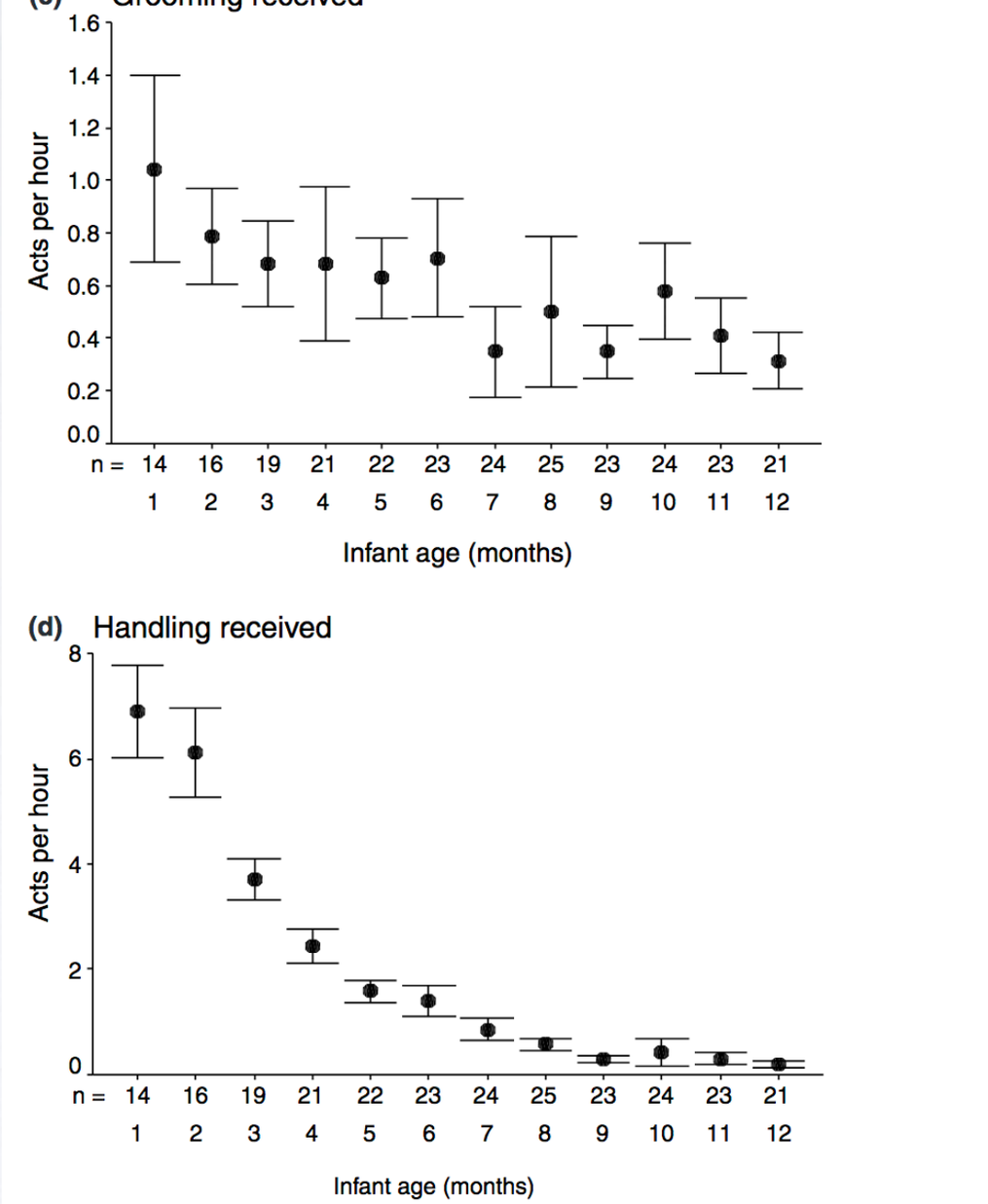


Fig. 1: Continued

Silk et al. 2003

Biological Market Theory

SIMIAN SUPPLY AND DEMAND I: LET ME TOUCH YOUR BABY!

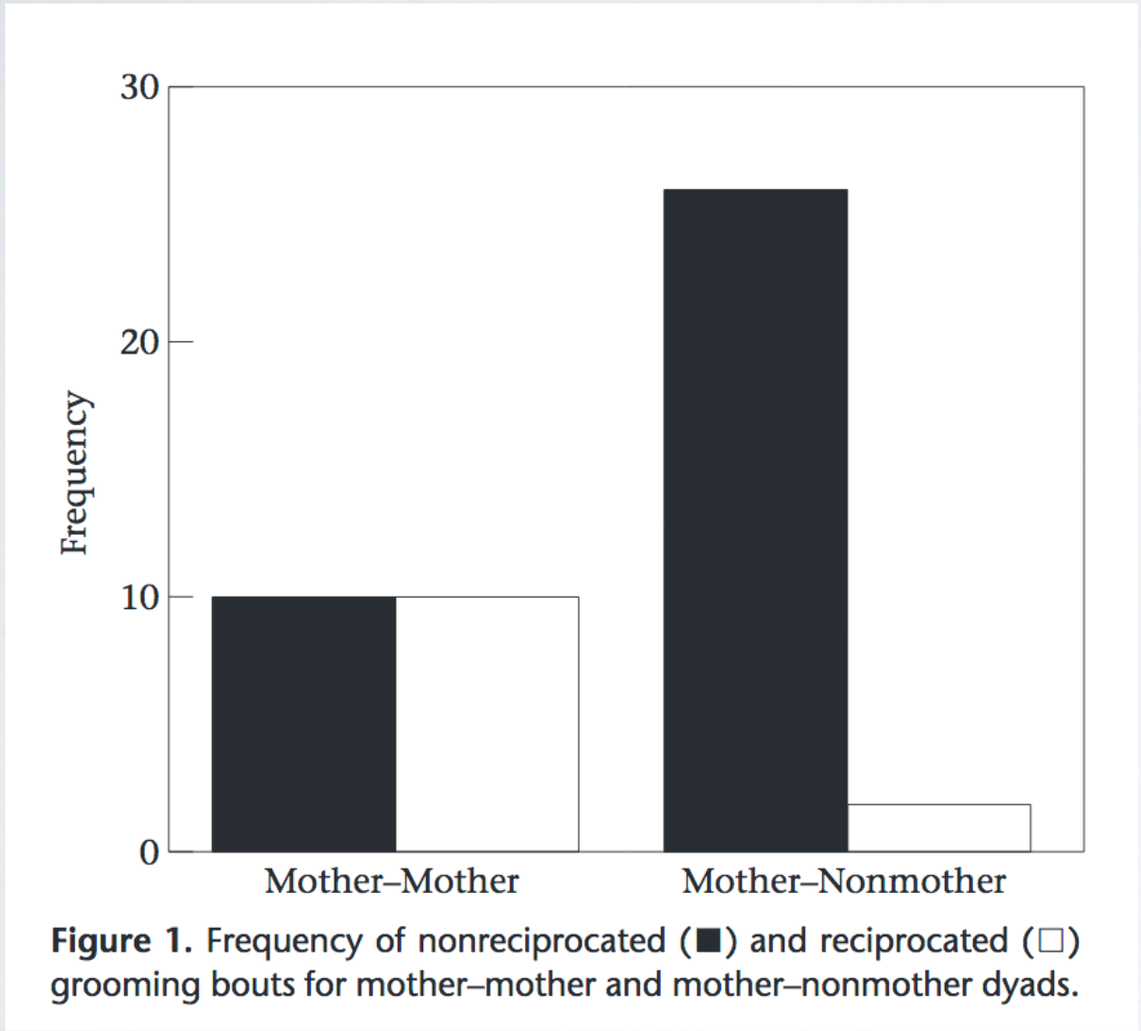


Figure 1. Frequency of nonreciprocated (■) and reciprocated (□) grooming bouts for mother–mother and mother–nonmother dyads.

Biological Market Theory

SIMIAN SUPPLY AND DEMAND I: LET ME TOUCH YOUR BABY!

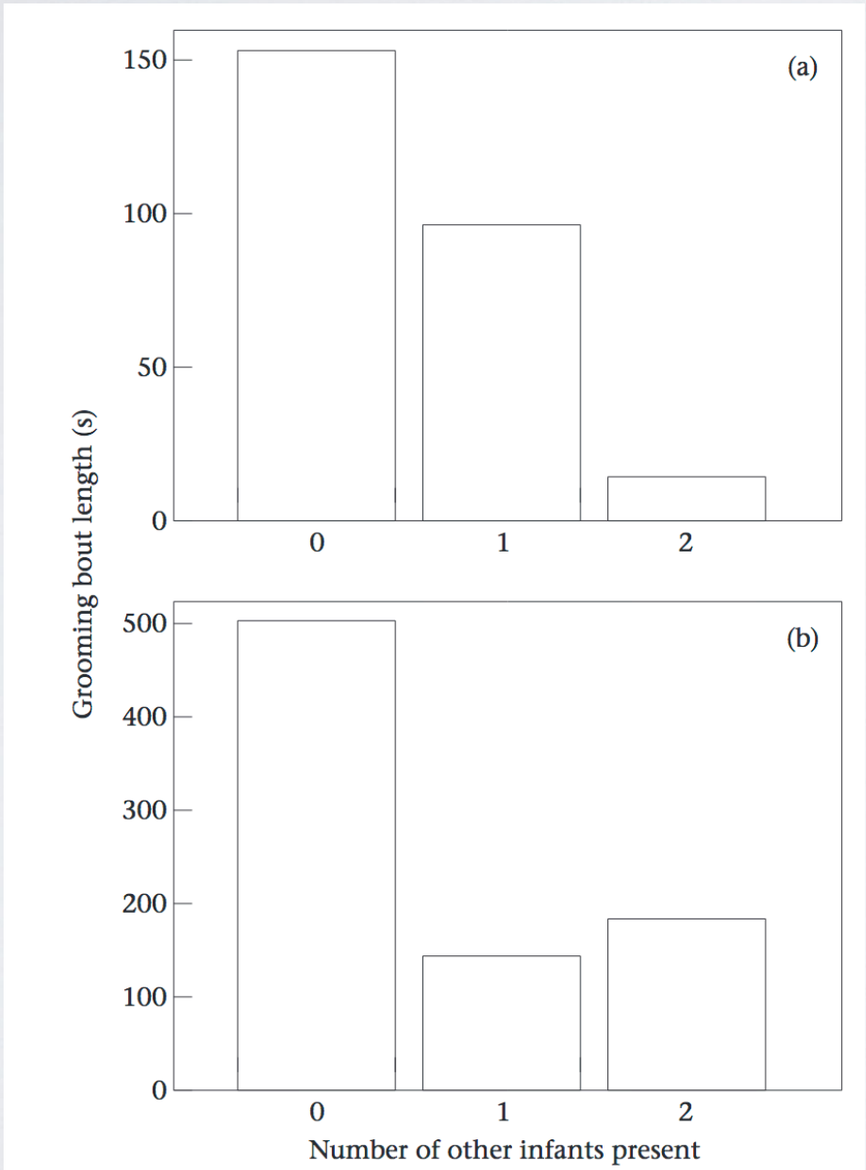
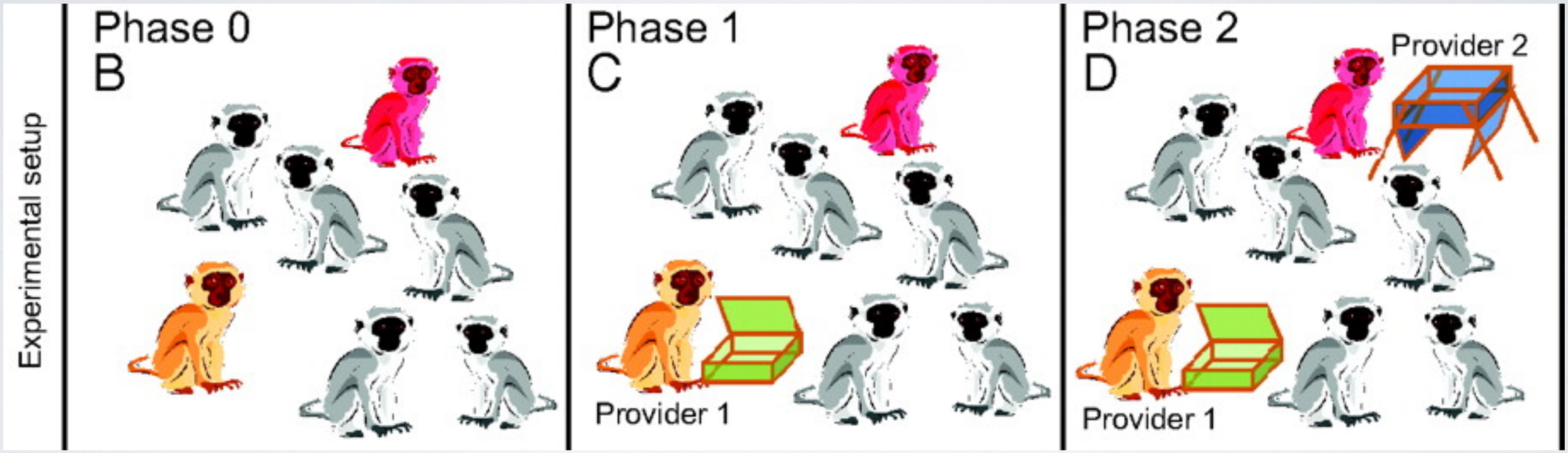


Figure 2. Variation in median grooming bout duration (s) with availability of infants present in the troop where (a) handlers outranked mothers and (b) mothers outranked handlers. Note that the Y axis scales and the number of other infants present differ.

Biological Market Theory

SIMIAN SUPPLY AND DEMAND II: GROOMING THE MAGIC MONKEY



Fruteau et al. 2009

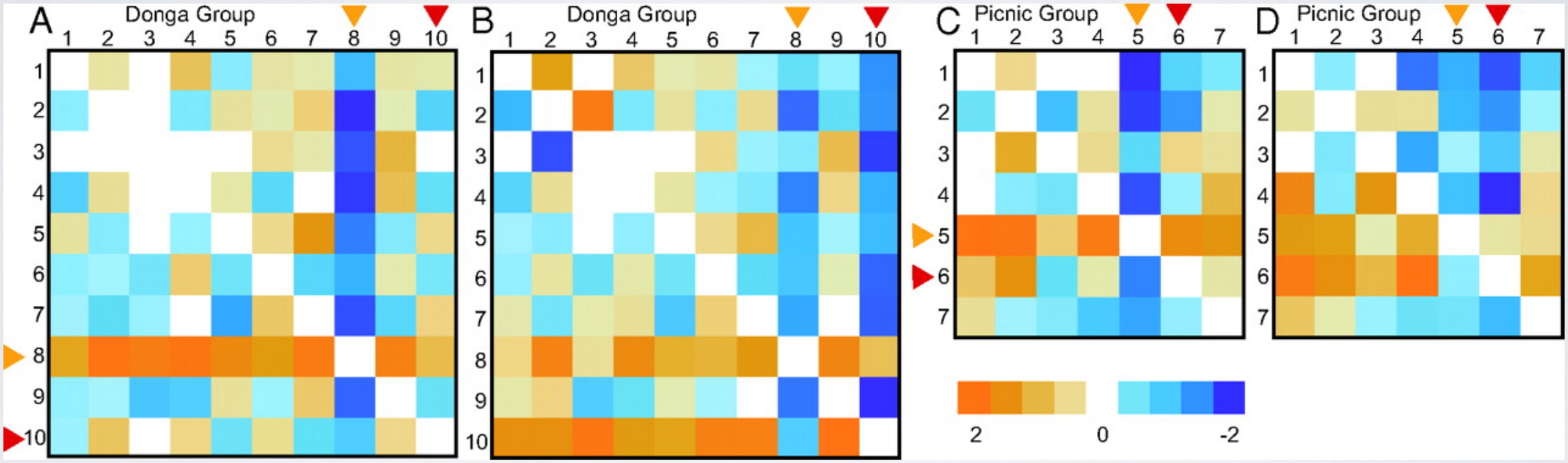
Biological Market Theory

SIMIAN SUPPLY AND DEMAND II: GROOMING THE MAGIC MONKEY

Fruteau et al. 2009

Biological Market Theory

SIMIAN SUPPLY AND DEMAND II: GROOMING THE MAGIC MONKEY



Biological Market Theory

GROOMING AS CURRENCY: THE PRICE OF PEACE

- Grooming for tolerance in Period 1
- Grooming for grooming in Period 2

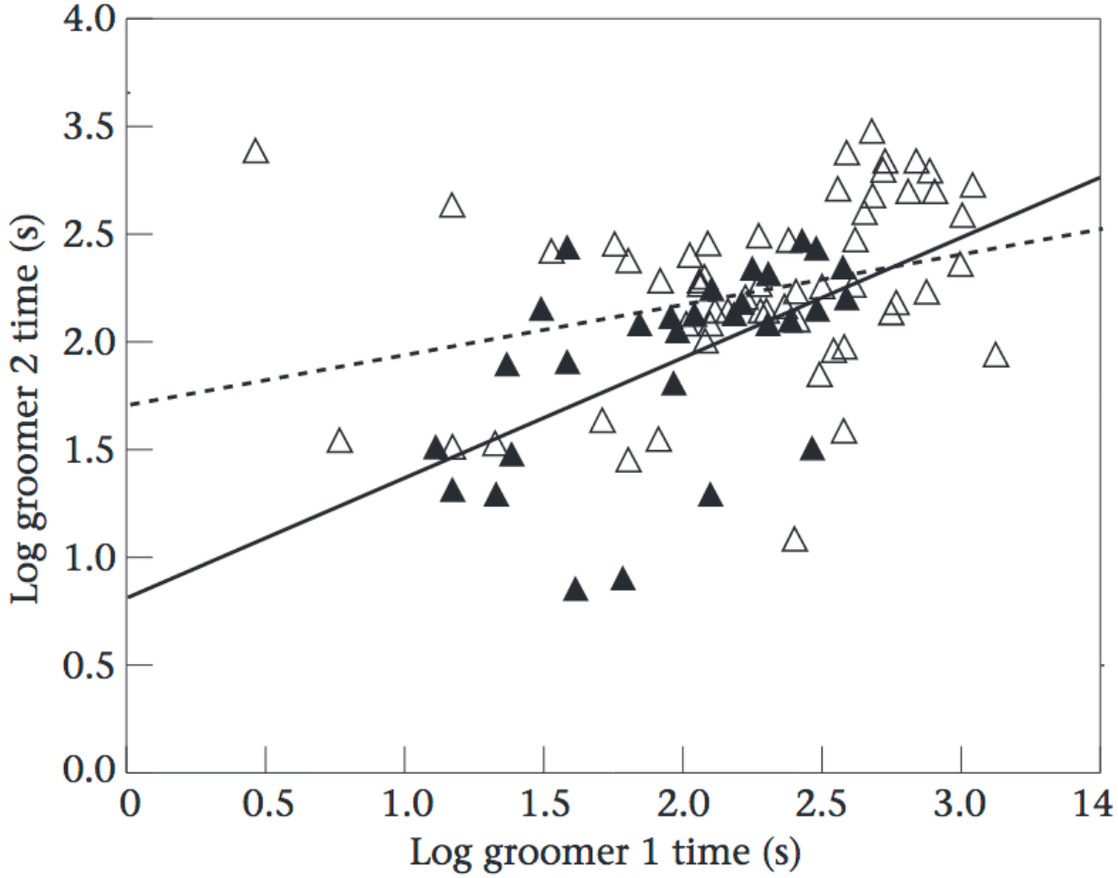
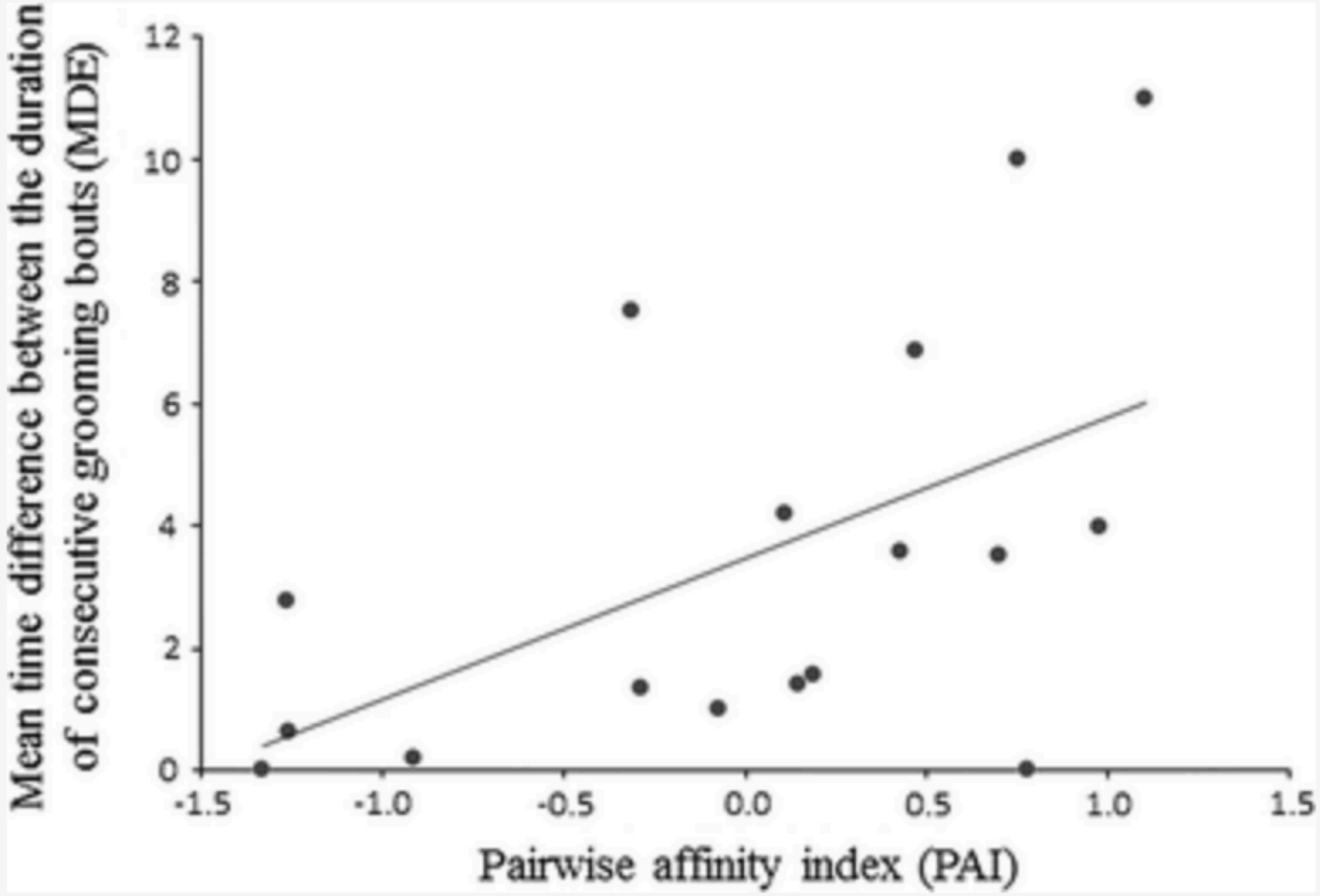


Figure 3. Relationship between the amount of time each individual contributed to individual grooming bouts ('time matching') across dyads for period 1 (– – –, △) and period 2 (——, ▲).

Barrett et al. 2002

Friendship Theory

I'LL GET YOU NEXT TIME:
MALE-MALE GROOMING IN BONOBOS:

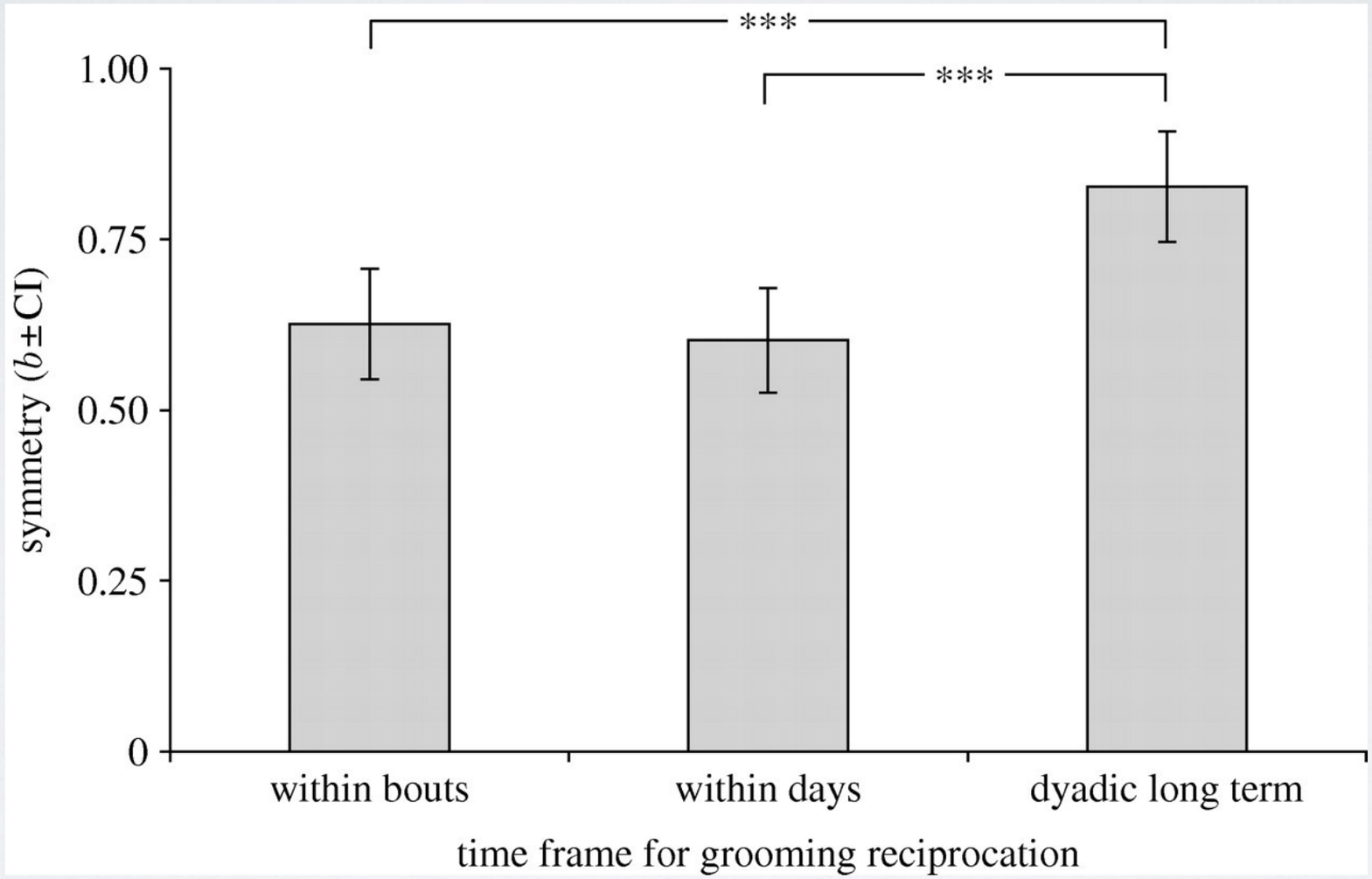


Surbeck and Hohmann 2015

Bonobos grooming

Friendship Theory

IT ALL EVENS OUT IN THE END



Male-male grooming in chimpanzees

SHARING WITH FRIENDS, NOT CLIENTS

Samuni et al. 2018

Friendship Theory

SHARING WITH FRIENDS, NOT CLIENTS

- Chimps share with individuals with whom they have equitable grooming relationships
- Not individuals that groomed them a lot

Samuni et al. 2018

Friendship Theory

NOT ALL GROOMING IS EQUAL

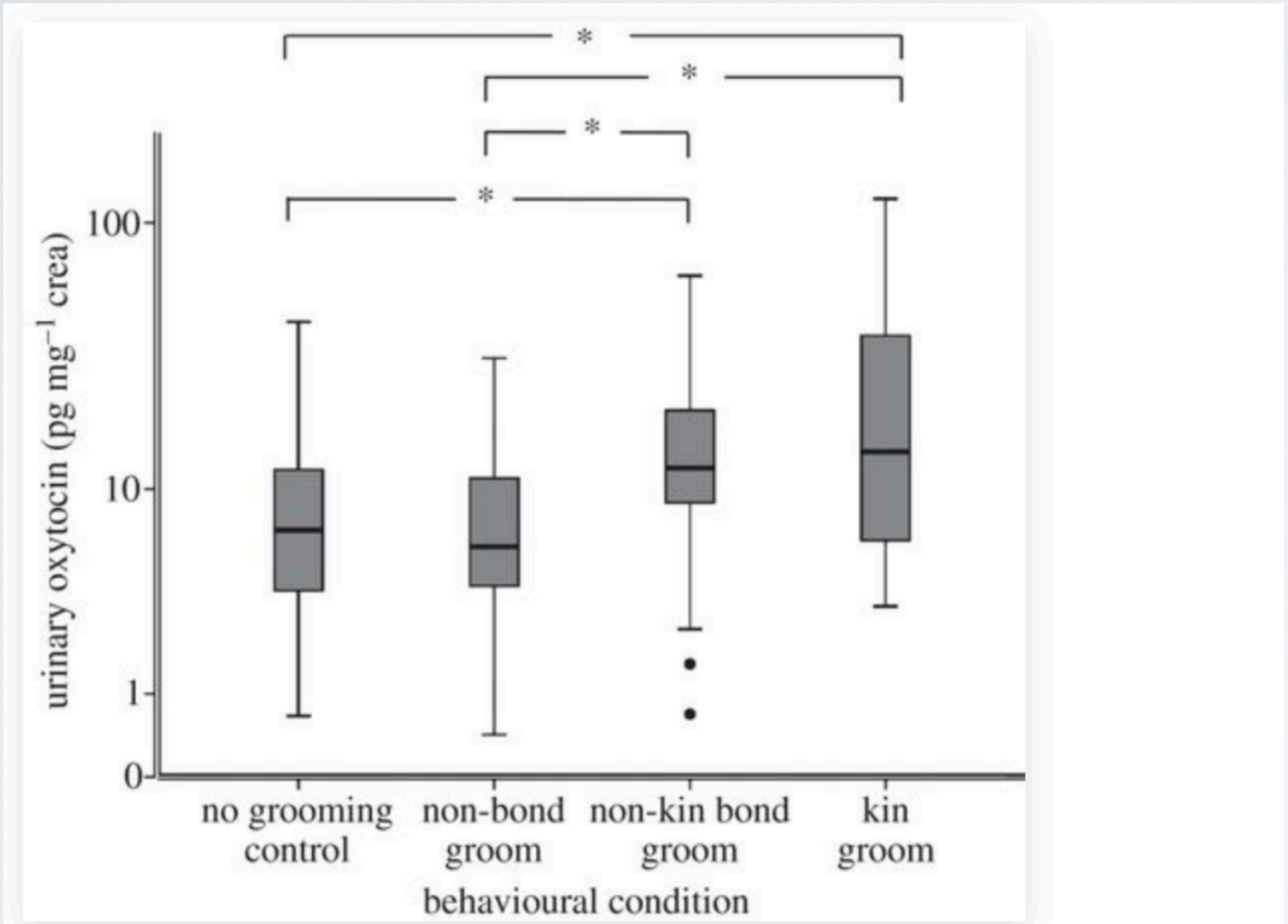


Figure 1.

The influence of relationship quality and recent grooming on urinary oxytocin levels ($n = 33$ subjects, $n = 137$ samples). Urinary oxytocin levels following a single bout of grooming (more than 10 min) with a genetically related bond partner, an unrelated bond partner, a non-bond partner or following resting or feeding (control). Box plots show median and quartiles, whiskers show the 95% CI, and circles indicate values >95% CI. Differences across behavioural conditions: *$p < 0.05$ (table 1*b*).

Friendship Theory

MORE PARTNERS, MORE PROBLEMS

- Having more grooming partners is associated with higher stress levels

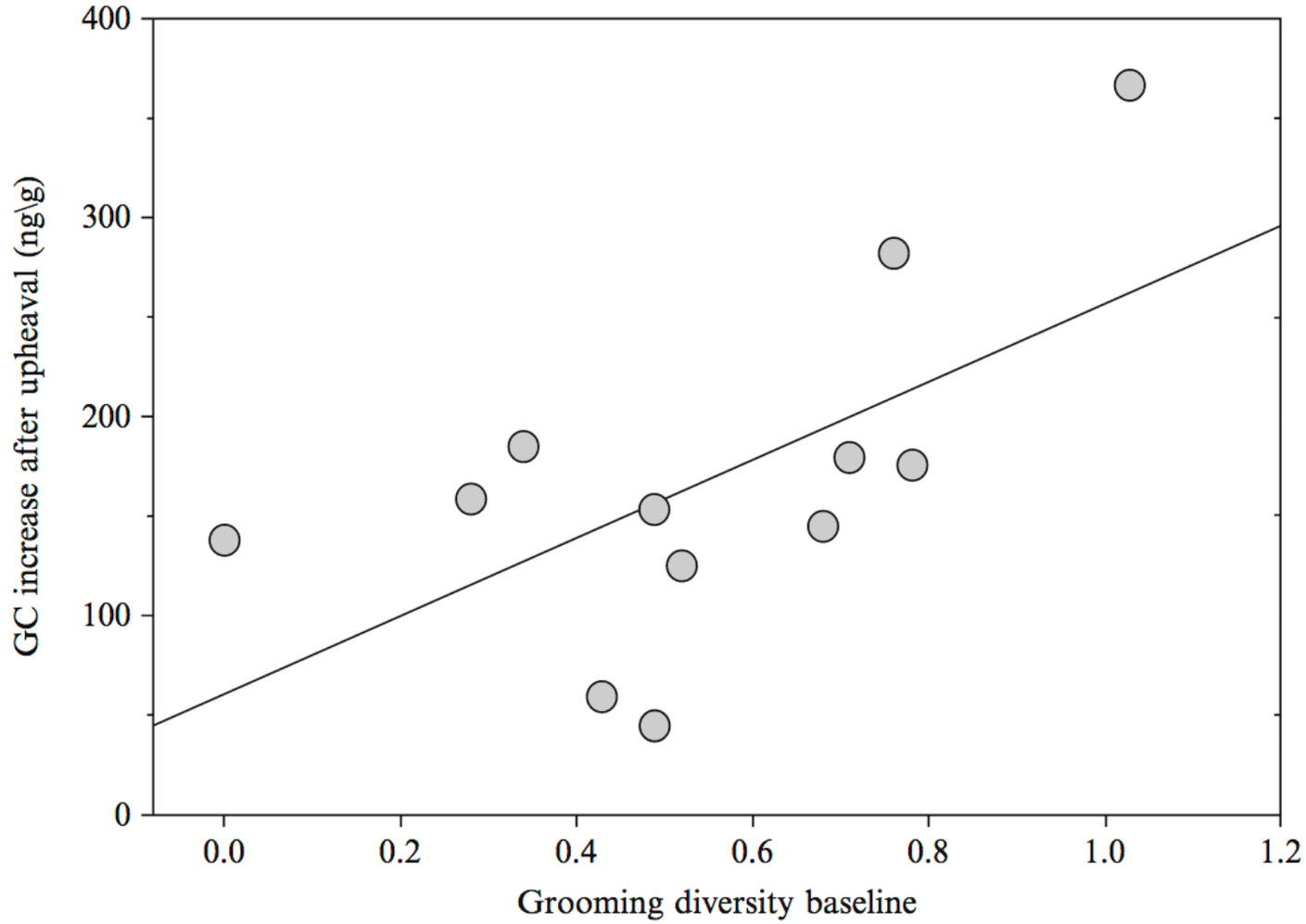


FIG. 6. The correlation between cycling and pregnant females' grooming diversity before the male immigration event and the increase in their GC levels in the following week (increase = GC levels$_{\text{week 1}}$−GC levels$_{\text{week 1}}$). Females who had a lower diversity of grooming partners experienced a smaller increase than females with a higher diversity of grooming partners.

Friendship Theory

RESPONSE TO DEATH OF CLOSE RELATIVE

- Stress levels increase after loss of close relative

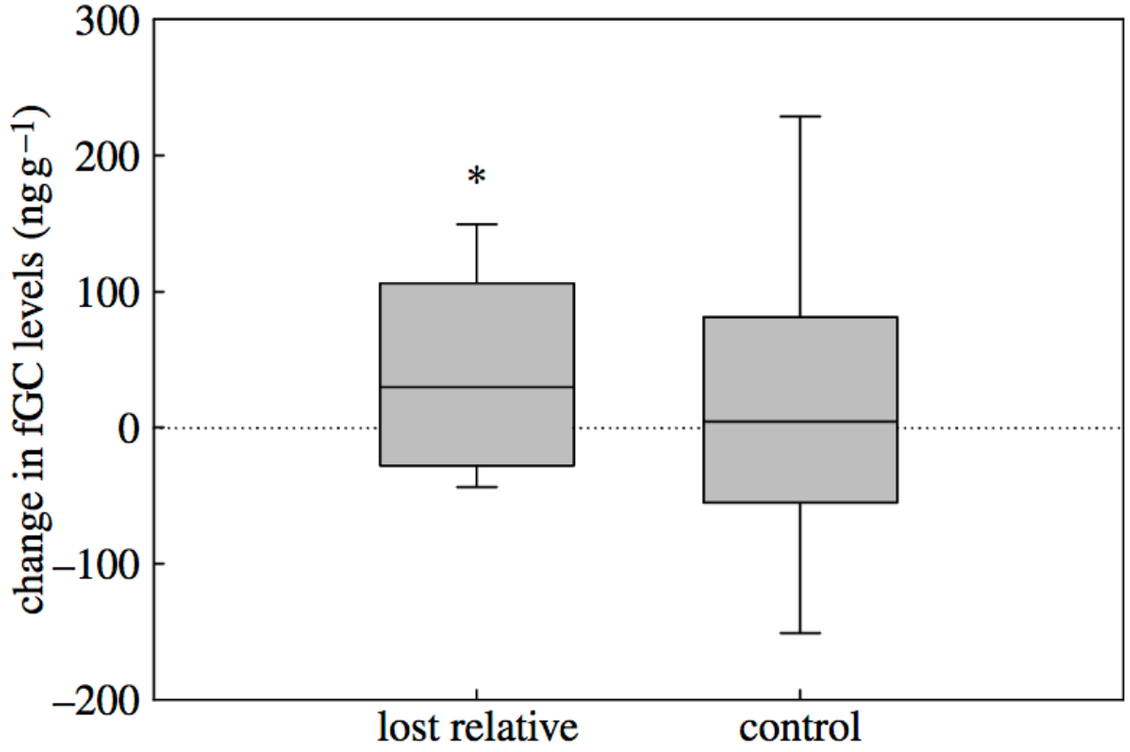
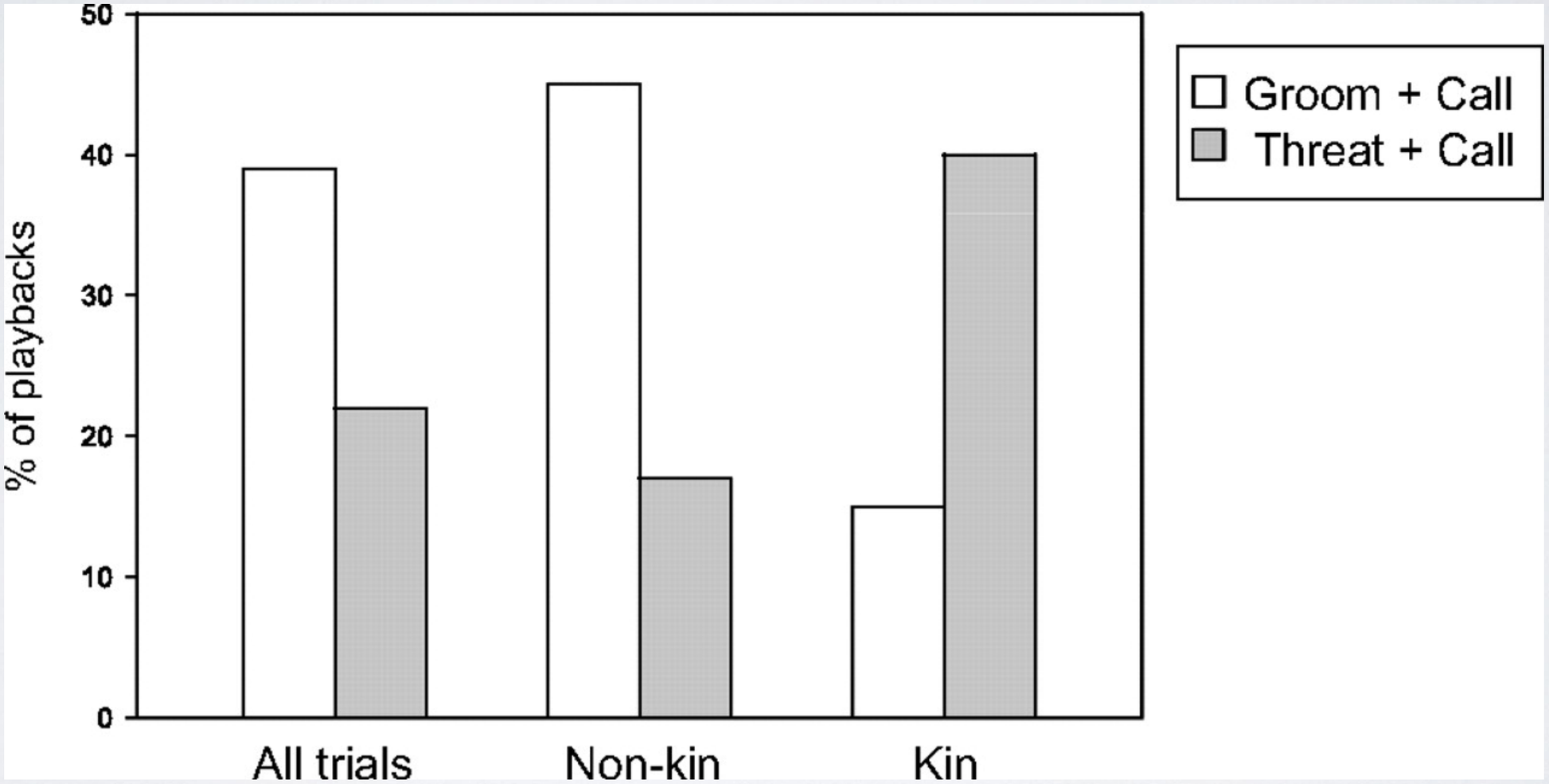


Figure 1. Change in fGC levels of 22 females who lost a close relative (i.e. mother, maternal sibling, offspring) to observed or suspected predation, compared to matched controls whose relatives did not die. Each box encompasses the 25th through 75th percentiles, with the median represented by an interior line. Whiskers denote 10th and 90th percentiles. An asterisk denotes a significant difference.

HOW TO RECONCILE BIOLOGICAL MARKETS AND FRIENDSHIP?

HOW TO RECONCILE BIOLOGICAL MARKETS AND FRIENDSHIP?



Contingent cooperation among baboons

Cheney et al. 2010

HOW TO RECONCILE BIOLOGICAL MARKETS AND FRIENDSHIP?

- Biological Market Theory explains certain interactions
- Some interactions, however, can only be explained as a result of individuals acting on their implicit social knowledge
- Recent, single interactions likely to be important for non-friends, but not for friends

QUESTIONS?