THE SOCIAL DISCOUNTING TASK IN ECONOMIC EXPERIMENTS: A VALIDATION IN THE FIELD AND IN THE LAB

BY

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ABSTRACT

Altruism is one of the single most important social preferences driving human behaviour. In Psychology experiments, the Social Discounting Task is employed as a measure of directed altruism. A conventional laboratory experiment was conducted with 117 undergraduate students at the University of the Free State, with students randomly assigned to complete the un-incentivized and incentivized Social Discounting Task. The aggregated results exhibit an inverse relationship between social distance and altruism in accordance with the 1/d law of giving. Multiple regression results show that incentivising of the Social Discounting Task does not matter. Results in this dissertation also suggest that family members are more altruistic towards each other as are those exhibiting greater intergenerational solidarity. Social development programmes that can strengthen families and foster intergenerational solidarity may therefore enhance altruism within the family, thus contributing to greater wellbeing.

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SECTION 1

INTRODUCTION

1.1. Background

Altruism is one of the single most important social preferences driving human behaviour. Simon (1995) incorporates altruism into the utility function using the notion of interpersonal or social distance. In Psychology experiments, the Social Discounting Task (SDT) is employed as a corresponding measure of altruism (Rachlin & Locey, 2011). With one exception (Locey et al., 2011), the approximately twenty conventional laboratory experiments on social discounting conducted to date do not employ real incentives. In Economics experiments real pay-offs is a methodological prerequisite for incentive compatibility. There is conclusive empirical evidence in fact that outcomes in experiments offering hypothetical pay-offs are different from those in experiments paying subjects real money (Vlaev, 2012). Yi et al (2012) recognises the limitation of the widespread use of hypothetical incentives in social discounting experiments. It is important to study altruism under the context of incentive compatibility because; we need an accurate estimate for altruism as any other estimate would be biased. Therefore, this dissertation investigates the extent to which incentivising the Social Discounting Task (SDT) impact on the resultant crossover points and social discounting function. A related objective of the paper is to investigate the role of specific sender and recipient characteristics in explaining differences in observed inter-personal altruism, including the role of family relations and other social dynamics. The dissertation is structured as follows: Section 2 presents an overview of the literature, while Section 3 describes the data and methods. Section 4 contains the results and their discussion. Section 5 concludes.

SECTION 2

LITERATURE REVIEW

This section reviews the existing literature on the social discounting task as well as related material on the dictator game, following a brief exposition of the relevant theory.

2.1. The Social Discounting Task

2.1.1 Theory

According to Rachlin and Jones (2008), twentieth-century economists have attempted to take some of the mystery out of the concept of altruism by incorporating altruism into utility functions. Simon (1995) suggested that a person's allocation of available goods can be described in terms of a three-coordinate system: (a) current consumption by the person, (b) consumption by the same person at later times [delay discounting], and (c) consumption by other people [social discounting]. Simon (1995) further argued that instead of a one-dimensional maximizing entity, or even the two-dimensional individual who allocates inter-temporally, this model envisages a three-dimensional surface with an interpersonal 'social distance' dimension replacing the concept of altruism. The word ''distance'' was properly put in quotes by Simon (1995) because there was then no existing scale by which interpersonal, or social distance might be measured. However, Simon (1995) did not consider a third mode of discounting which is probability discounting (Kahneman & Tversky, 1979); the degree to which reward value decreases as its probability decreases. Also, probability discounting, like delay discounting, is hyperbolic (Jones and Rachlin 2009, Bradstreet et al 2011).

The kin selection theory is an evolutionary theory that proposes that people are more likely to help those who are blood relatives because it will increase the odds of gene transmission to future generations. The theory suggests that altruism towards close relatives occurs in order to ensure the continuation of shared genes. The more closely the individuals are related, the more likely people are to help (Jones and Rachlin (2008b).

Furthermore, in selection implies that altruism is determined by factors in addition to social distance and is applicable to all social discounting experiments reviewed in this study.

2.1.2 Empirical Literature

This section describes published literature on social discounting experiments, focusing on the following dimensions; subjects, experimental setting, additional experimental tasks, other characteristics that the studies measure beyond altruism as well as the key findings of each study.

i. Subjects

The literature reviewed below seeks to study social discounting and does so by instructing participants to partake in a social discounting task (SDT). Almost all social discounting tasks conducted in these studies use students as their main participants and therefore these experiments can be classified as conventional laboratory experiments on the taxonomy of experimental design (Harrison and List, 2004). The sample size for all social discounting studies under review in this dissertation is relatively small. Researchers often employ undergraduate students who are mostly psychology majors, while some are in pursuit of a business qualification. However, three studies recruited field subjects, and as a result these studies can be classified as artefactual field experiments (Harrison and List, 2004). Bradstreet et al (2011) chose pregnant women as participants for the discounting tasks since the study focused on analysing social discounting amongst smokers, non-smokers and quitters. Participants in Boyer's et al (2012) experiment included employees and Kenyan herders. Sharp et al (2012) in turn studied boys who were 2nd to 12th graders recruited through community organizations.

ii. Countries

A vast majority of the studies like Locey et al (2011) took place in developed countries, specifically at universities in the United States of America. However, the study conducted by Boyer et al (2012), which analysed whether cultural differences had an influence on social discounting took place in three countries of which two were in developing countries, namely Kenya and China. Strombach et al (2013) also conducted their study in both a developed countries and developing country, namely Germany and China respectively.

Osinski et al (2009) conducted their study at Warsaw University in Poland. Ito et al (2011) compared social discounting in students in the USA and Japan. The majority of studies therefore have been conducted in developed countries.

iii. Additional experimental tasks

Ziegler and Tunney (2012), Rachlin and Jones; (2008) and Boyer et al (2012) instructed their study participants to complete a delay discounting task (DDT) where they had to make a choice between receiving an amount now over a higher value at a later stage. Since Ito et al (2011) wanted to assess selfish behaviour amongst participants; the study required the subjects to complete a one-shot Prisoners Dilemma Game. In Locey et al (2011), participants played a temporal discounting game that incorporates the logic of a repeated prisoner's-dilemma (PD) type game. Jones and Rachlin (2009) instructed their study participants to perform two additional tasks, the first being a public goods game where participants had to indicate how much of their initial endowment they would contribute towards a common investment in a public good and a probability discounting task (PDT) as an attempt to measure individual altruism and social cooperativeness. To measure self-control, Yi (2011) incorporated a delayed condition in the social discounting task.

iv. Other measures

In addition to measuring social discounting, Boyer et al (2012) measured generalized social trust (social capital) as well as trust in local institutions. Bradstreet et al (2011) collected data such as socio-demographics, smoking status, age, race, years of education, estimated gestational age, and smoking rate through a questionnaire. Strombach et al (2013) used an Individualism–Collectivism scale to estimate target-specific collectivism, quantified the relationship between the individual and his or her parents, and measured to what extent the individual is willing to share private information. Since Sharp et al (2012) was interested in analysing the correlation between social discounting and externalizing behaviour problems in boys, the study measured external behaviour using three measures namely the youth self-report (YSR), parent-report (PR), and peer nominations (PN). The YSR is an evidence-based assessment instrument that assesses behavioural and emotional disorders in the past 6 months among boys in the 6-18 age groups. A peer-nomination instrument developed by Werner and Crick (1999) was used to assess relational aggression and pro-social behaviour. Through a self-representation task, Strombach et al (2013) asked participants to rate their perceived closeness to specific people in their environment on a 20-point scale (mother, father, siblings, grandparents, family, kin, best friend, circle of friends, colleagues, neighbours, acquaintance, partner, child and stranger).

These measures are included simply because they want to determine how these factors are related to social discounting and/or to the other outcomes of the relevant study.

2.1.3 Findings

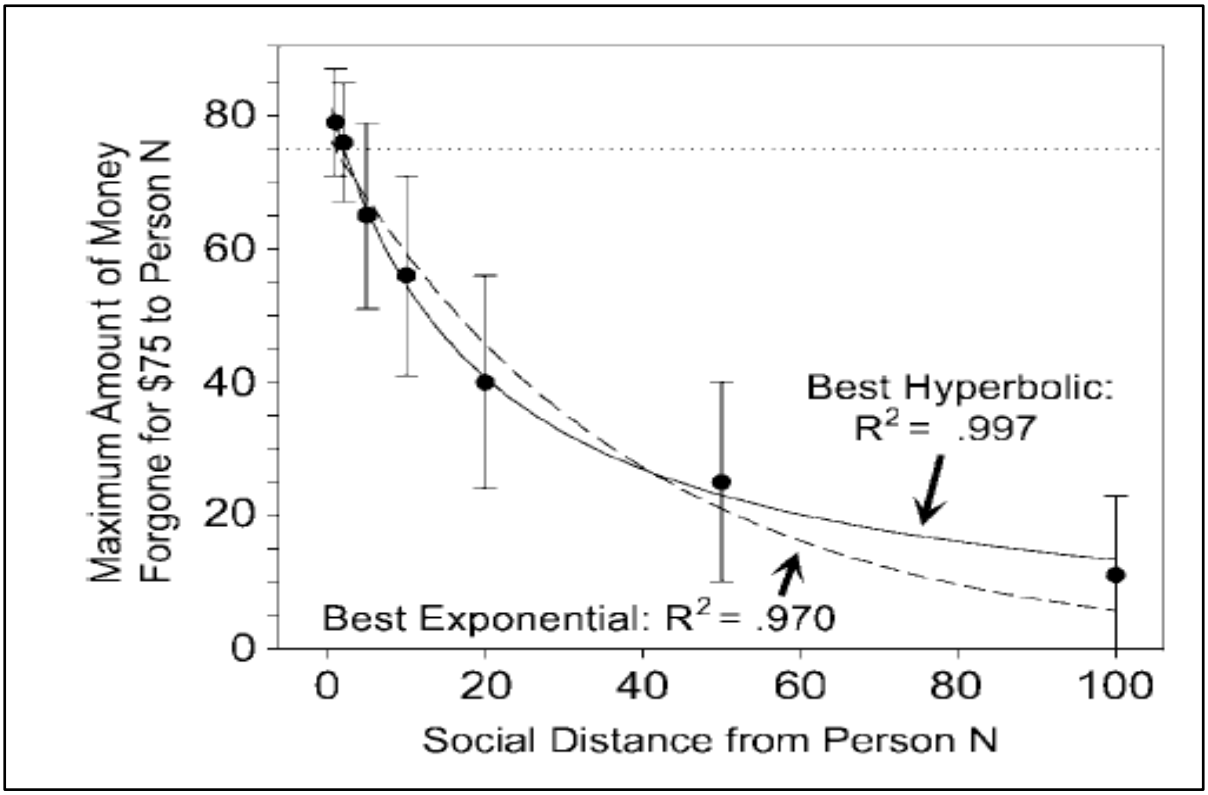
The key empirical findings from the social discounting experiments conducted to date can be summarised as follows**:**

(a) Hyperbolic vs. Exponential function

The hyperbolic discounting function better fits the data generated from the social discounting task compared to the exponential function (Locey et al 2011, Jones & Rachlin, 2006; Sharp et al, 2012). This implies that an individual's willingness to forego an outcome for themselves in exchange for a larger outcome for someone else (social discount rates) is well described by a hyperbolic function.

Figure 2.1 shows that the hyperbolic function ($R^2 = 0.997$) is a better fit compared to the exponential function ($R^2 = 0.9396$) (Jones and Rachlin, 2006).

Figure 2.1: Hyperbolic and exponential social discounting functions



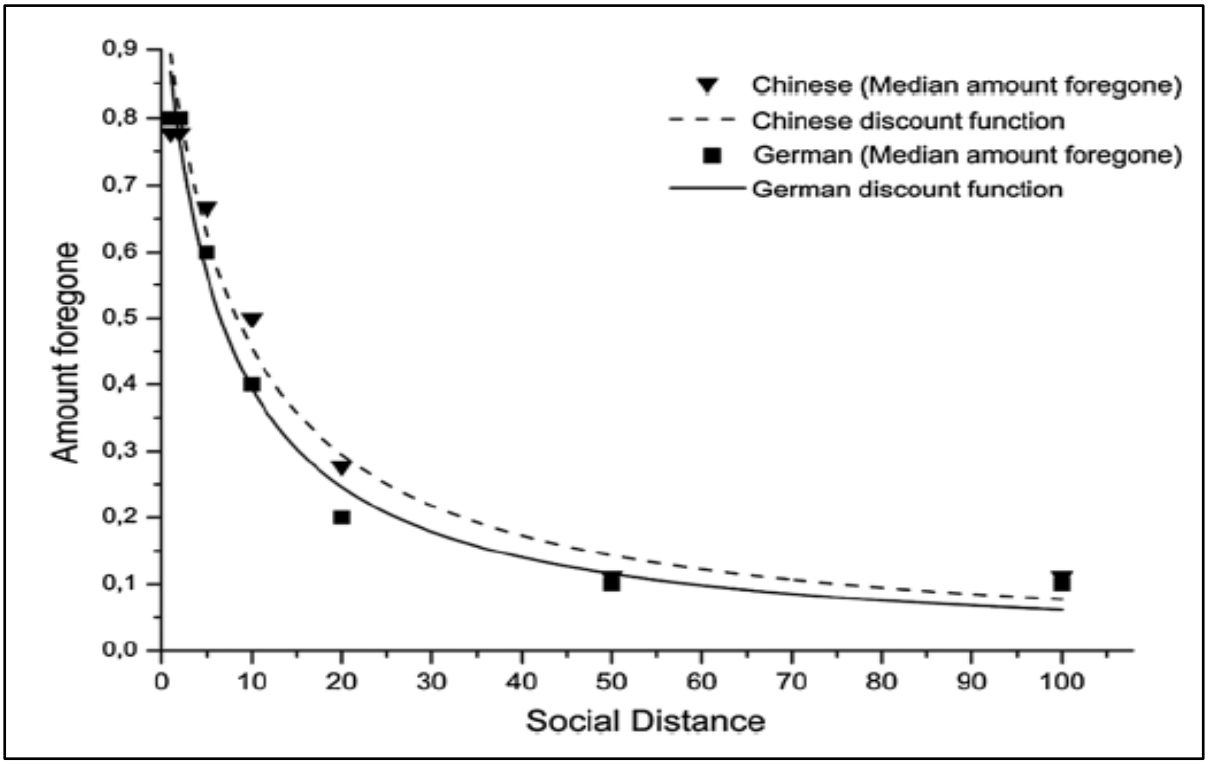
Source: Jones & Rachlin (2006:285)

(b) Cultural differences

Social discounting functions are significantly different across individualistic (Western) and collectivist (Asian/African) cultures (Boyer et al, 2012; Ito et al, 2011; Strombach et al, 2013). Findings imply that collectivist (Asian/African) cultures are more altruistic than individualistic (Western) cultures. This result can be attributed to the fact that in western societies, individuals generally perceive themselves as autonomous and independent from others, whereas the distinction between self and close others is less sharply defined by Eastern/African individuals, where relationships and group memberships are more centralized.

Figure 2.2 shows how altruism is higher in German subjects compared to Chinese subjects as an example.

Figure 2.2: Social discounting in German and Chinese subjects



Source: Strombach et al (2013:6)

(c) Interdependency in preferences

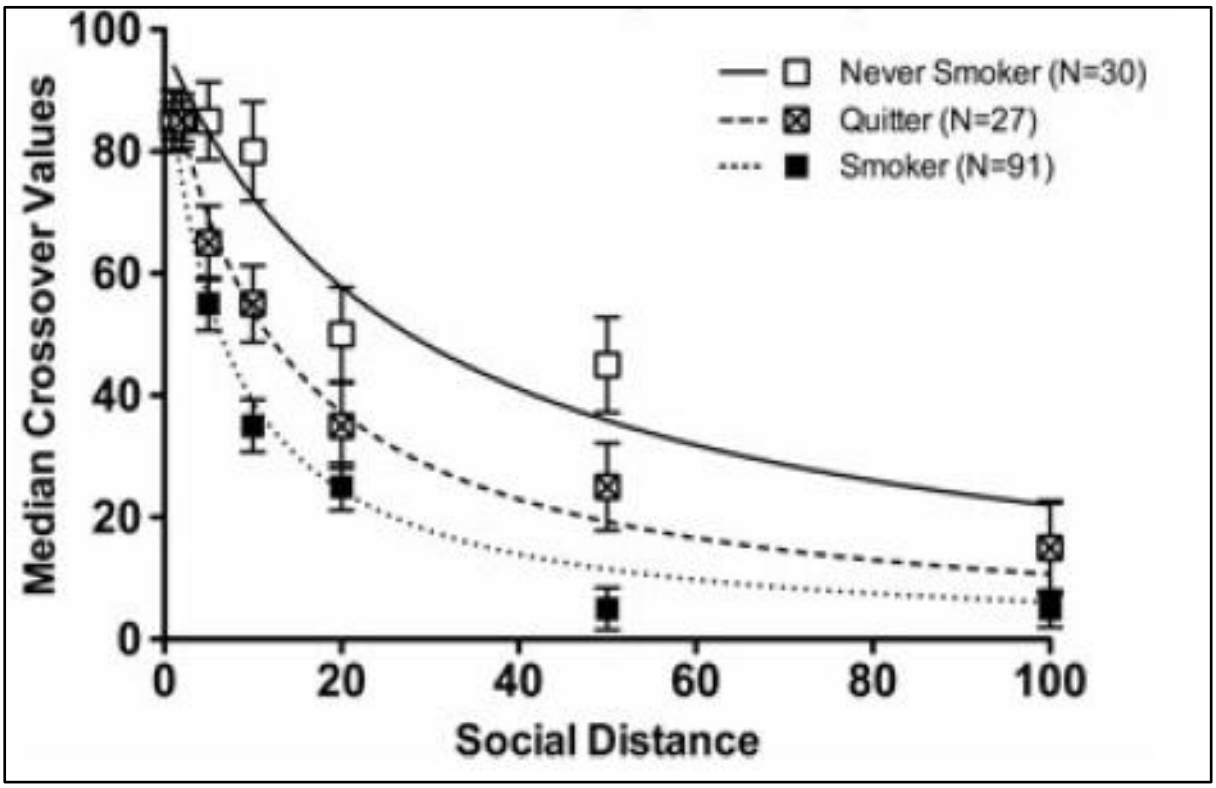
Jones and Rachlin (2009) found that social discounting was significantly correlated with public goods game (PGG) contributions. Social distance is correlated positively with rates of cooperation in a one-shot public goods game: high public-good contributors were more altruistic and also less risk averse than low contributors (Jones & Rachlin, 2009). The social discounting factor (social distance) is correlated with risk attitudes and time preferences, measured here using what is described as probability and delay discounting (Jones & Rachlin, 2009), respectively.

This study provides some evidence that social discount functions may be meaningful measures of individual altruism and social cooperativeness.

(d) Social discounting and behaviour

Bradstreet (2012) found that social discounting is associated with human behavior, whereby women who smoke are less generous than women who quit smoking or never smoked at all. The study suggests that individual differences in social discounting may be a factor influencing the choices that women make about quitting smoking upon learning of a pregnancy. Sharp's (2012) main result is that boys functioning in the clinical range on indices of externalizing behaviour problems demonstrated steeper social discounting compared to controls. The study suggests that social discounting as a measure of perceived social closeness is feasible for use in adolescent samples. Figure 2.3 illustrates that women who smoke display less altruistic behaviour compared to women that have either quit smoking or never smoked at all.

Figure 2.3: Social discounting and smoking

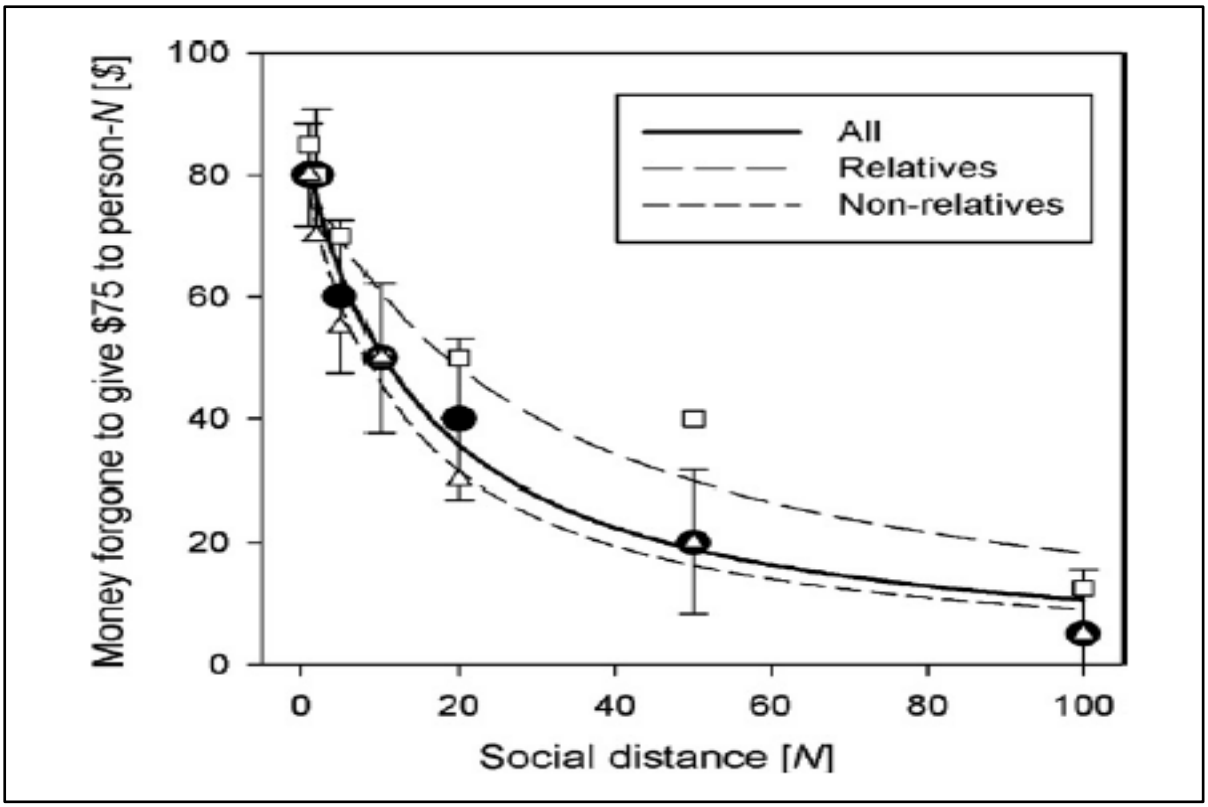


Source: Bradstreet et al. (2011:507)

(e) Kin-selection and family relations

Jones and Rachlin (2008b) found that altruism varied inversely with social distance; the closer you feel to someone else, the closer their relation to you is likely to be, and the more altruistic you are likely to be toward them. However, even at the same social distance, participants were willing to forgo significantly more money for the benefit of relatives than for the benefit of non-relatives. These results are consistent with kin-selection theory and imply that altruism is determined by factors in addition to social distance (Jones and Rachlin (2008b). Figure 2.4 shows that altruism is higher towards relatives than non-relatives.

Figure 2.4: Social discounting in relatives and non-relatives

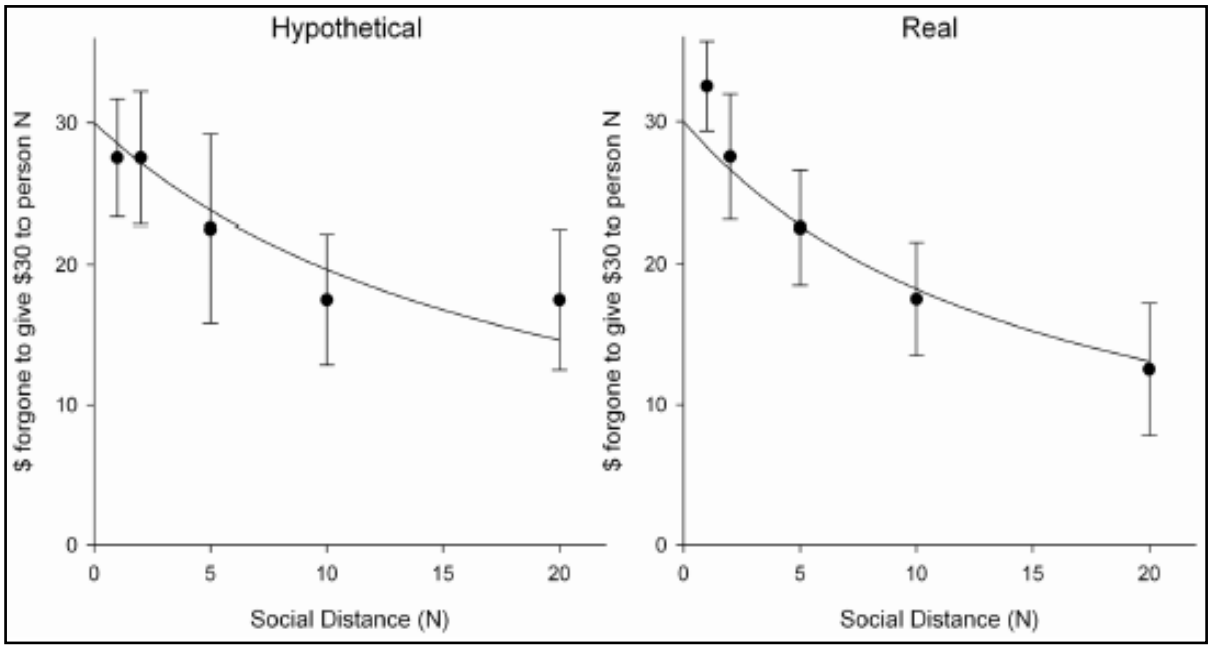


Source: Jones & Rachlin (2008b:122)

(f) Real vs. hypothetical rewards

Locey et al (2011) found that real rewards as opposed to hypothetical rewards made no significant difference in cooperation, although the social discounting function for real rewards was slightly greater than hypothetical rewards (Figure 2.5). These results do suggest that substantially larger samples would be needed to find statistically significant differences in social discounting between incentivised and un-incentivised tasks.

Figure 2.5: Social discounting functions for hypothetical and real rewards



Source: Locey et al (2011: 21)

2.2 Dictator Games

2.2.1 Theory

With social discounting tasks being comparable to a dictator game, it is important to make reference to the literature on dictator giving and social distance. Social relationships influence altruism in various ways. Leider et al (2009) decomposes altruistic preferences into three different theoretical mechanisms; these are enforced reciprocity, signaling and preference-based reciprocity. Enforced reciprocity refers to a decision maker's allocation that is purely motivated by the prospect of future interactions that will result in the repayment of the allocation or favour. The theory also assumes that the decision-maker and partner share a relationship that is consumed in the future and gives both of them utility (Karlan et al. 2009).

Beyond enforced reciprocity, the possibility of future interaction also incentivizes the decision-maker to signal her altruistic behavior to the partner. Benabou and Tirole (2006) proposed a signaling model that provides an alternative theory that explains greater generosity to friends under non-anonymity. In this framework, agents want to be perceived as being altruistic rather than being greedy, so they act more generous when their actions can be observed. Furthermore, the model assumes that individuals care more about signaling generosity to friends than to strangers, because they are more likely to interact with these friends in future.

Dufwenberg and Kirchsteiger (2004) developed a psychological game theory model of sequential reciprocity, where an individual treats kindly (unkindly) those who have treated/will treat him or her kindly (unkindly) in some future interaction. Under this model, the partners desire to return the decision maker's favor is intrinsic rather than designed to preserve the relationship with the decision maker or common friends.

2.2.2 Findings

Historically, researchers mimicked social distance by experimentally inducing differences in the degree of anonymity between dictator and experimenter or dictator and recipient (Bohnet & Frey, 1999; Charness & Gneezy, 2008; Etang et al., 2011; Hoffman et al., 1996).[1] In recent work, Brañas-Garza et al. (2010) found that social integration and social distance are complementary determinants of altruism. Goeree et al. (2010) and Leider et al. (2009) adopted a different approach, collecting information on subjects' social networks. In both instances, the findings support arguments regarding the important role of social distance in explaining differences in altruism, with giving declining with social distance. Goeree et al. (2010) describes this relationship as a simple inverse distance or 1/d law.

2.3 Conclusion

Social discounting experiments generally do not employ real incentives, although in economics real pay-offs are a methodological prerequisite for incentive compatibility. It is for this purpose that this study is conducted, which compares real and hypothetical monetary rewards in social discounting experiments.

[1] Etang et al. (2011) employ a similar approach, but also let subjects play a trust game. The authors, who present a comprehensive review of the literature on trust games and social distance, find that trust declines with social distance.

This section discussed the literature review on the social discounting as well as related material on the dictator game.

Section 3 describes the research design and methodology.

Box 1: Social discounting experiments

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Table 2.1: Summary of social discounting experiments

	Boyer et al (2012)	**Bradstreet et 2011**	**Ito et al (2011)**	**Jones & Rachlin (2006)**	**Jones and Rachlin (2008a)**	**Jones and Rachlin (2009)**	**Osinski (2009)**	**Rachlin and Jones (2008b)**
Country	USA, Kenya & China	USA	USA & Japan	USA	USA	USA	USA and Japan	USA
Subjects	Urban dwellers, Kenyan herders and college students.	148 Pregnant Women	1049 Psychology students	310 Psychology students	206 Undergraduate students	103 Business Students and 196 Psychology students	200 Full-time students	`439 Undergraduates
Real or Hypothetical Rewards	Hypothetical	Hypothetical	Hypothetical	Hypothetical	Hypothetical	Hypothetical	Hypothetical	Hypothetical
Main findings	Social discounting functions are significantly different across individualistic (Western) and collectivist (Asian/African) cultures.	Smokers are less generous than quitters or never-smokers.	Japanese Students more altruistic than U.S Students	Hyperbolic function better fit than exponential fit.	Altruism varies inversely with Social distance.	Social distance is correlated positively with rates of cooperation in a one-shot public goods game.	Social discounting is higher when the rewards are shared.	Social discounting function, like delay and probability discount function, is hyperbolic in form.

Table 2.1: Summary of social discounting experiments (continued)

	Strombach et al (2013)	**Yi et al (2011)**	**Ziegler and Tunney (2012)**	**Sharp et al (2012)**	**Locey et al (2011)**	**Luhmann and Pak (2013)**	**Locey and Rachlin (2015)**	**Yi et al (2016)**
Country	Germany and China	USA	USA	USA	USA	USA	USA	USA
Subjects	206 Undergraduate students	141 College students	70 psychology students	170 boys(2nd to 12th graders)	150 Undergraduate students	63 Undergraduate students	207 Undergraduate students (115 female, 92 male)	399 Amazon Works, 100 undergraduates students
Real or Hypothetical Rewards	Hypothetical	Hypothetical	Hypothetical	Hypothetical	Real	Hypothetical	Hypothetical	Real
Main findings	Social discounting functions are significantly different across individualistic (Western) and collectivist (Asian/African) cultures.	Adding any delay to the receipt of outcomes decreases social discounting.	The closer the social distance, the more altruistic people be.	Hyperbolic function better fit than exponential fit and social discounting is associated with human behaviour,	Discounting rates for real and hypothetical rewards did not Significantly differ.	Individual differences on these Measures accounted for a significant portion of the variance observed in a broad measure of intergenerational preferences.	Participants in the observed group were willing to forgo more money for the benefit of others (were more altruistic) than were those in the other anonymous group.	Use of episodic thinking to imagine other's scenarios reduced social discounting. Furthermore, episodic thinking to imagine the self in the future reduced social discounting.

SECTION 3
METHODOLOGY

This section describes the methods employed in the study, including the participants, experimental procedure and statistical analysis.

3.1 Participants

The standard social discounting experiment of Rachlin and Jones (2008) was replicated twice in two separate sessions.

Session 1:
The subjects are 45 undergraduate students at the University of the Free State, South Africa. Subjects were recruited using flyers distributed amongst students attending a lecture for third-year Economics students. Participation was voluntary.

Session 2:
The subjects are 72 undergraduate students at the University of the Free State, South Africa. Subjects were recruited using flyers distributed amongst students attending a second-year Economics lecture. Participation was voluntary.

3.2 Experimental Procedure

Following a pilot of the relevant elicitation procedure with a small group of post-graduate student subjects, a pencil and paper instrument was administered to study participants. Subjects in session 1 each received a show-up fee of R30 and were asked to complete Rachlin and Jones' (2008) standard Social Discounting Task (SDT) (see Annexure 1). Given the relatively low turnout witnessed in the first experiment, the show-up fee was increased to R50 in session 2 to increase incentive compatibility and to attract a larger number of subjects.

The instructions were as follows:

The following experiment requires that you have imagined making a list of the 100 people closest to you in the world ranging from your dearest friend or relative at position #1 to a mere acquaintance at #100.

On the following pages participants were asked to make choices between an amount of money for themselves versus an amount of money for each of the people on their social distance ladder.

Each page, inclusive of the practice table, contained the following specific instructions:

Imagine you made a list of the 100 people closest to you in the world ranging from your dearest friend or relative at #1 to a mere acquaintance at #100. Now imagine the following choices between an amount of money for you and an amount for the #[N] person on the list. Circle A or B to indicate which you would choose in EACH line.

A. R180 for you alone or B. R160 for the #[N] person on the list.
A. R160 for you alone or B. R160 for the #[N] person on the list.
A. -----Down To-----
A. R20 for you alone or B. R160 for the # [N] person on the list
A. R0 for you alone or B. R160 for the # [N] person on the list.

The tasked was counter-balanced: for half of the participants in each treatment group, the pages were organized in ascending order of social distance (person #1, #2, #5, #10, #20, #50, #100); for the other half, in descending order.

The treatment comprised of the following: upon arrival at the experimental venues, subjects were assigned consecutively to two different venues. Half of the participants were randomly assigned to the real money group (n= 22 experiment 1, n= 35 experiment 2) where an adapted version of the standard task offering real pay-offs was administered. The other half were assigned to the hypothetical money group (n= 23 experiment 1, n= 35 experiment 2) and instructed to complete the standard non-incentivized task. The only difference in the instructions for the Social Discounting Task (SDT) was a section that read, “None of your choices will be for actual money, but we ask that you still make choices as if real money were involved” (non-payment group) versus “One of the choices you make will be for real money”, inclusive of details of the particular payment procedures (payment group).

Study participants also completed a short questionnaire, providing brief information on the actual persons occupying each social distance [recipient characteristics], and basic their socio-demographics [sender characteristics] (see Annexure 2 and 3).

At the completion of the experiment, a random incentive system (RIS) (Annexure 4) was used to calculate subjects' earnings. Both the treatment and control groups, who were debriefed as to the purpose of the study following completion of the experiment, were paid in private. Subjects on average earned R150 in both experiments.

3.3 Hypothesis

Based on the review of literature contained in section 2 of this study, two opposing major hypotheses guide the main analysis of the data. First, it is hypothesized that subjects from the incentivized task would be less altruistic than those from the non-incentivized task. Generally, when faced with the prospect of earning real money (as opposed to giving money to others) subjects are expected to exhibit selfish behaviour. Secondly, it is hypothesized that subjects are more altruistic if the recipients can identify the donor (Locey et al 2015; Engel, 2011), as is the case in the incentivized task, with the resultant enforced reciprocity (Leider et al., 2009) implying that subjects would be more altruistic when incentivized.

3.4 Statistical Analysis

The Social Discounting Task (SDT) measures altruism as, the "amount of money a participant [is] willing to forgo to give a fixed amount to another person" situated at a specific social distances (Rachlin and Jones, 2008). The crossover point is the mean point at which the participant switched from choosing A to choosing B. For example, if a participant chose the selfish option at R180 or *R*160 and switched to the generous option at R160 or R160, the crossover point was calculated as R170 (see Annexure 1). If the subject switched between R100 or R160 and R80 or R160, the crossover point is R90. Where option B was selected throughout, the crossover point is assumed to be R190 and where option A was selected throughout the crossover point is assumed to be zero.

One however would not expect subjects to select A throughout, because the last option in row 10 is a choice between zero for oneself and R160 for the other person.

Altruism should prevail and subjects preferring A over B in rows 1-9 should be switching to B in the final row. However, envious or spiteful subjects may choose to withhold R160 from another person. Alternatively, subjects may not have fully understood the task.

The analysis comprises of the following: first, we describe the subject population and recipient characteristics, disaggregating the analysis by treatment arm and social distance. We also present a descriptive account of the distribution of crossover values and their mean and median crossover values at each social distance, using t-tests and Wilcoxon rank-sum tests, respectively. Subsequently, two social discounting functions, one for each treatment arm, was fitted onto the median crossover points using the following hyperbolic discounting function (Mazur, 1987):

$$v = \frac{V}{1 + kN}$$

, Where v = median crossover point; V = undiscounted value of the reward; N = social distance; k = a constant measuring steepness of discounting.

The ordered probit regression model was employed to regress sender and recipient characteristics on crossover points in the social discounting task. Sender characteristics include age, gender, household poverty, personal financial situation, access to financial aid, and previous participation in experiments. Recipient characteristics include age, gender, relationship, and intergenerational solidarity. In each case, the regression analysis is presented in pooled format (inclusive of the payment treatment dummy) as well as separately for the payment and non-payment treatment arms, and, in order to control for unobserved heterogeneity in subjects, with sender fixed effects. To identify and compare significant differences between treatment groups and across the two sessions, both sub-group and aggregate analysis was conducted.

To explore the role of social dynamics in explaining differences in inter-personal altruism, a composite index of intergenerational solidarity was constructed using multiple correspondence analyses (MCA).

The index includes three components, namely associational, affectual and structural solidarity (Bengtson & Roberts, 1991). The percentage of inertia explained by the first dimension of the intergenerational solidarity construct is 64.6% and 62.1 % respectively.

The three components are represented by the following questions: "How often do you communicate with this person?". "On a ten-point scale, at an emotional and psychological level, how close do you perceive yourself to be to this particular person?", and "How far does this person live from you?" respectively.

3.5 Conclusion

This section discussed the research design and methodology, including the participants, experimental procedure, hypothesis and statistical analysis.

Section 4 covers the data analysis and the interpretation of the results between treatment groups, sessions and on aggregate.

SECTION 4
RESULTS AND DISCUSSION

This section discusses the data analysis and the interpretation of the results between treatment groups and on aggregate. The results are reported in the following order: sender characteristics, crossover descriptive analysis, recipient characteristics, social discounting functions and regression results.

4.1. Results

Below we compare the results across the treatment arms and then proceed with an aggregate analysis. The data for session 1 and 2 are pooled, with the results of the analysis presented below.

4.1.1. Sender characteristics

Table 4.1 shows that the mean and median ages of subjects in the aggregate payment and non-payment group are 23 and 22 respectively. The majority of the subjects in the pooled payment and non-payment group are African females who speak Sesotho and are enrolled in the Faculty of Economic and Management Sciences. Furthermore, subjects are relatively well off in terms of their financial situation, both in respect of their household's poverty status (laying on the 3rd rung of the poverty ladder) and their own personal financial position (two thirds were not broke). More than a third of subjects in the pooled group applied for financial aid, with only one in every three of these applicants having been successful. Three subjects previously participated in a study of this nature. On aggregate, when comparing subject characteristics across the treatment and control group, only the subject's race (p=0.017), where 91.7% of subjects in the control group are African compared to the treatment group (71.9%) and the subject's application for financial aid (p=0.006) are statistically significant by treatment arm. A greater proposition of subjects in the non-payment group (45%) applied for financial aid compared to the payment group (21.1%), thus hinting at some degree of balance at baseline when it comes to subject characteristics.

4.1.2. Mean crossover descriptive analysis

Figure 4.1 shows how the aggregate distribution of crossover points differs for subjects in the pooled group, implying that there is heterogeneity in the level of altruism among subjects. Figure 4.2 illustrates how the distribution of crossover points for the control group lies somewhat to the somewhat left of the distribution of the treatment group, thus suggesting greater altruism among subjects in the treatment group as opposed to the control group. Figure 4.3 confirms the expectation that subjects are less altruistic at greater social distances than they are at lower distances.

Figure 4.4 shows the mean crossover points calculated across all seven social distances as well as the lower and upper confidence intervals for both the combined incentivized and non-incentivized arms. The aggregate mean crossover for the payment group is R113 compared to the mean crossover of the non-payment group, which is R108, a difference that is not statistically significant. The difference between the payment and non-payment group is only weakly significant in statistical terms at social distance 5 ($p<0.10$). Comparably, the differences in median crossover values are also not statistically significant across all social distances. Therefore, on the basis of the aggregate analysis, there is no sufficient evidence to conclude that subjects in the payment group are more or less altruistic that those in the non-payment group, as was the case in session 1 and 2 respectively.

Figure 4.5 shows that the median crossover points in the aggregated control group ($R^2=0.98$) are a better hyperbolic fit than the treatment group ($R^2=0.94$), implying that incentivising the social discounting task made no significant difference in predicting observed altruism. Interestingly, there is evidence in the payment group (Table 4.2) that suggests that female subjects (mean=R117) are more altruistic than male subjects (mean =R109), though weak in statistically significant terms ($p<0.1$). Table 4.3 confirms that male senders are more altruistic towards female recipients as compared to male recipients ($p<0.05$). Moreover, the difference between male and female senders is highly significant in statistical terms ($p<0.01$).

Table 4.4 illustrates that the crossover points for the payment group (mean=R113) exceed those of the non-payment group (mean=R108). Though, this difference is only statistically significant at a few intervals (i.e. 1-2 years and 2-3 years) and not statistically significant on aggregate ($p=0.121$).

There is no statistically significant difference in the control and treatment arms in terms of the frequency of communication (Table 4.5).

Similarly, there is no statistically significant difference between the payment and non-payment groups in terms of altruism and the recipient's physical distance (Table 4.6). Table 4.7 exhibits that there is a strong and positive association ($r>0.40$) between emotional and psychological distance and the amount subjects are willing to forgo to give recipients on their social distance ladder R160, in both the treatments arms and on aggregate.

As expected, subjects are statistically significantly more altruistic towards family members than non-family members in both the payment and non-payment group (Table 4.8). This result holds for both the treatment arms and on aggregate. Conversely, the difference between the treatment groups is only statistically significant for non-family members ($p=0.004$). Subjects in the payment group (mean=R94) displayed greater altruism towards non-family members when compared to subjects in the non-payment group (mean=R78).

4.1.3. Recipient Characteristics

The mean and median ages of recipients are 32 and 26 years respectively, with the gender composition relative equal: 74.4% females versus 25.6% male (Table 4.9). For family relations, 57% are family members while 43% are non-family members. Majority of the subjects have known the recipients for more than 10 years, with communication between them taking place at least daily. Physical distance between subject and recipient is varied, though almost 43% of recipients lived with the subjects. The average psychological and emotional distance between the sender and recipient is 6.3. Table 4.9 shows recipient characteristics on average do not differ statistically significantly by treatment arm, with physical distance being the only exception (where subjects in the treatment arm live relatively closer to recipients compared to the control group). This result is weak in statistical terms ($p<0.10$), implying that characteristics of the recipients whom subjects gave more to are the same.

As expected, the pooled results (Table 4.13) of the recipient characteristics at all seven social distances match those in the separate analysis (Table 4.11/4.12). There are strong statistically significant differences between recipient characteristics across the seven social distances ($p<0.01$).

Overall, recipients at closer social distances can be described as older family members likely to be female and have known the subject longer than 10 years. These recipients also communicate with the subject daily as they reside together.

Moreover, recipients are regarded to have a closer emotional and psychological bond with subjects at lower social distances. The opposite is true for recipients at greater social distances (social distance 50 and 100).

4.1.4. Regression results

Table 14.3 reveals that no sender characteristics in the non-payment (control) group are associated with altruism, while in the treatment group household poverty ranking (negative) and financial situation (positive) predict crossover values. Subjects from poor households displayed greater altruism compared to subjects from rich households. While oppositely, subjects who are personally financially well-off are more altruistic. In the analysis of the pooled data, the payment dummy variable is weakly significant in statistical terms ($p<0.10$), thus suggesting that subjects in the payment group are more altruistic. Age squared (positive) also predicts altruism, though weak in statistical terms ($p<0.10$).

Family relations and intergenerational solidarity, in terms of recipient characteristics, are positively associated with the crossover point in both the disaggregated and pooled analysis (Table 14.3). This result suggests that subjects are more altruistic towards recipients who are family members and those with whom they share a close bond. Gender (positive) in the treatment arm of the study is weakly significant in predicting altruism, suggesting that male subjects are more altruistic. In the pooled analysis, treatment (payment) status is now positive but not statistically significant. Yet, when adjusting for sender fixed effects, the payment dummy is highly statistically significant and positive, which suggests that incentivising the social discounting task impacts positively on estimates of altruism. Other recipient's characteristics that predict altruism are gender (positive); male subjects are more altruistic, family relations (positive); family members of recipients enjoy greater altruism and intergenerational solidarity (positive); subjects are more altruistic towards recipients with whom they share a close bond.

The results of the combined regression model (Table 14.3) show that overall, incentivising the social discounting task (positive); subjects in the payment group are more altruistic, family relations (positive); where subjects are more altruistic towards recipients who are family members and intergenerational solidarity (positive); where subjects are more altruistic towards recipients whom they share a close bond with are predictors of altruism.

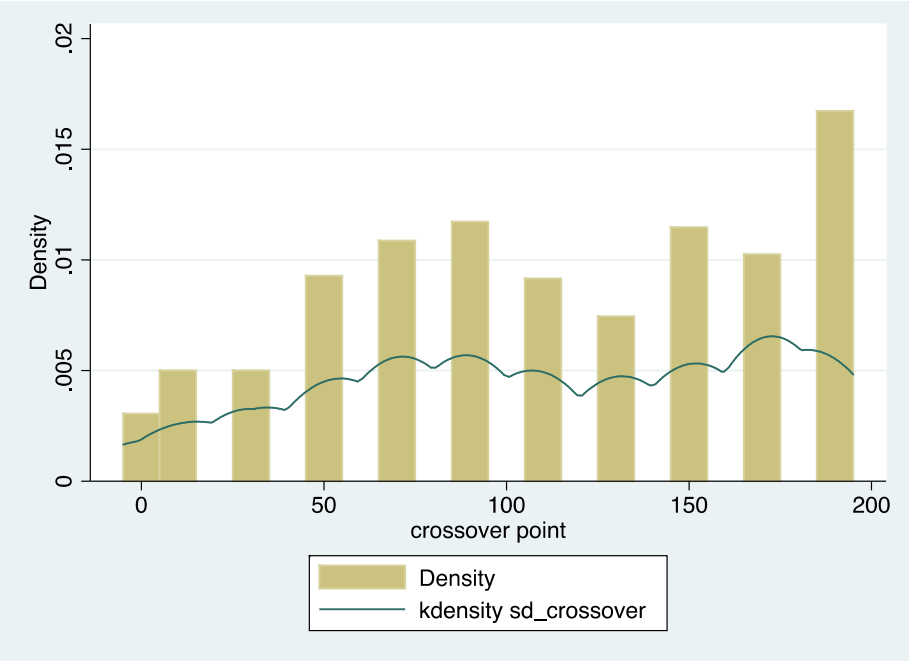
Recipient's gender ($p<0.05$) was only statistically significant and positive in the payment group, suggesting that subjects are more altruistic towards females than males.
In terms of sender characteristics, gender (positive), household poverty ranking (negative) and financial situation (positive) are associated with observed altruism, but only really in the treatment arm of the study. This result suggests that male subjects are more altruistic than female subjects, while subjects from poor households exhibit a greater willingness to give than subjects from rich households. Furthermore, subjects in a good financial situation are more altruistic than subjects in a very good financial situation. In the control group, subjects who regarded themselves as financially neutral in terms of their own financial position were less altruistic than subjects in a worse-off financial position. Subjects that previously participated in a study of this nature are more altruism hinting at some form of self-selection. The pooled data analysis illustrates that younger subjects are more altruistic (age is negative) and that there is a non-linear relationship between a sender's age and the crossover point (age square is positive). Previous participation in the experiment is also positive and a strong predictor of observed altruism ($p<0.01$). Participants with experimental experience are more altruistic and may be selecting into the experiment.

Table 4.1: Subjects – Descriptive Characteristic (n= 117), by treatment arm

	Payment	Non-Payment	Total	p-value
Age (years)				
Mean	22.3	22.7	22.5	0.186
Median [IQR]	22[24-21]	22[23.5-21]	22[24-21]	0.885
Female (%)	54.4	63.3	59.0	0.325
Population Group				
African	71.9	91.7	82.1	0.017
Coloured	3.5	3.3	3.4	
Asian	10.5	-	5.1	
White	14.0	5.0	9.4	
Total	100.0	100.0	100.0	
Language				
Sotho	38.6	40.0	39.3	0.935
Afrikaans	8.8	8.3	8.6	
Venda	8.8	6.7	7.7	
Xhosa	8.8	11.7	10.3	
Sepedi	1.8	1.7	1.7	
Tswana	13.3	8.8	11.1	
English	15.8	6.7	11.1	
Tsonga	1.8	3.3	2.6	
Zulu	3.5	5.0	4.3	
Other	3.5	3.3	3.4	
Total	100.0	100.0	100.0	
Faculty				
Economic and Management	82.5	68.3	75.2	0.443
Natural and Agricultural	8.8	18.3	13.7	
Health	3.5	5.0	4.3	
Education	-	1.7	0.9	
Law	-	1.7	0.9	
Humanities	5.1	5.0	5.1	
Total	100.0	100.0	100.0	
Household Poverty				
1 (poorest)	-	3.3	1.7	0.629
2	13.3	12.3	12.8	
3	52.6	55.0	53.9	
4	31.6	26.7	29.1	
5	3.5	1.7	2.6	
6 (richest)	-	-	-	
Total	100.0	100.0	100.0	
Financial Situation				
Very Broke	8.8	11.7	10.3	0.426
Broke	33.3	31.7	32.5	
Neither	26.3	36.7	31.6	
In good shape	31.6	20.0	25.6	
In very good shape	-	-	-	
Total	100.0	100.0	100.0	
Applied for financial aid (yes)	21.1	45.0	33.3	0.006
Received financial aid (yes)	10.5	11.7	11.1	0.844
Previous experimental experience (yes)	1.8	3.3	2.6	0.531

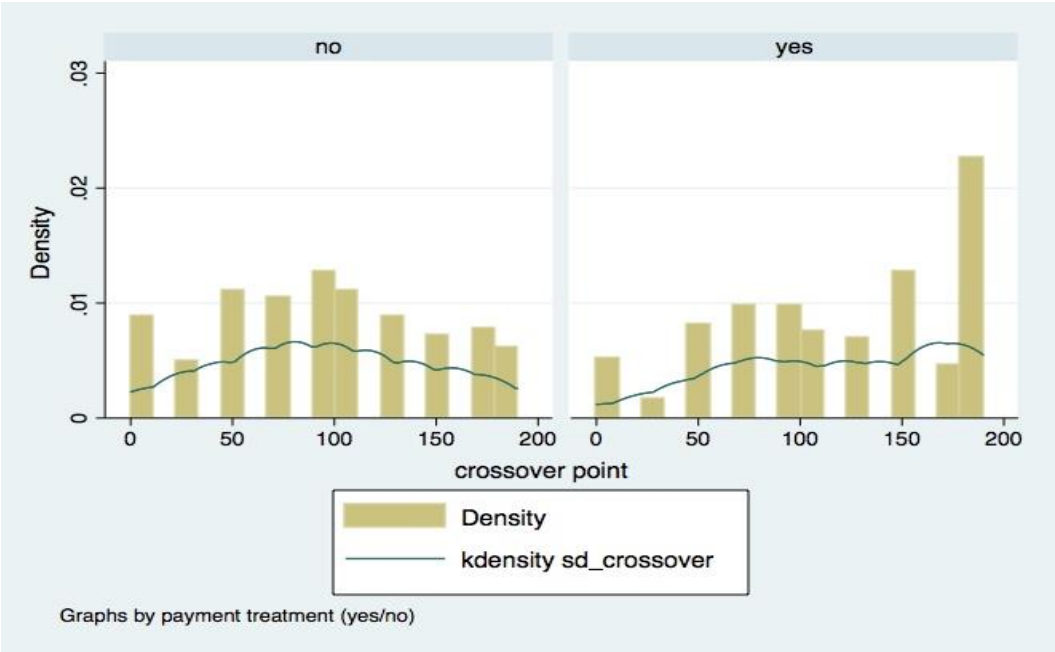
Note: Totals may not add up to 100% due to rounding.

Figure 4.1: Crossover points, aggregate distribution (n=117)



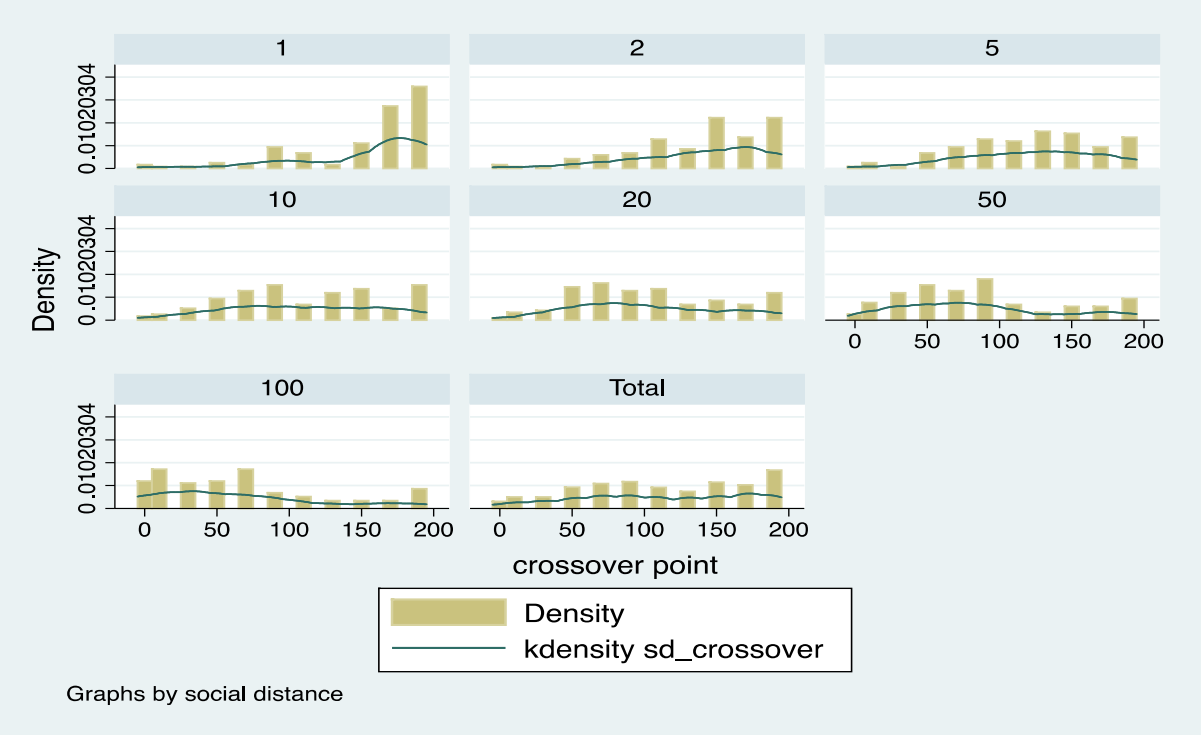
Note: Data for all participants who crossed over multiple times between A and B is included in the above analysis, with the first reported crossover being used as the crossover point.

Figure 4.2: Crossover points, by treatment arm (n=117)



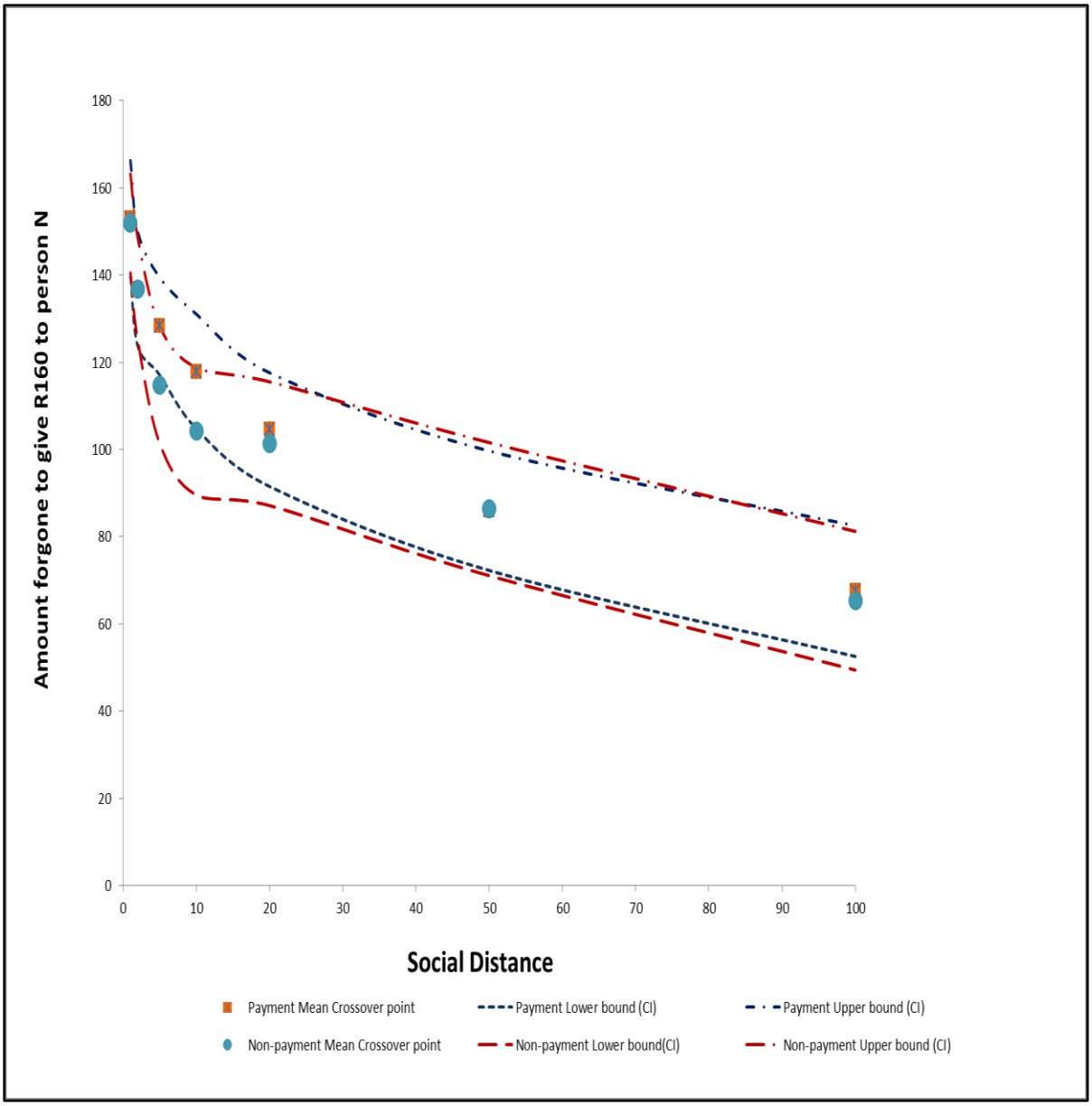
Note: Data for all participants who crossed over multiple times between A and B is included in the above analysis, with the first reported crossover being used as the crossover point.

Figure 4.3: Crossover points, by social distance (n=117)



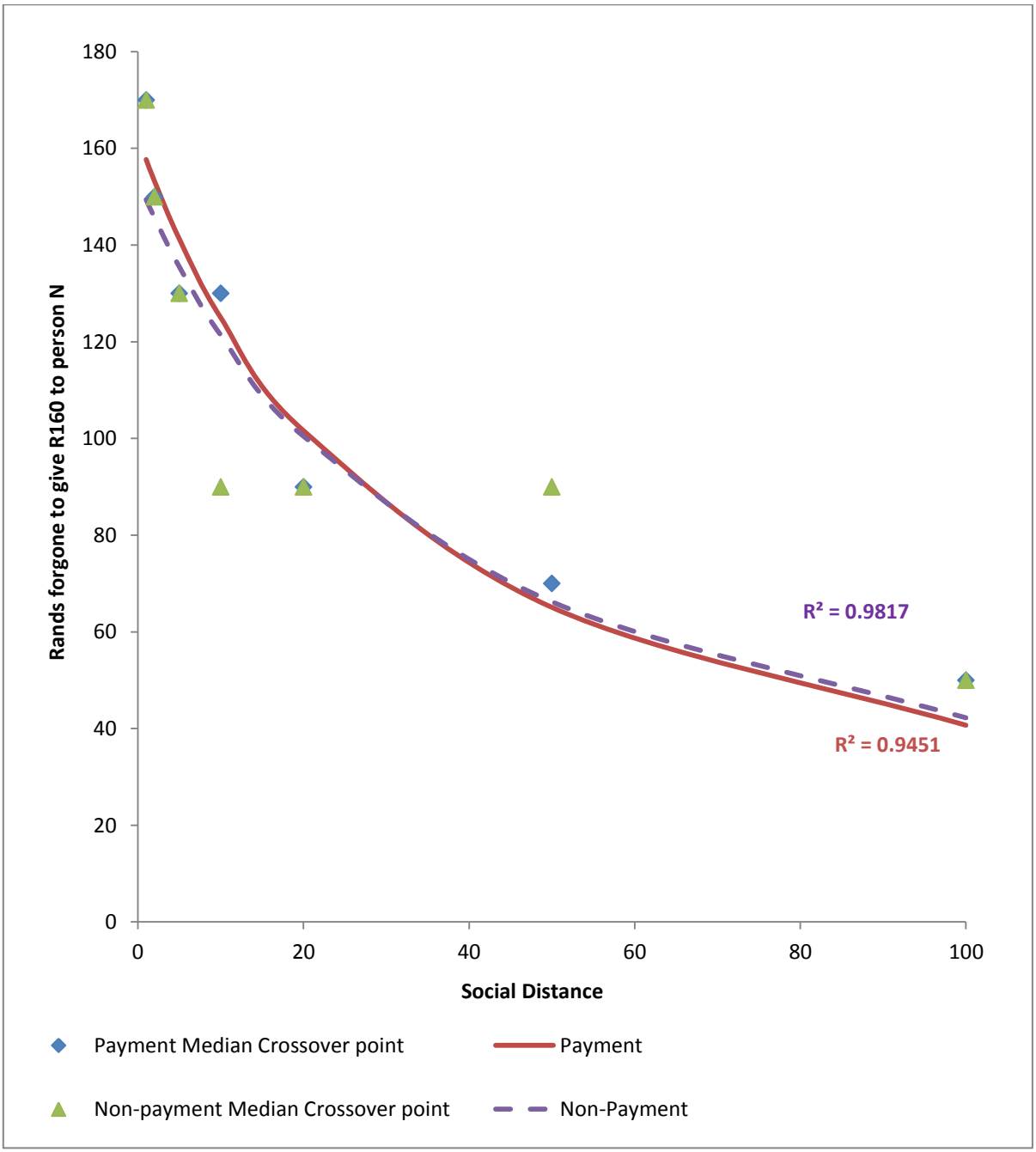
Note: Data for all participants who crossed over multiple times between A and B is included in the above analysis, with the first reported crossover being used as the crossover point.

Figure 4.4: Mean crossover points, by treatment arm



Note: Data for the participants who crossed over between A and B multiple times are included in the above analysis, with the first reported crossover being used as the crossover point.

Figure 4.5: Social discounting function, by treatment arm



Note: Data for participants who crossed over multiple times between A and B are included in the above analysis, with the first reported crossover being used as the crossover point.

Table 4.2: Mean crossover, by gender and treatment arm

	Payment		Non-payment		Total	
	Mean	**p-value**	**Mean**	**p-value**	**Mean**	**p-value**
A. Recipient						
Male	104.56	0.0022	104.92	0.1230	104.76	0.0027
Female	120.78		111.73		116.12	
Total	113.43		108.67		110.99	
B. Sender						
Male	109.01	0.0769	110.58	0.6912	109.73	0.3036
Female	117.14		107.56		111.86	
Total	113.43		108.67		110.99	

Table 4.3: Mean crossover, by gender

	Male sender		Female sender		Total	
	Mean	**p-value**	**Mean**	**p-value**	**Mean**	**p-value**
Recipient						
Male	102.69	0.0104	106.62	0.0519	104.76	0.0027
Female	117.39		115.42		116.12	
Total	109.73		111.86		110.89	

Table 4.4: Mean crossover and period of knowing, by treatment arm

Period (years)	**< 1**	**1-2**	**2-3**	**3-5**	**5-10**	**> 10**	**Total**	**F-test**
Payment	80.00	116.43	103.10	100.00	114.15	127.91	113.43	8.76***
Non-payment	72.67	94.76	83.61	107.25	103.95	127.70	108.67	11.54***
Total	76.59	103.43	92.31	104.08	109.24	127.80	110.99	19.46***
p-value	0.2516	0.0580	0.0830	0.7079	0.2089	0.4837	0.1213	

Table 4.5: Mean crossover and frequency of communication, by treatment arm

Frequency of communication	**Payment**	**Non-payment**	**Total**	**p-value**
Daily	137.39	138.13	137.77	0.5409
A few times a week	124.89	117.50	120.89	0.1707
Once a week	109.67	112.31	110.89	0.5682
A few times a month	108.33	98.33	103.07	0.1551
Once a month	126.15	75.26	104.67	0.0008
A few times a year	87.02	89.05	87.88	0.5702
Less frequently	119.23	82.90	99.47	0.0184
No contact	56.67	85.71	73.61	0.9664
Total	113.43	108.67	110.99	0.1213
F-test	10.68***	7.95***	15.10***	

Table 4.6: Mean crossover and physical distance, by treatment arm

Distance recipient lives from sender	Payment	Non-payment	Total	p-value
Living together	138.89	133.88	136.62	0.2823
Within walking distance	109.82	102.54	106.05	0.2398
Same town/village/city	104.35	99.72	101.86	0.2779
Another town/village/city	115.32	111.56	113.03	0.3234
Another country	128.54	131.43	129.76	0.5945
Do not know	70.23	58.00	65.27	0.1957
Total	113.43	108.67	110.99	0.1213
F-test	10.77***	9.18***	19.75***	

Table 4.7: Mean crossover and emotional and psychological distance, by treatment arm

Emotional and psychological closeness	Payment	Non-payment	Total	p-value
1	64.65	61.25	63.01	0.3942
2	61.58	60.77	61.25	0.4835
3	88.00	70.77	77.07	0.1934
4	87.19	77.04	82.54	0.2325
5	112.75	86.25	101.10	0.0130
6	104.47	106.67	105.47	0.5718
7	132.50	109.35	118.43	0.0117
8	133.00	118.18	125.24	0.0900
9	136.00	144.34	141.05	0.8134
10	144.39	147.59	146.00	0.6812
Total	113.43	108.67	110.99	0.1213
F-test	13.98	16.18	28.53	
Spearman Rho (p-value)	0.4634 (<0.001)	0.4908 (<0.001)	0.4735 (<0.001)	

Table 4.8: Mean crossover and family status, by treatment arm

	Payment	Non-payment	Total	p-value
Family	128.70	130.61	129.70	0.655
Non-family	94.09	78.24	86.16	0.004
Total	113.43	108.67	110.99	0.121
p-value	<0.001	<0.001	<0.001	

Table 4.9: Recipients – descriptive characteristics (n=819), by treatment arm

	Payment	Non-payment	Total	p-value
Age (years)				
Mean	31.8	32.7	32.2	0.793
Median [IQR]	26[41-21]	26[44-21]	26[42-21]	0.769
Female (%)	77.2	71.7	74.4	0.494
Relation				
Partner	8.8	6.7	7.7	0.881
Parent	68.4	70.0	69.2	
Sibling	12.3	8.3	10.3	
Other family	5.3	6.7	6.0	
Friend	5.3	6.7	6.0	
Neighbour/acquaintance	-	1.7	0.9	
Stranger	-	-	-	
Other	-	-	-	
Total	100.0	100.0	100.0	
Relation				
Family	55.9	58.1	57.0	0.524
Non-family	44.1	41.9	43.0	
Total	100.0	100.0	100.0	
How long known				
< 1 year	1.8	3.3	2.6	0.466
1-2 years	1.8	1.7	1.7	
2-3 years	3.5	6.7	5.1	
3-5 years	-	5.0	2.6	
5-10 years	7.0	3.3	5.1	
> 10 years	86.0	80.0	82.9	
Total	100.0	100.0	100.0	
Communication				
Daily	57.9	45.0	51.3	0.387
A few times a week	26.3	38.3	32.5	
Once a week	3.5	5.0	4.3	
A few times a month	5.3	5.0	5.1	
Once a month	-	3.3	1.7	
A few times a year	5.3	1.7	3.4	
Less frequently	1.8	-	0.9	
No contact	-	1.7	0.9	
Total	100.0	100.0	100.0	
Distance				
We live together	56.1	31.7	43.6	0.083
Within walking distance	10.5	10.0	10.3	
Same town/village/city	3.5	8.3	6.0	
Another town/village/city	19.3	35.0	27.4	
Another country	10.5	15.0	12.8	
Do not know where person lives	-	-	-	
Total	100.0	100.0	100.0	
Psychological and emotional distance				
Mean	6.5	6.2	6.3	0.111
Median [IQR]	7[9-4]	6[9-4]	7[9-4]	0.365

Note: Totals may not add up to 100% due to rounding off.

Table 4.10: Recipients – descriptive characteristics, by social distance

	1	2	5	10	20	50	100	Total	p-value
Age (years)									
Mean	41.1	35.5	28.5	33.0	28.5	29.7	29.4	32.2	<0.001
Median [IQR]	47[52-26]	30[50-23]	23[31-19]	25[40-22]	24[33-21]	25[33-21]	24[30-21]	26[42-21]	
Age differential (mean)	18.6	13.0	6.0	10.6	6.0	7.2	6.9	9.8	<0.001
Female (%)	74.4	58.9	48.7	56.4	51.3	51.3	42.7	54.8	<0.001
Relation									
Partner	7.7	14.5	14.5	8.6	5.1	2.6	0.9	7.7	<0.001
Parent	69.2	30.8	6.8	4.3	0.9	0.9	1.7	16.4	
Sibling	10.3	35.0	29.1	6.0	3.4	4.3	0.9	12.7	
Other family	6.0	12.8	30.8	42.7	35.9	23.1	6.0	22.5	
Friend	6.0	5.1	15.4	31.6	33.3	13.7	4.3	15.6	
Neighbour/acquaintance	0.9	-	2.6	5.1	20.5	47.0	24.8	14.4	
Stranger	-	1.7	0.9	0.9	0.9	7.7	60.7	10.4	
Other	-	-	-	0.9	-	0.9	0.9	0.4	
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	
Relation									
Family	92.3	89.7	76.9	57.3	43.6	29.9	9.4	57.0	<0.001
Non-family	7.7	10.3	23.1	42.7	56.4	70.1	90.6	43.0	
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	
How long known									
< 1 year	2.3	2.6	1.7	4.3	5.1	28.2	65.8	15.8	<0.001
1-2 years	1.7	3.4	7.7	6.8	15.4	15.4	9.4	8.6	
2-3 years	5.1	6.8	7.7	5.1	10.3	14.5	6.0	7.9	
3-5 years	2.6	8.6	10.3	14.5	14.5	6.8	3.4	8.7	
5-10 years	5.1	3.4	9.4	17.0	19.7	10.3	2.6	9.7	
> 10 years	82.9	75.2	63.3	52.1	35.0	24.8	12.8	49.4	
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	
Sample (n)	117	117	117	117	117	117	117	819	

Note: Totals may not add up to 100% due to rounding.

Table 4.10: Recipients – descriptive characteristics, by social distance (continued)

	1	2	5	10	20	50	100	Total	p-value
Communication									
Daily	51.3	41.0	25.6	11.1	12.8	12.0	3.4	22.5	<0.001
A few times a week	32.5	33.3	34.2	24.8	18.0	15.4	6.0	23.4	
Once a week	4.3	5.1	6.8	10.3	11.1	5.1	5.1	6.8	
A few times a month	5.1	12.8	14.5	25.6	18.8	13.7	6.8	13.9	
Once a month	1.7	-	6.8	7.7	11.1	9.4	1.7	5.4	
A few times a year	3.4	6.0	7.7	15.4	17.1	20.5	14.5	12.1	
Less frequently	0.9	0.9	1.7	1.7	8.6	13.7	21.4	7.0	
No contact	0.9	0.9	2.6	3.4	2.6	10.3	41.0	9.0	
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	
Distance									
We live together	43.6	41.0	18.0	8.6	6.0	5.1	4.3	18.1	<0.001
Within walking distance	10.3	7.7	15.4	16.2	23.1	18.0	6.8	13.9	
Same town/village/city	6.0	12.8	27.4	35.9	32.5	34.2	21.4	24.3	
Another town/village/city	27.4	28.2	29.1	28.2	27.4	23.1	8.6	24.5	
Another country	12.8	9.4	10.3	10.3	9.4	9.4	9.4	10.1	
Do not know where person lives	-	0.9	-	0.9	1.7	10.3	49.6	9.0	
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	
Psychological/emotional distance									
Mean	9.1	8.7	7.7	6.6	5.6	4.3	2.4	6.3	<0.001
Median [IQR]	10[10-8]	9[10-8]	8[9-6]	7[8-5]	5[7-4]	4[6-3]	1[3-1]	7[9-4]	
Sample (n)	117	117	117	117	117	117	117	819	

Note: Totals may not add up to 100% due to rounding.

Table 4.11: Regression results – sender characteristics

	Dependent variable: crossover value		
	Payment group	**Non-payment group**	**Pooled**
Payment	-	-	0.1340* (1.84)
Age	-0.4854 (0.94)	-0.1731 (0.62)	-0.3456 (1.54)
Age squared	0.0111 (0.99)	0.0055 (0.96)	0.0088* (1.87)
Gender (comparison = male)	0.2349 (2.15)	-0.0051 (0.04)	0.0902 (1.17)
Household poverty ranking	-0.2367** (2.45)	-0.0051 (0.07)	-0.0832 (1.40)
Financial situation – broke	0.0043 (0.02)	-0.3103 (1.50)	-0.1796 (1.23)
Financial situation – neither	0.4378** (2.07)	-0.4621 (2.40)	-0.1184 (0.82)
Financial situation – in good shape	0.7450*** (3.27)	-0.3584 (1.69)	0.1484 (0.94)
Social experiment experience	-0.2710 (0.67)	0.1394 (2.50)	0.1466 (3.00)
Observations	399	420	819
Wald chi2	29.71***	54.00***	56.88***
Pseudo R^2	0.0187	0.0171	0.0110

Note: ordered probit regression model; financial situation (comparison = very broke); level of significance: 10% (*); 5% (**); 1% (***) robust z-statistics in parenthesis.

Table 4.12: Regression results – recipient characteristics

	Dependent variable: crossover value		
	Payment group	**Non-payment group**	**Pooled**
Payment	-	-	0.1166 (1.61)
Age	0.0006 (0.04)	0.0033 (0.23)	0.0015 (0.15)
Age squared	0.0001 (0.40)	0.0001 (0.54)	0.0001 (0.70)
Gender (comparison = male)	0.1900* (1.83)	0.0431 (0.42)	0.1098 (1.51)
Family member	0.3079** (2.48)	0.7147*** (5.93)	0.5238*** (6.09)
Solidarity index (MCA)	0.2876*** (5.02)	0.2083*** (2.99)	0.2421*** (5.48)
Observations	399	420	819
Wald chi2	59.08***	81.61***	132.29***
Pseudo R^2	0.0387	0.0518	0.0433
Sender fixed effects:			
Payment	-	-	1.2534*** (3.45)
Age	-0.0058 (0.32)	0.0106 (0.61)	0.0028 (0.23)
Age squared	0.0001 (0.42)	0.0000 (0.24)	0.0001 (0.44)
Gender (comparison = male)	0.2634** (2.39)	0.2069* (1.80)	0.2286*** (2.86)
Family member	0.6670*** (4.67)	0.9931*** (7.46)	0.8250*** (8.37)
Solidarity index (MCA)	0.3208*** (5.39)	0.3950*** (4.78)	0.3432*** (7.13)
Observations	399	420	819
Wald chi2	850.17***	831.28***	2105.54***
Pseudo R^2	0.1603	0.2002	0.1767

Note: ordered probit regression model; level of significance: 10% (*); 5% (**); 1% (***) robust z-statistics in parenthesis.

Table 4.13: Regression results – sender and recipient characteristics

	Dependent variable: crossover value		
	Payment group	**Non-payment group**	**Pooled**
Payment	-	-	0.1587** (2.18)
Recipient characteristics:			
Age	0.0030 (0.18)	-0.0015 (0.11)	-0.0025 (0.24)
Age squared	0.0000 (0.13)	0.0001 (0.87)	0.0001 (0.97)
Gender (comparison = male)	0.1907** (1.83)	0.0694 (0.64)	0.1131 (1.53)
Family member	0.3213*** (2.59)	0.7465*** (6.12)	0.5359*** (6.25)
Solidarity index (MCA)	0.3043*** (5.08)	0.2503*** (3.47)	0.2607*** (5.74)
Sender characteristics:			
Age	-0.5331 (1.02)	-0.1189 (0.41)	-0.4590** (1.99)
Age squared	0.0118 (1.04)	0.0048 (0.83)	0.0112** (2.32)
Gender (comparison = male)	0.2272** (2.07)	0.0251 (0.22)	0.0836 (1.09)
Household poverty ranking	-0.2637*** (2.67)	0.0285 (0.38)	-0.0575 (0.95)
Financial situation – broke	-0.0683 (0.35)	-0.2955 (1.35)	-0.2320 (1.58)
Financial situation - neither	0.4144** (2.01)	-0.5481** (2.59)	-0.1928 (1.31)
Financial situation – in good shape	0.7396*** (3.36)	-0.3112 (1.39)	0.1285 (0.81)
Experiment previous experience	-0.2036 (0.61)	0.1456** (2.14)	0.1551*** (2.86)
Observations	399	420	819
Wald chi2	88.68***	113.20***	168.79***
Pseudo R^2	0.0585	0.0754	0.0556

Note: ordered probit regression model; financial situation (comparison = very broke); household poverty ranking (comparison = ranking 1); level of significance: 10% (*); 5% (**); 1% (***) robust z-statistics in parenthesis.

4.2. Aggregate Analysis

Further descriptive and regression analysis was performed using the aggregate data. Additionally, the aggregate results re-estimated while allowing for the clustering of choices within the individual are also presented and discussed below.

Table 4.14: Mean crossover value, by session and treatment arm

	Payment	Non-Payment	Total	p-values
Session 1	120.90	96.21	108.28	<0.001
Session 2	108.73	116.41	112.68	0.926
Total	113.43	108.67	110.98	0.1213
p-values	0.036	<0.001	0.147	

Table 4.14 shows the mean crossover values by sub-group and on aggregate on aggregate. There are statistically significant differences ($p<0.05$) between sessions when the social discounting task is incentivized, which suggest that subjects in session 1 are more altruistic (mean=R120) as compared to session 2 (mean=R108). Contrarily, when comparing sessions across non-payment, subjects in session 2 (mean=R116) are more altruistic than subjects in session 1 (mean=R96), a difference that is strongly statistically significant ($p<0.01$). When comparing the treatment arms by sessions, there are statistically significant differences between the payment and non-payment group in session 1 only ($p<0.01$). Subjects in the payment group (mean=R120) are more altruistic than subjects in the non-payment group (mean=R96). In session 2 there was no statistically significant difference between the treatment and control groups.

Table 4.15a shows the regression results for the aggregate model. In the sender characteristics analysis, the payment dummy is positive and statistically significant ($p<0.05$), suggestive that subjects in the payment are group are more altruistic compared to the non-payment group. Other sender characteristics that predict altruism are age square (positive); where both young and older subjects are unselfish as well as previous experimental experience (positive); where subjects with previous experimental experience are more altruistic. When adjusting for sender fixed effects, factors predicting altruism differ. The payment dummy becomes statistically insignificant. Only financial situation predicts crossover values (negative) whereby financially broke subjects are more altruistic. The session dummy is statistically insignificant in both instances.

When adjusting for differences in recipient characteristics, both the payment and session dummy are statistically insignificant. Only family relations (positive) and intergenerational solidarity (positive) matter in predicting altruism, a result that implies that subjects are more altruistic towards family members and those with whom they share a close bond. Adjusting for both sender and recipient characteristics significantly changes the results as the payment (positive) and session (negative) dummies become statistically significant. This result suggests that subjects in the payment group are more altruistic than those in the non-payment group. Furthermore, it implies that subjects in session 2 are less altruistic than subjects in session 1. Other sender characteristics that significantly predict altruism include age square (positive); where both young and older subjects are unselfish, as well as previous experimental experience (positive); where subjects with previous experimental experience are more altruistic. Family member (positive) and intergenerational solidarity (positive) continue to matter in predicting altruism as recipient characteristics. As always subjects are more altruistic towards family members and those with whom they share a close bond.

Lastly, when adjusting for differences in sender fixed effects as well as recipient characteristics; both the payment and session dummy variables become statistically insignificant. Family relations (positive): where subjects are more altruistic towards family members and intergenerational solidarity (positive): subjects are altruistic towards those with whom they share a close bond, remain recipient characteristics that predict altruism. Overall, family relations and intergenerational solidarity matter in all instances and their role is universal within the treatment arms, within each session and on aggregate.

Table 4.15b show the regression results with standard errors adjusted for clustering at the individual level. In terms of sender characteristics, the payment dummy variable is positive, but statistically insignificant. Only previous experimental experience (positive) predicts altruism; where subjects with previous experimental experience are more altruistic. When adjusting for observed heterogeneity in subject characteristics, factors predicting altruism differ. The payment and session dummy variables are positive and statistically significant ($p<0.01$), suggestive that subjects in the payment group are more altruistic compared to the subjects in the non-payment group, while subjects in session 1 are more altruistic those in session 2.

Furthermore, all sender characteristics are positive and statistically significant ($p<0.01$); suggestive that age, age squared, gender, household poverty ranking, financial situation and

previous experiment experience predict altruism. When adjusting for differences in recipient characteristics, both the payment and session dummy are statistically insignificant. Only family relations (positive) and intergenerational solidarity (positive) matter in predicting altruism, a result that implies that subjects are more altruistic towards family members and those with whom they share a close bond.

When adjusting for sender and recipient characteristics, the session dummy is negative and statistically significant ($p<0.05$); suggesting that subjects in session 2 are more altruistic than subjects in session 1. Other sender characteristics that significantly predict altruism include previous experimental experience (positive); where subjects with previous experimental experience are more altruistic. Furthermore, family member (positive) and intergenerational solidarity (positive) continue to matter in predicting altruism as recipient characteristics. As always, subjects are more altruistic towards family members and those with whom they share a close bond.

Lastly, when adjusting for differences in sender fixed effects as well as recipient characteristics; both the payment and session dummy variables are positive and statistically significant. This suggests that subjects in the treatment group are more altruistic than subjects in the control group whereas subjects in session 1 are more altruistic than subjects in session 2. Recipient's gender (positive), family member (positive) and intergenerational solidarity (positive) continue to matter in predicting altruism as recipient characteristics. As always subjects are more altruistic towards family members and those with whom they share a close bond. Furthermore male subjects are more altruistic than female subjects. Contrary to the robust aggregate regression results with sender fixed effects (Table 4.15a) all sender characteristics matter in predicting altruism when allowing for both the fixed effects and clustering of individual choices.

4.2.1 Conclusion

This section discussed the data analysis and the interpretation of the results between treatment groups and on aggregate.

Section 5 concludes the study, briefly discusses limitations and makes recommendations for further research.

Table 4.15a: Regression results: Aggregate model with sender fixed effects

	Sender Characteristics	Sender Fixed Effects	Recipient Characteristics	Sender and Recipient Characteristics	Sender Fixed Effects and Recipient Characteristics
Payment	0.1337** (1.82)	0.8323 (0.36)	0.1175 (1.62)	0.1585** (2.16)	1.2675 (0.52)
Session	0.0059 (0.08)	-0.0095 (0.01)	-0.0617 (0.83)	-0.2754*** (2.91)	-0.4447 (0.39)
Recipient characteristics:					
Age			0.0011 (0.11)	-0.0036 (0.36)	0.0058 (0.50)
Age squared			0.0001 (0.75)	0.0001 (1.39)	0.0001 (0.58)
Gender (comparison = male)			0.1092 (1.50)	0.0993 (1.34)	0.1925** (2.39)
Family member			0.5339*** (6.09)	0.4143*** (3.51)	0.4531*** (3.45)
Solidarity index (MCA)			0.2415*** (5.47)	0.3315*** (7.64)	0.4491*** (9.77)
Sender characteristics:					
Age	-0.3471 (1.54)	-0.0020 (0.00)		-0.4219* (1.78)	-0.0139 (0.03)
Age squared	0.0088** (1.87)	-0.0001 (0.01)		0.0105** (2.12)	-0.0007 (0.05)
Gender (comparison = male)	0.0895 (1.16)	0.2065 (0.42)		0.1043 (1.35)	0.0937 (0.18)
Household poverty ranking	-0.0831 (1.40)	0.1421 (0.14)		-0.0552 (0.92)	0.1251 (0.11)
Financial situation – broke	-0.1782 (1.21)	-1.6381** (2.01)		-0.2526* (1.74)	-1.3561* (1.70)
Financial situation - neither	-0.1170 (0.81)	-1.4118 (0.70)		-0.2048 (1.42)	-1.4084 (0.68)
Financial situation – in good shape	0.1499 (0.95)	-1.6908 (1.42)		0.1071 (0.69)	-1.4461 (1.18)
Experiment previous experience	0.1465*** (3.00)	-0.2153 (0.30)		0.1508*** (2.86)	-0.1678 (0.25)
Observations	819	819	819	819	819
Wald chi2	56.92***	-	132.81***	138.88***	-
Pseudo R^2	0.0110	0.1072	0.0435	0.0481	0.1600

Table 4.15b: Regression results: Aggregate model with sender fixed effects and clustering

	Sender Characteristics	Sender Fixed Effects	Recipient Characteristics	Sender and Recipient Characteristics	Sender Fixed Effects and Recipient Characteristics
Payment	0.1337 (1.19)	1.4772*** (24.18)	0.1118 (0.91)	0.1586 (1.35)	1.8873*** (12.83)
Session	0.0059 (0.05)	1.2301*** (5.34)	-0.1933 (1.43)	-0.2754** (2.07)	1.3901*** (3.00)
Recipient characteristics					
Age			0.0009 (0.09)	-0.0037 (0.33)	0.0048 (0.35)
Age squared			0.0001 (1.02)	0.0002 (1.32)	0.0001 (0.35)
Gender (comparison = male)			0.0987 (1.35)	0.0994 (1.42)	0.1937** (2.26)
Family member			0.3807*** (3.01)	0.4144*** (3.19)	0.4584*** (2.28)
Solidarity index (MCA)			0.3106*** (6.46)	0.3315***	0.4497*** (7.70)
Sender characteristics:					
Age	-0.3471 (0.81)	4.0431*** (10.25)		-0.4219 (0.91)	5.4646*** (7.44)
Age squared	0.0088 (0.97)	-0.0805*** (10.49)		0.0106 (1.07)	-0.1087*** (7.52)
Gender (comparison = male)	0.0895 (0.78)	0.2456*** (2.91)		0.1044 (0.85)	0.4498*** (2.76)
Household poverty ranking	-0.0832 (0.83)	-0.8415*** (8.51)		-0.0553 (0.52)	-1.1184*** (6.31)
Financial situation – broke	-0.1783 (0.76)	-1.9162*** (18.74)		-0.2527 (1.05)	-2.5366*** (12.97)
Financial situation - neither	-0.1170 (0.51)	-0.5481*** (3.24)		-0.2049 (0.86)	-0.7062** (2.30)
Financial situation – in good shape	0.1499 (0.59)	-0.9075*** (7.90)		0.1071 (0.41)	-0.9222*** (4.87)
Experiment previous experience	0.1465** (2.48)	0.4481*** (3.49)		0.1509** (2.43)	0.5259** (2.21)
Observations	819	819	819	819	819
Wald chi2	64.56***	-	70.30***	108.55***	-
Pseudo R^2	0.0110	0.1073	0.0356	0.0481	0.1604

SECTION 5

CONCLUSION

In both the treatment and aggregate analysis, subjects exhibit an inverse relationship between social distance and altruism (Leider et al., 2009) in accordance with the 1/d law of giving (Goeree et al. 2010). Furthermore, subjects in the treatment (payment) arm of the study exhibited significantly greater altruism compared to subjects in the control (non-payment) arm. When regression results are adjusted for unobserved heterogeneity in subject characteristics using sender fixed effects, incentivising of the Social Discounting Task does not however matter, nor so when adjusting standard errors for clustering. On aggregate, subjects were not more or less altruistic in the payment group compared to the non-payment group. Overall, family members are more altruistic towards each other as are those exhibiting greater intergenerational solidarity.

Differences in the results across sessions can be ascribed to various reasons. Firstly, the same facilitators did not conduct each experiment, subjecting the outcome of the research to possible experimenter demand effects. Experimenter demand effects refer to changes in behaviour by experimental subjects due to cues about what constitutes appropriate behaviour (Zizzo, 2010). Secondly, the two experiments were conducted at different months and times of the year. The first experiment was conducted towards the end of February 2015, while the second experiment was executed in the middle of October 2015. The period wherein the experiment takes place is important because it influences the financial decisions of subjects. Generally, there is an expectation that incentivized student subjects are less altruistic towards the end of the month relative to the beginning of the month.

The study has various limitations. Firstly, another major limitation of the study is inconsistent preferences. Thirty- four (14/45 in experiment one and 20/72 in experiment two) subjects switched multiple times from A to B on the social discounting task (SDT), which may be indicative of a lack of understanding ("noise") or preference reversals, also called inconsistent preferences.

To deal with this problem, one could potentially rephrase the task so as to ask subjects to mark the one row where they would choose to switch from A to B, as in the *s*MPL variant of the multiple price list (MPL) elicitation method (Andersen et al., 2006). In this study, however, we implemented the original standard social discounting task (SDT) protocol to allow comparability with other social discounting studies, in particular with Locey et al (2011), who conducted a similar study.

Secondly, as subjects from the same faculty participated in the experiments, these findings cannot be generalized beyond a limited setting. Therefore, for further research, experiments can conducted with students in other faculties as well as using field subjects to test whether incentivising the Social discounting task (SDT) matters. The latter is particularly important, as real rewards are imperative in field settings. In both sessions of this study, subjects received a show-up fee (R30 in session 1 and R50 in session 2). However, given that the reward difference between the sessions was slightly low (R20), future research with larger rewards should be conducted, to see whether incentives really matter in social discounting tasks and other social preference experiments. Furthermore, in terms of future work, it would be interesting to repeat these experiments with variation in terms of the framing of the experiment and see how this may affect choices.

Lastly, while the second objective of this dissertation is interesting, the knowledge generated is severely constrained by the use of a non-random sample of students, making it difficult to generalize the results about inter-generational solidarity. Thus, this component of the study serves only to demonstrate that it is possible that the characteristics of the subjects may mediate the outcomes of the experiment.

In conclusion, most important in terms of the role of sender and recipient characteristics in explaining behaviour observed in the social discounting task (SDT) is the nature of the relationship between sender and recipient. Family relations are more altruistic towards each other as are those exhibiting greater intergenerational solidarity.

Social development programmes, more generally, and preventive and developmental social work programmes, more specifically, that strengthen intergenerational solidarity may therefore enhance altruism within the family, thus contributing to greater wellbeing.

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Annexure A1: Social Discounting Task (SDT)

SOCIAL DISCOUNTING TASK

First, let us look at an example of how the task works and how we will calculate your earnings from the particular task.
The following experiment asks you to imagine that you have made a list of the 100 people closest to you in the world ranging from your dearest friend or relative at position #1 to a mere acquaintance at #100. The person at number one would be someone you know well and is your closest friend or relative. The person at #100 might be someone you recognize and encounter but perhaps you may not even know their name.
You do not have to physically create the list- just imagine that you have done so.
For example, imagine the following choices between an amount of money for you and an amount for person **#75** on the list. Circle A or B on the right hand side to indicate which option you would choose in EACH line,. Please note that there is no wrong or right answer, simply indicate whether you would choose A or B in each row.

	OPTION A:	**OPTION B:**	**CIRCLE**	
1.	R90 for you alone	R80 for person #75 on the list	A	B
2.	R80 for you alone	R80 for person #75 on the list	A	B
3.	R70 for you alone	R80 for person #75 on the list	A	B
4.	R60 for you alone	R80 for person #75 on the list	A	B
5.	R50 for you alone	R80 for person #75 on the list	A	B
6.	R40 for you alone	R80 for person #75 on the list	A	B
7.	R30 for you alone	R80 for person #75 on the list	A	B
8.	R20 for you alone	R80 for person #75 on the list	A	B
9.	R10 for you alone	R80 for person #75 on the list	A	B
10.	R0 for you alone	R80 for person #75 on the list	A	B

Row selected for payment:	
Option (A/B):	

Please complete the exercise table now.

Do you have any questions?

Payment:

You will complete seven of these tables.

First, we will randomly select one of these tables using a dice.

Then, one of the ten rows in the selected table will be selected randomly using a ten-sided dice.

The selected decision will be implemented, i.e. we will pay you the actual amount of money for real for the choice you have made.

For example, looking at the above exercise table and assuming this table was selected for payment, if row 3 was selected randomly for payment and you had chosen option B, then we will pay person #75 on your list R80 (we will collect this information from you later). If you had chosen option A, we will pay you R70.

If row 8 was selected, and you chose option A, we will pay you R20. If you chose B, we will pay person #75 on your list R80.

Next you will be asked to answer a series of questions about this particular person at a given social distance. In each case, imagine the person who best fits the specific position (#1 to #100) and answer each question.

Do you have any questions?

Let us play the first table now.

Please remember that there is no wrong or right answer, simply indicate whether you would choose A or B in each row.

Please take care when completing the tables as the values are different from those in the exercise table.

Annexure A1: Social Discounting Task (SDT) (continued)

NUMBER:	S	D	P		

SOCIAL DISCOUNTING TASK (continued)

Imagine you made a list of the 100 people closest to you in the world ranging from your dearest friend or relative at #1 to a mere acquaintance at #100.

Now imagine the following choices between an amount of money for you and an amount for person **#1** on the list. Circle A or B on the right hand side to indicate which option you would choose in EACH line.

	OPTION A:	OPTION B:	CIRCLE	
1.	R180 for you alone	R160 for person #1 on the list	A	B
2.	R160 for you alone	R160 for person #1 on the list	A	B
3.	R140 for you alone	R160 for person #1 on the list	A	B
4.	R120 for you alone	R160 for person #1 on the list	A	B
5.	R100 for you alone	R160 for person #1 on the list	A	B
6.	R80 for you alone	R160 for person #1 on the list	A	B
7.	R60 for you alone	R160 for person #1 on the list	A	B
8.	R40 for you alone	R160 for person #1 on the list	A	B
9.	R20 for you alone	R160 for person #1 on the list	A	B
10.	R0 for you alone	R160 for person #1 on the list	A	B

Row selected for payment:	
Option (A/B):	

Annexure A2: Social discounting questionnaire

NUMBER:	S	D	P		

SOCIAL DISCOUNTING TASK (continued)

Now we would appreciate it if you can provide us with more information on person **#1**. For Person **#1** on your list, please indicate which category best fits your relationship with that person by checking ONE box ONLY.

Wife/Husband	☐	Girlfriend/Boyfriend	☐
Mother/Father	☐	Friend	☐
Sister/Brother (sibling)	☐	Neighbour	☐
Uncle/Aunt	☐	Acquaintance	☐
Niece/Nephew	☐	Stranger	☐
Grandparent	☐		
Other family	☐		
Other: (please specify)			

In addition, please provide the following information for person **#1**:

Age (approximately): ☐☐ years

Gender (circle ONE option ONLY):

Male	Female

How long have you known this person?

Note: Mark ONE option ONLY.

< one year	1
1-2 years	2
2-3 years	3
3-5 years	4
5-10 years	5
> 10 years	6

How often do you communicate with this person?

Note: Mark ONE option ONLY.

Daily	1
A few times a week	2
Once a week	3
A few times a month	4
Once a month	5
A few times a year	6
Less frequently	7
I have no contact with this person	8

How far does this person live from you?

Note: Mark ONE option ONLY.

We live together	1
Within walking distance	2
In the same town/city/village	3
In another town/city/village	4
In another country	5
I do not know where this person lives	6

On a ten-point scale, at an emotional and psychological level, how close do you perceive yourself to be to this particular person?

Not close at all — Extremely close

1	2	3	4	5	6	7	8	9	10

Annexure A3: Post-experimental questionnaire

SOCIO-DEMOGRAPHIC QUESTIONNAIRE

Please provide us with the following information – please note that all information will be kept confidential and nobody else will know what you have written:

1. Age: [ ][ ] years

2. Gender:

Male = 1	Female = 2

Note: Circle ONE option ONLY.

3. Race:

African/Black = 1	Coloured = 2	Asian/Indian = 3	White = 4

Note: Circle ONE option ONLY.

4. Home language:

Afrikaans = 1	English = 2	IsiNdebele = 3	IsiXhosa = 4	IsiZulu = 5	Sepedi = 6
Sesotho = 7	Setswana = 8	Siswati = 9	Tshivenda = 10	Xitsonga = 11	Other = 12

Note: Circle ONE option ONLY.

5. Faculty:

Economic and Management Sciences = 1	Education = 2	Health Sciences = 3	Humanities = 4	Law = 5	Natural and Agricultural Sciences = 6	Theology = 7

Note: Circle ONE option ONLY.

6. Imagine a six-step ladder where the poorest in South Africa stand at the bottom (the first step) and the richest people in South Africa stand on the highest step (the sixth step). On which step are your household today?

Poorest 1	2	3	4	5	Richest 6

Note: Circle ONE option ONLY.

7. How will you describe your financial situation today? (i.e. the status of your personal finances)

Very broke	1
Broke	2
Neither	3
In good shape	4
In very good shape	5

Note: Mark ONE option ONLY.

8. Have you applied to UFS for financial aid?

Yes = 1	No = 0

Note: Circle ONE option ONLY.

9. Were you awarded financial aid from UFS?

Yes = 1	No = 0

Note: Circle ONE option ONLY.

10. Have you previously participated in any experiment of this nature?

Yes = 1	No = 0

Note: Circle ONE option ONLY.

Annexure A4: Random incentive system

Social Discounting Task

(i) Subject rolls 8 sided-dice – if rolls 8, roll again until roll a number between 1 and 7 record result:

1	2	3	4	5	6	7

(ii) Record the relevant social distance:

1	2	5	10	20	50	100

(iii) Subject rolls 10-sided dice – record row:

1	2	3	4	5	6	7	8	9	10

(iv) Record the relevant chosen option (A/B):

A	B

(iii) Subject rolls 10-sided dice – record row:

R

(vi) If OPTION B is chosen, complete the nomination/payment form for the person at the relevant social distance

Annexure A5: Interval Regression

Table 14.3: Regression results – sender characteristics (Treatment)

	Dependent variable: crossover value		
	Payment	**Non-Payment**	**Pooled**
Payment	-	-	8.4754* (1.77)
Age	-36.0205 (1.14)	-11.4558 (0.62)	-23.9092 (1.63)
Age squared	0.8216 (1.19)	0.3645 (0.98)	0.6044** (1.96)
Gender (comparison = male)	14.9903** (2.19)	0.4832 (0.06)	6.0975 (1.21)
Household poverty ranking	-14.6339** (2.47)	0.1538 (0.03)	-5.2901 (1.37)
Financial situation – broke	-2.0432 (0.16)	-20.1957 (1.47)	-12.6699 (1.33)
Financial situation – neither	24.0720* (1.85)	-30.6598** (2.40)	-9.0740 (0.96)
Financial situation – in good shape	44.9538*** (3.28)	-24.9961* (1.77)	8.7670 (0.85)
Social experiment experience	-15.7635 (0.63)	9.6301*** (2.67)	9.9674***
Observations	399	420	819
Wald chi2	34.71***	62.72***	63.40***

Note: interval regression model; financial situation (comparison = very broke); household poverty ranking (comparison = ranking 1) ; level of significance: 10% (*); 5% (**); 1% (***) robust z-statistics in parenthesis

Table 14.6: Regression results – sender characteristics (Session)

	Dependent variable: crossover value		
	Session 1	**Session 2**	**Pooled**
Session	-	-	1.0667 (0.22)
Age	-21.9981 (1.33)	-66.3418** (2.43)	-24.1018 (1.64)
Age squared	0.5068 (1.57)	1.5606*** (2.65)	0.6044** (1.96)
Gender (comparison = male)	-5.1340 (0.62)	14.6251** (2.17)	4.9876 (0.99)
Household poverty ranking	0.9327 (0.16)	-8.8622* (1.71)	-4.8762 (1.25)
Financial situation – broke	8.7365 (0.43)	-24.5023** (2.19)	-11.9519 (1.25)
Financial situation – neither	2.5866 (0.12)	-9.4381 (0.86)	-9.3128 (0.99)
Financial situation – in good shape	15.3467 (0.72)	13.6683 (1.12)	9.8650 (0.95)
Social experiment experience	-7.4240 (1.67)	7.4068** (2.19)	9.4070*** (2.98)
Observations	315	504	819
Wald chi2	13.33	66.80***	60.40***

Note: interval regression model; financial situation (comparison = very broke); household poverty ranking (comparison = ranking 1) ; level of significance: 10% (*); 5% (**); 1% (***) robust z-statistics in parenthesis.

Table 15.3: Regression results – recipient characteristics (Treatment)

	Dependent variable: crossover value		
	Payment	**Non-Payment**	**Pooled**
Payment		-	6.4992 (1.49)
Age	0.0365 (0.04)	0.2302 (0.27)	0.1124 (0.18)
Age squared	0.0043 (0.40)	0.0054 (0.51)	0.0050 (0.68)
Gender (comparison = male)	10.4359* (1.69)	2.5095 (0.41)	6.1473 (1.40)
Family member	18.6165** (2.55)	43.4305*** (6.24)	31.7929*** (6.30)
Solidarity index (MCA)	16.5147*** (5.24)	11.8934*** (2.98)	14.0434*** (5.60)
Observations	399	420	819
Wald chi2	73.01***	109.25***	166.35***
Sender fixed effects:			
Payment	-	-	55.5422*** (3.64)
Age	-0.2249 (0.28)	0.4591 (0.64)	0.1409 (0.27)
Age squared	0.0033 (0.38)	0.0021 (0.23)	0.0025 (0.41)
Gender (comparison = male)	11.5584** (2.32)	8.5511* (1.81)	9.7126*** (2.80)
Family member	29.9007*** (4.97)	41.1295*** (7.98)	35.9989*** (9.06)
Solidarity index (MCA)	14.0102*** (5.54)	15.5815*** (5.12)	14.4804*** (7.47)
Observations	399	420	819
Wald chi2	1277.62***	1811.66***	3006.02***

Note: interval regression model; level of significance: 10% (*); 5% (**); 1% (***) robust z-statistics in parenthesis.

Table 15.6: Regression results – recipient characteristics (Session)

	Dependent variable: crossover value		
	Session 1	**Session 2**	**Pooled**
Session	-	-	-3.0891 (0.69)
Age	-1.3385 (1.41)	0.7192 (0.93)	0.1018 (0.17)
Age squared	0.0226** (1.94)	-0.0014 (0.16)	0.0053 (0.72)
Gender (comparison = male)	8.9658 (1.32)	5.1109 (0.89)	6.0908 (1.39)
Family member	28.2621*** (3.69)	35.1259*** (5.05)	32.1278*** (6.24)
Solidarity index (MCA)	14.3321*** (3.92)	13.6790*** (3.90)	13.9487*** (5.56)
Observations	315	504	819
Wald chi2	70.41***	103.33***	166.30***
Sender fixed effects:			
Session	-	-	55.5422*** (3.64)
Age	-1.2888 (1.34)	0.8996 (1.44)	0.1409 (0.27)
Age squared	0.0176 (1.56)	-0.0052 (0.72)	0.0025 (0.41)
Gender (comparison = male)	8.2652 (1.39)	11.6704*** (2.70)	9.7126*** (2.80)
Family member	29.7698*** (5.10)	42.4347*** (7.92)	35.9989*** (9.06)
Solidarity index (MCA)	15.3293*** (5.31)	13.6293*** (5.21)	14.4804*** (7.47)
Observations	315	504	819
Wald chi2	572.62***	2020.85***	3006.02***

Note: interval regression model; level of significance: 10% (*); 5% (**); 1% (***) robust z-statistics in parenthesis.

Table 16.3: Regression results – sender and recipient characteristics (Treatment)

	Dependent variable: crossover value		
	Payment	**Non-Payment**	**Pooled**
Payment	-	-	8.8205** (2.08)
Recipient characteristics:			
Age	0.1603 (0.17)	-0.0598 (0.07)	-0.1266 (0.21)
Age squared	0.0016 (0.15)	0.0082 (0.83)	0.0069 (0.95)
Gender (comparison = male)	9.9482* (1.70)	4.0509 (0.67)	6.1329 (1.43)
Family member	18.5035*** (2.68)	42.7877*** (6.63)	31.4549*** (6.50)
Solidarity index (MCA)	16.6291*** (5.25)	13.7912*** (3.59)	14.7356*** (5.92)
Sender characteristics:			
Age	-36.8289 (1.28)	-5.9317 (0.37)	-27.8580** (2.09)
Age squared	0.8166 (1.30)	0.2635 (0.82)	0.6823** (2.43)
Gender (comparison = male)	13.1670** (2.15)	2.1820 (0.34)	5.0685 (1.14)
Household poverty ranking	-14.6662*** (2.69)	2.0155 (0.47)	-3.2015 (0.91)
Financial situation – broke	-6.3394 (0.59)	-16.3481 (1.31)	-14.4241* (1.69)
Financial situation - neither	19.6540* (1.72)	-31.2740*** (2.61)	-12.7562 (1.48)
Financial situation – in good shape	39.8055*** (3.33)	-19.0651 (1.49)	6.4102 (0.69)
Experiment previous experience	10.1269 (0.53)	8.6920** (2.28)	9.4433*** (3.00)
Observations	399	420	819
Wald chi2	123.06***	178.40***	228.46***

Note: interval regression model; financial situation (comparison = very broke); household poverty ranking (comparison = ranking 1) ; level of significance: 10% (*); 5% (**); 1% (***) robust z-statistics in parenthesis.

Table 16.6: Regression results – sender and recipient characteristics (Session)

	Dependent variable: crossover value		
	Session 1	**Session 2**	**Pooled**
Session	-	-	-6.8517 (1.56)
Recipient characteristics:			
Age	-1.7970* (1.87)	0.7132 (0.94)	-0.1630 (0.27)
Age squared	0.0269** (2.28)	-0.0019 (0.22)	0.0075 (1.04)
Gender (comparison = male)	8.2096 (1.23)	6.5834 (1.20)	5.9994 (1.39)
Family member	31.3037*** (4.12)	34.3352*** (5.32)	32.4207*** (6.58)
Solidarity index (MCA)	14.6913*** (4.00)	14.5185*** (4.27)	14.5834*** (5.83)
Sender characteristics:			
Age	-15.5154 (1.09)	-76.1835*** (2.98)	-25.9300* (1.90)
Age squared	0.3933 (1.41)	1.7607*** (3.20)	0.6432** (2.23)
Gender (comparison = male)	-5.6892 (0.76)	14.8915** (2.55)	4.7462 (1.07)
Household poverty ranking	3.0551 (0.58)	-7.8100* (1.67)	-2.8437 (0.80)
Financial situation – broke	8.0437 (0.51)	-28.0615*** (2.74)	-15.4006* (1.80)
Financial situation - neither	1.8009 (0.11)	-14.8914 (1.47)	-14.8745* (1.75)
Financial situation – in good shape	18.5828 (1.11)	7.5645 (0.68)	5.6199 (0.61)
Experiment previous experience	2.4665 (0.14)	6.8460** (2.00)	8.9909*** (2.83)
Observations	315	504	819
Wald chi2	88.58***	196.34***	222.25***

Note: ordered probit regression model; financial situation (comparison = very broke); household poverty ranking (comparison = ranking 1) ; level of significance: 10% (*); 5% (**); 1% (***) robust z-statistics in parenthesis