The Social Discounting Task in Economics Experiments:
A Validation in the Lab and in the Field

Background

Altruism is one of the single most important social preferences driving human behaviour and is common in everyday life, particularly among kin, but also among non-related individuals (Fehr & Fischbacher, 2003). Social discounting represents a measure of altruism and is measured with a specific experimental task developed for this purpose, namely the social discounting task (DST). Applications of this methodology is almost exclusively limited to work in Experimental Psychology, in which tasks are not incentivised with the aid of real pay-offs. For this reason, it is not clear whether indeed the social discounting task presents a valid measure of altruism. In addition, there are various other resultant methodological concerns related to the validity of findings from social discounting experiments. The main research question, as outlined in the literature review and research aims, is to validate the social discounting task for use in incentivised Economics experiments.

Rationale

In Economics, Simon (1995) describes interpersonal distance as a dimension representing consumption by others in his three-coordinate maximising system, incorporating altruism in the utility function in this manner. In social psychology, moreover, construal level theory (CLT) describes social distance as one of the four dimensions of psychological distance, which determines humans’ interpretation of events and behavior, the others being temporal and physical distance and what is described as hypotheticality (Trope & Liberman, 2010). Within these theoretical frameworks, therefore, social distance, measured using a social discounting factor or function, represents an important social preference insofar as altruism represents one of the key social preferences driving human behaviour (Cardenas & Carpenter, 2008).

To date, approximately a dozen social discounting experiments have been conducted (see references). The majority of these experiments comprise conventional laboratory experiments, being conducted with student subjects, predominantly students in Psychology. Only one experiment implemented real pay-offs to the social discounting task (Strombach et al, 2014), the others all using hypothetical pay-offs. Apart from two studies in China and Kenya (Boyer et al, 2012; Strombach et al, 2014), the studies have all been conducted in developed countries.

In summary, the studies report the following: (a) the hyperbolic discounting function better fits the experimental data generated from the social discounting task compared to the exponential function (Jones & Rachlin, 2006; Sharp et al, 2012), (b) the social discounting factor (social distance) is correlated with risk attitudes and time preferences, measured here using what is described as probability (PDT) and delay (DDT) discounting tasks (Jones & Rachlin, 2009), (c) social distance is correlated positively with rates of cooperation in a one-shot public goods game (Jones & Rachlin, 2009), (d) 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, 2014), and (e) social discounting is associated with human behaviour, specifically decisions to quit smoking among pregnant mothers (Bradstreet et al, 2012) and young boys exhibiting externalizing behaviour problems (Sharp et al, 2012).

In Economics experiments, in contrast to Psychology experiments, real pay-offs is a methodological prerequisite in order to ensure incentive compatibility (Hertwig & Ortmann, 2001). In fact, there is conclusive evidence that for sound methodology, “people should be observed and measured in real or incentivized social interactions” (Vlaev, 2012). For this reason, it is not clear whether the above findings are in fact methodologically sound or spurious and an artefact of this design feature of Psychology as opposed to Economics experiments, given the potential impact on responses to the social discounting task of offering real rather than hypothetical pay-offs. (Only one study, Strombach et al (2014), implemented real pay-offs: however, the study does not ask the question as to whether the responses to
social discounting tasks are significantly different, one would expect that the social discounting function would be less steep, compared to responses to non-incentivised tasks, which leaves this important methodological question, the central question in this study, unanswered.)

Furthermore, the association of social distance with other preference sets, specifically risk attitudes, time preferences and cooperation in public goods games, may be quite different where the more standard, incentivised preference elicitation methods in Economics experiments are employed to measure these preferences. As explained below, the VCM public goods game and multiple price lists (MPL) for risk attitudes and time preferences, or, for risk attitudes, Binswanger task, should be used to assess associations between these preferences.

In Economics experiments the researcher has to make a trade-off in relation to the number of experimental games/tasks to include in the experiment: more tasks allow an investigation into interdependencies between preferences, but increases the time required to administer the said games/tasks. Since experiments generally in terms of optimal time do not exceed 2-3 hours, only a maximum of 3-4 tasks can be included. Where potentially highly relevant tasks/games are dropped due to these constraints, the experimenter may include survey-type questions to measure these preferences. At present, various such standardized questionnaire items and scales exist. Of the studies conducted to date, only a handful include such questions, essentially only questions on generalized and particularised trust in specific institution. Such design allows another test of the correlation between the dimensions of psychological distance, as well as, where time allows, the correlation between outcomes measured using experimental games/tasks and survey questions.

An incentivised social discounting task allows a stronger test of the hypothesis that those in collectivist cultures exhibit steeper discounting functions.

The validation in the laboratory and field of the Social Discounting Task in these respects in terms of basic research in Experimental and Behavioural Economics is a necessary methodological precursor to adopting the task in further laboratory and field experiments, particularly in programme evaluations investigating the extent to which policy interventions may impact social discounting, associated human behaviour, and family functioning, cohesion and well-being. An important example includes preventive and developmental Social Work interventions that through building family skills, such as parenting skills and interpersonal communication skills, may reduce social distance and impact positively on cooperation in the provision of family public goods, which has important developmental implications in terms of education, health and poverty. The existing literature in fact does not investigate the extent to which social discounting may be associated with prominent features of family psychology, including family functioning, cohesion and well-being. For this reason, it is also necessary to determine the extent to which social discounting, trust and reciprocity, and cooperation in public goods games are associated with family functioning, cohesion and well-being. This research moreover requires the application of these validated methods in longitudinal studies of social discounting and other preferences and behaviour.

**Aim and objectives**

The study's overall aim is to validate the social discounting task for use in Economics experiments in the laboratory and in the field.

The first main objective is to determine if incentivising social discounting tasks affect the responses to the task and the shape of the social discounting function.

The second objective is to establish if there are statistically significant differences in social discounting functions for student and field subjects.

A third objective is to determine the association of social distance and social discounting with the following, conditional on social discounting tasks being incentivised and with comparisons drawn between student and field.
subjects: culture; risk attitudes and time preferences; cooperation in public goods games; inter-generational altruism and reciprocity as measured in comparative dictator and trust games; social and anti-social punishment; inter-generational solidarity; family boundary ambiguity; and family functioning, cohesion and well-being.

The last objective is to develop and pilot an elicitation method for social discounting tasks for use in field experiments with illiterate and less educated subjects.

Work plan

Over the course of the three-year project, a set of four experiments will be conducted, each comprising a 9 month cycle of the following activities: compilation of experimental package(s) with draft instructions, protocols and instruments; proposal writing; obtaining letters of approval and ethical clearance; piloting and revision of protocols, instructions and instruments; recruitment of subjects; preparation of materials; training of experimenters and assistants; carrying out the experiment; debriefing experimenters and assistants; data capturing; data analysis; write-up; dissemination; publication.

Main milestones achieved over the course of the study include the following: literature review; repository of experimental instructions, protocols and instruments; research proposals; letters of approval; proof of ethical clearance; package with instructions, protocols and instruments; sampling frames; datasets, presentations and manuscripts; scientific publications.

Methods

Experimental design: the experimental design, for the first series of experiments, which address the first two research aims, can be described as a conventional laboratory experiment, in the case of student subjects (Harrison & List, 2004), and, in the case of university staff, as a so-called extra-laboratory experiment, where (non-student) field subjects are brought to the (computer) laboratory setting (Charness et al, 2013). In the case of the second experiment, which addresses the third research aim, where the social discounting task is adapted for the use with subjects with low levels of literacy, comprises an artefactual field experiment with non-standard, non-student subjects (Harrison & List, 2004).

Subjects: the subjects, in the case of the first set of experiments, comprise under- and post-graduate students and support and academic staff employed at the University of the Free State. In the second experiment, the subjects comprise family members living in randomly selected households in an urban informal settlement in the Mangaung Metro.

Pay-offs: subjects, in addition to the show-up fee (R50), will earn money for incentivised tasks/games (see details below on randomised incentive schemes). The average earnings for each task will be R200, which is equivalent to approximately two days' minimum wage, which is considered a sufficiently large incentive to encourage subjects to reveal their true preferences.

Procedure: on arrival at the venue, or in the case of family members of households in poor communities, at the arrival of the experimenters at their household, subjects will be paid a show-up fee of R50 by means of a payment to their mobile phones, to compensate subjects for their time. Following payment of the show-up, the experimenter will proceed with the implementation of the relevant experimental tasks/games.

Social discounting task (SDT): social discounting, as measured in the standard social discounting task, represents a measure of altruism that is defined as, “the amount of money a participant was willing to forgo to give a fixed amount to another person” (Rachlin & Jones, 2008b: 29). The social discounting task comprises a set of 10 questions completed for seven different social distances, i.e. 1, 2, 5, 10, 20, 50, 100, each asking the subject to choose between a declining amount for themselves ($85-$0). In this study, we adopt the task as described in Rachlin and
Jones (2008a/b) (see attachment for full instructions). In the task, the order of the social distances and the order of the ten questions are randomized, or, at the minimum, counter-balanced, with different sets of questionnaires ordering these from top-to-bottom and then in the opposite order, respectively. As in the Rachlin and Jones (2008a/b) procedure, subjects will complete a short questionnaire for the person they envisage at each social distance, recording their social relation to the person as well as information on how often they communicate with this person, how far they live from this person (if they are not co-resident), how often they visit the said person, how long they have known the person, as well as basic socio-demographics of the person. In addition, if time allows, we will consider including a 1-20 scale self-representation task of perceived closeness as a manipulation check (Strombach et al., 2014). At the completion of the task, a randomised incentive scheme will be used to implement pay-offs by (a) determining if the SDT is the one task to be paid (versus one of the other tasks – see details below), (b) if so, then selecting one of the seven social distances randomly, using a seven-sided dice or a set of numbered balls in a bag, then (c) selecting one of the seven social distances randomly, using a seven-sided dice or a set of numbered balls in a bag. This procedure will be implemented separately for each individual, who will visit two experimental assistants sitting in a different room(s) so as to ensure payments are private. Where the choice to be played out involves a payment to be made to another person at the specific social distance, whom the subject will identify after having selected the specific choice, the subject will complete a short form with the relevant person’s information, including a mobile phone number, so that payment can be made anonymously to the identified person via his/her mobile phone.

Other tasks/games: in order to establish how social distance and social discounting is related to other preference sets, the following games or tasks will be considered for inclusion in each of the laboratory and field experiments.

In the first instance, in order to determine the extent to which social discounting is correlated with time preferences (delay discounting) and risk attitudes (probability discounting), the standard multiple price list (MPL) elicitation methods will be employed for eliciting risk attitudes (Holt & Laury, 2002) and time preferences (Coller & Williams, 1999), respectively, or, in the case of the elicitation of risk attitudes in subjects with low levels of education, the Binswanger (1979) method.

Secondly, to answer the question as to whether social distance is associated with higher levels of cooperation in the provision of public goods, subjects will be administered a standard, 10-round Voluntary Contribution Mechanism (VCM) public goods game (PGG). (The game may be presented in its standard neutral or abstract frame, or, within the context of household decision-dynamics, with its inter-generational dimension, framed in relation to the provision of a specific family public good, such as contributions to the common pool for expenditure on (children’s) health and education) In addition, a question will be added to elicit information on subjects’ perceptions regarding what they expect others should contribute in order to measure conditional cooperation.

Thirdly, in the case of the research question pertaining to whether the measure of altruism obtained from the social discounting task is similar or different to measures of altruism obtained using alternative methods, a comparative dictator (CDG) and ultimatum game (CDG) will be employed, with a sub-set of the main inter-generational social relations included in the social discounting task ordered at random in its implementation (e.g. partner, parent, sibling, grandparent, grandchild, friend, neighbour, stranger). Responses from the comparative DG and UG will be used to construct measures of pro-social punishment (i.e. split DG pie equally and reject unequal offers in UG) versus anti-social punishment (i.e. reject unequal offers in UG but transfer nothing in DG) (Branas-Garza et al, 2014). In addition, in order to determine whether reciprocity is a function of social distance, subjects may, where time allows, be administered an additional comparative trust game (CTG) with a similar inter-generational framing, which allows one to obtain a measure of trust and trustworthiness (Ashraf et al, 2006; Cardenas & Carpenter, 2008).

Pay-offs: In the experiment, real pay-offs will be implemented for one game/task only. First, one of the specific tasks (see design of experiments 1, 2, 3) will be selected randomly using a dice, bingo machine or draw from a set of balls in a bag. Then, an appropriate randomised incentive scheme system will be used to implement the relevant payoffs.
As in the case of the social discounting task, the procedure will be implemented separately for each individual, who will visit two experimental assistants sitting in a different room(s) so as to ensure payments are private.

*Survey measures:* in order to establish how social distance and social discounting are related to other correlates, characteristics and outcomes, excluding risk, time and social preferences, the following measures will be considered for inclusion in each of the laboratory and field experiments in a pre- and/or post-experimental questionnaire.

Standard socio-demographic information is collected on subjects: age; sex; race/ethnicity, education, household size, individual/household income. To supplement or add information on cooperation on public goods, in the field experiment with poor families, questions can be asked regarding the allocation of household expenditure to consumption categories such as food and (children’s) health and education.

Where the focus is on determining if estimates of risk attitudes, time preferences and trust from Economics experiments are correlated with corresponding survey measures, the following questions will be included: for risk attitudes, or, where relevant to behaviours under study, questions on risk behaviours such as drinking, smoking and gambling, Dohmen et al’s (2005) 11-point survey question representing a global assessment of people’s willingness to take risks ("How willing are you to take risks, in general?"); for time preferences, Barratt’s impulsiveness scale (Stanford et al, 2009); 56-item Zimbardo’s time perspective inventory (ZTPI) (Zimbardo & Boyd, 1999); 28-item balanced time perspective scale (BTPS) (Webster, 2011), and for trust, 5-point generalised and family trust questions (World Values Survey).

In order to determine to what extent social discounting and other social preferences are associated with family psychology, used will be made of a combination or sub-set of the following questions: family ties – 3 questions (World Values); 8-scale Family Adaptability and Cohesion Evaluation Scale (FACESIV, including Family Life Satisfaction) (Olson, 2010).

For an investigation into the nature and magnitude of cultural differences in social discounting and other social preferences, in addition to using race and ethnicity as proxy variables, use may be made of the Individualism-collectivism scale (INDCOL, Hui & Yee, 1994).

The first choice will be for instruments that have been translated and validated in South African settings (e.g. the Barratt impulsiveness scale and Zimbardo time perspective index as well as the standard MPL elicitation methods for risk and time preferences employed by researchers at the University of Cape Town), while in the case of others, such as FACESIV, for use with less educated support staff and family members in poor households, the relevant scales will be translated and validated during the piloting phase of the study (see work plan).

The reason the questionnaire most likely will be completed after the above tasks/games, is that the responses to the family functioning scales (FACESIV) and other survey measures may introduce some priming to the social discounting task’s elicitation or to other games/tasks. In the case of the survey measures of risk attitudes and time preferences, for example, asking these questions prior to completing the MPL and/or Binswanger task(s) may impact subjects’ responses.

Importantly, the series of experiments to be conducted as part of this study in terms of the inclusion of other tasks/games and the content of the post-experimental questionnaire will be designed with reference to the key research questions and keeping in mind the burden on subjects, given that subjects generally speaking can only concentrate optimally for approximately two hours, based on a process of developing and piloting the relevant experimental protocols and procedures. At present, we envisage conducting four experiments:

*Experiment 1* (within-subjects design with student and staff subjects): 200 subjects randomised to two groups, a non-incentivised social discounting task (n=100) and another group doing the incentivised social discounting task (n=100)
(as per the stratification below). In each group, subjects complete the social discounting task (SDT) as well as the standard MPL elicitation for risk attitudes and time preferences.

Experiment 2 (within-subjects design with student and staff subjects): 120 subjects complete the incentivised social discounting task employed in experiment 1, together with a comparative dictator, ultimatum and trust game.

Experiment 3 (within-subjects design with students and staff subjects): 120 subjects complete the incentivised social discounting task employed in experiment 1, together with two framed 10-round series of VCM public goods game (including questions to estimate conditional cooperation) – including the standard neutral frame (first) and a (second) frame for “pooled household resources”.

In each case, the post-experimental questionnaire will include a selection of questions on socio-demographics and other related outcomes of interest to the study (see survey measures). Furthermore, the data from the three experiments can be analysed using a between-subject design to explore correlations between other outcomes, including information on risk, time and social preferences collected using experimental games/tasks and data collected using the post-experimental questionnaire, using the information on socio-demographics and other subject characteristics as controls. Sessions with support staff from lower post levels will be conducted separately from sessions with students and higher level post levels. The social discounting task (SDT) is administered to each group of subjects, because it is the primary outcome in the study.

Experiment 4 (within and between-subjects): In the pilot of the social discounting field task two pilots are conducted, one with 75 subjects (25 each from each generation: adolescent/young adult, adult, elderly), then, following a revision of the instructions and protocol based on feedback from the pilot, a second experiment with 75 subjects, stratified similarly. In addition to the SDT, subjects will complete a Binswanger risk attitude elicitation task and the 30-item Barratt impulsiveness scale (BIS-11). The tasks will be administered with paper and pencil and where necessary, explanatory props, signs or other materials needed to communicate the key ideas to an illiterate or poor educated subject pool. In this case, the main focus is on implementing an incentivised social discounting task. A short post-experimental questionnaire with basic socio-demographics will be administered (including education). In addition, there will be an open discussion session with subjects following the completion of the tasks in each pilot to collect feedback on subjects’ experiences and challenges in completing the task.

Recruitment and sampling strategy: The student subjects in the laboratory experiments on social discounting will be selected randomly from the attendance lists of first-, second-, and third-year undergraduate courses in Economics and the joint class list of Honours- and Masters-degree students (25 each in experiment 1 = 100; experiment 2/3: 15 each = 60). In the case of staff, 50 subjects each (experiment 1) will be randomly sampled from the University’s personnel lists for academic and support staff respectively (50 x 2 = 100), proportionally stratified by post level. For experiment 2/3, 30 subjects each from support and academic services (n=60). In both cases, a master sample listing will be obtained first, with an additional reserve list, to replace subjects who after being invited to participate in the study refuse. In addition, an extra 10% subjects will be invited to the experiment to allow for subjects who opt in on recruitment not presenting at the experimental venues. Where more than the requisite number of subjects arrives, the experimenter will ask if there are such number(s) of volunteers who may want to withdraw from the study. These volunteers will be paid their show-up fee (R50) and, where a small number of extra subjects arrive, may be offered the opportunity to assist the experimenter with administrative tasks.

In the case of the field experiment piloting a newly developed social discounting task in families in poor communities, subjects will be sampled purposively, in accordance to family structure being at least three-generational in terms of co-resident generations, based on data collected during a quantitative community survey and a qualitative ecomap-genogram mapping conducted as part of a larger, ongoing study. In this case, one person each will be randomly sampled from the household roster to represent a young adult, adult and elderly person. The subjects from each generation will be gathered in separate groups, with the social discounting task administered to small groups of 5-10
subjects. This design allows for a three/four-dimensional mapping of psychological distance between different generations, with a distinction being made between temporal distance, social distance, physical distance and hypothetical distance, which is an important methodological tool for studying decision-making dynamics in the extended family.

**Data analysis:** Median cross-over points will be determined for each social distance, then an exponential and hyperbolic function will be fit to these data, testing whether the exponential or hyperbolic function better fits the data. (For details on the relevant formulae, see Sharp et al, 2012) Atypical responses, such as where respondents switch more than once across the ten lines in the table or switch from B responses at the top end of the table to A responses towards the bottom of the table (Sharp et al, 2012), are excluded from the analysis). Social discounting functions will also be estimated using a theoretical approach based on Tsallis’ statistics (Takahashi, 2010), which to our knowledge has not been done in any application of social discounting. Pearson correlation coefficients ($r$) are employed to determine the extent to which social discounting is correlated with risk, time and other social preferences, measured with the aid of the above-mentioned experimental tasks or games and/or the set of corresponding survey questions, as well as with continuous variables used to measure other constructs, including socio-demographics such as age as well as the individualism-collectivism scale and the various measures of family functioning, cohesion, satisfaction and well-being. ANOVA are used to test for differences in social discounting across binary and categorical variables, including socio-demographics such as sex, race, and ethnicity. Multiple linear regression models are used to regress various correlates and characteristics onto estimates of social distance obtained from the social discounting function. In terms of methodological advances, mixture models will be used to jointly estimate social discounting rates with other preferences, particularly risk attitudes and/or time preferences.

**Ethics**

Approval for the study will be obtained from the Dean of Student Affairs (student subjects) and Vice-Rector Research (staff subjects), following which the necessary approval will be obtained from the ethics committee of the Faculty of Humanities. Written informed consent will be obtained from all subjects. In each case, study participants are fully informed of the nature and purpose of the research, the possible risks and benefits to their participation in the research, their right to privacy and confidentiality, the research team’s contact details, and the voluntary nature of their participation in the research, using an informed consent form. Study participants are provided with a copy of the signed consent form. Consent forms, together with the data, will be safely and securely stored, and kept separately from completed data collection instruments to ensure subjects’ anonymity. Respondents are also anonymous insofar as data collection instruments and data sets will include no personal information (e.g. address, name, ID number, date of birth, etc.) that may allow a third party to link responses to a specific respondent, with questionnaires being assigned a random number. In accordance with good practice, experimental pay-offs will be made in private and not disclosed to other subjects. Study participants will be provided with a brief summary of the study’s main findings and copies of the research paper and publications emanating from this research will be made available to subjects at the completion of the research.

**Impact**

The proposed research is likely to be of prominence, not only nationally, but internationally, given the relatively small literature published in this field. The validation of social discounting tasks for incentivised Economics experiments is particularly important insofar as it informs the use of this method in future laboratory and field experiments in South Africa and beyond. In addition, validation of the methodology means that social discounting experiments, in accordance with current best practice (Viceisz, 2012), can be nested in programme evaluations of family programmes, given the aim to establish whether social distance and other social preferences such as inter-generational altruism, trust and reciprocity are associated with key outcomes in family psychology, including family functioning, cohesion and well-being. In this way, the research stands to contribute significantly to
building existing and future knowledge of human and social dynamics, including in the area of the study of decision-making dynamics on family public goods in the extended family.

**Dissemination**

The knowledge dissemination strategies include the publication of the findings in prominent working paper series (e.g. Research Unit in Behavioural and Neuro-Economics (RUBEN), University of Cape Town; Experimental Economics Centre (ExCEN), Georgia State University; Centre for Behavioural and Experimental Social Science (CBESS), University of East Anglia), presentations of this work at local and international conferences, and the publication of the findings in 4-5 high-impact scientific journal articles (Kiel Institute journal rankings: “A” – 1 article; “B+” – 1/2 articles; “B” – 1/2 articles; other behavioural and experimental psychology journals – 1/2 articles).

**References**


