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# Social discounting: choice between rewards for other people

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**Abstract.** The purpose of the present study was to test the prediction that when two rewards, a smaller but “socially closer” one and a larger but “socially more distant” one, are moved away from the subject by the same social distance, subjective value of the socially more distant reward will increase (i.e. the rate of social discounting will be shallower). The effect was absent when the recipients were moved back 10 places, but emerged when they were moved back 20 places. In addition, the hyperbolic model was found to correctly describe choices between two socially distant rewards. The results confirm similarities between social and temporal discounting.

**Keywords:** Altruism; Self-control; Social discounting

## 1. Introduction

According to Rachlin & Jones (2009), both temporal and social discounting are associated with the “extension of the self”. Temporal discounting depends on the distance to the self in time, while social discounting involves the extension of the self in the social sphere: just as one may fail to perceive the relationship between the present and future self, one can also ignore real-life relationships or be unaware of the actual overlap between his own interests and those of others.

Dewitte & De Cremer (2001) have a similar point of view. They draw attention to the parallels between the conflicts experienced by individuals in the context of self-control and choices in social dilemmas: (1) cooperation may be seen as equivalent to self-control, since the “do not cooperate” option is more attractive than the “cooperate” one, but can be detrimental to the subject’s circumstances in the long run and (2) conversely: self-control may be construed in terms of cooperation with a past or future self.

Temporal and social discounting can thus be thought of as corresponding processes. This point of view is validated by the positive correlation between the rates of discounting in these two areas reported by Jones & Rachlin (2009) and the similarity of the discounting function. Just as a subjective value of a delayed reward is a hyperbolic function of temporal distance (Mazur, 1987), the attractiveness of a reward for another person is a hyperbolic function of social distance (e.g. Jones & Rachlin):

$$V = A/(1 + kD) \text{ and} \tag{1}$$

$$V = A/(1 + sN), \tag{2}$$

respectively, where  $V$  is the subjective value of the reward  $A$ ,  $D/N$  is the distance from the reward measured as the amount of delay/location on the social distance axis, and  $k/s$

parameters reflect the rate at which the subjective value of a reward decreases as a function of delay/social distance.

Green et al. (2005) demonstrated that the hyperbolic model is well suited for describing the choice between two delayed rewards and that, provided the interval between the smaller and larger reward remains constant, the value of  $k$  declines as the time to receipt of the smaller reward increases, indicating a shift in preference towards the larger although more delayed reward. If social discounting is indeed a process equivalent to temporal discounting, it should also feature a shift in preference, i.e. moving a pair of beneficiaries (at different positions on the social distance axis) each by the same distance should enhance the relative attractiveness of the reward for the more distant of the two. In other words, in the same way delaying a reward frees the decision-making process from the temporarily narrow “self”, increasing its social distance should mitigate the effects of the egoistic, socially narrow “self”.

In a study on social discounting conducted by Rachlin and Jones (e.g. 2008), participants were asked to imagine a list of 100 people ranked by their increasing social distance (with the first person on the list being the closest to the participant, and the last someone they knew only by sight). Based on that method, the present hypothesis can be expressed by the following pair of proposals: “\$50 for yourself or \$100 for the 1st person on the list” vs. “\$50 for the person no. 10 or \$100 for the person no. 11”. If a shift in preference were indeed present, the probability of choosing \$100 would be much higher in the second pair.

In short, the purpose of the present study was to test the prediction that when two rewards – a smaller but “socially closer” one and a larger but “socially more distant” one are moved away from the subject by the same social distance, the subjective value of the socially more distant reward will increase (i.e. social discounting will be shallower).

## 2. Materials and methods

### 2.1. *Participants*

Participants were 120 students of Warsaw's higher education institutions (University of Warsaw:  $n=73$ , Warsaw School of Economics:  $n=47$ ) aged 19 - 29 years (mean 21.50,  $SD$  2.190), 74 of them female and 46 male.

### 2.2. *Materials*

The rate of social discounting was measured by a computer application. After stating their age and sex, participants accessed a screen with instructions, followed by a screen with a sample problem, and finally the tasks proper. They were instructed to imagine a list of 100 people ordered by social distance from the participant (person no. 1 was to be the closest, while person no. 100 someone known only by sight), and then make hypothetical choices between a smaller financial reward (option A) for a specific person ("anchor") and a larger reward (option B) for another person more distant on the imaginary list by 1, 5, 20, and 80 positions. Each participant solved three series of such problems with different anchors (the point of reference on the social distance axis): (1) option A was accepting a reward for oneself, while option B – a reward for a person ranked 1, 5, 20 or 80, (2) option A was a reward for person 10, option B – a reward for person ranked no. 11, 15, 30 or 90, (3) option A was a reward for person no. 20, option B – for person no. 21, 25, 40 or 100. The sequence of the series varied using the Latin square table.

In each series of tasks, the amount in option B was constant (PLN 2,900; 1 PLN = ca. \$3.25) and the amount in option A changed according to the titration algorithm described by Holt, Green & Myerson (2003), i.e. in the first task it was half the amount for option B, and in subsequent choices it was increased or decreased depending on choices made by participants.

The adjusted amount of A following the sixth choice was treated as the equivalent of the reward value in option B (the so-called indifference point).

An application with an essentially analogous algorithm was used to measure the rate of temporal discounting, but the results for that variable are beyond the scope of the present paper.

### *2.3. Procedure*

Participants completed the study individually. The rate of social discounting was measured first, followed by the measurement of temporal discounting. The experimenter was separated from the participant by a screen. There was no time limit (during the actual experiment, participants never took more than 30 minutes).

## 3. Results

The computer program used to measure social discounting recorded, among other things, the time the on-screen instructions (some 220 words) for participants were displayed. Using the distribution of this variable, 5 outliers were removed from the database (time < 7 seconds; other participants took over 20 seconds to read the instructions). Also, due to a technical glitch, responses of one male participant were lost. In the end, a dataset of 114 observations was subjected to statistical analysis.

To test the hypothesis of interest, two measures of social discounting were analyzed: the discounting parameter  $s$  from Equation 2 and the area under the curve (AUC) proposed by Myerson et al. (2001). It was expected that  $s$  would decrease (higher  $s$  values correspond to steeper discounting rates) as the anchor was moved further away on the social distance axis. The opposite was predicted for AUC, where higher values indicate shallower discounting.

Analysis of variance using the MANOVA model with the anchor point on the social distance dimension (reward for oneself vs. for the person no. 10 vs. the person no. 20) as a within-subjects factor and sex as a between-subjects factor conducted on the logarithms of the individual  $s$  values showed significant effect of the anchor point ( $F(2, 108)=2.376$ ;  $p=0.049$ ;  $\eta^2=0.042$ ). Helmert contrast tests (comparing the mean from each measurement with the mean from a subsequent measurement) revealed significant differences between the  $s$  values for the second and third anchor points, but no such differences between the first and second anchor point. Table 1 presents the  $R^2$  and  $s$  values, while Figure 1 shows medians of indifference points depending on the anchor point on the social distance axis with a hyperbolic curve fit to them. In addition, analysis showed steeper discounting in females than in males ( $F(1, 109)=9.181$ ;  $p=0.003$ ;  $\eta^2=0.078$ ; medians of individual  $s$  values for combined anchor points before data transformation were 0.257 and 0.123 respectively). There was no interaction effect of sex and anchor point ( $F(2, 108)=0.618$ ;  $p=0.541$ ).

--Tab. 1--

A corresponding analysis conducted for AUC yielded the same effects. There was a significant effect of the anchor point ( $F(2, 111)=4.084$ ;  $p=0.019$ ;  $\eta^2=0.069$ ; mean AUC of 0.192 (SE=0.016), 0.192 (SE=0.014) and 0.223 (SE=0.014) respectively) and sex ( $F(1, 112)=9.899$ ;  $p=0.002$ ;  $\eta^2=0.081$ ; mean AUC: females 0.174 (SE=0.015), males 0.252 (SE=0.020)). No interaction effect of sex and anchor point was found ( $F(2, 111)=0.565$ ;  $p=0.570$ ).

--Fig. 1--

#### 4. Discussion

This study tested the hypothesis that moving a pair of beneficiaries (occupying different ranks on the social distance axis) by the same distance should increase the relative

attractiveness of the reward for the more distant of the two. The effect was absent when beneficiaries were moved back 10 places, but emerged (for both sexes) when they were moved 20 places. Significantly, the expected effect was observed not only for the  $s$  parameter, but also for AUC, which, considering the objective of this study, has the advantage of being theoretically neutral, i.e. independent of the assumed discounting function.

Furthermore, our findings imply that, similarly to choices between two delayed rewards (Green et al., 2005), choices between two socially distant rewards are accurately described by the hyperbolic model. Goodness of fit of Equation 2 to medians of individual indifference points ranged from  $R^2=0.985$  (when the recipient of the socially closer reward was the subject herself) to  $R^2=0.997$  (reward received by person no. 10).

The results may therefore confirm the intuitions of other authors (Dewitte & De Cremer, 2001; Rachlin & Jones, 2009) with respect to the parallels between the spheres of self-control and altruism, at least in their structural aspect. However, the absence of a shift in preference when person number 10 was the socially closer recipient merits closer analysis. Green et al. (2005) showed that delayed rewards were discounted progressively less steeply as the delay to the sooner reward was increased. That this effect was not observed in the present study may have been due to the unusual nature of choices the subjects were asked to make, but it could also mean that, contrary to expectations, when the choice is made for the benefit of a close person ( $N<10$ ), the positive bias for that person is the same or even stronger than for the self in a corresponding condition. A study with the “socially closer” reward located at positions lower than 10 should resolve this issue.



Figure 1. The group median subjective values (expressed as a proportion of the amount of the reward for the more distant beneficiary) and best-fitting discounting functions.

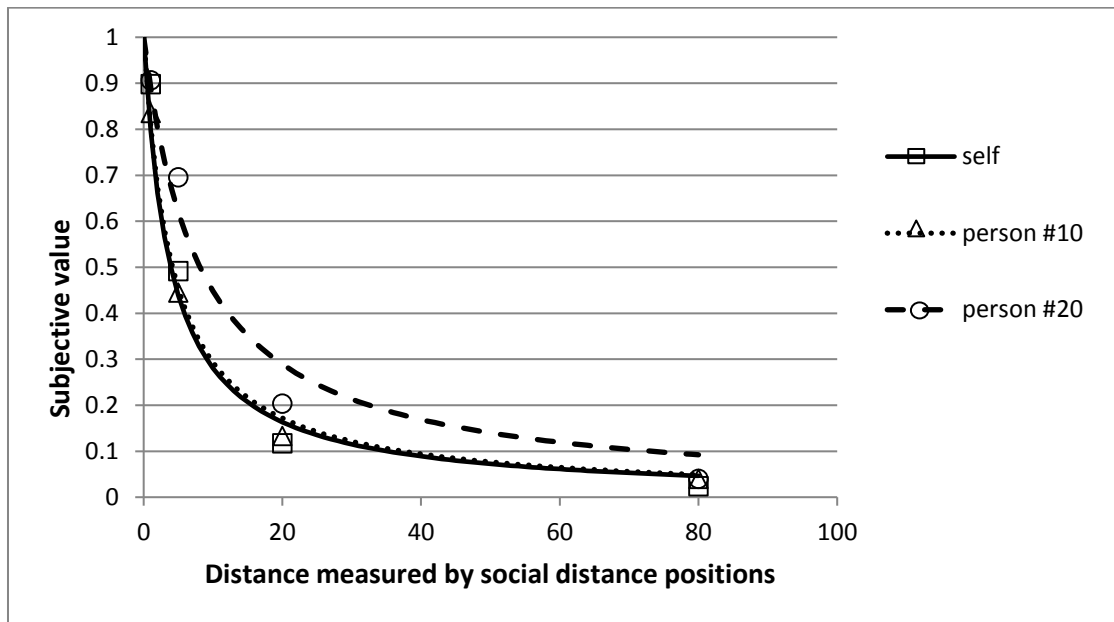


Table 1. Goodness of fit ( $R^2$ ) and estimated discounting parameter ( $s$ ) obtained with Equation 2 fitted to median indifference points (Group) and the medians based on fits to individual data (Individual), in relation to social distance to closer beneficiary (Anchor point).

| Anchor point  | Group |       | Individual |       |
|---------------|-------|-------|------------|-------|
|               | $s$   | $R^2$ | $s$        | $R^2$ |
| Self          | .214  | .985  | .256       | .924  |
| Person no. 10 | .248  | .997  | .241       | .942  |
| Person no. 20 | .125  | .978  | .123       | .920  |

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## References

- Dewitte, S., De Cremer, D., 2001. Self-Control and Cooperation: Different Concepts, Similar Decisions? A Question of the Right Perspective. *J. Psychol.* 135, 133-153.
- Green, L., Myerson, J., Macaux, E. W., 2005. Temporal discounting when the choice is between two delayed rewards. *J. Exp. Psychol.-Learn. Mem. Cogn.*, 31, 1121-1133.
- Holt, D.D., Green, L., Myerson, J. (2003). Is discounting impulsive? Evidence from temporal and probability discounting in gambling and non-gambling college students. *Behav. Process.* 64, 355–367.
- Jones, B.A., Rachlin, H., 2009. Delay, probability, and social discounting in a public goods game. *J. Exp. Anal. Behav.* 91, 61-73.
- Mazur, J.E., 1987. An adjusting procedure for studying delayed reinforcement, in: Commons, M.L., Mazur, J.E., Nevin, J.A., Rachlin, H. (Eds.), *Quantitative analyses of behavior: Vol. 5. The effect of delay and of intervening events on reinforcement value.* Hillsdale, NJ: Erlbaum, pp 55-73.
- Myerson, J., Green, L., Warusawitharana, M., 2001. Area under the curve as a measure of discounting. *J. Exp. Anal. Behav.* 76, 235–243.
- Rachlin, J., Jones, B.A., 2008. Altruism among relatives and non-relatives. *Behav. Process.* 79, 120-123.
- Rachlin, H., Jones, B.A., 2009. The extended self, in: Madden, G.J., Bickel, W.K. (Eds.), *Impulsivity: theory, science, and neuroscience of discounting.* American Psychological Association, Washington, pp. 411–439.
- Rachlin, H., Locey, M., 2011. A behavioral analysis of altruism. *Behav. Process.* 87, 25–33.