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# Prosocial behavior in families: Moderators of resource sharing

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## Abstract

Archival studies of within-family prosocial behavior (Judge & Hrdy, 1992; Smith, Kish, & Crawford, 1987) have shown that inheritance patterns support Hamilton's (1964) theory of inclusive fitness, such that people will more of their estates to relatives of closer genetic relatedness. In a survey-based simulation of these studies, students allocated one of three lotteries to their blood relatives. As expected, participants allocated greater proportions of their lotteries to relatives of greater genetic relatedness. This effect became stronger with decreasing lottery amounts. Relatives of certain relatedness were favored over relatives of uncertain relatedness (via paternal uncertainty), and this effect was stronger among those with less money to allocate. Male participants tended to favor their young female relatives over their young male relatives when given the smallest lottery, but this sex preference reversed when male participants were given the largest lottery. In general, scarcer resources led to more evolutionarily conservative investment strategies.
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## Introduction

Prosocial behavior has received much attention from social psychologists (see Batson, 1998, for a review). However, much of the social psychological literature has dealt with people helping non-relatives such as friends and strangers, whereas comparatively little research has been undertaken on prosocial behavior towards family members. This could be because choosing to help strangers is thought to be a rare and noble human quality, whereas helping one's own kin is thought of as commonplace and occasionally nepotistic. Evolutionary biologists, on the other hand, have done more research on prosocial behavior within families, because it is more frequent and observable in the natural world than altruistic acts towards strangers.

One area of prosocial research that has benefited from evolutionary and social psychological perspectives has been kin-based altruism (Daly, Salmon, & Wilson, 1997). Interestingly, altruistic behaviors proved to be a

stumbling block for early Darwinian theorists. From the standpoint of the individual organism, altruism makes little evolutionary sense, because sacrificial behaviors typically result in reducing an individual's reproductive fitness to the benefit of others' fitness. Hamilton (1964) was able to understand that natural selection can act on an individual indirectly via the individual's kin. Hamilton proposed that altruistic tendencies would be selected for if the benefit to the recipients' fitness—weighed by the degree of relatedness between the altruist and the recipients—were greater than the cost of altruism to the altruist's fitness.

An example of such an inequality can be expressed via shared genetic relatedness coefficients ($r$s): An individual animal ($r = 1.0$) would be wise to sound a distress call upon spotting a predator if doing so would allow, for instance, three siblings ($r = 0.5 \times 3 = 1.5$) to escape unharmed, because copies of the individual's genes contained within its siblings exceed its own relatedness to itself (i.e., $1.5 > 1.0$). On the other hand, an individual might choose to avoid detection from a predator if only a single sibling is within earshot (i.e., $0.5 < 1.0$). Although these examples demonstrate altruism in its most

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extreme form (where the target individual's survival is threatened), less-extreme examples are common.

One less-extreme example of altruism is a parent's investment in its offspring (Trivers, 1972). In species that require some amount of parental investment to survive, parents typically give resources to their offspring to promote the offspring's survival—resources that might otherwise serve to promote the parents' reproductive fitness. Trivers (1974) described this parent–offspring conflict as a type of altruism, where parents sacrifice energy to secure resources for their offspring. Among species that require a great deal of parental investment (e.g., humans), parents often promote the survival and reproductive fitness of their offspring throughout their lives. Among humans, parents may even continue to invest in their progeny after death by drafting wills.

By analyzing the inheritance patterns of 1000 British Columbian wills, Smith et al. (1987) found that deceased benefactors allocated the greatest percentage of their estates to their closest genetic relatives, a lesser percentage to their relatives of lesser genetic relatedness, and gave the least to non-kin and organizations. This pattern of resource allocation is what would be expected given Hamilton's (1964) inclusive fitness theory. Interestingly, wealthier benefactors bequeathed a larger percentage of their estates to their sons relative to their daughters, whereas poorer benefactors favored their daughters over their sons. According to Smith et al. (1987), this finding fit a pattern that Trivers and Willard (1973) would have hypothesized: A wealthier son is more likely to sire more children than a poorer son, who may have difficulty securing a mate. Thus, wealthier parents might favor allocating more resources to their sons than daughters. On the other hand, daughters represent more of a reproductive "sure bet," such that they are more likely than a son to produce at least one child, and thus might present a more attractive investment option to poorer parents.

Judge and Hrdy (1992) examined over 1500 inheritances from Sacramento, California over the course of a century (1890–1984). They found the same basic pattern predicted by Hamilton (1964) and demonstrated by Smith et al. (1987): On average, benefactors gave a greater percentage of their estates to kin of closer genetic relatedness than more distantly related kin and non-kin. Moreover, Judge and Hrdy demonstrated that this basic genetic effect was fairly stable across their stratified time sample. However, their data failed to replicate the wealth × sex preference interaction predicted by the Trivers–Willard hypothesis and demonstrated by Smith et al. (1987): No preference was found for either sons or daughters, and this preference (or lack thereof) did not vary as a function of the benefactor's wealth. Analyses of family survey data from a large longitudinal US sample also yielded no support for the Trivers–Willard hypothesis among many parental investment and status variables (Keller, Nesse, & Hofferth, 2001).

Analyses of inheritance patterns may not be the optimal way to test the wealth × sex preference interaction predicted by the Trivers–Willard hypothesis. If such an interaction is robust, it should be strongest when the beneficiaries of inherited wealth are at or near their peak reproductive potential. Because women vary more in their reproductive potential over their lifespan than men, the point at which women are at their peak— around 20 years of age (Symons, 1979; Williams, 1975)— should produce the greatest preference for investing in one sex over another. Therefore, the wealth × sex preference interaction should be strongest when the recipients of resources are around 20 years of age.

In a series of altruism experiments employing undergraduate participants, Burnstein, Crandall, and Kitayama (1994) demonstrated that decisions regarding altruistic responses depended not only on such inclusive fitness factors as the target individual's relatedness, age, health, and wealth, but also on whether or not the situation involved an "everyday" or a "life-or-death" helping decision. The general pattern of results suggested that people placed more importance on cues to increase their fitness when given a life-or-death scenario (i.e., helping relatives who are genetically closer, younger, healthier, or wealthier than other relatives), than they did when faced with an everyday or trivial opportunity to help, in which case the pattern was attenuated (i.e., more likely to help less genetically related kin) or reversed (i.e., helping older, sicker, or poorer relatives).

Wang and colleagues (see Wang, 2002, for a review) have examined the relationship between life-or-death decision-making scenarios and group size (Wang, 1996a; Wang & Johnston, 1995), ages of participants and relatives (Wang, 1996b), and genetic relatedness (Wang, 1996c). For instance, Wang (1996c) demonstrated that the extent to which undergraduate participants preferred a sure outcome of saving two of their first-order relatives (over a one-third chance to save six first-order relatives) was higher (40%) than the sure outcome preference to save two second-order relatives (22%). This difference was attenuated when participants were asked to consider non-kin.

Another factor that influences resource allocation within families is relatedness uncertainty. According to DeKay (1998) and Euler and Weitzel (1996), the psychological certainty of an individual's relatedness to various kin can be assessed via paternal uncertainty. First, because women carry their offspring until birth, they are assured that their child is in fact *theirs*. Second, because women have concealed ovulation and can engage in extra pair copulations, men *cannot* be sure that the child of a woman with whom they have had intercourse is actually theirs. Thus, fathers are not entirely certain whether they are raising their own offspring or being cuckolded by raising another man's child.