



## Kin altruism, reciprocal altruism and social discounting

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### ABSTRACT

According to evolutionary psychologists, human pro-social behaviour is regulated by evolutionarily developed psychological mechanisms whose role is to solve adaptive problems. The same reasoning can be applied to social discounting, i.e. subjective devaluation of a reward which must be shared with one or more people. Based on reciprocal altruism and inclusive fitness theories, hypotheses were formulated about the effect of relatedness and reciprocation on the rate of social discounting and the relationship between the subjective value of a reward to be shared and agreeableness and neuroticism. The results of the study show that the rate of social discounting is higher when the reward is to be shared with an unrelated person and that the subjective value of the reward to be shared with another person declines as that person's willingness to reciprocate decreases. Moreover, a positive correlation between the subjective value of the reward and agreeableness and a negative correlation with neuroticism was found when sharing with an unrelated person.

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### 1. Introduction

Explaining the origin of altruistic behaviour poses an interesting challenge from the perspective of Darwin's Theory of Evolution. It would seem that individuals engaging in altruism should lose in competition with their egoistic peers and be eliminated through natural selection. Evolutionary biology offers a number of theoretical solutions to this apparent contradiction. The most popular and influential ones include the inclusive fitness theory (Hamilton, 1964a, 1964b) and the reciprocal altruism theory (Axelrod & Hamilton, 1981; Maynard Smith, 1984; Trivers, 1971).

According to Hamilton (1964a, 1964b) a key step in understanding altruistic behaviour is to take into account the degree of relatedness between benefactor and beneficiary. The higher the co-efficient of relatedness, the greater the probability that offering help will contribute to the survival of genes promoting altruism. A single act of altruism may benefit more than one related beneficiary, which increases its profitability from the genetic perspective. The mechanism described by Hamilton is referred to as kin selection, and the resulting type of altruism is called kin altruism.

According to Trivers (1971) high probability of future encounters is the basic prerequisite for the evolution of reciprocal altruism. Furthermore, altruistic behaviour must be an investment which yields a surplus benefit when roles are reversed, thus the cost of providing aid by the benefactor should be significantly lower than the beneficiary's gain. And finally, the altruist should be able to avoid being exploited by individuals accepting aid but not

offering it in return. This last condition may be fulfilled by developing specific cognitive abilities enabling an organism to use the "tit-for-tat" strategy. Trivers' theory has inspired a plethora of other concepts in the field of evolutionary psychology, the most prominent being the social contract theory developed by Cosmides (1989), Fiddick, Cosmides, and Tooby (2000). The concepts advanced by these researchers, as well as the ideas of Buss (1995) outline the current paradigm in evolutionary psychology. The principal thesis of this school is that humans are equipped with psychological mechanisms shaped by natural selection. These mechanisms are "domain-specific", i.e. they are geared towards solving specific adaptation problems, such as issues related to social exchange.

In direct opposition to the beliefs of evolutionary psychologists is the behaviourist paradigm of experimental analysis of behaviour, according to which there is no need to posit the presence of evolution-shaped domain-specific psychological mechanisms to explain human altruistic behaviour. Its proponents interpret pro-social behaviour by invoking the phenomenon of temporal or social discounting, with the assumption that preferences in terms of rewards are shaped by individual experience. "Temporal discounting" refers to the decrease in the subjective value of a reward resulting from delay in its receipt. According to Rachlin (2002), choosing between altruistic and egoistic behaviour is essentially analogous to choosing between a greater but delayed reinforcement and one that is smaller but readily available. By definition, a one-off act of altruism is less profitable for the subject than egoistic behaviour. From a long-term perspective, however, altruistic strategy may prove to be more beneficial. The term "social discounting" was introduced by Rachlin and Raineri (1992) to

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describe the subjective devaluation of a reward which must be shared with others. The discounting factor in this case is primarily the number of people with whom the reward is to be shared. Research results show that the value of a reward will also decrease with the increase of social distance (Jones & Rachlin, 2006; Rachlin & Jones, 2008).

It should be noted that both temporal and social discounting can be seen as having an adaptive role. Without doubt, in certain environmental conditions, choosing a smaller but readily available amount of resources can be a favourable strategy. The nature of this dilemma is reflected in the proverb “A bird in the hand is worth two in the bush”. From this perspective, the factors that could have potentially contributed to the evolution of discounting are competition for resources, high energy requirements and strong predator pressure (Logue, 1988). In the case of a social discounting factor such as the number of people, a decrease in the subjective value of a reward is inextricably linked with a decrease in its objective value. Obviously, as the number of people participating in a reward increases, an individual’s share in the resources decreases, while the risk of not gaining any resources grows. Thus, from the point of view of an individual, discounting in such circumstances seems justified. Even more interesting, especially in the context of Hamilton’s theory, is the discounting effect of social distance. In the study conducted by Jones and Rachlin (2006) and Rachlin and Jones (2008), a person close to a participant was referred to as a friend or relative, and a distant one – as an acquaintance. The effect of this type of social distance on discounting is not only consistent with kin altruism theory, it is also one of its predictions. Thus, the phenomenon of discounting seems an attractive concept not only from the perspective of economic and behavioural psychology, which are at the forefront of its exploration, but also from the point of view of evolutionary psychology. The assessment of the rate of social discounting could serve as an interesting measure of prosociality when testing evolutionary hypotheses.

The theories of Trivers and Hamilton describe two alternative mechanisms behind the evolution of altruism. In all probability, however, both are at the basis of human altruistic behaviour. According to the reciprocal altruism theory, willingness to share resources (or to offer help in general) is directly proportional to loyalty of the recipient, i.e. his willingness to reciprocate for the help received. Thus, we may propose a general hypothesis that: (1) there should be discounting relative to the degree of the recipient’s loyalty, i.e. the subjective value of a resource to share with another person should decrease as that person’s loyalty decreases. By taking into account Hamilton’s theory, we can put forward another, more detailed hypothesis: (2) the rate of social discounting relative to the partner’s loyalty should be lower for relatives than for unrelated recipients. This means that a reward which is to be shared with a relative should appear (a) more attractive, and also (b) the level of partner’s loyalty should have less impact on its subjective value. The evolutionary basis for this hypothesis is obvious. Sharing with an unrelated individual who does not reciprocate for the aid received leads to greater losses in terms of reproductive success compared to dealing with a disloyal relative.

Ashton and Lee (2001) presented the interpretation of evolutionary ideas about altruism in terms of the Big Five factors of personality. These authors focus on the agreeableness factor (defined in lexical studies by such adjectives as cooperative and kind vs. cold and unsympathetic) and emotional stability (vs. neuroticism – relaxed vs. moody and touchy). Altruism towards strangers (reciprocal) and relatives (kin) should be located on the same pole in terms of agreeableness (high), but on opposite poles of emotional stability (Ashton, Paunonen, Helmes, & Jackson, 1998). Kin altruism requires low emotional stability, since helping relatives is based on strong emotions such as attachment and empathy. Altruism to-

wards strangers depends to a lesser extent on the community spirit and emotional attachment, and as such requires a high level of emotional stability, which is a prerequisite for an appropriate amount of understanding for the sometimes disloyal peers. Empirical studies (Ashton et al., 1998) confirm those predictions and provide material for further hypotheses about social discounting. We can expect that: (3) the rate of social discounting (relative to the partner’s loyalty) will be negatively correlated with agreeableness and (4) the rate of social discounting when sharing with an unrelated person will be positively correlated with neuroticism, i.e. the rate of decline in the subjective value of a reward which must be shared will be lower for more emotionally stable individuals.

## 2. Methods

### 2.1. Participants

Participants were 200 full-time and extramural students of Warsaw’s colleges. Due to missing responses in the social discounting rate checklist, the final dataset included 184 participants aged 18–53 years (mean = 23.2 years, standard deviation = 5.9 years), 101 females and 83 males.

### 2.2. Materials

Participants completed a file consisting of two parts: social discounting rate checklist and Costa and McCrae’s NEO–FFI inventory measuring the Big Five personality factors (Costa & McCrae, 1992; Polish adaptation: Zawadzki, Szczepaniak, & Strelau, 1995). According to Costa and McCrae, on the cognitive and emotional level, the agreeableness is manifested by confidence in others or lack thereof and sensitivity or indifference to other people’s problems, and on the behavioural level in a cooperative or competitive attitude. Neuroticism denotes susceptibility to negative emotions (anxiety, confusion, discontent, anger, guilt) and psychological stress. Individuals scoring low in neuroticism are emotionally stable, calm, and relaxed.

The inventory measuring the rate of social discounting was prepared in two versions. In the version where participants shared with a non-relative, the inventory opened with the following instruction: “Imagine you have created a list of ten people who are not related to you (are not members of your family), whom you have helped in various ways over the past couple of years. People in this list are ordered by their willingness to return a favour. Person number 1 always reciprocated for your help, while person number 10 never did so. You do not need to write the list down, you only need to imagine it”. Accordingly, the instructions in the version where participants were to share with a relative opened with: “Imagine you have created a list of ten people who are related to you (are members of your family), ...”.

Each inventory contained six pages with 30 alternative choices arranged in the following manner: in the left hand column option A – reward for oneself only, in the right hand column option B – reward to be shared with one person whose degree of loyalty, i.e. the rank on the imaginary list, varied from sheet to sheet). On the successive pages of the inventory, it was the first-, second-, fourth-, sixth-, eighth- and tenth-ranked person, respectively. The values of the reward were expressed in Polish currency (PLN). In the left hand column, the amounts were ordered from smallest to largest. The following amounts of the reward were used: PLN 4.94; 24.70; 49.40; 98.80; 197.60; 296.40; 395.20; 494.00; 741.00; 988.00; 1235.00; 1482.00; 1729.00; 1976.00; 2223.00; 2470.00; 2717.00; 2964.00; 3211.00; 3458.00; 3705.00; 3952.00; 4199.00; 4446.00; 4544.80; 4643.60; 4742.40; 4841.20; 4890.60; 4940.00. The right hand column contained a constant value of the reward to be shared (PLN 4940). Participants were asked to select one option for each

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