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## Robert Trivers



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Robert Trivers is an American evolutionary biologist who has made a number of significant contributions to evolutionary theory, including parental investment theory and parent-offspring conflict.

### Parental Investment Theory

Parental investment theory was developed by Trivers (1972) and predicts that, in sexually reproducing species, the sex that invests more resources in its offspring will also be more selective when choosing a mating partner. As a result, the sex that invests less parental resources will experience greater intrasexual competition for mating partners and will exert greater mating effort to gain sexual access. Differences in minimum obligatory parental investment have also informed predictions regarding sex differences in sexual strategies. For example, women rate financial resources as more important in a potential mate than do men (Buss 1989) and are less interested in casual sex than are men (Buss and Schmitt 1993). Parental investment theory has

led to numerous hypotheses regarding animal behavior and cognition as it relates to offspring investment and mating strategies.

### Parent-Offspring Conflict

Parent-offspring conflict (Trivers 1974) refers to the differing levels of desired investment from the perspectives of a parent and his or her offspring. Although parents may increase their genetic success by investing resources in offsprings to a certain extent, there is a point at which the costs of offspring investment outweigh the potential benefits to the parent. For example, a parent who invests too heavily in a single child may reduce the likelihood of their own survival and, as a result, the likelihood that they will produce more children. Additionally, a parent with two or more offspring may maximize their reproductive success by investing equally in each offspring or by investing more heavily in the offspring with better prospects for survival and reproduction. However, from an offspring's perspective, they can maximize their reproductive success by extracting as many parental resources as possible, regardless of what the parent desires to invest. Further, because any individual shares 100% of its genes with itself and approximately 50% of its genes with a full sibling, an offspring may attempt to extract a disproportionate amount of investment from their parent, thereby increasing his or her survival or reproduction but to the detriment of siblings.

## Reciprocal Altruism

Reciprocal altruism (Trivers 1971) refers to any behavior performed by an organism that temporarily reduces its own genetic success but increases the genetic success of another organism. Kin altruism proposes that, by engaging in behavior that increases the fitness of a genetic relative, even at the temporary expense of one's own fitness, an organism may enhance its overall genetic success by promoting the success of shared genes in another organism (Hamilton 1964). Reciprocal altruism, in contrast, suggests that an organism may improve its own fitness in the long-term by incurring a temporary cost to help a genetically unrelated organism, who may return the favor at some point in the future. Altruistic behavior may also generate long-term benefits for an individual by improving social reputation with fellow group members.

## Trivers-Willard Hypothesis (Facultative Sex Ratio Determination)

The Trivers-Willard hypothesis (Trivers and Willard 1973) suggests that female mammals may alter the sex ratio of their offspring in response to environmental cues. The hypothesis suggests that, although selective pressures often promote the production of an equal sex ratio among offspring, environmental pressures may facilitate the reproduction of one sex more than the other. For sexually reproducing species in which males compete with for sexual access to females, parents will invest in sons when environmental conditions are more favorable and daughters when conditions are less favorable. Because males have lower obligate parental investment than females, they also have the potential to sire more offspring. Well-provisioned sons may be especially likely to sire offspring if, as a result of receiving increased parental resources, they are better able to compete with other males for sexual access to females. Therefore, investing in sons when conditions are more favorable has the potential consequence of greater long-term genetic

success than would investing in daughters. However, when conditions are less favorable, the potential reproductive benefits of investing in daughters will outweigh the investment costs, as daughters are likely to reproduce, even if they have been poorly provisioned. In these scenarios, it is preferable to produce and invest in daughters, who are likely to produce even a few offspring, rather than attempt to invest in sons, who, if poorly provisioned, may fail to attract a mate, thus producing no offspring.

The evolutionary theories developed by Robert Trivers have greatly benefitted the scientific understanding of animal behavior and cognition. His theoretical contributions to evolutionary biology have informed numerous hypotheses regarding the behaviors of sexually reproducing species, which have in turn produced substantial empirical knowledge.

## Cross-References

- ▶ [Altruism](#)
- ▶ [Parental Investment](#)
- ▶ [Richard Dawkins](#)
- ▶ [Sex Ratio](#)

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