

The evolution of cooperation

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Humans are the world champions of cooperation. We help each other even if costs are involved. We have established cooperative enterprises that span the entire globe. Such 'altruistic behavior' should be at variance with natural selection. Why should we help potential competitors? I will present five mechanisms for the evolution of cooperation: kin selection, group selection, graph selection, direct reciprocity and indirect reciprocity. Direct reciprocity means there are repeated interactions between the same two individuals and my behavior towards you depends on what you have done to me. Indirect reciprocity means there are repeated interactions within a group and my behavior towards you also depends on what you have done to others. Direct and indirect reciprocity are the key mechanisms for understanding any pro-social behavior among humans. Arguably, indirect reciprocity provided the right selection pressure for social intelligence and human language. I will present new results showing that costly punishment is not a mechanism for the evolution of cooperation and that winner's don't punish.

Further reading:

Dreber A, DG Rand, D Fudenberg, MA Nowak (2008). Winners don't punish.

Nature **452**: 348-351.

Nowak MA (2006). Five rules for the evolution of cooperation.

Science **314**: 1560-1563

Nowak MA (2006) *Evolutionary Dynamics*, Harvard University Press