

# Natural selection makes some relatives selfish, others altruistic

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(PhysOrg.com) -- Cain and Abel certainly displayed it and the three daughters of King Lear proved the point too - families contain a mixture of the selfish and those who put themselves out to help others.

Previous research has shown that these traits - selfishness and altruism - can be passed down through families. A new study from the University of Reading shows how [natural selection](#) determines the frequencies of selfishness and altruism in successive generations.

Studies in behavior genetics show that around 40% of the willingness to help others is inherited. Those who do not help others help themselves, and anti-social behavior is inherited too. Depending on the genotypes of their parents, children may all be [selfish](#), all altruistic or a mixture of both.

The Reading study, based on [population genetics](#), suggests that the numbers of altruistic and selfish individuals in society are controlled by a law of diminishing returns. If there are only one or two altruists in a family, and their actions help others in the family sufficiently compared to the cost of the [altruistic behavior](#), then genes for altruism will do better than genes for selfishness, resulting in more altruists in the family tree. So eventually all individuals in the population may be altruistic. Alternatively, when there are many altruists natural selection may ensure that altruistic [genes](#) are less likely to be passed on.

This is because the extra altruists may not bring enough extra benefits to

the family. For example, if someone needs shelter when injured or food when starving, the first individual to help may save their life. Latecomers may also attempt to help, but the additional benefit is less.

In other words, there are diminishing returns because there are limits to how much individuals can be helped. Altruists are selected when rare but selected against when common. The result is an evolutionary equilibrium with some individuals selfish and others altruistic.

The research was conducted by Professor Richard Sibly, of the School of Biological Studies, and Professor Robert Curnow, of the School of Mathematical and Physical Sciences.

Professor Sibly said: "Understanding how altruism evolved was of absorbing interest to Darwin and has continued to fascinate biologists ever since. Help comes in many forms, presumably with different genetic bases, for example, child rearing, provisioning during times of need, and defence of resources against competitors. Each and any of these may be subject to laws of diminishing returns. The form of the relationship between help received and number of helpers requires quantitative description. The expected mix of selfishness and [altruism](#) can then be calculated using the new equations."

Provided by University of Reading

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