The hitchhiker's guide to altruism -- Study explains how costly traits evolve

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Darwin explained how beneficial traits accumulate in natural populations, but how do costly traits evolve? In the past, two theories have addressed this problem.

The theory of hitchhiking suggests that genes that confer a cost to their bearer can become common in natural populations when they "hitch a ride" with fitter genes that are being favored by natural selection. Conversely, the theory of kin selection suggests that costly traits can be favored if they lead to benefits for relatives of the bearer, who also carry the gene.

"Animal traits are not always independent. For example, people with blond hair are more likely to have blue eyes," explains Andy Gardner (Oxford University). "This is a nuisance for natural selection, which could not, for instance, favor blond hair without also indirectly favoring blue eyes, and this is the idea of genetic hitchhiking."

Kin selection is similar, but here the genetic associations are between different individuals: "If I have a gene that makes me more altruistic, then I can also expect my relatives to carry it. So while the immediate effect of the gene is costly for me, I would benefit by receiving altruism from my relatives, and so the gene is ultimately favored," Gardner explains.

New research carried out at the University of Edinburgh and Queen's University, Canada shows that both processes are governed by the same

equations. This reveals that kin selection can be seen as a special form of genetic hitchhiking, explain Gardner and his coauthors Stuart West and Nick Barton (University of Edinburgh) in the February issue of *The American Naturalist*.

The researchers built on a general framework for modeling hitchhiking first proposed by Barton and colleagues, showing how it can be used to describe social evolution and recovering the classical results of kin selection theory. This insight raises the possibility of using the tools of hitchhiking theory to explore social problems that have so far been too complicated to analyze using traditional kin selection techniques.

Source: University of Chicago