

# Altruism among kin vs. nonkin: effects of cost of help and reciprocal exchange

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## Abstract

Evolutionary principles suggest that there will be differences in the nature of altruism directed toward kin vs. nonkin. The present study sought to explore these differences. Participants were 295 undergraduate students who each completed a questionnaire about help exchanged with siblings, cousins, acquaintances or friends. For siblings, cousins and acquaintances, greater relatedness was associated with higher levels of helping. Friends were an exception, however, receiving as much or more help than kin. Consistent with an evolutionary analysis, as the cost of helping increased, kin received a larger share of the help given, whereas nonkin received a smaller share. For low-cost help, people helped friends more than siblings; for medium-cost help, they helped siblings and friends equally; and for high-cost help, they expressed a greater willingness to help siblings than friends. As expected, the level of reciprocal exchange was higher among acquaintances than among friends; however, there was also an unexpectedly high level of reciprocal exchange among kin.

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## 1. Introduction

In many species, greater relatedness is associated with higher levels of altruism, a pattern that makes good sense in light of Hamilton's (1964) kin selection theory (KST). Data from various sources indicate that humans are no exception (Burnstein et al., 1994; Daly & Wilson, 1988; Essock-Vitale & McGuire, 1985; Korchmaros & Kenny, 2001, 2006; Neyer & Lang, 2003; Tooley et al., 2006; Webster, 2003). Considered in isolation, however, KST is unable to explain much of the data on human altruism. First, although unrelated acquaintances receive less help than kin (Burnstein et al., 1994), they do typically receive some help. In addition, certain categories of nonkin are exceptions to the general rule that people help kin more than nonkin. This includes friends, who often receive as much or more help than kin (Cialdini et al., 1997; Essock-Vitale & McGuire, 1985; Kruger, 2003). The present study explored some of the ways in which these findings can be reconciled with KST.

### 1.1. Cost of helping

An initial suggestion concerns the cost of help. Although KST does not rule out the evolution of nonkin altruism, it

does imply that it cannot be selected unless there is a return benefit to the altruist or the altruist's kin (but see Fehr & Henrich, 2003; Gintis, 2000; Richerson et al., 2003, for discussion of how genetic or cultural group selection could produce altruism in the absence of any such benefit). There are various channels through which return benefits could come, e.g., through the reciprocation of help, an increase in mating opportunities, or an enhancement of the altruist's reputation (Gurven, 2004). However, it is never guaranteed that altruism will bring a return benefit, and the greater the cost of altruism, the greater the net direct fitness cost if it does not. This is less problematic when the recipient is a genetic relative, because the direct fitness cost may be compensated by the indirect fitness benefit associated with aiding relatives. So, although people may be altruistic toward nonkin, one would expect that this would be somewhat dependent on the cost of help. This leads to the following hypothesis:

*Hypothesis 1.* As the cost of helping increases, the share of help given to kin will increase, and the share given to nonkin will decrease.

### 1.2. Levels of reciprocal exchange

A second suggestion involves considering KST in tandem with Trivers's (1971) reciprocal altruism theory

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(RAT), according to which altruism can enhance direct fitness as long as there is sufficient probability that it will be reciprocated. Again, reciprocation is less important among kin than among nonkin, because the indirect fitness benefits of helping kin can outweigh the direct fitness costs of unreciprocated help. This has led to the suggestion that kin will exhibit a lower level of reciprocity than nonkin, a hypothesis that has found some support (Berté, 1988; Essock-Vitale & McGuire, 1980, 1985; Hames, 1987; but see Gurven et al., 2001). There is a complication, however. Some commentators argue that RAT does not provide an adequate explanation for altruism among close friends (Roberts, 2005; Silk, 2003; Tooby & Cosmides, 1996). People are often angered by the suggestion that their friendships are founded on the exchange of favors, and deny that when they help their friends they do so with the expectation of immediate repayment. This rules out strict tit-for-tat reciprocity as a model for altruism among friends. However, equity and reciprocity are nonetheless important in friendships (Silk, 2003). It remains possible, therefore, that friendships are founded on reciprocity but that exchanges of help among friends take place within an extended timeframe, with friends tolerating longer periods of imbalance. This leads to the hypothesis that there will be a higher level of reciprocity among acquaintances than among friends. However, because kinship reduces the need for reciprocation, the level of reciprocity found among kin will be lower still than that among friends.

*Hypothesis 2.* The association between help given and help received will be larger for acquaintances than for friends, and larger for friends than for siblings or cousins.

## 2. Method

### 2.1. Participants

Participants were 295 undergraduate psychology students: 146 (49.5%) males and 149 (50.5%) females. The minimum number of participants needed for each experimental condition was determined in advance using the computer program GPOWER, with alpha set at .05 and power at .8, and assuming a medium effect size. Ages ranged between 16 and 46 (mean=18.71; S.D.=2.58), with no significant age difference between the sexes ( $t_{293}=1.46$ ,  $p=.15$ ).

### 2.2. Materials and procedure

Participants were recruited online from the pool of undergraduate psychology students and received course credit for their participation. Some were tested alone, but most were tested in groups of up to 30 people (median=25). Participants reported to a classroom and sat in forward-facing desks, spaced apart from one another. The materials for the study consisted of a booklet of questionnaires titled “Understanding Behavior” (available on request from the

author). After providing general biographical information, participants completed the following questionnaires:

#### 2.2.1. Finding Person A

This questionnaire assigned participants to one of eight conditions, each of which involved answering questions about one member of their social network (“Person A”). The eight conditions were defined by (a) the sex of the target individual, and (b) the relationship of the target individual to the participant: full sibling ( $r=.5$ ), cousin ( $r=.125$ ), acquaintance ( $r=0$ ) or close friend ( $r=0$ ). Siblings and cousins were chosen to represent kin because, like acquaintances and friends, they are typically similar in age and of the same generation. Second-degree kin ( $r=.25$ ) were not represented in this study because the most common second-degree kin (i.e., aunts, uncles, nephews and nieces) are usually not of the same age or generation, whereas second-degree kin who are of the same age and generation (i.e., half-siblings) are relatively uncommon. Following Cialdini et al. (1997), an acquaintance was defined as someone whose name you know and who you would stop to chat with for a few minutes, but not someone you ever arrange to meet and go out with.

Because not everyone has a sibling or cousin, the assignment of participants to conditions was based on a decision procedure embodied in eight questions. The first question might ask, for example, whether the participants had a full sister. If they did, they were informed that they would answer questions about their full sister (or, if they had more than one full sister, about the one whose first name came first alphabetically). They were then directed to the next section of the booklet. If, on the other hand, they did not have a full sister, they moved on to the next question, which asked about a different category of individual (e.g., a full brother or a close female friend). Participants continued answering questions until they came to a person whom they did have in their social network. The order of the questions varied across different versions of the questionnaire.

#### 2.2.2. Word Meaning Task

Participants next completed a Word Meaning Task. Although ostensibly exploring the different ways in which people define words, the task was in fact a priming task and was included because it has been shown to increase the accuracy of responses to self-report surveys (Rasinski et al., 2005). Participants were presented with a series of six words, each of which was followed by three synonyms. For each word, they chose the one synonym they viewed as closest in meaning to the original word. Half the words were related to honesty (e.g., “honest,” “genuine,” “correct”). The task is based on the idea that semantically processing these words primes more honest responding.

#### 2.2.3. Social relationships

The next questionnaire focused on the target individual assigned to participants earlier. In addition to gathering

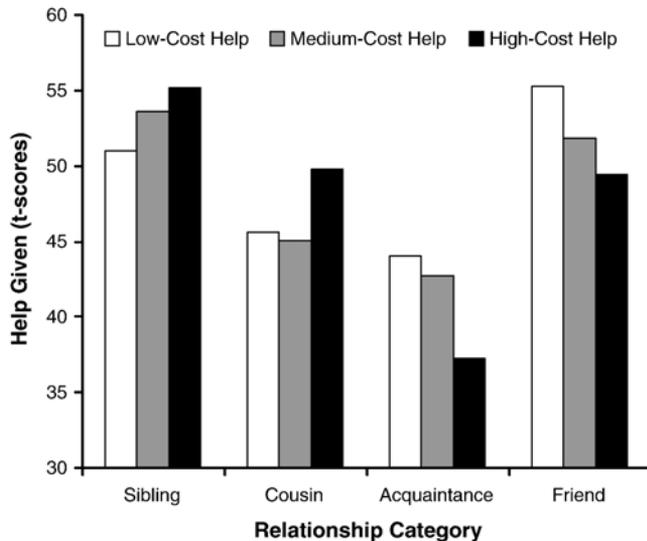


Fig. 1. Help given as a function of relationship category and cost of helping.

demographic data about this individual, the questionnaire included items related to the following:

**2.2.3.1. Altruism.** Various categories of help were derived from the literature on kin altruism (Burnstein et al., 1994; Cunningham, 1986; Essock-Vitale & McGuire, 1985; Lieberman et al., in press; Neyer & Lang, 2003). Items were preselected as representative of three categories of help: low-, medium- and high-cost help. For low- and medium-cost help, participants were asked how much help they had given to, and how much they had received from, the target individual in the last 2 months. Responses were registered on a Likert-type scale spanning from 1 (*never*) to 9 (*often*). Low-cost help was represented by a single item: emotional support. Medium-cost help was represented by five items: help during an illness; help during a crisis; help with everyday living (e.g., household chores, errands); help with housing; and financial help. For both help given and help received, these items exhibited a high level of internal consistency ( $\alpha=.82$  and  $\alpha=.88$ , respectively). They were therefore aggregated to form the medium-cost help given and medium-cost help received variables.

Whereas low- and medium-cost help items asked about actual help, the high-cost help items asked about willingness to help in a hypothetical scenario. Two items were used: willingness to donate a kidney and willingness to risk injury or death providing life-saving help in an emergency (e.g., rescuing someone from a burning building; cf Burnstein et al., 1994). Responses were registered on a Likert-type scale spanning from 1 (*not at all willing*) to 9 (*extremely willing*). Although the use of hypothetical scenarios is not ideal, high-cost helping situations are rare, so this method afforded the only way of investigating the issue within the confines of the present study (see Wilson & O’Gorman, 2003, for a defense of the use of hypothetical scenarios). The two items exhibited a high level of internal consistency

( $\alpha=.82$ ) and were therefore aggregated to form the high-cost help variable.

**2.2.3.2. Other variables.** Various potential confounds were measured. Residential proximity was measured with a single item (“How long would it take to travel to where Person A lives?”). Perceived probability of future interaction was also measured with a single item (“How likely is it that you will still be in contact with Person A in one year?”), with responses registered on a Likert-type scale spanning from 1 (*very unlikely*) to 9 (*very likely*). Finally, following Korchmaros and Kenny (2006), frequency and duration of contact were each measured using three items (number of instances/number of minutes of face-to-face, telephone and email contact per month).

### 3. Results

#### 3.1. Help given as a function of relationship category and cost of help

Raw scores were converted to *t*-scores (standardized scores based on *z*-scores, but centered on 50 and with a standard deviation of 10 units). These scores were used because they permit one to compare the share of low-, medium- and high-cost help given to members of each relationship category. Scores were analyzed using an ANOVA with three between-group factors (Relationship Category, Sex of Participant, and Sex of Target) and one within-group factor (Cost of Help Given). This revealed an interaction between Relationship Category and Cost of Help Given ( $F_{6, 548}=14.95, p<.001, \eta_p^2=.14$ ). Note that neither Participant Sex nor Target Sex interacted with any of the other variables of interest, and therefore that sex is not considered in the remainder of this article.

#### 3.2. Relatedness, friendship and altruism

To locate the source of the Relationship Category  $\times$  Cost of Help interaction, further between- and within-group analyses were conducted. Looking first at the between-group analyses, there were main effects of Relationship Category for low-cost help ( $F_{3, 279}=33.35, p<.001, \eta_p^2=.26$ ), medium-cost help ( $F_{3, 275}=24.69, p<.001, \eta_p^2=.21$ ) and high-cost help ( $F_{3, 278}=53.21, p<.001, \eta_p^2=.37$ ). As Fig. 1 shows, at each level of help, for siblings, cousins and acquaintances, greater relatedness was associated with higher rates of helping. Fig. 1 also shows that, at each level of help, friends were an exception to this general rule. However, as the cost of help rose, the relative ranking of friends fell. Post hoc tests using Dunnett’s C revealed that, for low-cost help, friends received significantly more help than did members of any other relationship category; for medium-cost help, friends fell to the level of siblings; and for high-cost help, friends fell to the level of cousins, receiving significantly less help than siblings.

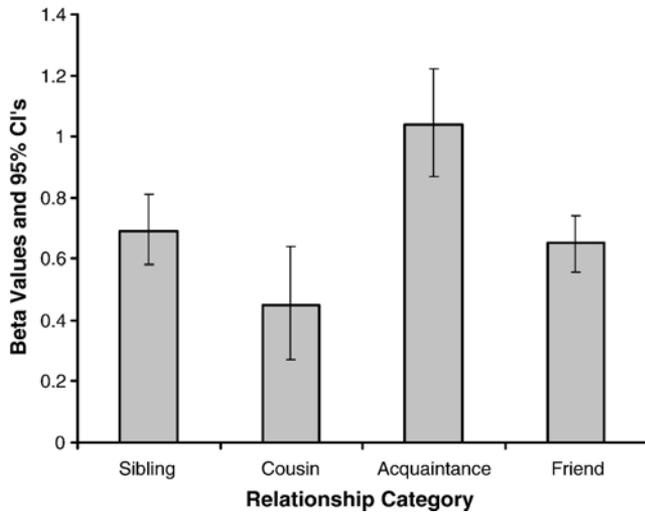


Fig. 2. Help given as a function of help received for each relationship category.

### 3.2.1. Cost of help

To test Hypothesis 1, within-group analyses were conducted for each relationship category. For the two kinship categories, the expectation was that as the cost of help rose, the share of help would rise too. Fig. 1 shows that, as expected, siblings received a larger share of medium-cost help than they had of low-cost help ( $F_{1, 64}=7.20, p=.009, \eta_p^2=.10$ ) and a larger share of high-cost help than medium-cost help (although the latter difference did not reach significance;  $p>.05$ ). Cousins provided mixed support: Contrary to Hypothesis 1, cousins did not receive a larger share of medium- than low-cost help ( $p>.05$ ); however, consistent with Hypothesis 1, they did receive a larger share of high- than medium-cost help ( $F_{1, 64}=15.17, p<.001, \eta_p^2=.19$ ). For the nonkin categories, the expectation was that as the cost of help rose, the share of help would fall. Consistent with this expectation, acquaintances received a smaller share of medium- than low-cost help (although this difference did not reach significance;  $p>.05$ ) and a smaller share of high- than medium-cost help ( $F_{1, 58}=16.63, p<.001, \eta_p^2=.22$ ). Finally, friends received a smaller share of medium- than low-cost help ( $F_{1, 86}=20.13, p<.001, \eta_p^2=.19$ ) and a smaller share of high- than medium-cost help (although the latter difference did not reach significance;  $p>.05$ ).

Note that statistically controlling for age, number of siblings, residential proximity, frequency and duration of contact, and perceived probability of future interactions did not alter the overall pattern of results for any of the above analyses.

### 3.3. Kinship and reciprocal exchange

Hypothesis 2 stated that a higher level of reciprocity would be found among acquaintances than among friends, and among friends than either among siblings or cousins. To assess this hypothesis, two new aggregate variables were formed: low/medium-cost help given and low/medium-cost

help received. These were formed from the one low-cost help and five medium-cost help variables. The rationale for forming these variables was that reciprocation might not always be in kind; an instance of medium-cost help might, for example, be reciprocated with several instances of low-cost help. To ensure that the estimates of levels of reciprocal exchange were not artificially inflated, 35 participants who indicated that they had neither given help nor received help from the target individual were excluded from the analysis. Simple linear regressions were performed for each relationship category, using help given as a predictor of help received. All  $\beta$  values were significant, suggesting a consistent pattern of reciprocity within each relationship category (see Fig. 2).

Having established that the  $\beta$  values for each relationship category differed significantly from 0, the next question was whether they differed significantly from one another. To answer this, 95% confidence intervals were calculated for each value. As Fig. 2 shows, the confidence intervals for siblings, cousins and friends overlapped with one another, indicating that there were no significant differences among the  $\beta$  values for these categories. Only the confidence interval for acquaintances did not overlap with those of any other category. Consistent with Hypothesis 2, then, the degree of reciprocity among acquaintances was significantly higher than that among friends and that among siblings or cousins. Contrary to Hypothesis 2, however, the degree of reciprocity among friends was no higher than that among siblings or cousins.

## 4. Discussion

For siblings, cousins and acquaintances, greater relatedness was associated with higher levels of altruism, a finding that replicates past research (e.g., Burnstein et al., 1994). Friends were an exception to the rule, receiving comparable levels of help to kin. Nonetheless, there were clear indications that the psychology underlying kin altruism differs from that underlying altruism among friends and other nonrelatives, and that it does so in a manner consistent with evolutionary psychological principles.

First, the level of help within each category was dependent on the cost of help. A general (albeit imperfect) trend was observed such that, as the cost of helping increased, the share of help given to kin increased, whereas that given to nonkin decreased. Furthermore, as the cost of help increased, the relative ranking of friends fell. It is particularly interesting that, even though young adults report that they are emotionally closer to friends than to siblings (Kruger, 2003; Stewart-Williams, unpublished data), participants were more willing to provide high-cost help (i.e., evolutionarily significant help) to siblings. Korchmaros and Kenny (2001) have proposed that emotional closeness is an evolved psychological disposition that helps to mediate the link between relatedness and altruism. The results of the present study suggest a qualification to this idea: The

relative importance of emotional closeness and other variables may change depending on the cost of the help.

As predicted, the level of reciprocity among friends was lower than that among acquaintances, consistent with the supposition that reciprocation among friends takes place within a wider temporal window. However, whereas acquaintances exhibited a higher level of reciprocity than siblings or cousins, friends did not. At first glance, this might appear to support the notion that human friendship is not explicable in terms of RAT (Roberts, 2005; Silk, 2003; Tooby & Cosmides, 1996). However, the results do not necessarily indicate that reciprocity among friends is less important than would be expected on the basis of RAT. Instead, the strength of the  $\beta$  values implies, if anything, that reciprocation is *more* important among *kin* than might be expected on the basis of KST. In other words, the results are consistent with the idea that friendship is explicable in terms of RAT; the surprising finding is the high level of reciprocity among kin, especially siblings.

How might this finding be explained? One possibility is that, in humans, unreciprocated kin altruism is most common in relationships in which there is an asymmetry in the neediness and/or reproductive value of the parties involved. Consider the parent–offspring relationship. Young offspring have a greater need for help than their parents, and older offspring generally have greater reproductive value than their parents. As such, it makes good evolutionary sense that altruism would tend to flow down through the generations, from parent to offspring, more than it would do the reverse. In contrast, siblings and cousins are usually similar in age and therefore usually have similar needs and reproductive values. Under such circumstances, there may be little call for unreciprocated altruism — little reason that help would flow in one direction rather than the other. Thus, siblings and cousins may instead form reciprocal alliances.

#### 4.1. Alternative explanations

There are several alternative explanations for the present study's results. One is based on the work of Clark and Mills (1993; Mills & Clark, 1982), who have drawn a distinction between communal and exchange relationships. In communal relationships, benefits are given based on recipient need and without expectation of immediate repayment. In exchange relationships, on the other hand, benefits are given with the expectation of prompt repayment. The communal/exchange distinction cuts across the kin/nonkin divide: Communal relationships include those with close friends and (typically) close kin; exchange relationships include those with acquaintances, but can also include those with kin.

It might be suggested that the communal/exchange approach provides a better account of the data than does an evolutionary approach, and especially of the fact that friends resemble kin in giving high levels of help without requiring immediate reciprocation. However, this conclusion would not be warranted. First, in itself, the communal/exchange distinction does not *explain* similarities in the

treatment of kin and close friends; it simply labels these similarities. In contrast, an evolutionary approach aims to provide an ultimate explanation for the patterns observed. Of course, one might argue that the capacity to form communal vs. exchange relationships has an evolutionary origin (e.g., Korchmaros & Kenny, 2006). But then the communal/exchange approach would face the same challenge that the inclusive fitness approach faces: explaining why friends are treated in a similar way to kin, despite being unrelated. Beyond this, inclusive fitness theory provides reason to doubt that close relationships with kin and nonkin really are psychologically identical. It leads, for example, to the hypothesis that the share of help given to kin vs. nonkin will depend on the cost of help — a hypothesis that found support in the present study but that would not have emerged from the communal/exchange approach.

Another potential challenge is that the cost-of-help findings can be explained equally well in terms of cultural norms: People give more high-cost help to kin than to friends because they experience stronger normative pressure to do so. An initial response to this suggestion is that cultural norms could in principle be invoked to explain *any* pattern of findings. This does not mean such explanations are necessarily false, but it does highlight the need to provide independent evidence for any proposed norm. Korchmaros and Kenny (2006) claim to have such evidence. They found that people felt more obligated to help kin than nonkin in life-or-death situations than in everyday helping situations. The implicit assumption is that feelings of obligation are shaped only by cultural norms. This assumption seems unwarranted, however. Indeed, it seems entirely possible that questions about obligation tap into evolved psychological mechanisms that underlie the distribution of altruism. Thus, although possible in principle, there is no particular reason to think that the cost-of-help finding is a product of cultural norms.

#### 4.2. Limitations

There were a number of potential weaknesses associated with the measurement strategy employed in the present study. One concerns the item dealing with willingness to donate a kidney. It is possible that scores on this item were influenced by people's belief that they would have to be genetically matched to the recipient, which could raise their scores for kin but lower them for nonkin. It is important to note, though, that high-cost help was also assessed using a second item (help during an emergency), and that exactly the same pattern of results emerged for that item. A second weakness concerns the assessment of levels of reciprocity. Although a strong association between help given and help received is *consistent* with a high level of reciprocity, it is somewhat ambiguous evidence. After all, the fact that two individuals give one another similar levels of help does not necessarily mean that either individual's help is *contingent* on the other's. As such, it would be desirable to corroborate the results of this study using an alternative method that would yield a less ambiguous indicator. A longitudinal field

study would be one way to demonstrate more convincingly the extent to which help given is contingent on help received across different relationship categories.

A final limitation relates to the comparison of actual helping with hypothetical helping. Actual helping is presumably a product of both willingness and opportunity to help, whereas responses to hypothetical scenarios reflect only willingness to help. In defense of the validity of this comparison, however, the same pattern of results emerged even when controlling for variables related to opportunity to help, such as residential proximity, frequency of contact, and duration of contact. This suggests that actual helping provides a reasonably clear window on willingness to help, and thus can be meaningfully compared with responses to the hypothetical scenarios.

#### 4.3. Conclusion

In summary, the present study uncovered several differences in patterns of helping among kin and nonkin that make good sense in light of inclusive fitness theory. Although the findings are not logically inconsistent with alternative approaches (such as the communal/exchange approach or explanations based on cultural norms), such approaches offer no *a priori* reason to expect these results. As such, the results constitute good support for an inclusive fitness approach to explaining altruism among humans.

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