

Why Live in Groups and Kinds of Social Interactions

List on the board Darwin's hostile forces as why organisms live in groups, and all the social interactions I want to distinguish: predation, parasitism, direct and indirect nepotism, mutualism, pseudo-reciprocity, inveigling, direct social reciprocity, indirect social reciprocity.

We want to know what all the different kinds of social interactions are, and how they evolve. We want to be able to place any new social interaction we hear about into one category or another and thereby understand it because we understand that category of social interaction. It's easy to talk about one or another social interaction and believe we're learned if we don't try to tackle them all, and in selective terms. But if we are going to realize in here our goal of understanding humans in evolutionary terms, we have to understand any and every social interaction that comes along. That's not easy.

To understand kinds of social interactions we need first to understand why organisms live in groups. Our intent must be to find ways, if possible, to understand all groupings of organisms. It's easy if one only takes a few groups of organisms and develops hypotheses to explain their grouping; the difficult thing is to develop an approach that promises to explain all groupings in all organisms. But that's what we need to do if we are going to apply natural selection to understanding animal behavior. Part of the proposition is that until 25 or 30 years ago biologists supposed that organisms live in groups so they can help each other because they believed that selection is most effective at the group level.

We can begin with Darwin's hostile forces, supposing that organisms live in groups because of predators, parasites, diseases, food shortages, climate, and weather.

Read out loud bottom right of p. 73 and upper left of 74 in text.

We might expect three major kinds of behavior by individuals in groups: (1) self-helping (selfish), (2) relative-helping (selfish: nepotistic), and (3) group-helping or other-helping, not restricted to or favoring relatives (altruistic).

If organisms group to help each other against hostile forces, then we should expect groups to take special forms. The longer-established the group the more likely that mothers who lose their offspring or have extra parental effort to give should go looking for orphans to assist: except in humans they don't do this. Rather, in all cases known, the opposite happens: mothers who live alone accept strange offspring but mothers who live in groups have strong aversions to orphans. That's a falsifier of the notion that social groups are selected at the group level. We have to return to the question why humans adopt; we might suggest that it's because we have always lived in groups of close kin and have for a long time shown a unique differential and extrafamilial nepotism.

If organisms group to help each other, we should also expect that when danger threatens the group should behave so as to protect the more vulnerable individuals: juveniles and weak, lame, sick, or small individuals. That happens when the group is composed of parents and offspring. It happens in some groups composed of close relatives that include other than parents and offspring: I know of no clear cases outside (1) eusocial forms such as ants, termites, wasps, bees, naked mole rats, and aphids (explain) and (2) perhaps sibling groups of poisonous and bad-tasting caterpillars and other forms (explain Fisher's argument about how bright color and bad taste can evolve in such forms). Musk oxen are often touted as an example, but one doesn't know if the adults are forming in a circle to protect the juveniles or to protect themselves, with the juveniles springing to the center to protect themselves.

At least one knows the kind of response such a group should make to the attack of a predator, and what to look for. It's important that such cases are restricted to close relatives because it indicates that nepotism is what is happening, not any other kind of altruism (explain the difference: use a list of kinds of social interactions).

Again, I think this general finding is a falsification of the notion that groups form or are maintained as an aspect of group selection.

If groups form because individuals find it reproductively profitable, then not only should the above findings be true, but we should also expect that all kinds of social interactions would give evidence of having evolved to reduce the likelihood of losing benefits to others and to increase the likelihood of acquiring benefits to one's self -- actually to one's genes. We should examine all social interactions with that expectation in mind, and we should be able to understand them only if we keep that expectation in mind.

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or "no brain?"
"No brain?"
"because"

① potential partners are alike
② " " " " " " " "
③ parceling
far apart
or hard to find

High Cost to Change
Low Benefit to Change
1. receive all alcohol
2. Parceling to back
of p. 5-

Mutualism prevails when the expense of changing to a different partner is greater than the benefit of cheating through taking a benefit and leaving. There may be no benefit large enough, or no partner nearby. If partners are readily available parceling may work. There may be little difference between potential partners.

Use flowers and pollinators to explain mutualism; compare it to host-specific plant feeders.

Mutualism: Flowers and pollinators: bees or flies start feeding on pollen; some gets carried; plants that make excess pollen attract more pollinators, fertilize more ova; some plant makes something like nectar, attracts more pollinators; more distinctive flower attract more pollinators. Each party is reliable, in evolutionary terms, for the other. Each change in each party benefits its self because it causes the other party to do something beneficial for its self. No brain is required in the plants. The brain in the pollinator evolves because it helps the pollinator find the flowers not because it helps the pollinator "cheat" or "beat" the plant.

which is unpredictable

No brain

Cooperation occurs when collective action benefits everyone (boatful of rowers heading for a waterfall); cheating is not possible.

Social reciprocity involves one organism being repaid for incurring a cost explicitly as a benefit to the other organism. Social reciprocity prevails when it sometimes pays to desert after receiving a benefit and change to another partner. That can happen if additional partners are readily available, or if potential partners vary greatly in value as partners.

Use a loan of money or risking one's life to save another as examples of reciprocity.

Cheating in reciprocity can be reduced by evolution of means of detecting it, or detecting its likelihood, and through indirect reciprocity (reputation).

Buying a hamburger example of social reciprocity (time element in parceling)

Horses mutually grooming as an example of benefit parceling

John Bihlmeyer example of social reciprocity

Starlings piling together in flying flocks

Sheep piling together

Fish schools piling together: small fish and "sea wolves" off Green Island

Flamingos in flight

Cows and other grazers and herd geometry

Birds nesting on cliffs

Baboons or bison or caribou or ____ on a savannah

Small groups of prey animals in rolling country with some trees, such as horses

Zebras (and baboons) in small groups that merge

Chimpanzees in fruiting trees (food clumping)

Vultures flying in sight of one another (food clumping)

Wild dogs cooperating to bring down game

Ostrich babies uniting in multiple broods

Communal nursing of bats

Leks: collembola, sage grouse, honeybees, swarms of flies (world series pitcher's mound: ponds and streams and cow patties and puddles: resource-based and non-resource-based: meaning of lek. Why nonresource-based leks are appropriate in species with no paternal care and no clumped resources.

Explain how mutualism may be unlikely to lead to social reciprocity and how nepotism pre-adapts for both direct and indirect reciprocity.

Distinguish paternal care and mating effort and explain pseudo-reciprocity.

Explain why no large brain is required for mutualism, and why it is for reciprocity. Explain in general why learning evolves (when predictability of important events is such -- short-term and unpredictable -- that

exposure to immediately preceding events during one's lifetime and adjustment as a result works better than preparation without individual experience. Use snake bite as an example when pre-preparation works best; and sexual response in insects that may never see another individual of their species before becoming ready to mate. But if you have regular possibilities to learn about an event incompletely predictable before you have to experience it, you may gain by changing your behavior to fit it better.

Mutualism is based on long-term predictability (it's a sure thing like host-specificity: you'll gain for sure, the only question is how much), and on it being more expensive to change partners even after receiving a benefit than remaining with the current one: partners vary little, and probably there is typically evolution that causes exchange of benefits to reduce the payoff from changing partners (e.g., parceling). I'm not sure there is a break between the two, but certainly social reciprocity has resulted in a race to have a bigger brain while mutualism can remain essentially brainless. And I think the difference has to do with how much learning can assist in securing benefits and avoiding costs. Does mutualism evolve, then, because you cannot cheat, and social reciprocity even though you can sometimes cheat and win (in effect, it evolves because cheating can often enough be reduced in cost: maybe reciprocity is what typically evolves when there are multiple possible partners that vary in quality, and it causes individuals to advertise differences in quality -- how does it differ from mate choice?). Precisely what is sure enough about reciprocity to make it evolve? Is it that if some evolve to do it the rest can't avoid the game, even if they happen to be the ones that will lose by its existence? It's sure enough that we evolve the machinery for dealing with it? What is that machinery evolved to do? To choose (invest in) partners according to their ability and likelihood of paying us back with interest? And avoid partners that won't? In the male-female interaction either can lose, not as male or female per se but as an individual in an interaction with another individual.

The male-female interaction is mutualism because the sexes are evolved to depend on one another; in the interactions between one male and one female it starts to assume qualities of reciprocity (!) it can include pseudo-reciprocity (male gives gift worth x , female gives mating worth more than x , male leaves; distinguish male cricket, doling out gift while mating proceeds, and male bird feeding female -- is he demonstrating ability to feed young, commitment, or his good health?), parasitism (males on female parental effort), may involve reciprocity in humans.

on one side
 (+ maybe
 must be
 you have
 reciprocal)

Pseudo-Reciprocity
 byproduct
 mutualism
 parechery

NO BRAIN

SOME BRAIN (at least on one side)

LOTS OF BRAIN

Nondisc - ?

Nepotism

How much yolk in egg
When & where to lay it
How to hatch it

Recognize parent
Recognize young (only)

when under it no brain (as by site)

Extensively DISCRIMINATE

Nepotism in Direct

Indirect

Mutualism

Parochial?

Asymmetry
Honey bee

(Individual recognition because ~~individual~~ reciprocity Treatment)

Reciprocity

Direct

Indirect



High cost to changing partners
they're far apart
hard to find

Not much benefit to ch. partners
they're all alike
Parochial

close Many > Lots of partners
Cheap to change
Highly variable

When predictability is possible as a result of ^{can be enhanced significantly} "unrel." prior to necessity of action, + used to greatly improve ones response to the situation.

Honey bees tell us that when food is changed in space & time foraging help can lead to ~~extravagant~~ ^{evolutionary} changes.

No-Brain No position

How much yolk in the egg?
Where to put the eggs?

(So long as whole brood ^(in semi-elp. org) remains together, no recognition problems, few conflicts betw P & S)

In iterop. org. ∴ no brain possibly one at a time for brood.

Tending multiple individuals of different needs (e.g. diff. ages, diff. relatives) requires brain -

↑
Individual recognition!

discrimination of needs -
" " relatedness

↑ feeding

} same in reciprocity
BY-PRODUCT OF DELAYED-
PSEUDO RECIPROCALITY
INVEIGLING

① Assignment "Evolutionary" Reliability vs.

② On board stuff

- ③ Host-specific crickets: koalas, pandas
- ④ Non-Host specific crickets
- ⑤ Termites & protozoans (no brain)

⑥ Bees + flowers (bee brain + learning because flowers are unpredictable WHAT EVOLVES??)
 (bees are honest w/ their signals!)

⑦ Impala, horses grooming (still virtually no-brain)

⑧ Chimney swifts (♂ & ♀) no brain nepotism

⑨ Cooperation -
 Jump to reciprocity -
 individual recognition
 discriminative nepotism
 extensive disc. w/ p.

because alt. partners avoid benefits because partners become different

ability + tendency to change in the way we call learning?
 what is learning?
 Not (usually?) "open"
 Time-restricted
 Age-restricted
 stimulus-restricted
 (Horses & fear)
 (Geese & imprinting)
 (mother-offspring recognition)

Mutualism can evolve into reciprocity via punishment (when cheating becomes possible, punishing can reduce or eliminate it, and

Why nepotism might be the background for reciprocity (sets up giving w/o expecting return immediately)

Can one party or both are always (?) "no-brain" in mutualism?