

# Altruism towards strangers in need: costly signaling in an industrial society

Tamas Bereczkei\*, Bela Birkas, Zsuzsanna Kerekes

*Institute of Psychology, University of Pécs, 7621 Hungary*

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## Abstract

In the present study, the costly signaling theory (CST) is used to examine the effect of an offer of charity on social recognition. On behalf of a charitable organization, 186 students enrolled in 16 different courses were asked to offer support to unfamiliar persons in need. In accordance with our predictions, the results show that significantly more subjects are willing to give assistance if they make charity offers in the presence of their group members than when the offers are made in secret. In accordance with CST—but not with the prevailing explanations in social psychology—the likelihood of charity service was strongly influenced by the expected cost of altruistic behavior. Publicly demonstrated altruistic intentions yielded long-term benefits: Subjects who were willing to participate in a particular charity activity gained significantly higher sociometry scores (as a sign of social recognition) than did others. The cost of volunteerism correlated with social recognition in the case of a charity act judged as the most expensive (giving assistance to mentally retarded children), but not for the other categories of charity offer. Our results suggest that public generosity towards strangers as a costly signal may convey reliable information about subjects' personality traits, such as cooperativeness, but our data do not support the hypothesis that the signaling mechanism is related to sexual selection and mate choice.

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*Keywords:* Generosity; Social recognition; Charity offer

## 1. Introduction

Why do people help others who are unfamiliar to them and cannot be expected to return the favor? Generosity seems to be a cross-culturally ubiquitous feature of life. It is well documented that humans are often altruistic toward unrelated individuals, even strangers. Several evolutionary explanations have been provided for explaining generous acts towards non-kin: indirect reciprocity (Alexander, 1987; Milinski, Semmann, Bakker, & Krambeck, 2001), strong reciprocity (Bowles & Gintis, 2004; Fehr, Fischbacher, & Gächter, 2002), reputation-building (Bereczkei, Birkas, & Kerekes, 2007; Milinski, Semmann, & Krambeck, 2000; Semmann, Krambeck, & Milinski, 2005), competitive altruism (Barclay, 2004; Hardy & Vugt, 2006), altruistic punishment, etc. (Bernhard, Fischbacher, & Fehr, 2006;

Boyd, Gintis, Bowles, & Richerson, 2003). In the light of these theories, generosity does not seem to be an unconditional motive. Instead, it appears to be strategic: the actual situation in which an altruistic act occurs and the personality of both donor and recipient deeply influence behavioral output (Smith & Bliege Bird, 2000, 2005).

### 1.1. Costly signaling theory

Costly signaling theory (CST) states that generosity is one means by which individuals gain social recognition and preferential treatment in their group and thereby gain reproductive benefits in the long run (Gurven, Allen-Arave, Hill, & Hurtado, 2000; Bliege Bird & Hawkes, 2002; Smith & Bliege Bird, 2000, 2005; Sosis, 2000). Individuals who engage in altruistic acts serve their own interests by reliably demonstrating qualities that underlie the altruistic act, such as resource control, trustworthiness, social skills, etc. For the signal to be reliable, it should be costly in terms of energy, time expenditure, and potential risk (Hawkes & Bliege Bird, 2000; Smith, 2000). Public

\* Corresponding author.

E-mail address: btamas@btk.pte.hu (T. Bereczkei).

generosity—providing collective goods, charity, donation, etc.—implies especially tremendous costs in terms of physical activity, time, money, etc. This kind of helping behavior is considered an indiscriminate or unconditional altruistic act because it is usually directed to strangers who have no chance of returning the favor.

Public generosity as a honest signal may benefit both signaler and observers. The payoff to the altruist comes from being favored by the others as a reliable partner in cooperative relationships and chosen as ally, mate, or competitor (Gurven et al., 2000). Studies with experimental games have revealed that donations to strangers deeply influence the social attitudes of group members toward the altruist (Milinski et al., 2000; Semmann et al., 2005). The payoff to the observer comes from the usefulness of the information inferred from the altruistic act as a signal. The observer can evaluate the signaler's qualities that would be beneficial in future social interactions in the group, involving friendship, alliance, and mating. In this respect, costly signaling may be regarded as a kind of reputation-gaining strategy. The difference is that CST specifies mechanisms leading to the benefits (social recognition, prestige, preferential treatment) that individuals gain within their groups. The signaling mechanism provides information about the relevant underlying qualities of the altruist (signaler). This information could then favorably alter the behavior of other group members towards the altruist (Smith & Bliege Bird, 2005).

CST has been tested in pre-industrial societies: for example, among the Ache of Paraguay (Gurven et al., 2000), in the Ifaluk society (Sosis, 2000), and in the community of the Conambe (Ecuadorian Amazon) (Patton, 2005). Turtle hunting and the associated public feasting among the Meriam of Torres Strait, Australia, is one of the best documented forms of public generosity (Bliege Bird & Bird, 1997; Smith & Bliege Bird, 2000, 2005; Smith, Bliege Bird, & Bird, 2003). Although successful male turtle hunters receive no recompense, not even portions of their catch in the subsequent feast, they gain net benefit from their risky endeavor, which is realized through multiple avenues (Gurven, 2004). Those who lead turtle hunts appear to be signaling leadership skills, specialized knowledge and generosity in supplying collective goods, as well as their good physical condition and willingness to take risks, which are highly valued traits in this community. As a possible result, they were found to gain social recognition, have an earlier onset of reproduction, achieve higher age-specific reproductive success, and gain highly ranked mates.

The solid empirical foundation of CST comes from the preindustrial societies. Although there have been several investigations on costly signaling applications in contemporary urban communities (Farthing, 2005; Goldberg, 1995; Lyons, 2005), well-controlled empirical studies have not yet been conducted in modern industrial

societies. This failure is especially pressing, if a crucial difference between technically less and more advanced societies is taken into consideration. Studies in pre-industrial societies have referred to circumstances where both signaler and observer lived in the same group and both generosity and preferential treatment toward altruists occurred inside the group. However, it is well documented that humans are often altruistic to strangers, especially in industrial societies, for example, in donating to charities.

### 1.2. *Charity service and social recognition*

Our research is based on a realistic (life-like) situation in which subjects have an opportunity to decide freely whether they wish to help unfamiliar people (Bereczkei et al., 2007). A representative of a charity organization requested students in a seminar course to support unfamiliar people in need (alone, elderly, homeless, and mentally retarded people). In one setting, students could make their offers publicly in the presence of their group, while in another setting, the offers were concealed, so the others in the group were not aware of them. We expected that both altruistic behavior and the subsequent change in social recognition would differ as a function of these circumstances, as follows.

*Prediction 1.* People who can make their charity offers in the presence of group members are more likely to offer support to strangers than those whose intention to provide assistance remains concealed from the group.

*Prediction 2.* Subjects who make their charity offers to the needy in the presence of and with the knowledge of their group members should gain social recognition (reputation, prestige, and popularity) within the group.

### 1.3. *Costs for helping*

However, these predicted relationships between altruistic acts and social recognition can be interpreted by certain non-evolutionary theories, especially social-psychological explanations. Although the presence of others can inhibit people from responding to an emergency (Latané & Darley, 1970), in general, people are more likely to engage in prosocial behavior when they are observed by others (Schroeder, Penner, Dovidio, & Piliavin, 1995). The presence of others has long been known to stimulate altruism, generosity, and cooperation (Berkowitz, 1972; Eisenberg-Berg, 1979; Hofman, McCabe, Shachat, & Smith, 1994; Hogg & Vaughan, 2005; Jerdee & Rosen, 1974). Studies in evolutionary psychology have also found that an increase in the visibility and decrease in the anonymity of individuals enhances their cooperation in social dilemmas (Haley & Fessler, 2005; Kurzban, DeScioli, & O'Brien, 2007). From this perspective, the visibility of potential altruists can be, in itself, responsible for the higher frequency of a charity offer without the need to assume altruistic signaling and reputation-gaining strategies.

However, CST provides unique predictions that cannot be inferred from other psychological theories. It claims that the willingness to provide generosity and the related social recognition will depend on the perceived costs of the altruist act. When being observed, people are likely to engage in the costly acts of public generosity and highly value those persons who choose helping behavior with a high expenditure of time, energy, and risk-taking. In contrary, in light of the prevalent social psychological theories, people are motivated to minimize the costs imposed by helping behavior (effort, time, danger, disruption of ongoing activities, etc.), and they engage in prosocial behavior when immediate reward or direct compensation counterbalance these costs (Dovidio et al., 2006). Researchers have found that personal costs for helping can readily outweigh even the serious need of the victim, regardless of whether others were present or not (Pilavin & Pilavin, 1972). Furthermore, even the factors that are seemingly unimportant compared to the suffering of the victims, such as time pressure, often make people with good personality traits less responsive to the needs of the others, in spite of the fact that they were observed by their group mates (Darley & Batson, 1973).

*Prediction 3.* Whereas the frequency of social support is expected to be inversely proportional to the costs of the charity activity (i.e., more people are willing to provide less costly support than more costly support), this relation is highly context dependent. In accordance with the theory of the costly signaling model, more people offer costly support in groups in which they can make their offers publicly than do people in groups in which the offers are made in secret. In the latter group, less costly offers will tend to be more frequent.

*Prediction 4.* Social recognition as a benefit is directly proportional to the costs of altruistic investment. The social attraction of individuals who make costly charity offers (when others in the group learn about it) will grow more than that of people who make less costly contributions to assist a charity organization.

#### 1.4. Signaling mechanisms

##### 1.4.1. Sexual selection

CST can also provide distinctive predictions about the individual characteristics being signaled. One possibility is that public generosity is related to sexual selection whereby men are signaling qualities that increase their chances to get sexual partners and establish long-term partnership. In fact, several studies of pre-industrial societies (the Ache, Meriam, Hadza, etc.) have revealed that young, unmarried men display costly activities associated with sharing their own resources in a way that was generous and also highly desirable for potential mates (Bliege Bird & Hawkes, 2002; Hawkes, 1991; Sosis, 2000). In light of evolutionary theory, men who have been selected to compete for resources can achieve a greater fitness return as compared to women through high cost–high return strategies (Geary, 1998;

Mealey, 2000). Thus, public generosity can be seen as a form of competition among men that increases their reproductive success in terms of getting sexual partners. This argument seems to contradict the more traditional view in social sciences stating that women who have more empathy, show more care and are more sociable than men will on average participate in charity activities in greater number than members of the opposite sex—regardless of the condition of publicity.

*Prediction 5.* Costly signaling is more characteristic of men and less characteristic of women. Men are more likely to initiate charity offers publicly, while more women are willing to participate in organized charity anonymously, even if their intention is concealed from the group.

##### 1.4.2. Personality traits

Public generosity toward strangers as a costly signal may convey reliable information about subjects' personalities and abilities that might be hidden in everyday interactions. By offering charity service, university students in a seminar class can demonstrate various psychological traits associated with prosocial personalities such as trustworthiness, empathy, and solidarity. These features might refer to an altruist's benevolence and helpfulness toward group members, who may regard these qualities as valuable and useful in future interpersonal relationships.

*Prediction 6.* Individuals who gain an above-average social recognition and are chosen as best friends among their group mates are expected to have a higher prosocial personality than those with lower scores of social recognition.

## 2. Material and methods

### 2.1. Subjects

One hundred eighty-seven subjects (117 women and 70 men) participated in the experiment. All subjects were second- and third-year students in the Medical School and the Faculty of Sciences (University of Pécs, Pécs, Hungary) and belonged to 16 different seminar classes. All members of each seminar were involved in the experiment. The main criterion in selecting subjects for the experiment was to find groups whose members knew each other well but, at the same time, did not have stable friendships. For this purpose, we investigated seminar groups that had formed at the beginning of the semester, thus whose members had known each other for only a few months. This condition was necessary to ensure that group members could change or to some extent reevaluate their opinion about one another under the influence of certain events (Bereczkei et al., 2007).

### 2.2. Questionnaire measures

Individual differences in social recognition were measured by sociometric investigations based on the classic

works of Moreno (1954). These surveys are designed to reveal the position that individuals hold within a social structure (Coie, Dodge, & Coppotelli, 1982; Crick, 1996). The starting point for this thesis is that social groups can be seen as networks that consist of often-hidden, latent systems of personal bonds formed by emotionally driven choices. All the members of the group select a position for the others within the community on the basis of preference. Accordingly, in sociometric surveys, members of a group are asked questions such as whom they would choose as a friend, whom they could trust on in a critical situation, and whom they would ask to perform certain activities.

The sociometric survey used in our study consists of six items (Bereczkei et al., 2007). All the members of the investigated group were asked to name three individuals who best met the criteria for each item (see Appendix A). After analyzing the responses of the participants, the position of each individual within the group was evaluated as a function of the number of times they were chosen as the most appropriate person for a given item. The social recognition of each individual was calculated by the total number of votes given by all the group members. The survey was administered both before and after the experiment. Change in subjects' social recognition was measured by the difference between the total scores on the first and the second survey.

For assessing prosocial personality character, the Social Cooperation Scale of Cloninger's Temperament and Character Inventory (TCI) test was used (Cloninger et al., 1994). TCI evaluates seven higher-order personality or behavior traits. One of them, Cooperativeness, has been formulated to account for individual differences in identification with and acceptance of other people. It includes five aspects: social acceptance, empathy, helpfulness, compassion, and conscience. Highly cooperative persons are described as empathic, tolerant, compassionate, supportive, fair, and principled individuals who enjoy being at the service of others and try to cooperate with others as much as possible. They understand and respect the preferences and needs of others as well as their own. This capacity is important in teamwork and social groups for harmonious and balanced relationships to flourish.

### 2.3. Procedure

The present study involves a similar procedure to one used in a previous study (Bereczkei et al., 2007). On the basis of a previous agreement with the lecturers, the experimenters (two of the authors) visited one class meeting of each seminar group. The students had no knowledge of the aim of our visit. The experimenters told them that participation in the survey was voluntary and anonymous: their responses would be kept confidential, and no outsiders or other members of the group would have access to them. Then the experimenters administered the first sociometric survey, and each subject filled out the Social Cooperation Scale of the TCI.

Several weeks after the first encounter, a representative of a charity organization was asked to visit each seminar group. This person asked the students to offer their support to the needy on an unpaid voluntary basis. She handed them a sheet containing the logo of a charity organization. The sheet listed seven different forms of support and target groups from which the students could make their choice (taking blood pressure, organizing a day for blood donors, collecting donations, providing care for the elderly, providing care for the physically disabled, providing health care for the homeless, providing assistance for mentally handicapped children). Students could mark one or several choices, indicating what sort of charity activity they would be willing to engage in or who they would wish to support. Each listed charity act was restricted to a single occasion and took the same period of time, approximately 3–4 h. The members of each group were not only asked to say which charity act they would be willing to perform but also to give a date by which to accomplish the task. Students were told that for this purpose a representative of the charity organization would be in telephone contact with them.

The donations and offers characteristic of the second phase were made across different conditions. The seminar groups were divided into two categories according to whether the members of each group were informed of the intention of their group members to participate in the work of the charity organization or not. In some of the seminars ("anonymous" or "private offer groups") students made offers of assistance in the presence of the others but in writing, so others did not learn about it. After the representative of the charity organization had told students how to become involved, everybody filled in a form individually, saying what sort of assistance they were willing to provide for whom and when. In the other ("public offer") groups, offers were also made in the presence of the others, but this time each group member publicly declared his or her intention to help. In order for group members to note who offered what and to make each group member aware of the offers, the representative of the charity organization repeated the names of the volunteers loudly several times and praised their generosity. The second phase of the research gave us the following variables: Generosity (made an offer to participate or not), Publicity (public or anonymous offer), and Cost (high or low cost of investment, see below).

When the representative of the charity organization had left (so neither she nor investigators were present), several hours later (usually at the end of the session), the leader of the seminar asked the students to fill another sociometric survey that contained the same questions as the first one. Social cognition as a variable was calculated by the difference between the total scores of the first and the second sociometric survey, and these differences were also calculated for the dimensions of trustworthiness and social skill.

## 2.4. Costs of charity activities

After completing the experiment, the investigators asked other students who had not participated in the study to fill in a questionnaire ( $n=30$ ). They asked them to grade seven activities that had been listed in the call of the charity organization. (Obviously, these students were not informed about the experiment.) Each activity was assigned a rank on the basis of how costly the students viewed it; that is, they had to determine how much time and energy would be needed for a particular activity in comparison with the others. Cost grading—in ascending order—resulted as follows: (1) Taking blood pressure, (2) Organizing a blood donation day; 3. Collecting donations; 4. Providing care for the elderly; 5. Providing care for the physically disabled; 6. Providing health care for the homeless; 7. Providing assistance for mentally handicapped children. Thus, the Cost variable has seven different values in ascending order.

## 3. Results

### 3.1. Charity offer

Of the subjects, 44.3% were willing to give assistance to people in need (83/187). As expected (Prediction 1), significantly more subjects were willing to give assistance if they could make charity offers in the presence of their group members than in a situation when the offers were made without the knowledge of the others. In the public groups, more than half of the subjects appeared to be altruistic, while in the anonymous groups, less than one third were (61/116 vs. 22/71,  $\chi^2=8.32$ ,  $p<.005$ ).

### 3.2. Costs

The expected costs of altruistic behavior also influenced the likelihood of charity service (Generosity). In accord with the theory of costly signaling (Prediction 3) more subjects offered costly assistance when they could make their offers in public than in groups where they could not do it publicly ( $\chi^2=18.31$ ,  $p<.01$ ). In other words, more subjects offered their services in public to charity activities that required a relatively higher cost (Fig. 1).

### 3.3. Social recognition

A significant association was found between publicly made charity offers and the increase in social recognition, measured by the difference between the scores of the two consecutive sociometric surveys [ $F(1,114)=21.61$ ,  $p<.001$ ]. This means that those who expressed their intention to participate in a particular charity activity received a significantly higher score in the second sociometric survey, following the public offer, compared with the first sociometric survey. The Generosity  $\times$  Publicity interaction was significant [ $F(1,185)=7.34$ ,  $p<.01$ ], suggesting that the increase in social recognition differed in the two types of the groups. As Fig. 2 shows, in the public groups the

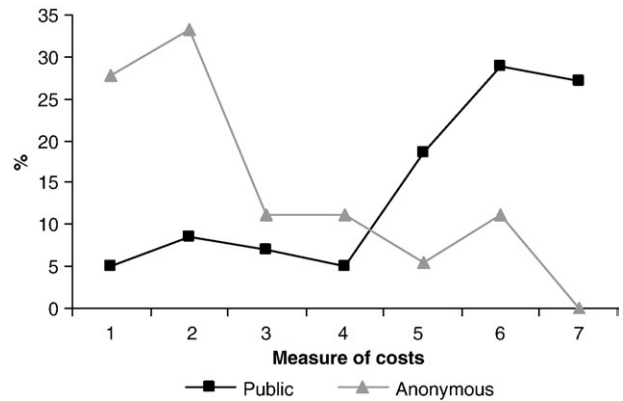


Fig. 1. Distribution of charity offers in public and anonymous groups as a function of the perceived cost of the altruistic action. Costs were measured on a 7-point scale by independent raters.

popularity of potential altruists increased while that of the non-altruists decreased ( $1.69\pm 2.79$  vs.  $-0.49\pm 2.18$ ,  $t=4.65$ ,  $p<.001$ ). However, in the anonymous groups (in which group members did not learn about offers made by the others) we did not find any difference in the social recognition scores of those who made an offer and those who did not ( $0.32\pm 1.58$  vs.  $0.14\pm 2.19$ ,  $t=0.34$ ,  $p>0.05$ ).

The costs of charity that subjects offered did not prove to be predictive with respect to the increase in popularity of the subjects within the public group [ $F(6,59)=1.10$ ,  $p>.05$ ]. In other words, group members who made offers that required physically and emotionally more costly investments did not show a greater increase in social recognition than those who offered to participate in less costly activities. The only significant difference was found in the most expensive altruistic activity (Fig. 3). Helping mentally disabled children proved to be perceived as so expensive as an altruistic investment that it significantly improved the reputation of altruists in the group as compared to other charity offers [ $F(1,59)=5.11$ ,  $p<.05$ ].

### 3.4. Signaling mechanisms

In general, women were more likely than men to offer help to the needy persons (59/117 vs. 24/70,  $\chi^2=4.62$ ,  $p<.05$ ). However, contrary to our assumption (Prediction 5),

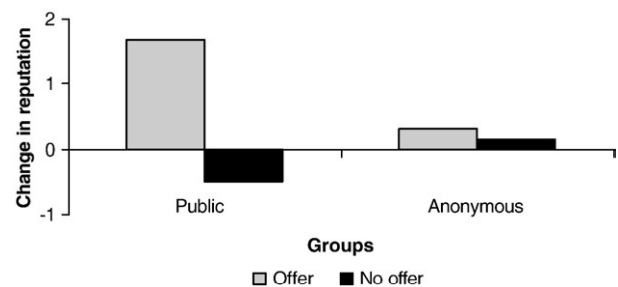


Fig. 2. The effect of charity offers on the social recognition of altruists. The change in social recognition was calculated as the difference between the second and the first sociometric surveys.

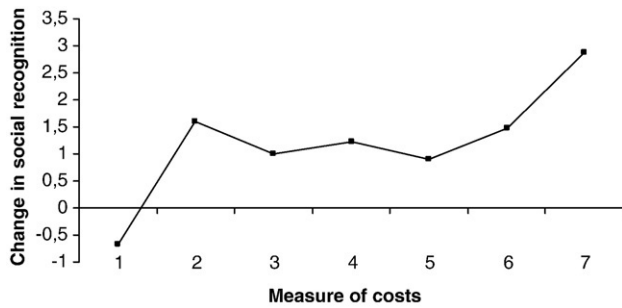


Fig. 3. The change in the altruist's social recognition within the group as a function of the perceived cost of the generous action.

men did not show off of their altruism more often than women. We have found that women were more likely to offer their support to a charity organization in public than in anonymous situation (44/75 vs. 15/42,  $\chi^2=5.67$ ,  $p>.05$ ). Men also shown similar pattern but the measured difference did not reach the significance level (17/41 vs. 7/22,  $\chi^2=2.26$ ,  $p>.05$ ). Thus, surprisingly, only women shown significant tendency to be more altruistic in public groups than in anonymous groups. However, the difference in offering public help between male and female participants was not significant (17/61 vs. 24/55,  $\chi^2=3.15$ ,  $p<.05$ ).

Subjects who were willing to offer help to a needy person characterized themselves as highly prosocial persons. They received higher scores in Social Cooperation scale of TCI than those not offering help [ $F(1,185)=12.88$ ,  $p<.001$ ]. Significant differences were found on the subscale of social approval, empathy, and helpfulness ( $7.13\pm 1.32$  vs.  $6.64\pm 1.33$ ,  $t=2.50$ ,  $p<.05$ ;  $5.06\pm 1.49$  vs.  $4.46\pm 1.69$ ,  $t=2.53$ ,  $p<.05$ ;  $6.48\pm 1.31$  vs.  $5.88\pm 1.32$ ,  $t=3.12$ ,  $p<.05$ , respectively).

People who gained higher social recognition on the second sociometry survey showed a higher scores in the personality traits of cooperativeness than those with lower scores of social recognition [ $F(24,185)=2.28$ ,  $p<.005$ ]

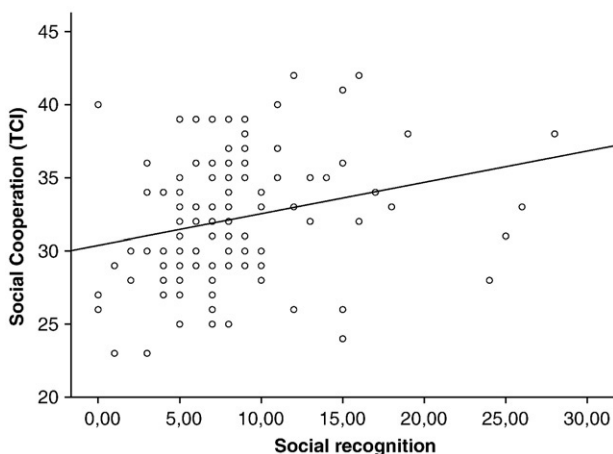


Fig. 4. Relationship between the subjects' social recognition (measured on the second sociometry survey) and their prosocial personality (measured on the Social Cooperation scale of TCI).

(Fig. 4). It means that those students were chosen as friends in the seminar groups who had an above average prosocial personality.

#### 4. Discussion

The present study is one of the first attempts to extend the theory of costly signaling to the group dynamics of an industrial society. Instead of a small community, such as a hunter-gatherer society, this study took place in a large-scale, complex and highly layered society in which more complex and less transparent interpersonal relations should be expected. It is probably even more important to analyze the situation in which group members observe others offering support to an individual *outside a group* who is completely unknown to them. Our question was whether it pays off to be altruistic towards strangers, which is by no means rare in modern industrial societies.

Our data show that 44.3% of the subjects were willing to give assistance to people about whom they knew only that their social status meant they had to rely on other people's help (e.g., they were homeless, disabled, ill or elderly). It was found that the subjects showed more willingness to support strangers when they could make their charity offers with the knowledge of their group members than in a situation where their altruistic intention remained concealed. More than three times as many subjects offered their help in the public groups than in the anonymous groups.

Generous acts appear to pay off to the altruist, for we found that the altruists' social recognition (reputation, popularity) increased in public groups, while remaining stable in anonymous groups. The difference in the scores of the sociometric surveys taken before and after making the altruistic offers shows that in groups where members could make their charity offers in public the altruists' reputation scores increased, while the sociometry scores of those who made no offers when requested by the charity organization decreased.

However, the frequency of charity offers and their impact on social recognition do not merely depend on whether there is a chance to make charity offer publicly. The expected costs of charity activities also have an influence on altruistic decisions. This is the point where predictions inferred from the CST will differ from predictions from social psychological explanations. In accord with CST, we found that the others' presence and attention increases the likelihood of making *costly* charity activities. Subjects made more costly offers in public groups, while there was a roughly equal chance of making more and less costly offers in anonymous groups. This finding can be interpreted very clearly in the theoretical model that we used: The helping individual sends a signal that informs the others of valuable and costly forms of generosity.

CST - but not the relevant social psychological theories - also predicts that social recognition as benefit comes in direct

proportion to the costs of generous behavior. Our results partially support this hypothesis. A significant relationship between reputation building and costs was found in the case of the most expensive charity act. When looking at the category where altruism seems to involve the highest investment (giving assistance to mentally retarded children), the altruists' reputation increased significantly more than that of those who offered other, less costly types of help. This expensive kind of charity service appears to signal such characteristics of the altruists that may make them especially valuable and useful to the rest of the group.

For the rest of the altruistic acts, however, we did not find a significant relationship between the emotional and physical investment required by the charity services and the increase in social recognition. It is quite likely that while the available charity activities differed in costliness, group members did not perceive much difference in the degree of unselfishness and benevolence demonstrated by more and less costly signals, or at least they did not attribute much significance to it. For example, they might view provisions for the physically disabled as more costly than the collection of donations, but it is quite possible that they considered these activities as having the same degree of generosity and helpfulness.

In the light of CST, we provided several predictions about the nature of the particular signaling system in circumstances where young adults are allowed to offer voluntarily help to the needy people. First, we assumed that public generosity towards strangers as a costly signal conveys reliable information about the subjects' prosocial personality that might be hidden in everyday interactions. The willingness to cooperate (measured on a subscale of TCI) was found to be associated with both charity offer and social recognition (measured on a sociometry questionnaire). On the one hand, those who characterized themselves as having more social approval, empathy, and helpfulness showed more readiness to support the needy persons. On the other hand, people who gained higher social recognition on the second sociometry survey – and were chosen as friends – received higher scores on the Social Cooperation Scale in Cloninger's Temperament and Character Inventory (TCI). These results, altogether, suggest that students highly value generous behavior, and public generosity towards strangers may signal the altruist's prosocial personality. We can further hypothesize that group members may regard these psychological traits as valuable and useful in their future interpersonal relationships. In order to test this assumption, a future study should examine what real long-term benefits generous acts towards unfamiliar people can bring for altruistic individuals.

A second possible kind of signaling mechanism was supposed to be related to sexual selection. It was expected that men—who are characterized by a higher risk-taking and competitive ability—would be more likely to offer their assistance in the presence of their group mates than members of the opposite sex. This publicly demonstrated helping behavior would serve as calling attention of their

potential partner. However, we did not find male advantage in this respect. We have found that significantly more female subjects offered their help to strangers when the others in the group could see their generous acts than when the intention to help remained concealed. Yet, women engaged in helping behavior in public groups even more frequently than men did, although this difference between sexes was not significant.

This raises the possibility that women in industrial societies make use of the opportunity to show off via public generosity. By offering their assistance to strangers, they may demonstrate qualities that can be useful in building beneficial relations with their group mates in the future. Thus, their generosity may be a tool for enhancing their prestige in the group. It is possible that costly signals of altruism are used by young women in competing for status in the same way as by men. This assumption seems to be confirmed by other research findings that show that, under certain circumstances, such as women's youth, a low number of high-status men, etc., competitive behavior is likely to emerge among women (Campbell, 2007; Mealey, 2000). Quarrels and gossip among young women often involve issues of choosing a partner; competing for highly valued young men, maintaining reputation and protecting their partner relations constitute the main motives of rivalry between women (Campbell, 1995; Rucas et al., 2006). It is possible, then, that public generosity as a costly signal is a means for both sexes to attract the potential mate's attention and to elicit their preferential treatment. However, an empirical test of that hypothesis needs further studies about the relationship between social recognition and sexual attractiveness.

Theoretically, generosity as a costly signal may advertize other qualities, such as those associated with time and resources that are devoted to non-selfish activities (E. A. Smith, personal communication). This assumption accords with studies in social psychology that found that the costs of helping associated with time pressure made otherwise "good" people less responsive to the needs of others (Darley & Batson, 1973). CST predicts that a subject may inform the others that she/he can afford to give time altruistically and still can pursue studies and other activities characteristic to students. This possibility also needs further investigation.

Our study raises several questions and limits. One of the key facets of costly signaling is that individuals with desirable qualities or resources freely choose to display these through their choice or behavior. The individuals in our experiments did not have such an unlimited choice. Of course, they freely made decisions about charity service but they were forced to say publicly if they want to offer help or not. Therefore, their choice would have been a social desirability response to a situational demand rather than a display of a reputation-gaining strategy. In fact, our previous study revealed that support for an organized charity was influenced by sensitivity to the norms of the group and the need for social approval (Bereczkei et al.,

2007). However, motivation underlying an altruistic act (including social sensitivity) should be distinguished from the preferential attention toward the altruist. We simply predicted that individuals—regardless of their direct motivation to behave altruistically—gained a higher reputation among group mates.

It is also possible that since participants were watched by their group mates, they felt pressured to volunteer for costly activities. Therefore, in the public condition, observation and a demand for social approval could be, in itself, responsible for higher social recognition. However, if this were the case, we would have found a strong relationship between the cost of charity service and an increase in the altruist's social recognition. As we have seen, with the exception of the most costly charity offer, no such relationship was found. Whereas participants offered relatively costly forms of generosity in public conditions, they did not appear to evaluate others' reputation as a function of the costs imposed by altruism alone. Reputation gaining seems to be a more complex process that includes personality characters, popularity, and other conditions (Bereczkei et al., 2007).

Another alternative interpretation may be that it was not the charity offer as a single act but the events occurring in the seminar groups during the weeks between the first and the second sociometric survey that might be responsible for the measured increase in social recognition. In fact, the first sociometric measures were taken several weeks before, and the second survey a few hours after the charitable action took place and any changes during this time might have influenced the perceived position of individuals within social network. However, this alternative explanation does not explain our findings that increased social recognition only occurred in the public condition, and not in the private condition. The alternative hypothesis is also weakened by the strong association between charity support and change in social recognition. Sociometric scores increased only for group members who made charity offers and decreased for those who did not make any offer. Altruistic people might also provide support to others during the weeks between the two sociometric surveys, but this unobserved generosity was likely to reinforce their good reputation as bolstered by their charity offer.

A similar criticism may be related to the closeness between the charity offer and the second sociometry measurements. These measurements were conducted on the same day when the charity service was requested because after a lapse of time it becomes increasingly more likely that the reevaluation of within-group status and positions is the result of later social interactions rather than the result of charity offers. Sociometric surveys are extremely sensitive to changes in interpersonal relations, so we can trust that we are measuring the effects of the given transaction only if the survey is administered right after the transaction is completed. On the other hand, members of the seminar group did not realize at all that the two surveys were related.

In this context we asked the subjects at the end of the experiment whether they had realized at any point during the experiment that they were being manipulated, and whether they had noticed that the representative of the charity organization and the people conducting the tests were participants in one and the same experiment. Less than 5% of the students answered yes to this question (Bereczkei et al., 2007).

## Appendix A. Sociometric survey

1. Who would you prefer to make friends with?
2. Who would you prefer to spend a weekend with?
3. Who would you turn to for help in case a difficulty arises?
4. In your view, who would be the best choice in the group to organize a party or an event?
5. Who would you ask to help you perform a difficult task?
6. Who do you think are the most popular individuals in the group for particular personal qualities and abilities?

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