The mystery of altruism

Does true altruism exist? And can science provide the answer?

By Oren Harman

The origin of kindness is a mystery. Where do giving and altruism come from? Were they inherited on the wings of natural selection – a gift bestowed upon us via the inching, evolutionary march of sacrificial amoeba, selfless penguins and charitable baboons? Or is altruism a unique refinement, a singular human triumph over ‘nature red in tooth and claw’? Charles Darwin called this the greatest single riddle, and thinkers ever since have tried to crack it.

Here is the mystery: if evolution is a process of survival of the fittest, and altruism is a behaviour that reduces fitness, why do we find altruistic acts wherever we look in nature? Consider the honey-pot ants of the American deserts, hanging upside down like great big pots of sugared water, perennially, waiting to be tapped by the queen and her brood when they are thirsty; or gazelles, conspicuously jumping up and down to signal to the troop that a lion lurks in the grass; or, for that matter, yellow jewelweed plants (Impatiens pallida), which, when sunlight becomes scarce, do not hog it by investing in the creation of leaves, but rather invest in stems and roots so as to share the sunlight with everyone. These are just a few of thousands of examples from across the natural world.

Biological altruism is defined by the result of an action: if an amoeba acts in such a way as to reduce its own fitness while providing a fitness benefit to another, it is an altruist. (Certain species of social amoeba are known to sacrifice themselves for their brethren.) Human, or psychological altruism, on the other hand, is all about intent: if I help an old lady cross the...
Altruism is a behaviour observed in all types of organism, yet its causes remain a mystery. In this article, Oren Harman explores the plausible causes of altruism and whether true altruism exists in humans. This is not a science article in the strict sense; it could be used just as easily in a social studies lesson. Teachers could use the article as the basis of a discussion of many topics that link science and social studies subjects: for example, natural selection and altruism; the genetic basis of altruism; altruism and the fitness of the group; and mathematical formulations for altruism. The article could be used for any age group of secondary-school students, in particular those aged 15-19.

The article could be used in a comprehension exercise, with potential questions including:

1. Why is altruism considered to be a behaviour that reduces fitness for the individual organism?
2. Some people believe that true altruism does not exist in humans. Why is this?
3. Altruism is a behaviour that could play a role in natural selection. Use a specific example to support this idea.
4. ‘If altruism could be explained by mathematics, it was never really what it seemed.’ Explain what this means.

Michalis Hadjimarcou, Cyprus
How can altruistic behaviour such as a soldier jumping on a grenade to save his comrades be explained scientifically?

One scientist who tried to solve the mystery of altruism was the US population geneticist George Price. Deriving an equation in the late 1960s that would later carry his name, Price came to believe that if altruism could be explained by mathematics, it was not true altruism. Selflessness was always interested – this is what he believed his equation seemed to indicate (Price, 1970).

For George Price, this was a terrible realisation and he descended on the homeless people of London, UK, like an angel, determined to disprove the very maths that he had constructed. In the end, having given away all his possessions, he became a homeless derelict himself, committing suicide in a cold London squat in 1975.

Science is a powerful tool for understanding the world. Neurogenetics and functional magnetic resonance imaging studies are attempting to find the genes for altruism and the particular regions of the brain that play a role in altruistic behaviour (Churchland, 2011). But precisely because of this, we need to remember the fate of George Price: his story is a personification of the very paradox of altruism. It

which ought to be; or, what we observe in nature with a rule for our own behaviour (Hume, 1739). This is important when it comes to altruism, because in the years since Darwin, science has provided a number of explanations for the evolution of sacrificial traits.

One of these explanations is nepotism: the closer the genetic relatedness, the greater the chance of altruism. This was formalised in algebra by the late British evolutionary biologist Bill Hamilton, who stated that a genetic trait for altruism should spread through a population if:

$$rB > C$$

where $r$ is the genetic relatedness of the two individuals, $B$ is the reproductive benefit gained by the recipient of the altruistic act, and $C$ is the reproductive cost to the individual performing the altruistic act (Hamilton, 1964a, 1964b). Does this mean that it is natural to help kin, but unnatural to help strangers?

Perhaps not. Another explanation is simple reciprocation: one individual should help another in the expectation of being helped in return. Related to this is the matter of trust: if I cannot signal to others that I can be trusted, I won’t survive in a world that depends on co-operation.

A third explanation is group selection: those groups that use altruism as a social glue to help to cement cohesion will outcompete groups of non-co-operative individuals.

But do these explanations leave room for true altruism? The explanations satisfy the sceptic, as they all ultimately hinge on the logic of egoism: it’s worth helping others or even the group if it benefits yourself. And if that is what models and theories show, supported by empirical observation, then perhaps true altruism is really just a dream. More dangerous still is the idea that if we evolved to be altruistic only for selfish reasons, perhaps we shouldn’t even attempt to behave as true altruists.
In low light conditions, yellow jewelweed plants (*Impatiens pallida*) are thought to grow tall and leggy, to share the sunlight with other plants of the same species.

To find out why psychologist Steven Pinker does not support the idea of group selection, see his essay ‘The false allure of group selection’. http://edge.org/conversation/the-false-allure-of-group-selection

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Resources

Philosopher Elliott Sober and biologist David Sloan Wilson attempt to reconcile altruism, both evolutionary and psychological, with the scientific discoveries that seem to portray nature as ‘red in tooth and claw’.