Re: Group selected altruism − (was: Hamilton's rule)

Source: http://sci.tech−archive.net/Archive/sci.bio.evolution/2005−11/msg00316.html

- *From*: "Jim McGinn" <jimmcginn@xxxxxxxxx>

- *Date*: Tue, 22 Nov 2005 13:19:12 −0500 (EST)

Perplexed in Peoria wrote:
> "Catherine Woodgold" <an588@xxxxxxxxxxxxxxxxxx> wrote in message
news:dlotn3$h0s$1@xxxxxxxxxxxxxxxxxxxx
> >
> > Someone in some post in the last couple of weeks said that
> > genes for altruism towards distant relatives don't tend to
> > propagate. I disagree with this.
> >
> > Suppose the following scenario: a species is organized
> > into large groups such that each group almost always breeds within
> > itself, not interbreeding much with other groups. Suppose
> > the groups are distinguished by visible phenological differences
> > but are not restricted to geographical areas. Suppose some
> > groups have genes that promote altruism towards individuals
> > within their group. If the benefit exceeds the cost, then
> > the genes will promote prosperity of the group, which will
> > tend to take up a larger geographical space. At the same
> > time, altruism genes within the group will tend to diminish
> > in frequency; the rates of these two opposing processes
> > depend on the ratio of cost to benefit. If the benefit is
> > large enough, the process of altruistic groups growing and
> > splitting into smaller groups and taking over territory or
> > habitat from non−altruistic groups will support the altruism
> > genes faster than those genes diminish in frequency within
> > each group.
> >
>
> You have given the standard argument for group selection as the
> mechanism for the spread of altruism. Hence the change in the
> title of the thread.
>
> Yes, by careful 'tuning' of the parameters, you can set up
> starting conditions such that altruism increases in the population
> as a whole under the group selection mechanism. However, the
> same selective dynamic that spreads the altruism also tends to
> 'detune' the parameters.

How so?

So, it is very likely that the increase
> in altruism will be short lived.
>
> You pointed out the reason for this yourself: although altruistic
> groups grow faster than nonaltruistic ones, the frequency of
> altruism within the altruistic groups must decline. So a very
> altruistic group grows very fast, and then splits into two
> moderately altruistic groups which grows moderately fast and
> then split into four barely altruistic groups which barely grow
> but eventually split into eight groups with no particular
> altruistic tendencies.
>
> Most group selection scenarios have this same problem. In order
> for some groups to succeed and others to fail, there have to
> be differences between groups. But the dynamic of success always
> seems to have the effect of diminishing the differences between
> groups.

How so?

Group selection rather rapidly 'runs out of gas'.
> (Incidentally, individual selection avoids this problem because
> mutation is continually adding 'fuel'.)
>
> (Also, you postulated that there are visible differences between
> groups − presumably you are also postulating that a new visible
> difference arises every time a group splits! But lets ignore
> that problem.)
>
> Maybe we can split the group asymetrically so that the most altruistic
> members form one child group and the least altruistic members form
> the other child group. If you can keep this dynamic going through
> many group generations, it is possible that at least some later
> generation groups will be just as rich in altruism as the richest
> ancestral group. But then what is the reason that causes groups
> to split in this odd way?
>
> If the group splits into kinship clans, that could produce an
> asymmetry, but then we are back to a kind of kin selection −
> altruism mostly goes to fairly close relatives.
>
> If the groups are small enough, you may get sufficient asymmetry
> due to sampling error, but now the groups may be too small to
> do within−group breeding without significant inbreeding.
>
> Personally, I think that the only group selection mechanism that
> can work (for altruism or anything else) is some variety of
> D.S. Wilson's 'trait group selection'. But a lot of people don't
> consider this as 'true group selection' since the groups don't

> live any longer than individuals. In the Wilson model, organisms
> spend a crucial portion of their life−cycle in groups, but the
> groups break up before the organisms breed and then reform somewhat
> randomly in the next generation. Such groups can be small enough
> so that sampling error at group−formation time provides enough
> intergroup variance so that you get an ongoing process.

All that is necessary for group selection is that there situational
factors that
prevent or reduce gene flow between groups, as Catherine described, and

situational factors that cause differential survival/reproduction
between the
groups, as Catherine also described.

Jim

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- ***Follow−Ups***:
  - ♦ ***Re: Group selected altruism − (was: Hamilton's rule)***
    - ◊ *From:* Perplexed in Peoria
  - ♦ ***Re: Group selected altruism − (was: Hamilton's rule)***
    - ◊ *From:* Guy Hoelzer

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