Inclusive Fitness: Why We Help Our Own

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Inclusive fitness is the sum of an organism's classical fitness (how many of its own offspring it produces and supports) and the number of equivalents of its own offspring it can add to the population by supporting others. The first component is called classical fitness by Hamilton (1964).

From the gene's point of view, evolutionary success ultimately depends on leaving behind the maximum number of copies of itself in the population. Until 1964, it was generally believed that genes only achieved this by causing the individual to leave the maximum number of viable offspring. However, in 1964 W. D. Hamilton proved mathematically that, because close relatives of an organism share some identical genes, a gene can also increase its evolutionary success by promoting the reproduction and survival of these related or otherwise similar individuals. Hamilton claimed that this leads natural selection to favor organisms that would behave in ways that maximize their inclusive fitness. It is also true that natural selection favors behavior that maximizes personal fitness.

Hamilton's rule describes mathematically whether or not a gene for altruistic behaviour will spread in a population:

where

is the reproductive cost to the altruist,
is the reproductive benefit to the recipient of the altruistic behavior, and
is the probability, above the population average, of the individuals sharing an altruistic gene - commonly viewed as "degree of relatedness".

The concept serves to explain how natural selection can perpetuate altruism. If there is an '"altruism gene"' (or complex of genes) that influences an organism's behavior to be helpful and protective of relatives and their offspring, this behavior also increases the proportion of the altruism gene in the population, because relatives are likely to share genes with the altruist due to common descent. Altruists may also have some way to recognize altruistic behavior in unrelated individuals and be inclined to support them. As Dawkins points out in The Selfish Gene (Chapter 6) and The Extended Phenotype, this must be distinguished from the green-beard effect.

Psychological adaptations related to interactions with kin are facultative. Although it is generally true that humans tend to be more altruistic toward their kin than toward non-kin, there may be exceptions. Specific types of behavioral output are dependent on the interaction of both genetic and environmental influences. For example, John Bowlby and others have noted that patterns of attachment to others are dependent on early developmental experiences with caregivers. In any specific instance, the manifestation of emotional bonds into altruistic behaviour depends on early bonding experiences, and symbolic, economic and other cultural factors, which may or may not always coincide with consanguinity.