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Cooperation without Counting

The Puzzle of Friendship

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ABSTRACT

Cooperative relationships, which involve the exchange of altruistic behaviors that are costly to the actor and beneficial to the recipient, are thought to be the product of kin selection or reciprocal altruism. Humans form close, enduring, cooperative relationships with nonrelatives. In these relationships, which we call friendships, both emotional and material support are exchanged. If these relationships are shaped by the adaptive logic of Tit-For-Tat reciprocal altruism, then we would expect people to keep track of benefits given to and received from friends, and for there to be contingencies between favors given now and favors received in the past. However, the social science literature suggests that Tit-for-Tat reciprocity is characteristic of relationships among casual acquaintances and strangers, not among friends. A considerable body of empirical work indicates that people value balanced reciprocity in their relationships with friends, but avoid keeping careful count of benefits given and received, and are offended when friends reciprocate immediately and directly. Thus, the dynamic of friendship does not fit the logic of models of reciprocity and presents a puzzle for evolutionary analysis.

INTRODUCTION

Friendship is a common, perhaps universal, feature of human societies. One of the defining features of friendship is that it involves the exchange of costly favors and services, including both material help and emotional support. Evolutionary theory predicts that altruistic interactions will be shaped by kin selection or reciprocal altruism. Since costly help is often extended to nonrelatives, and does not benefit the actor directly, evolutionary theory predicts that friendship will conform to the logic of reciprocity. The social science literature indicates that reciprocity and equity are important among friends, but Tit-for-Tat reciprocity is antithetical to the formation and maintenance of close friendship. If

these seemingly contradictory claims are correct, then friendship presents a puzzle for evolutionary analysis. The goal of this chapter is to lay out the pieces of this puzzle and try to see how they fit together.

I begin by considering the phylogenetic history of cooperative relationships in the primate order. This is an important place to begin because it is possible that friendship is a derived feature of human societies, one that appears after humans diverged from their last common ancestor with other primates five to ten million years ago. If so, then the evolution of friendship may be linked to emergent features of human societies which produced the capacity for collective action, strong norms of fairness, a willingness to inflict costly punishment on strangers, and other forms of highly cooperative behavior (Richerson and Boyd 1998; Fehr and Gächter 2001). Primatologists, however, have recently begun to use the term *friendship* to describe affiliative social bonds among nonhuman primates. If nonhuman primates (or other animals) form relationships that embody the essential features of human friendships, then these relationships may be ancestral traits that evolved before the other highly cooperative features of modern human societies emerged. Thus, it is important to examine the mechanisms that underlie cooperation in nonhuman primates and to consider the phylogenetic roots of friendship in the primate order.

Next, I examine empirical evidence about reciprocity in relationships with friends and strangers. There is a broad consensus in the social science literature that short-term, Tit-for-Tat reciprocity is not a feature of close friendships, but concerns about equity and reciprocity are nonetheless important among friends. These seemingly contradictory claims are supported by empirical studies that demonstrate that people tend to obscure contributions to joint tasks completed with friends, but not strangers, but are disturbed about inequities in their relationships with others. Despite this evidence, most evolutionary analyses of friendship in humans assume that friendship evolves through Tit-for-Tat reciprocal altruism. If the empirical claims made by social scientists are correct, then evolutionary explanations based on reciprocal altruism need to be amended.

RECIPROCITY IN COOPERATIVE RELATIONSHIPS IN PRIMATES

In nonhuman primates, as in other animals, evidence for reciprocal altruism is much more limited than evidence for kin selection (Dugatkin 1997; Hammerstein, Chapter 5, this volume). This is somewhat surprising because primates are good candidates for reciprocal altruism. All monkeys and apes, except for orangutans, live in stable social groups of known individuals and have many opportunities to interact. They have good memories and are able to solve complex social problems. For example, they keep track of their own kinship, dominance, and affiliative relationships with other group members, and know something about the nature of kinship, dominance, and affiliative relationships among others (Tomasello and Call 1997).

A number of naturalistic studies document exchanges of altruistic behaviors within pairs of individuals and measure the statistical significance of the associations between behaviors initiated and received. In many of these studies, positive correlations between various types of friendly behaviors, such as grooming and proximity, can be detected.

An example of this kind of work that seems relevant to the notion of friendship comes from recent work on chimpanzees at Ngogo, in the Kibale Forest of Uganda. Male chimpanzees form close and well-differentiated social relationships. These kinds of relationships are uncommon among nonhuman primate males. This is probably related to the fact that males in most species are the dispersing sex and consequently live in groups composed mainly of nonkin. In addition, males compete with one another for resources that cannot be shared equitably, namely receptive females. This limits the potential benefits derived from cooperation among males, and relationships among adult males typically range from indifferent to hostile. In chimpanzees, however, males are the philopatric sex and males form close ties with other males. Chimpanzee males groom one another, hunt in groups, share meat with other males, support one another in conflicts, jointly patrol the borders of their territories, participate in hostile intergroup encounters, and guard access to receptive females. Careful analyses of the patterning of these activities at Ngogo indicate that males groom, share meat, and support one another reciprocally (reviewed in Watts 2002). Males apparently exchange grooming for support. Moreover, males tend to hunt with the same males that they groom, support in conflicts, and accompany on border patrols. Present data (Mitani et al. 2002) suggests that males do not associate preferentially with their maternal kin. These data, and data from other chimpanzee communities, suggest that reciprocity plays an important part in the lives of chimpanzees.

However, even the most comprehensive correlational studies provide an unsatisfying foundation for studying reciprocity for several reasons. First, it is notoriously difficult to draw causal deductions from correlational data. In this case, it is important to make sure that correlations between one form of cooperation and another are not the product of third variable, such as kinship or dominance rank. Second, correlational analyses do not address the mechanisms underlying behavioral exchanges, although reciprocal altruism relies on the ability of animals to detect defection and terminate relationships when partners cheat. Third, correlational studies do not account for the possibility that different processes may shape interactions in different dyads. Females might unilaterally support their offspring, trade grooming for support from males, and balance grooming with nonrelatives of adjacent rank. Fourth, it is very difficult to specify the relevant behavioral and temporal domains in which exchanges might take place.

Better evidence for contingent exchanges comes from detailed studies of turn taking during grooming bouts. In some cases, one monkey grooms its partner for a short period, then they switch roles (Barrett and Henzi 2001; Cords 2002). Not

all grooming bouts involve turn taking, and there is no evidence that primates “raise the stakes” by extending the duration of grooming in each successive round (Barrett et al. 2000). Nonetheless, these data suggest that grooming is parcelled into short, low-cost units and exchanged on a contingent basis.

Several experimental studies provide further evidence that nonhuman primates adopt contingent strategies in the deployment of altruism to nonrelatives. Using tape-recorded vocalizations of females’ screams, which signal distress and are often used to recruit support, Seyfarth and Cheney (1984) showed that free-ranging vervet females were more attentive to screams of other unrelated group members if they had been groomed by the screamer shortly before they heard the scream than if they had not been groomed by the same individual. This experiment demonstrates that monkeys’ responses are contingent on prior interactions, a key component of the tactics of reciprocal altruism. However, because the conflicts were simulated, there was no opportunity for monkeys to intervene, leaving some doubt about the meaning of their responses. This shortcoming was remedied in a study conducted on captive long-tailed macaques by Hemelrijk (1994). She artificially induced fights among familiar, unrelated macaques housed temporarily in groups of three. When fights between two females occurred, aggressors sometimes received support from the third member of the trio. Supporters were more likely to intervene on behalf of females who had previously groomed them.

These experimental studies must be weighed against naturalistic studies of the association between grooming and support among nonrelatives. Schino (2001) has found consistent support for a number predictions about the distribution of grooming derived from Seyfarth’s hypothesis; however, evidence of direct associations between grooming and support among nonkin is quite limited. Schino (2001) suggests that it may not be possible to find statistically significant correlations between grooming and support because alliances are rare, whereas Henzi and Barrett (1999) interpret the absence of such correlations as evidence that monkeys do not exchange grooming for support.

Chimpanzees sometimes share plant foods and meat and use specialized “begging” gestures to solicit food from others. In a group of captive chimpanzees, de Waal (1997a) assessed the relationship between grooming and subsequent food sharing. He and his colleagues observed chimpanzees for several hours before and after they were provisioned with leafy branches. He found that the chimpanzees were more likely to share with individuals who had previously groomed them than with individuals who had not groomed them in the past few hours. Moreover, if there had been no grooming before provisioning, possessors were more likely to respond aggressively to efforts to share. Interestingly, the magnitude of the effect of prior grooming was influenced by the nature of the relationship between the two individuals: for pairs that rarely groomed, sharing was strongly contingent on recent grooming, whereas for pairs that groomed at higher rates, recent grooming had a smaller impact on sharing.

The dynamics of food sharing in capuchin monkeys has also been studied by de Waal in the laboratory. In this setting, capuchins are strongly motivated to sit close together and are very sloppy eaters. When they are given food, they frequently carry the food back toward other group members and allow them to take pieces of food that have dropped to the floor of the cage. De Waal (1997b) took advantage of the capuchins' tolerance to examine the patterning of food exchanges within dyads. In one set of experiments, a pair of familiar monkeys were placed in adjacent cages separated by wire mesh. The holes in the mesh were large enough to allow the monkeys to reach into the adjacent cage and take food items. In the first phase of the experiment, one member of the dyad was given food and all exchanges of food were monitored. In the second phase of the experiment, the other monkey was given food and exchanges were monitored again. In this experimental situation, the vast majority of exchanges occurred when one monkey reached through the mesh and helped itself to scraps of food dropped by the owner; owners tolerated these initiatives but did not actively donate food to their partners. Among females, the number of transfers from the owner to her partner in the first phase of the experiment was correlated with the rate of transfer when their roles were reversed in the second phase of the experiment. Dyads that tended to associate frequently and fight little had higher transfer rates than dyads that associated less often and fought more frequently.

The primate data are important for several reasons. First, they demonstrate that cooperation is (sometimes) contingent on prior interactions. Second, some types of exchanges involve potentially high cost forms of behavior, coalitionary support, or access to mates. Third, the experiments reveal that the dynamics of reciprocity differ across dyads. Fourth, the data span a broad spectrum of the monkeys and apes, including New World monkeys, Old World monkeys, and apes. This suggests that the capacity for Tit-for-Tat reciprocal altruism may have deep roots in the primate order.

THE PHYLOGENY OF FRIENDSHIP

Observers of savanna baboons were the first to use the word friendship to describe close ties between certain pairs of adult males and females. Smuts' book, *Sex and Friendship in Baboons* (1985), made friendship a respectable topic for primatological analysis, and the word began to appear with greater frequency in the literature. Friendship is sometimes used as a synonym for close, affiliative bonds, which are thought to involve high levels of nonaggressive behaviors, such as grooming and proximity, tolerance and mutual attraction, and reciprocity (reviewed by Silk 2002).

In baboon groups, pairs of adult males and females sometimes form close relationships. In East African baboon groups, these relationships are characterized by high frequencies of proximity (mainly maintained by the female), grooming (mainly performed by the female), and support (mainly performed by the male

on behalf of the female and her offspring). Typically, each female has just one close male associate, spending very little time with other males. These pairs are labeled as “friends.” Smuts (1985) hypothesized that males and females both benefit from these relationships. Females obtain protection for themselves and their offspring, whereas males gain future mating advantages and access to infants that they can use in triadic interactions with other males.

In baboon groups in the Moremi Reserve in Botswana, these relationships look much the same, vis-à-vis proximity maintenance and grooming, but differ in their function. There, immigrant males often rise quickly to the top-ranking position within the group and then kill unweaned infants (Palombit et al. 2000). The death of these infants causes females to resume cycling much sooner than they would otherwise. Because top-ranking males monopolize access to high-ranking females, infanticidal males also gain mating opportunities. In Moremi, mothers of new infants form close ties with familiar males, often former mating partners and likely fathers of their infants (Palombit et al. 1997). Males are attentive to these females and their infants, and rush to their defense when they are distressed. Males often hold infants and carry them in confrontations with new immigrants. Infants provide the pivotal link in these relationships. If the infant dies or disappears, males soon lose interest in their partners’ welfare. In this case, male-female relationships seem to be a form of parental investment in the welfare of their joint offspring.

Thus, male-female relationships in baboons seem to be a form of mating effort or joint parental investment in the welfare of offspring. I have argued elsewhere that these relationships are different than close friendships among humans because they hinge on the presence of a third party, are often asymmetric and relatively short-lived, and have instrumental functions (Silk 2002).

Empirical support for the existence of friendships, aside from male-female friendships in baboon groups, is still quite limited. There is good evidence that social relationships are frequently differentiated — not all dyads interact with the same frequency or in the same contexts. However, we know little about the behavioral repertoire of friendship — do grooming partners also protect each other from aggression or predators, sit together, tolerate attempts to handle their infants, or share food with one another? Also, we do not know how long these relationships last. Barrett and Henzi (2002) detected frequent changes in preferred grooming partners among female baboons, suggesting that stable long-term relationships may not be common in these animals. Is this true of other groups and species? We know even less about the emotional tenor of affiliative relationships. Are primates more relaxed in the presence of close associates?

Although friendship is often linked to reciprocity, some primatologists have begun to question whether monkeys and apes have the cognitive ability to keep track of costs incurred and benefits received across long periods of time and different currencies (Barrett and Henzi 2002). Most cooperation among nonkin may be based on short-term objectives, such as getting groomed or obtaining

access to infants. In these cases, the costs involved in exchanges may be low and the time frame over which accounts must be kept may be quite short. De Waal (2000) also doubts whether monkeys are capable of managing relationships that require careful record keeping. He suggests that balanced exchanges might simply arise from mutual tolerance or high rates of association between partners. On the other hand, de Waal (1992) has suggested that chimpanzees may hold grudges against group members for long periods, suggesting that there may be taxonomic differences in the form of reciprocal relationships among nonhuman primate species.

HOW DOES HUMAN FRIENDSHIP WORK?

Friendships in contemporary Western societies are voluntary, intimate, supportive, reciprocal relationships between equals (Hinde 2002). Companionship, trust, self-disclosure, loyalty, commitment, affection, acceptance, empathy, and mutual regard are important elements of close friendships (Hinde 1997). Time spent together is an important relational currency, but friendships can endure long separations and infrequent contact. Compatability is an important element of friendship, although friendships can weather some degree of tension and conflict (Bleiszner and Adams 1992). Even though people gain both material and emotional support from their friends, emotional support seems to be particularly important in the satisfaction that people derive from their friends and in the benefits that people derive from friendship.

There is some dispute about whether this notion of friendship is a universal feature of human societies. Some social scientists believe that our contemporary notion of friendship as an intimate, private, noninstrumental relationship among nonrelatives is specific to contemporary Western societies and emerged with the rise of commercial societies during the eighteenth century (Adams and Allan 1998; Allan 2001; Bell and Coleman 1999; Pahl 2000; Silver 1990). They point out that in some times and places, social networks are almost entirely limited to close kin; there are also societies in which friendships are institutionalized and lose something of their voluntary and private character. Others contend that friendship is a ubiquitous feature of human societies (Argyle and Henderson 1984), and point to ethnographic descriptions of friendships based on sentiments of affection, intimacy, and empathy. Some evolutionary psychologists hypothesize that there is a universal psychology of friendship (Bleske and Shackelford 2001; Bleske-Rechek and Buss 2001). Here, I focus primarily on the contemporary Western notion of friendships as voluntary, intimate, and private relationships that provide both material and emotional support.

There is some dispute among psychologists about the processes that sustain friendship in contemporary Western societies. Equity theorists contend that inequality in relationships produces dissatisfaction and distress (Walster and Walster 1975). According to this theory, people are equally unhappy when they

give more than they receive and when they receive more than they give, and the same processes govern all kinds of close relationships. However, the evidence suggests that although people do value equality in their relationships, they have different expectations about different kinds of relationships (e.g., Bar-Tal et al. 1977; Rook 1987; Winn et al. 1991).

Building on work by Goffman (1961), who distinguished between relationships based on social exchange and economic exchange, Clark and Mills (1979) drew a distinction between exchange relationships and communal relationships. In exchange relationships, benefits are given with the expectation that they will be reciprocated. When one party receives a benefit, she incurs an obligation to return the benefit, and both parties are principally concerned with equity. In evolutionary terms, exchange relationships rely on Tit-for-Tat reciprocal altruism. In communal relationships, benefits are given according to the other's need, and receiving a benefit does not create an obligation to reciprocate. Exchange relationships are thought to characterize relationships among strangers and casual acquaintances, whereas communal relationships are thought to characterize relationships among close friends and kin. Very similar kinds of distinctions are drawn in the sociological and anthropological literature. For example, Wolf (1966) distinguished between instrumental and expressive relationships, and Reisman (1981) distinguished between associative (casual), reciprocal (close), and receptive (asymmetric) friendships.

There is broad consensus in the social science literature that close friendship is independent of short-term, Tit-for-Tat reciprocity (Argyle and Henderson 1984; Hinde 2002; O'Connor 1992). Even Adam Smith recognized the fundamental difference between market exchanges among strangers and transactions among friends. In *The Theory of Moral Sentiments*, he wrote: "The actions required by friendship, humanity, hospitality, generosity are vague and indeterminate."

The communal-exchange distinction articulated by Clark and Mills would be of little interest if it was not reflected in the behavior of people in everyday life. However, the results of several experiments suggest that this distinction maps onto the behavior of people in consistent ways.

In one experiment, subjects were asked to read a short account of a series of interactions between two people (Clark 1981). In these accounts, one person asked another person for a favor, such as a ride to work. In half the accounts, the recipient of the favor subsequently provided the same benefit to the other person (i.e., if they were given a ride to work, they offered the other person a ride to work), and in half the accounts the recipient of the favor subsequently provided a different kind of benefit to the other person (i.e., if they were given a ride to work, they offered to buy the other lunch). Subjects were asked to evaluate the quality of the friendship between the two individuals after they read these accounts. Subjects reported that individuals who exchanged comparable benefits were less close than individuals who exchanged benefits of different types.

Asked why they made these assessments, subjects said that they interpreted the exchange of comparable benefits as a form of repayment, something that they evidently did not associate with close friendship.

Similarly, Shackelford and Buss (1996) examined the effects of immediate reciprocity on relationships between committed mates, close friends, and coalition partners. In this experiment, coalition partners were described as people who worked together to accomplish specific objectives, but were not close friends. Subjects were asked how strongly they thought someone would feel betrayed if immediate reciprocity was offered or demanded by close friends or coalition partners. The results indicate that immediate reciprocity elicited stronger feelings of betrayal among mates and close friends, who are expected to have communal relationships, than coalition partners, who are expected to have exchange relationships.

Boster et al. (1995) examined the effects of "pre-giving" on subsequent compliance with requests from close friends and strangers. Their experiment builds on previous evidence that the receipt of a favor or gift makes recipients more likely to feel obligated to reciprocate, perhaps because pre-giving elicits a norm of reciprocity. In these experiments, subjects requested close friends or strangers to purchase \$1 raffle tickets from them. In one treatment, the subject gave a soda to their partner before making the request, and in one treatment, no soda was given. When subjects were paired with strangers, pre-giving nearly doubled the number of raffle tickets purchased. When subjects were paired with friends, pre-giving had no effect, though close friends in both conditions purchased more raffle tickets than strangers.

Clark and her colleagues have conducted a series of experiments investigating contributions to joint tasks (described in Mills and Clark 1994). In one experiment, subjects were assigned a joint task on which they would be rewarded on the basis of their performance. They were required to complete the task in ink and were provided with pens by the experimenters. One subject began the task, and shortly later the other subject was asked to join in the task in a separate room. When the two subjects were strangers, the second subject nearly always used a different color pen than the first subject, but when the two subjects were friends, they were more likely to use the same color pen. The differences between friends and strangers were more exaggerated when the subjects were asked to do the task at the same time face to face.

In another experiment, experimenters monitored subjects' attention to a light that flashed when their partner needed help or when their partner had made a substantial contribution to a joint task. When the signal indicated that help was needed, friends looked at the light more often than strangers. When the signal indicated that their partner had made a contribution to a joint task, strangers monitored the light more often than friends. In a similar experiment, the subjects were more likely to monitor others' needs for help (even when they were unable to provide actual support) when a communal relationship was desired than when an exchange relationship was desired.

Taken together these experiments provide empirical support for the distinction between exchange and communal relationships. More importantly, they support the hypothesis that communal relationships are not based on strict Tit-for-Tat reciprocity. People use Tit-for-Tat reciprocity as a diagnostic criteria for the existence of close friendships; when benefits are balanced directly, relationships are assumed to be casual and ephemeral. People seem to make concerted efforts to obscure the accounting of costs and benefits among their friends—in joint tasks, they hide their own contributions and avoiding monitoring their friends' contributions.

It is important to emphasize that the exchange-communal distinction does not imply that people do not care about the cost-benefit balance in close relationships. In fact, people are unsatisfied when they perceive relationships with close friends to be unbalanced in either direction, and they become resentful when their requests are not granted or when they feel that they are being asked to do too much (Allan 1998; Rook 1987; Walker 1995; Winn et al. 1991). The failure to provide help when requested or needed produces a sense of betrayal and can lead to the dissolution of friendships (O'Connor 1992; Walker 1995).

Mills and Clark believe that the exchange-communal distinction implies that the process that preserves the balance in these two different kind of relationships differs. In exchange relationships, help is given with the explicit expectation that it will be reciprocated. In communal relationships, help is given because it is needed or desired; when both partners have the same communal orientation, benefits will flow back and forth, but they will not be strictly contingent on expectations of future benefits.

HOW DID FRIENDSHIP EVOLVE?

Most researchers interested in the evolution of human social relationships have been preoccupied with kin relations, parenting decisions, and mate choice, giving little attention to the problem of human friendship. When friendship is mentioned, it is usually assumed to be the product of kin selection, which is misdirected toward nonkin or Tit-for-Tat reciprocity.

The argument that friendship is derived from kin selection relies on the logic that our altruistic dispositions were shaped during the millions of years in which people lived in conditions like those of modern foragers. In these societies, people interacted mainly with close relatives and had no need to distinguish between kin and nonkin, or between reciprocators and nonreciprocators. We continue to treat close associates like kin because our ancestors had few opportunities to interact with strangers and had little need to discriminate between kin and nonkin. Accordingly, we form friendships because we have a long history of nepotistic associations (e.g., Alexander 1979; Kenrick and Trost 2000).

I find this hypothesis unconvincing because it assumes that people are less flexible in their behavior than other primates. In many nonhuman primate

groups, the average degree of relatedness among females is relatively high. Nonetheless, they clearly discriminate among potential partners, interacting selectively with close kin and reciprocating partners. Even in small foraging societies, people interact regularly with both relatives and nonrelatives, and have opportunities to discriminate between close kin and distant kin, between relatives with high reproductive value and low reproductive value, and between reliable and unreliable reciprocators.

Others have hypothesized that friendship is the product of reciprocal altruism (e.g., Kenrick and Trost 2000; Hewlett 2001). Shackelford and Buss (1996, p. 1153; *italics in original*) wrote, "One of the most important characteristics of close relationships is a reciprocity of time, resources, and effort expended by one relationship members for the benefit of the other. This exchange of costs and benefits between relationship parties has been termed *reciprocal altruism*." Humans are good candidates for reciprocal altruism because natural selection seems to have equipped humans with well-tuned mental mechanisms to detect violations of social contracts (Cosmides and Tooby 1992), and these mechanisms could operate in the context of friendship.

Shackelford and Buss (1996) suggest that the difference in the dynamics of reciprocity in communal and exchange relationships reflects differences in the timescale over which accounting is done. According to their view, in coalitions and exchange relationships, the shadow of the future is short, and immediate reciprocity is required to prevent exploitation and cheating. In communal relationships (such as close friendships), the shadow of the future is extended, and there is more tolerance of short-term imbalances in relationship accounts. In such cases, insistence on immediate reciprocity signals uncertainty about the continuation of the relationship, and this elicits feelings of concern, distress, or betrayal. They hypothesize that the difference in responses to requests for immediate reciprocation by close friends and coalition partners described earlier arises because a demand for immediate reciprocity implies that future interactions are unlikely to occur. This is more disturbing for close friends, and elicits stronger feelings of betrayal, than for coalition partners. Although this explanation might explain why friends avoid Tit-for-Tat reciprocity, it does not explain why they obscure their contributions to joint tasks with friends.

FRIENDSHIP IS NOT MUTUALISM

It is possible that friendship is a form of mutualism, a relationship in which each party benefits directly from the things that they do for each other. There is growing interest in the role of mutualism and pseudoreciprocity in nature (Leimar and Connor, this volume). Clutton-Brock (2002) argues persuasively that mutualism plays an important role in the evolution of cooperation in cooperative breeders.

Tooby and Cosmides (1996) emphasize the importance of mutualistic processes in friendship. They begin by challenging the relevance of the

conventional definition of altruism, which is based on costs to the actor and benefits to the recipient. They point out that there are many situations in which benefits can be provided at little cost to the actor. For example, if you own a television, it costs you nothing to let others watch with you. This is roughly analogous to what is called by-product mutualism (Dugatkin 1997). To understand the evolution of friendship, they argue, we need to understand how evolution shapes mechanisms that are designed to deliver benefits to others.

Tooby and Cosmides note that when we need help the most, we are often least able to reciprocate. They call this the banker's paradox, likening it to the banker's problem in deciding who to loan money to — those who need it most are often the worst credit risks. Tooby and Cosmides suggest that the solution lies in choosing the right friends. The most reliable sources of support will be those who consider their friends to be unique and irreplaceable, because they will be most motivated to preserve the relationship. Thus, if you are the only person in the neighborhood who owns a television, you will be much sought after as a friend. However, it is also important to distinguish between sincere and loyal friends and "fair-weather" friends, because only the former will be willing to help when your needs are greatest. This may be why help received in times of great need is particularly memorable.

Tooby and Cosmides suggest that it is important to be selective in choosing friends because there are practical constraints on the number of friends that a person can have. Thus, when we choose friends it is important (a) to consider how many friends we already have, recruiting friends when we have few friends, discouraging new friendships when we have many; (b) to evaluate the qualities of potential friends, preferring those who possess positive externalities (qualities such as strength, wealth, prestige, and power) that provide benefits with no obligation to repay; and (c) to select those who are able to read your mind and thus anticipate your needs and desires, who consider you to be irreplaceable, and who want what you want.

Tooby and Cosmides's verbal model reflects some important features of the psychology of friendship, focusing on the many ways in which friendship increases the benefits that we gain from our relationships with others (Blieszner and Adams 1992). For example, by forming friendships with people who share our interests and understand our needs we can increase the net value of benefits that we derive. (Thus, you might like me because I let you watch my television, but you will derive little benefit from the experience if you are a Star Trek fan and I only watch BBC nature documentaries. Trekkies should seek other Trekkies as friends.)

Tooby and Cosmides also emphasize the importance of choosing the right partners. This may mean choosing partners with positive externalities who can provide copious benefits, or choosing partners who will provide help when you need it. De Vos and Zeggelink (1997) show that the tendency to request support

selectively from previous supporters facilitates the evolution of cooperation in small groups living under harsh conditions.

I find it difficult, however, to understand how Tooby and Cosmides's scheme avoids the underlying logic of reciprocity completely. The metaphor of the banker's paradox is based on the implicit assumption that reciprocity matters. If bankers were unworried about being repaid, they would loan money to anyone who asked. Tooby and Cosmides argue that the mechanisms for obtaining benefits matter more than mechanisms that focus on contingent exchange of benefits and costs, but their argument implicitly assumes that costs limit peoples' willingness to provide benefits to others. The banker's paradox is not resolved by ignoring costs and obligations to reciprocate, but by choosing friends for whom the cost-benefit balance is most favorable. It may be that it is easier to inflate the benefit side of the equation (maximizing the benefits that others derive from their association with you), than to deflate the cost side; however, this does not mean that costs are irrelevant.

Finally, I do not think that the Tooby and Cosmides model gives sufficient weight to the fact that close friendship sometimes involves real costs. Such costs may be necessary for friendship: "By definition all friendship must be both sentimental in inspiration and instrumental in effects since there is no other way to demonstrate one's sentiments than through those actions which speak louder than words" (Pitt-Rivers 1973, p. 97). Friendship involves material investments of time, energy, and resources (O'Connor 1992). Moreover, friends may put themselves at risk because same-sex friendships increase vulnerability to sexual rivalry (Bleske and Schackelford 2001) and jealousy (Argyle and Henderson 1984). Although we may be best off choosing friends so that we minimize costs to our friends and maximize benefits to ourselves, friends are valued because they are the ones who are willing to provide help even when it is costly to themselves. Thus, you would be more appreciative if a friend gives you the shirt off his back than if he gives you one of two dozen shirts he has stacked in his closet. The benefit is the same, but the cost to your friend is different. Moral sentiments that we attach to acts of altruism are particularly sensitive to the costs paid.

Thus, I would argue that close friendship is not a form of mutualism. This is not to say that mutualism plays no role in human affairs. We may derive some direct benefits from associations with other people, and mutualistic payoffs may be relevant in those relationships. In some cases, we may even invest in others in order to receive by-product benefits (or pseudoreciprocity, *sensu* Connor 1986). Thus, it makes sense for me to strike up a relationship with someone who has a big screen television as the World Cup final approaches, even to contribute something to the cost of the television, as long as I get to watch the game. However, this does not provide an adequate description of close friendships. We provide costly favors, services, and support to our friends, and we do not benefit directly when we do so. We only benefit to the extent that our friends provide us with similar benefits.

COOPERATION WITHOUT COUNTING

Friendship is friendship, but accounts must be kept. (*Chinese proverb*)

Friendship in contemporary Western societies seems to be based on two fundamentally incompatible rules. The first rule is that it is inappropriate to keep careful and accurate track of benefits given and received from friends, or to help friends with the explicit expectation of being repaid. This is not just rhetoric; in the laboratory, people obscure their own contributions to joint tasks with friends and avoid keeping track of their friends' contributions. The second rule is that costs and benefits should be balanced in relationships with friends. Friendships are expected to be based on equality, and people seem to be dissatisfied with relationships in which the benefit-cost balance is tipped in favor of themselves or in favor of their partners.

The existence of these two rules implies that people value reciprocity in relationships with friends and strangers, and rely on the mechanisms of Tit-for-Tat reciprocal altruism to regulate their behavior toward strangers, but not toward friends. We have no models of the evolution of reciprocity that can accommodate both these rules. Theoretical work on reciprocity generally suggests that natural selection will favor strategies that are highly sensitive to recent interactions and require contingent (but not necessarily equal) distribution of benefits. The psychology of friendship contradicts the logic of these models.

The rules that govern exchanges among friends seem to facilitate systematic exploitation. By consistently giving just a little less than she receives, an unscrupulous individual could take advantage of an uncalculating friend. The perceptions of equity in relationships provide some protection against exploitation, but if accounting is imprecise, there may be considerable opportunity for cheating. Moral sentiments, which produce guilt when we cheat our friends and resentment and anger when we think we are being cheated (Hinde 2002), may be effective when asymmetries are detected, but what will trigger these emotions at appropriate times if we do not keep careful cost-benefit accounts? Cheater detection mechanisms seem well designed to catch single transgressions of social contracts (Cosmides and Tooby 1992), but it is not clear that we are equipped to deal with kinds of accounting problems that long-term relationships create.

Although the threat of exploitation seems very real, the practical difficulties of keeping track of costs and benefits seem intractable. How could people keep track of long-term patterns of exchange in multiple currencies with many different partners? In theory, this is necessary to sustain friendship; in practice, it does not seem feasible. It is possible that people only keep track of acts that have substantial costs, and make little effort to monitor the many small exchanges with their friends. It is also possible that people take stock of their relationships periodically, conducting random mental audits of their friendships (Pillsworth, pers. comm.). Other shortcuts for accounting might be used, though we lack evidence

on this point. We still need to explain why people deny that they keep track of accounts with close friends and why accounting interferes with friendship.

One obvious solution to this puzzle is to assume that the empirical evidence is wrong. Experiments conducted on undergraduates in the laboratory involve trivial stakes and extremely unnatural settings; they may tell us little about the real psychology of friendship. However, the experiments are consistent with more qualitative descriptions of the motivations of people toward their friends. The congruence of these results may simply mean that people consistently misrepresent their own motivations to themselves and to experimenters in different experimental settings. Subjects may deny that they monitor benefits given and received from their friends and act accordingly when they are asked to perform cooperative tasks in the laboratory, but behave differently outside of these artificial experimental environments. Still, it seems unreasonable to simply ignore these data because they do not fit our theoretical preconceptions. Doubts about the credibility of these kind of laboratory experiments must be addressed by collecting relevant data in more realistic settings.

Thus, the puzzle remains unresolved. People establish close cooperative relationships with nonrelatives, care about reciprocity, but avoid keeping careful count of benefits given and received. None of our models of reciprocity can accommodate the psychology of human friendship. As always, we need more data and better models.

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