

Illustrated

Alexander, Richard D. Reproductive competition and the evolution of sociality.

Group-living intensifies reproductive competition for both dominants and subordinates; hence, tendencies for individuals to live in groups containing competitors should evolve only when external selective forces (e.g., predators) overcompensate the disadvantages. Social behavior evolves when it enhances the primary functions of group-living, and because group-living allows for greater reproduction by individuals showing nepotism and participating in systems of reciprocity.

Analysis of nepotism (kin selection) involves demographic and other considerations. One's closest relative may be his most direct competitor; extreme competition and cooperation may both occur between two close relatives; and though genetic relatedness varies greatly within a honeybee colony if the queen mates twice, discrimination seems lacking.

Parents may use some offspring to increase their own reproduction via others. This phenomenon, extending from early abortions to sterilization of adult offspring, becomes crucial when parental reproduction overlaps that of descendants, as in eusocial insects and humans. Alleles for selfishness among siblings can win only if their possessor outreproduces the average of cooperating siblings. Such selection will prevail when altruism is unlikely to be directed at non-siblings; the return is to the parent. A theory heavily invoking

such parental "manipulation" seems more easily to account for much of insect eusociality than does kin selection.

Kin selection, surprisingly, has rarely been applied within groups because (1) eusocial insects do not obviously favor closer relatives within colonies; (2) genetic relationships within vertebrate groups are rarely known; and (3) most social scientists still do not accept that a history of differential reproduction is the key to understanding human sociality. Human social groups nevertheless seem remarkable examples of the interaction of nepotism, reciprocity, and manipulation of descendants.