UNIVERSITY OF GOTHENBURG
SCHOOL OF BUSINESS, ECONOMICS AND LAW

Master thesis

Group size and label framing: Experimental evidence on cooperative behaviour

Abstract

Cooperation is a fundamental element of human society and essential to tackle the global challenges we face. This thesis addressed two questions: (1) does cooperation decline with increasing group size and (2) is cooperation higher when a community label is applied as opposed to a neutral label? I also conducted two explorative analyses of (1) individual-specific determinants of cooperation and (2) motives for cooperating or defecting. To fulfil these aims, I conducted a monetarily incentivized N-person Prisoner's Dilemma (NPD) experiment in which the group size was set to 3, 7 or 25, and the NPD was referred to as "community dilemma" or "dilemma". No significant group size effect was found, but the results indicated a negative effect for 25- relative to 3-person groups. No label framing effect was found. A novel finding was that left-wing voters cooperated more than right-wing voters and those of other political affiliation. Cooperators were most motivated by efficiency, Kantian reasoning and fairness, while defectors were most motivated by profitability, zero-profit avoidance and concerns for a low probability of reaching social optimum.

Summer 2018

Supervisor: Elina Lampi

Author: Ronja Sundborg

Civic number: 940914-8922

Acknowledgements

I would like to express my deepest gratitude to my supervisor Elina Lampi for her invaluable comments and help during the process of writing this master thesis. I would also like to thank the many friends that participated in the focus groups and pilot studies. Finally, I am very grateful to the Centre for Collective Action Research (CeCAR) at Gothenburg University for financially supporting the experiment.

1. Introduction

Cooperation is a fundamental element of human society. At all levels, from cooking a family dinner to intergovernmental collaborations aimed at tackling world problems, cooperation is at the centre. Thus, it is paramount to understand its characteristics and underlying mechanisms. It is especially important to have knowledge of how cooperation changes with group size in a time when we are faced with numerous pressing issues of global nature requiring large scale cooperation, such as climate change and resource depletion (Capraro & Barcelo 2015). Key global challenges are outlined in the well-known 2030 Agenda for Sustainable Development in the form of 17 Sustainable Development Goals (SDGs). A wide range of areas are incorporated, each requiring a different set of actions. Nonetheless, as made clear by the 17th goal, a vital component to reach the SDGs at large is cooperation between all sectors and at all levels (United Nations n.d., 2017). In this master thesis, I use an economic experiment with monetary incentives conducted in a web survey format to strengthen the knowledge on this central topic.

I explore the behaviour of individuals who faced a conflict between selfish and collective interests, known as a social dilemma, under different treatments. Specifically, participants were allocated to a group and each group member had to choose option A or B, where option A lead to the highest total gains while option B lead to the highest personal gains. In other words, they participated in the N-person Prisoner's Dilemma (NPD; see Section 2.1. for detailed description). Four different treatments (T1-T4) were used. For T1-T3, the aspect of the dilemma that changed was the group size, where in T1 the group size was set to 3 participants, in T2 to 7 and in T3 to 25. For the last treatment (T4), the group size was still 25 but the NPD was referred to as "community dilemma" instead of simply "dilemma" in the instructions. This label change is in this thesis referred to as label framing, in line with Dufwenberg *et al.* (2011). Originally, the framing effect was coined by Tversky and Kahneman (1981), which implies that the wording of a choice problem can impact what decision a person makes.

In summary, the main objective of this master thesis is to strengthen the knowledge about cooperation by investigating both the role of group size and the role of label framing for cooperation. Specifically, the following key research questions are addressed: (1) does cooperation decline with increasing group size and (2) is cooperation higher when a community label is applied as opposed to a neutral label? I also conduct two explorative analyses of secondary nature. Firstly, I investigate some potential drivers of cooperative behaviour based on collected

background information of the participants. Secondly, I explore the participants' own motivations for their choice to either cooperate or defect.

Generally, previous empirical studies have found evidence that cooperation decreases as the group size increases in NPDs (Marwell & Schmitt 1972; Kahan 1973; Hamburger *et al.* 1975; Bonacich *et al.* 1976; Fox & Guyer 1977; Komorita & Lapworth 1982; Grujić *et al.* 2012; Barcelo & Capraro 2015; Bosch-Domènech & Silvestre 2017). I find only one study that has reported a positive group size effect in a NPD, namely Duffy and Xie (2016). To this day, researchers have used fairly small group sizes to determine the presence of a group size effect in NPDs, usually between two and seven participants. To the best of my knowledge, the largest group size employed in a NPD is 12 participants (Fox & Guyer 1977). In addition, some studies have found evidence indicating that the group size effect tapers off quickly. For example, Grujić *et al.* (2012) compared cooperation when the group size varied between 2 and 5, but only found a significant decline in cooperation for dyads compared to triads. Given the global issues we stand before, it is important to extend the investigation of the group size effect beyond a size of 12 participants. Thus, the first contribution of my thesis is that I study cooperation in groups of as many as 25 participants, in addition to 3- and 7-person groups.

The second body of literature central for this thesis is the literature on label framing. Ellingsen *et al.* (2012) compared cooperation in a one-shot[1] Prisoner's Dilemma (PD)[2] when it was named either "Community game" or "Stock market game" and found significantly higher cooperation in the former case. Other papers have reported similar results for the equivalent frames (Ross & Ward 1996; Liberman *et al.* 2004; Dreber *et al.* 2012). However, there are also studies that have reported contradictory evidence. Brandts and Schwieren (2009) found less cooperation when using the label "Community game" compared to "Stock exchange game" or a neutral label. Likewise, Dufwenberg *et al.* (2011) reported less cooperation for a community as opposed to neutrally framed game. Finally, Bernold *et al.* (2014) compared cooperation under a neutral, community, stock market and environmental frame, but were unable to detect any label framing effect in a one-shot setup. As evident, there is a lack of consensus and consequently a need for further research. To the best of my knowledge, no research has been conducted on the effect of changing the label of a NPD when the group size is larger than 2 participants. As a community usually is comprised of more than 2 actors, it is valuable to apply a larger group size when studying this effect. Thus, a key novelty of my thesis is that I used a

[1] "One-shot" is a common term used to describe whether the participants face the decision to cooperate or defect multiple times (iterated) or only one time (one-shot).
[2] The PD is the two-person version of the NPD.

group size of 25 participants when comparing cooperation under a community frame with a neutral frame.

Relevant for this thesis is also the research on individual-specific determinants of cooperation. In my analysis, I included a number of background factors and the participants' beliefs about others' behaviour. Literature on these determinants is discussed in Section 5.2.1. An important contribution is that I examine the relationship between political affiliation and cooperation, which is a severely underexplored topic.

The last body of literature relevant to this thesis is the research on the motives for cooperative and defective behaviour, which is presented in Section 2.4. Previous literature has focused on explaining why individuals cooperate, while reasons for defecting have largely been ignored. Thus, an important contribution of my thesis is to explore some novel explanations for defecting. Concerning cooperation, previous papers have generally had a narrow focus on one or a few explanations at a time. I included eight possible motives for cooperators and defectors, respectively. This allows me to judge the importance of different motives. I find only one study that has used a similar approach, namely Bosch-Domènech and Silvestre (2017). However, in my experiment, the participants could pick multiple statements and more options were offered.[3] Thus, my thesis can contribute with more in-depth knowledge.

I do not detect a statistically significant group size effect for neither medium- nor large-sized groups relative to small-sized groups. Nevertheless, the results provide some indication of a negative effect for large- relative to small-sized groups. No indication of a label framing effect is detected. However, a key finding from the first explorative analysis is that participants who are left-wing voters cooperate significantly more than right-wing voters and participants of other political affiliations. This finding is novel in the literature. I also find that participants tend to behave as they believe others to behave, and that participants who perceive the NPD as difficult to understand cooperate significantly less. Finally, cooperators appear to be most driven by efficiency concerns, Kantian reasoning[4] and fairness, while defectors appear to be most driven by profitability, fears of getting zero profits and concerns for a low probability of reaching the social optimum.

The remainder of this master thesis is organised as follows. Section 2 provides relevant theory and literature by introducing the NPD, presenting previous literature on the mechanisms

[3] Bosch-Domènech and Silvestre (2017) offered four possible motives to cooperators and two to defectors, in addition to asking the participants to describe their rationale in an open-format.
[4] Kantian reasoning implies that the participant cooperated because she believed that was what everybody should have done in that situation (see Section 2.4. for details).

behind the group size effect and label framing effect as well as describing explanatory theories for unselfish and selfish behaviour. Section 3 gives the hypotheses to be tested. Section 4 outlines the methodology by describing the experimental design and the implementation. Section 5 gives the empirical strategy. Section 6 describes the sample and descriptive statistics. Section 7 presents the results. Finally, Section 8 contains a discussion and the relevant conclusions.

2. Theory & literature

2.1. N-person Prisoner's Dilemma

A social dilemma is a situation in which individual rationality and collective rationality are in opposition. One type of social dilemma is the Prisoner's Dilemma (PD), for which the participants only have two options: cooperate or defect. The PD is a social dilemma since the payoff to a single participant for defecting is always higher than the payoff for cooperating, but all participants receive a lower payoff if everyone defects compared to if everyone cooperates (Dawes 1980). In the standard two-person version, there are four possible outcomes: both cooperate (CC), participant 1 cooperates while participant 2 defects (CD), participant 1 defects while participant 2 cooperates (DC) and both defect (DD). From the perspective of participant 1, the best possible outcome is defecting while participant 2 cooperates (DC); the next best outcome is full cooperation (CC); the third best outcome is full defection (DD) and the worst outcome is cooperating while participant 2 defects (CD). The equivalent ranking of outcomes applies to participant 2 (Kollock 1998).

The standard PD can be extended to include more than two participants, which is then referred to as the N-person Prisoner's Dilemma. However, the properties of the dilemma change to some extent when there are more than two participants. Firstly, when one participant chooses to defect in the PD, the harm of that decision is focused on the participant's partner, while the harm is diffused throughout the group in the NPD. Secondly, each participant in the PD knows what decision their partner made, whereas the decision is not necessarily revealed in the NPD. Thus, greater anonymity can be achieved in the NPD (Dawes 1980).[5,6]

In this thesis, the payoff at each possible outcome follows the structure employed in Barcelo and Capraro (2015). Participant *i*'s payoff is conveyed by Equation 1 when she cooperates and Equation 2 when she defects.

[5] If three people participate in the NPD and two people choose to defect, the third person knows the decision of the other two. Thus, greater anonymity is not a certainty in the NPD.
[6] Dawes (1980) described an additional difference but as it only applies for iterated games it is not relevant for this thesis.

$$\frac{bC_{-i}}{N-1} - c \quad (1)$$

$$\frac{bC_{-i}}{N-1} \quad (2)$$

Where b is the benefit, c is the cost, C_{-i} is the number of cooperating participants other than i and N is the total number of participants. In this thesis, the benefit was set to 48 SEK and the cost to 16 SEK.[7] The payoffs relevant for the treatment with a group size of 3 participants are given in Equation 3-4.[8]

$$\frac{48C_{-i}}{2} - 16 \quad (3)$$

$$\frac{48C_{-i}}{2} \quad (4)$$

The monetary amounts used in my experiment were far higher than those used in equivalent previous survey experiments (Dreber *et al.* 2012; Barcelo & Capraro 2015), slightly lower than those applied in a lab experiment in a similar context (Ellingsen *et al.* 2012) and about half as high as payoffs used in lab experiments in other settings (e.g. Grujić *et al.* 2012; Duffy & Xie 2016; Bosch-Domènech & Silvestre 2017). The two key aspects of the NPD's payoff structure are the benefit and the cost. My benefit and cost were set to achieve a benefit-cost ratio of 3, in accordance with the ratio applied in Dreber *et al.* (2012) and Barcelo and Capraro (2015).

2.2. Literature on mechanisms behind the group size effect

The core rationale presented in Barcelo and Capraro (2015) for the expected group size effect on cooperation for the NPD is as follows. Because the individual cost and individual benefit at full cooperation are constant with group size, but more people need to cooperate to reach said benefit, cooperation is expected to decline with group size. To illustrate, consider the payoffs displayed in Equation 3-4. To attain the full benefit of 48 SEK, all three participants need to choose the cooperative option at a personal cost of 16 SEK. The payoffs when the group size increases to 7 participants are displayed in Equation 5-6. Still, the benefit at full cooperation is 48 SEK and the cost is 16 SEK, but the cooperative option has to be chosen by as many as 7

[7] Average for Mars, 2018, USD 1 = SEK 8.23 (Statistics Sweden 2017). Subsequently, the benefit and the cost are approx. 5.8 USD and 1.9 USD, respectively.
[8] Since participants began my experiment by receiving 16 SEK each, the lowest possible amount to exit the experiment with was 0 SEK.

participants to attain the 48 SEK. In other words, the probability of reaching the socially optimal outcome is far lower when the group size is set to 7 as opposed to 3.

$$\frac{48C_{-i}}{6} - 16 \tag{5}$$

$$\frac{48C_{-i}}{6} \tag{6}$$

Another explanation for the negative group size effect can be changes in the diffusion of harm. Dawes (1980) discussed the degree of diffusion as an important difference between the 2-person and N-person versions of the PD, but this aspect can possibly be of importance as the group size grows within the N-person version as well. As the group size grows, the harm directed toward any single person by choosing to defect decreases. In other words, the impact of one individual's action on the payoff of another group member diminishes with size. To see this, note that 48/6 is far smaller than 48/2 in Equation 3-6. It is possible that people tend to cooperate less as the diffusion increases. Thus, we should observe less cooperation as the group size increases.

2.3. Literature on mechanisms behind the label framing effect

Ellingsen *et al.* (2012) outlined three categories of framing theories: (1) the variable sociality hypothesis, (2) the social image hypothesis and (3) the coordination hypothesis. The first hypothesis is built on the notion that frames affect the participant's internalized social norms or social preferences, meaning that a cooperative label activates a more intense desire or need to cooperate. The second hypothesis relies instead on the idea that the participant wishes to look good to others, and that the frame impacts others' opinion of her behaviour, thereby affecting her social esteem. Thus, the participant might act to appear prosocial. Lastly, according to the third hypothesis, frames affect the participant's expectations of her group members' behaviour, which in turn impacts her behaviour. As discussed by Ellingsen *et al.* (2012), this would require that the participant cares about the other participants' actions, intentions or payoffs. Thus, the payoff matrix can be turned into a utility matrix in which there are multiple equilibriums. The frame can then be used as a coordination device.

By conducting three studies in which the attributes of the PD were varied, Ellingsen *et al.* (2012) attempted to disentangle these hypotheses. In the first study, they established higher cooperative behaviour under a community frame than under a stock market frame in the standard PD. However, when they altered the dilemma so that only one participant was in control of

her actions, the difference disappeared. In the second study, they wanted to allow for social esteem by making an additional alteration: they allowed the passive participant to observe. No significant difference was found. The same result was found in the last study when the PD was played sequentially. Ellingsen *et al.* (2012) concluded that the results were inconsistent with the variable sociality and social image hypotheses, but instead support the coordination hypothesis.

Dreber *et al.* (2012) provided further evidence in support of the coordination hypothesis. They studied cooperation under different frames in the Dictator game by conducting three studies. In the Dictator game, label framing can only affect behaviour via social norms/preferences as only one participant makes a decision. Across all studies, they found no significant effect. Krupka and Weber (2013), on the other hand, used similar frames as Dreber *et al.* (2012) and found a significant framing effect. They also used an incentivized elicitation method to identify social norms and found that changes in social appropriateness account for behavioural changes in their experiment as well as in previously published studies. These findings speak in favour of the social variability hypothesis.

2.3.1. Example of Community N-person Prisoner's Dilemma

One way to interpret the NPD as a community dilemma is to consider the issue of pollution. Suppose there is a long river with 24 farms upstream and an industrial firm downstream. Suppose further that the farms pollute the water, e.g. by using fertilizers that cause eutrophication, and the industrial firm requires clean water for production. At the same time, the industrial firm pollutes the air, which has significant effects for the farms as the heavy winds tend to blow in the direction of the farms, giving rise to e.g. acid rain. Both the farms and the industrial firm face the decision to keep polluting or pollute less. However, the cost of polluting less is each actor's own, while the benefit of their reduction in pollution is reaped by other actors. Assume the role of the industrial firm. Suppose it costs 16 SEK to emit less and the farms' profits are increased by a total of 48 SEK. If one farm emits less, the water is slightly cleaner, leading to a benefit of 2 SEK for the industrial firm. The industrial firm then faces the following payoffs when it chooses to pollute less (Equation 7) and pollute the same (Equation 8):

$$\frac{48C}{24} - 16 \tag{7}$$

$$\frac{48C}{24} \tag{8}$$

Where C here is the number of farms that choose to pollute less. These figures are the same as those that were used in the experiment of this thesis.

2.4. Motives for unselfish and selfish behaviour in the literature

Central to economic analysis is the commonly used assumption that individuals are selfish and rational. This implies that participants in the NPD are assumed to only care about their own outcomes and know that defection is the dominant strategy. Subsequently, participants are predicted to defect (Dawes & Thaler 1988). However, as evident from everyday life, people do cooperate. For decades, researchers have made attempts to explain why some people act unselfishly in social dilemmas, giving rise to a vast number of theories and models.

One proposed reason for acting unselfishly in social dilemmas is altruism (e.g. Levine 1998; Andreoni & Miller 2002; Bosch-Domènech & Silvestre 2017). Batson (1991) provided a useful discussion and definition concerning the concept of altruism. Specifically, he defines altruism as "a motivational state with the ultimate goal of increasing another's welfare" (p. 6). Note that this definition does not involve self-sacrifice, as opposed to the definitions provided by a number of other scholars of psychology (e.g. Midlarsky 1968; Krebs 1970, 1982; Campbell 1975; Hatfield *et al.* 1978). Batson (1991) argued that self-sacrifice should not be incorporated into the definition of altruism because (1) it shifts the focus from the motivation to the consequences of a decision and (2) a definition centred on self-sacrifice ignores the possibility that the self-benefit of an action may increase as the self-cost increases. However, note that Bosch-Domènech and Silvestre (2017), who conducted a similar analysis of the motivational drivers of cooperation as my thesis, applied a definition based on self-sacrifice.[9] Moreover, Andreoni (1989, 1990) suggested a distinction between pure altruism, impure altruism and pure egoism. In the context of the NPD, pure altruism as defined by Andreoni (1989, 1990) refers to the case when the individual cooperates because she cares about the welfare of others, while pure egoism means that the individual cooperates only to receive a warm glow from doing the "right" thing. Impure altruism then implies a combination of the two.

Other theories of unselfish behaviour in social dilemmas involve some sort of fairness (e.g. Rabin 1993; Blount 1995; Levine 1998; Fehr & Schmidt 1999; Bolton & Ockenfels 2000; Dufwenberg & Kirchsteiger 2004; Falk & Fischbacher 2006; Bosch-Domènech & Silvestre 2017). In a model developed by Fehr and Schmidt (1999), fairness was modelled as self-centred inequity aversion, where inequity aversion means that the individual is willing to lose some

[9] Bosch-Domenech & Silvestre (2017) formulated the altruistic motivation as: "I like to help others even at a cost to myself" (p. 255), which clearly has a self-sacrificing component.

material payoff to achieve more equitable outcomes. The self-centred component of the definition implies that the utility of the individual is not affected by inequity amongst others, only by how her own payoff relates to the payoff of others. A similar view on fairness was used in Bolton and Ockenfels (2000). Others have adopted another perspective of fairness, focusing on the individual's desire to punish hostile intentions with hostility and reward kind intentions with kindness (Rabin 1993; Blount 1995; Dufwenberg & Kirchsteiger 1999; Falk & Fischbacher 2006). Yet another view on how to incorporate fairness into theories of unselfish behaviour is that the individual cares about whether her opponent is a nice person, rather than the opponent's actions or intentions (Levine 1998).

Another possible reason for acting unselfishly emphasized in the literature is social norm compliance (e.g. Fehr & Fischbacher 2004; Rege & Telle 2004; Andreoni & Bernheim 2009; Krupka & Weber 2013). Krupka and Weber (2013) discussed two key elements of social norms: (1) they prescribe behaviour rather than outcomes and (2) they are jointly recognized by members of a population. Further, the authors made a distinction between injunctive and descriptive social norms, where the former concern what people ought to do while the latter concern what people usually do. In their paper, the focus was on injunctive social norms, which Krupka and Weber (2013) defined "as collective perceptions, among members of a population, regarding the appropriateness of different behaviors" (p. 499). Similar definitions have been used by other researchers (e.g. Ostrom 2000), but some researchers have also included that a social norm is enforced by informal social sanctions (e.g. Coleman 1990; Fehr & Gächter 2000). Since the actions of the participants in my experiment were anonymous, the participants could not be exposed to social sanctions. Nevertheless, social norms can be a relevant driver of cooperative behaviour in such a setting since social norms can be internalized, meaning that the norm is enforced by internal sanctions such as the feeling of guilt (Lindbeck 1997).

A recent addition to the array of motivation theories is Roemer (2015)'s "Kantian optimization", introduced in spirit of famous philosopher Immanuel Kant. Roemer (2015) proposed that the participant of the NPD evaluates each option under the premise that her action is universal, i.e. that all group members act in the same manner. She then chooses to deviate from a particular action if, and only if, she prefers the situation in which all group members make the same deviation. This model of cooperation was used in Bosch-Domènech and Silvestre (2017). The basis of the model is Kantian ethics, a theory on ethical reasoning which, simply put, dictates that one should only take those actions that if universalised, one would deem the world better. There are other theories of ethics, i.e. notions of how to distinguish right actions from wrong actions. One prominent ethical theory is utilitarianism. According to this theory, one

should take those actions that lead to the greatest happiness of everyone affected by one's actions (Quinton 1973). This view on moral behaviour is in line with another explanatory theory on unselfish behaviour in social dilemmas, namely concerns for efficiency (e.g. Charness & Rabin 2002; Bosch-Domènech & Silvestre 2017). Efficiency concerns imply that the participant likes to increase the social surplus, i.e. maximizing the total utility, even at a cost to herself (Charness & Rabin 2002).

Why individuals act selfishly is a much less researched topic, especially in a one-shot setup as is the case in this thesis. For defectors, Bosch-Domènech and Silvestre (2017) only provided two motives centred on either 1) profit maximisation or 2) that PD theory dictates that participants should defect. When reviewing the open-format explanations given by the participants, Bosch-Domènech and Silvestre (2017) also found motivations centred on the riskiness of cooperating or maximising the lowest payoff. I am unaware of any additional theory on defection relevant for my experiment.

3. Hypotheses

Based on previous empirical findings discussed in Section 1 and the two theories for the group size effect presented in Section 2.2., I expect to observe a negative group size effect between the 3- and 7-person versions of the NPD. I see no obvious reason why these two theories could not be applicable when comparing the 7-person version with the 25-person version. Thus, I expect a continued negative group size, which I formalise in Hypothesis 1.

(1) Cooperation is higher in the treatment with small group size compared to (a) medium group size and (b) large group size. In addition, (c) cooperation is higher in the treatment with medium group size compared to large group size.

As discussed in Section 1, the empirical findings on the effect of label framing are mixed. However, from a theoretical point of view, if there exists an effect I expect label framing to have a positive effect on cooperation (see Section 2.3.). Hence, Hypothesis 2 is formulated as follows.

(2) Cooperation is higher when a community label is used compared to when a neutral label is used.

4. Methodology

4.1. Experimental design

To investigate the stated hypotheses, I conducted a between-group economic experiment with four treatment groups via a web survey. In my experiment, Swedish students participated in a NPD in which they could receive up to 70 SEK, depending on their choices. The dilemma had the same characteristics as those outlined in Bosch-Domènech and Silvestre (2017): (1) the payoffs were symmetric, (2) the dilemma was only run once, (3) each participant could either cooperate or defect, (4) a strictly dominant strategy existed and (5) full cooperation was the Pareto efficient outcome. This setup was used rather than a Public Goods Game because in such a dilemma, the participants choose what *amount* to contribute. This implies that they face numerous options and all possible outcomes cannot easily be conveyed to the participant. Thus, as discussed by Bosch-Domènech and Silvestre (2017), the NPD can be perceived as easier to understand. Also, the exclusion of intermediate strategies removes some of the complexities with interpreting the results (see Kümmerli *et al.* 2010).

There were four treatment groups for which the group sizes and/or label frame varied. Three different group sizes were employed: small size (3-person groups), medium size (7-person groups) or large size (25-person group). For the largest group size, either a neutral or community frame was applied. Consequently, the following treatments (T1-T4) existed.

- T1: small group size and neutral frame
- T2: medium group size and neutral frame
- T3: large group size and neutral frame
- T4: large group size and community frame

As discussed by e.g. Dawes (1980), a pair has characteristics that are distinctly different from a group. Thus, the small group size was set to 3 participants rather than 2 since the interest of this thesis is how cooperation changes with group size, rather than comparing cooperation for pairs versus groups. The large group size was set to 25 participants as it is the second largest group size for which the payoffs are ensured to be integers, which was important to be able to provide the participants with their full earnings in cash.[10] The medium size was then set to 7 as

[10] The highest possible group size is 49 participants, but a group of this size would result in an unreasonably long table of possible payoffs. As I deemed it important to provide the full list of possible payoffs to ensure that the participants had all the necessary information to make their decision, I chose the second largest possible group size (25 participants).

this size also ensures integer payoffs and has been previously used in comparison to 3-person groups by Hamburger *et al.* (1975).

The framing was limited to the name of the NPD in line with e.g. Dufwenberg *et al.* (2011), Ellingsen *et al.* (2012) and Dreber *et al*. (2012). A neutral frame was used instead of a stock market frame to make the results of this thesis comparable to the literature aimed at studying the group size effect. A disadvantage of using the combination of a neutral and community frame is that the framing effect presumably is of smaller size compared to the effect of a community frame versus a stock market frame. Thus, the required sample size increases. Furthermore, in contrast to the vast majority of previous studies, my experiment was not presented as a game, but rather as a dilemma to avoid potentially conflicting signals. As discussed by Thaler *et al.* (2012), it is crucial to construct the choice architecture so that the signals provided are compatible in order to ease decision-making.[11] Reasonably, the word "Community" sends a cooperative signal while the word "game" sends a competitive signal, rendering the signals of the commonly used "community game" label incompatible.

4.2. Implementation

4.2.1. Focus groups and pilot studies

To ensure high-quality results, the instructions to the experiment were first reviewed in a focus group consisting of two 5th year master students in economics. Based on their comments, the instructions were revised and reviewed in a second focus group consisting of three other 5th year master students in economics. After the suggestions from the second focus group had been incorporated, the first pilot study was initiated. It was distributed in February 2018. The participants were 32 current or former students from a wide range of fields, excluding economics and business administration. The former students had graduated less than three years prior to participating. The participants were recruited via my personal network and randomly allocated to one of the treatment groups. There were 6 treatments in which the group size was 3, 7 or 25 and the dilemma was either called "dilemma" or "environmental dilemma".

Surprisingly, the first pilot study indicated that, if present at all, there was a negative framing effect. To investigate this effect more closely before conducting the actual experiment, a second pilot study was initiated in March 2018 for which only two treatments were applied: either the NPD was called "dilemma" or "environmental dilemma" for groups consisting of 25 members. Students enrolled in the speech therapy programme at Gothenburg University were

[11] Choice architecture refers to the design of how choices are presented to the decision-maker, coined by Thaler and Sunstein (2008).

contacted via mail and randomly allocated to a treatment. Out of 97 students, 26 participated. Again, the results indicated a negative framing effect, if an effect was present at all. Since multiple participants in the focus groups and pilot studies expressed that they did not understand how the dilemma was applicable to environmental issues, I was concerned that the findings were driven by confusion. As it might be easier to make the connection between the NPD and community issues in general, I decided to apply a community frame in the main study instead, in line with most studies on label framing (Ross & Ward 1996; Liberman *et al.* 2004; Brandts & Schwieren 2009; Dufwenberg *et al.* 2011; Dreber *et al.* 2012; Ellingsen *et al.* 2012; Bernold *et al.* 2014). None of the pilot studies were monetarily incentivized.

4.2.2. Experiment

The experiment was executed by sending an email to the university e-mail accounts of 2,173 undergraduate students at Gothenburg University in March 2018. Reminders were sent 4-5 days after the first invitation. The students were enrolled in one of the following programmes: Biology, Biomedical Analysis, Data Science, Geography, Journalism, Law, Logistics, Marine Science, Mathematics, Pharmacy, Physics, Political Science, Public Administration, Social Work or Systems Science. In accordance with Bosch-Domènech and Silvestre (2017), students of economics and business administration were not included in the sample since they might be too familiar with the NPD.

A block based on web browser cookies was applied to reduce the risk of students participating in the experiment multiple times.[12] In the email, a link to the experiment was attached. The email and all instructions were in Swedish to ensure that the participants fully understood them (see Appendix D-E for English translations. Swedish versions are available upon request). When first entering, the experiment was introduced. The participants were then allocated to the four treatment groups by asking them whether they were born on an even (uneven) day in an even (uneven) month. This technique should result in a random allocation.

The experiment consisted of four parts. In the first part, the participants were informed about the NPD and got to decide whether to cooperate or defect. In the second part, they were asked to motivate their decision. In the third part, they were asked about how they believe other participants acted. In the fourth part, they were asked some final questions. After Part 4, the payment options (SWISH, cash or relinquish payment) were presented and the required personal information to be able to pay the subjects was collected. For Part 1-4, the participants

[12] As the block was based on cookies, participants were unable to respond from the same device multiple times. However, if they used another device, they were not blocked. During the payment process, only one participant was discovered to have participated in the experiment twice.

could not go back to a previous page. The reason for this decision was to avoid participants being affected by subsequent parts and changing their previous choices. After Part 4, the participants were allowed to return to the previous page.

In Part 1, the participants allocated to T1-T3 were informed that they were part of a group of 3, 7 or 25 participants and faced a dilemma. For T4, the instructions were exactly the same as in T3 with the exception of consistently referring to the NPD as the "community dilemma" instead of "dilemma" in the heading as well as in the text.[13] The NPD was introduced by describing the payoff mechanism, followed by four examples of extreme outcomes and finally providing the full list of possible outcomes, which could be accessed by clicking a button. The payoff structure applied in this thesis is described in Section 2.1.

After the dilemma was introduced, the participants were asked to make their decision. As opposed to Barcelo and Capraro (2012), no comprehension questions were asked before the participants formed their decision. The main reason was that I wished to avoid the risk of affecting the decision process of the participants, which possibly could have distorted my results.[14] Similar to Ellingsen *et al.* (2012), cooperation was labelled "option A" and defection was labelled "option B" to avoid any framing effect of strategy labels, which e.g. Bosch-Domènech and Silvestre (2017) found empirical support for. However, full neutrality was not attained since the instructions included a text describing the payoff mechanism, which I was unable to formulate completely neutrally.[15] In the focus groups, attempts were made to achieve full neutrality, for example by simply providing the table of payoffs and describing the table, without introducing the payoff mechanism, but these alternative versions of the instructions reduced understanding dramatically. Instead, the final instructions were formulated as shown in Figure 1.

[13] "[Community] dilemma" was mentioned 10 times in Part 1, 1 time in Part 2 and 11 times in Part 3.

[14] For example, asking which option leads to the largest personal gains might lead a participant who intuitively focused on the risk of getting zero profits to shift focus. This would obviously affect my analysis of the participants' motivations.

[15] Specifically, the following piece of text from the experiment's instructions can be described as having a "give"-frame as opposed to a "take"-frame (see e.g. Brewer & Kramer 1986). "You start the [community] dilemma with 16 kronor and must choose option A or B. If you choose option A, you lose the 16 kronor while the other students get 2 kronor each. If you choose option B, you keep the 16 kronor while the other students get nothing."

Figure 1. English version of the instructions presented in Part 1 for T3 and T4.

Below are the instructions to the [community] dilemma presented.

****

A computer chooses twenty-four other students at random so that you make up a group of twenty-five students together. The other students get exactly the same instructions as you. Neither you nor the other students will learn anything about each other at any point in time.

You start the [community] dilemma with 16 kronor and must choose option A or B. If you choose option A, you lose the 16 kronor while the other students get 2 kronor each. If you choose option B, you keep the 16 kronor while the other students get nothing. Remember that all students face the same decision, which means that the amount of money each student exits the [community] dilemma with depends on the choices of all students.

Below, you see some examples of possible outcomes.

[Community] dilemma examples:

- If everybody chooses A, the [community] dilemma is ended with everybody getting **48** kronor each.
- If everybody chooses B, the [community] dilemma is ended with everybody getting **16** kronor each.
- If you choose A and all the other students choose B, the [community] dilemma is ended with you getting **0** kronor and the other students getting **18** kronor
- If you choose B and all the other students choose A, the [community] dilemma is ended with you getting **64** kronor and the other students getting **46** kronor

****

If you wish to see all possible outcomes, you can click on "Open table" below.

After the participants had made their decision, they were asked whether they formed their decision at random. If they answered "Yes", they moved straight on to Part 3 in which their beliefs were assessed. If they answered "No", they moved on to the second page of the motivation part. To reduce the time and effort required of the participant, they were not first asked to describe their rationale in an open format, as was done in Bosch-Domènech and Silvestre (2017). Instead, in my experiment, the participants picked at least one and at most three of the suggested motivations, where one option was to write their own motivation. Depending on whether the participant chose to cooperate or defect, different motivational statements were shown. However, for all participants, there were eight possible statements in addition to the open option. The motivations were presented in a random order. For cooperators, the following statements were presented, which appealed to (1) beliefs, (2) efficiency, (3) fairness, (4) pure altruism, (5) pure egoism, (6) ethics, (7) social norms and (8) Kantian reasoning.

1. I chose A because it is the choice I believe most other students in my group made

2. I chose A because it leads to the group getting most money in total
3. I chose A because I consider it to be the fair choice
4. I chose A because I care about others
5. I chose A because it feels good to help others
6. I chose A because I think that it is the ethically right thing to do
7. I chose A because I think that this choice is consistent with social norms
8. I chose A because it is the choice that I'd like everybody to make in this situation

These statements were selected to capture the different theories presented in Section 2, with the addition of the ethics motivation. This motivation was added as there are moral philosophies other than Kantianism and utilitarianism, such as virtue ethics and divine command theory (see e.g. LaFollette & Persson 2013), that may or may not coincide with the reasoning of participants in social dilemmas. Rather than provide a long list of possible moral appeals, the participants in my experiment could claim to be driven by the righteousness of the cooperative option, without discriminating between different philosophies of ethics further.

Since previous literature has had a strong focus on explaining cooperation rather than defection, inspiration was taken from different sources when designing the motivational statements presented to defectors. The first motive presented in the list below was written based on the coordination hypothesis (see Section 2.3.) and is the same as for cooperators. The second motivation was designed to capture profitability, which was also provided as a motivation in Bosch-Domènech and Silvestre (2017). In the open format section of Bosch-Domènech and Silvestre (2017)'s experiment, participants frequently motivated their choice with maximising the lowest payoff and/or the riskiness of cooperating. Thus, statement 3 and 6 in the list below were designed to capture these motives. Statement 7 and 8 were included to reflect the two theories attempting to explain the group size effect presented in Section 2.2. Finally, motive 4 and 5 were included after discussion in the focus groups.

1. I chose B because it is the choice I believe most other students in my group made
2. I chose B because it is the most profitable choice for me
3. I chose B because I want to avoid getting 0 kronor
4. I chose B because I want to avoid being taken advantage of
5. I chose B because I don't know who the other students are
6. I chose B because I don't know what choices the other students made
7. I chose B because I think that the choice I make has a small impact on how much the other students get

8. I chose B because I believe that the probability that all students choose A is small

After choosing their motives, the participants moved on to Part 3. In this part, they were asked to indicate how many other students in their group they thought had picked option A, i.e. cooperated. If they provided the correct answer, they would receive an additional 6 kronor. The instructions to the NPD were provided again to refresh their memory. For all treatments, there were three alternatives. For T1, the alternatives were 0 students, 1 student or 2 students. For T2, the alternatives were 0-2 students, 3-4 students or 5-6 students. For T3 and T4, the alternatives were 0-8 students, 9-16 students or 17-24 students. Note that for T2-T4, the first alternative includes one more student than the other two alternatives, which was necessary to ensure realistic ranges.

Moreover, a problematic aspect of the experiment is the order of Part 1-3 since it possibly can affect the decisions made. As the NPD is the centrepiece of this thesis, it was introduced first to ensure that no other parts had influenced the decision to cooperate or defect. The motivation section was then introduced before the beliefs section because (1) the participants' memory of how they reasoned in the NPD might deteriorate quickly and (2) forcing the participants to think about their beliefs plausibly has a greater impact on their answers in the motivation section than vice versa.

In the last part, the participants were asked questions about themselves (gender, age, income, field of education and political affiliation). They were also asked how interested they are in community issues, how familiar they are with the Prisoner's Dilemma and how difficult they perceived the instructions to the NPD to be.

5. Empirical strategy

5.1. Non-parametric analysis

In order to examine potential differences between treatment groups, the Fisher's exact test of independence is used, in line with Bosch-Domènech and Silvestre (2017). Fisher's exact test is a non-parametric test suitable for investigating whether one categorical variable is dependent on another categorical variable. Thus, it can be applied to conduct proportions comparisons between treatments. The test yields a p-value that can be used to determine statistical significance (McDonald 2014).[16]

[16] Similar tests are the chi-square test of independence and the G-test of independence, but since Fisher's exact test is more accurate than these tests for small sample sizes (McDonald 2014), I choose to use the Fisher's exact test for the non-parametric analysis of this thesis.

At times, the analysis requires multiple testing. When comparing how many participants in each treatment group appealed to a certain motivation, eight such comparisons are conducted for cooperators and another eight for defectors. Thus, the same subjects are used eight repeated times, which increases the risk of committing a type I error, i.e. the risk of rejecting a null hypothesis even though it is true. Hence, I apply a correction called the Benjamini and Hochberg (BH; 1995) correction. The procedure to apply the BH correction is as follows: (1) the p-values obtained from multiple testing are ranked in ascending order and (2) whether the condition described in Equation 9 holds or not is tested for each p-value.

$$p_{(i)} \leq \frac{i}{m}\alpha \tag{9}$$

Where p is the p-value, i is the order of the p-value (taking the value 1 for the smallest p-value), m is the number of tests conducted and α is the desired significance level.

5.2. Probit regression

I also use a probit approach to analyse the data, which allows me to control for confounding factors. This model is applicable when the dependent variable is binary, as is the case in this thesis. An alternative approach is the linear probability model (LPM), which I use as a robustness check (see Appendix C). Moreover, as the coefficients in a probit model only provide information about the direction of an effect, not the size of an effect, the marginal effects at the mean (henceforth, marginal effects) are presented in Section 7.[17]

5.2.1. Variables

The variable of interest is *Cooperated*, which takes the value 1 if the participant chose to cooperate and 0 if the participant chose to defect. The key independent variable is *Treatment,* a categorical variable with the following 4 categories: T1 (small group size), T2 (medium group size), T3 (large group size) and T4 (large group size and community frame). A number of additional explanatory variables are included in the econometric models.[18] Two standard socio-economic controls are added, namely *Female* and *Older (>23),* where the former is a dummy for gender and the latter is a dummy for age. The age variable takes the value 1 for participants born before 1995, i.e. participants who were older than the median age of 23. Neither gender

[17] An estimated marginal effect at the mean is the change in the predicted probability of a participant choosing to cooperate given a unit change in a particular variable, holding all other variables at their respective sample mean (Wooldridge 2015).

[18] In general, it might be considered important to control for income. However, given my specific sample, the income data collected provides little information since many participants possibly lived at home and/or were supported by their parents, rendering information concerning their own income inadequate in capturing their budget constraint.

nor age have been found to be important determinants of cooperation in previous literature (see a meta-analysis by Balliet *et al*. 2011 for the effect of gender and Gutiérrez-Roig *et al.* 2014 for the effect of age).

One factor that has been found to be of importance in social dilemmas is intelligence. Both Segal and Hershberger (1999) and Jones (2014) have found that intelligent groups cooperate more. On the other hand, previous studies have also found a positive correlation between confusion and cooperation in social dilemmas (e.g. Andreoni 1995; Houser & Kurzban 2002; Burton-Chellew *et al.* 2016), which might be viewed as contradictory.[19] In my experiment, how difficult the participants perceived the instructions to be, *Difficult (>2)*, was measured. This variable can be viewed as a proxy for both intelligence and confusion. The variable is a dummy, taking the value 1 for participants who rated the instructions to the NPD to be a 3, 4 or 5 on a Likert scale regarding difficulty, where 5 means very difficult and 1 means not at all difficult.[20] The variable *Payment* is also a dummy, taking the value 1 for participants who chose to receive payment. I am unaware of any paper that has studied the effect of a similar variable. It can possibly be viewed as a proxy for greed and/or economic need.[21] Theoretically, greedy people or people in need are plausibly more likely to act selfishly to ensure a higher monetary payoff in social dilemmas.

Furthermore, *Political opinion* is added, which is a categorical variable for political affiliation with the following three categories: left-wing voters, right-wing voters and other political affiliation.[22] Previous research has found that political affiliation is related to social value orientation (SVO), where SVO is a concept capturing a person's concern for self and other's outcomes. Specifically, liberals show more concern for others' outcomes than conservatives (see Balliet *et al.* 2018 for a meta-analysis). SVO has in turn been found to be positively related to cooperation in various situations (Balliet *et al*. 2009; Van Lange *et al.* 1997). Yet only one newly published study has investigated whether political affiliation predicts cooperation in a social dilemma, namely Balliet *et al.* (2018). However, they were unable to detect a relationship when, in a US setting, Democrats and Republicans were compared in a PD. A limitation to their

[19] Bayer *et al.* (2013) found that confusion does not necessarily lead to more cooperation.
[20] Participants who chose a 3 on the difficulty scale are grouped with those who chose a 4 or 5 because as many as 77.6% chose a 1 or 2. Grouping participants who chose a 3, 4 or 5 together would thus lead to a slightly improved balance in observations.
[21] *Payment* is of course not a perfect proxy for greed/need since there are other important aspects to whether a participant chooses to accept payment, such as whether or not she is connected to the SWISH service.
[22] Left-wing includes Green Party, Feministic Initiative, Left Party and Social Democrats. Right-wing includes Centre party, Christian Democrats, Moderates and Liberals. Other includes unsure voters, Swedish democrats, other specified parties, blank votes and refusals to answer.

study was that the participants were informed of the political ideology of their co-player, which could have confounded the results.

Moreover, a substantial body of literature has found empirical evidence that expectations of other's behaviour are positively related to cooperation in social dilemmas (e.g. Deutsch 1960; Dawes 1980; Messic & Brewer 1983; Yamagishi 1986, 1988; Fischbacher *et al.* 2001; Ferrin *et al.* 2008). In other words, a person who believes others cooperate is more likely to cooperate as well. Thus, the categorical variable *Beliefs* is included in my analysis. As the participants of all treatment groups were presented three possible alternatives, *Beliefs* has the following three categories: low, medium and high beliefs, where high beliefs means that the participant believed a high number of her group members cooperated.[23] In the regressions, a categorical variable for field of education is also added, *Education dummies*, with one category for each of the 15 education programmes, but this variable is not analysed as a determinant given the large number of categories.

6. Sample and descriptive statistics

The total response rate was 22.5% (see Table A1 in Appendix A for specifics). The sample size was set to 500, but since 40 of these 500 participants reported answering at random, their answers are excluded from the analysis. In addition, four participants are excluded as they in their open-format motivation provided rationales that are incompatible with the instructions, e.g. stating that she/he defected to ensure that nobody would be left with 0 SEK. Thus, their answers make it evident that they did not understand the instructions. Four other participants are excluded as they reported that they were economics students or no longer students. Finally, one student participated in the experiment twice. Consequently, the second entry from this participant is excluded. Hence, the total sample includes 451 participants. Since all questions in the experiment were compulsory, there are no missing values for any variable.[24] However, for gender, the participants had the opportunity to choose "Other" and since only three participants chose this option, they are not treated as an individual category. Instead, these three observations are treated as missing for gender.

On average, the participants earned 38.7 SEK, with median 38 SEK, which translate to approx. 4.7 and 4.6 USD in mean and median earnings, respectively.[25] Table 1 displays the

[23] For T1, the alternatives were 0 students, 1 student or 2 students. For T2, the alternatives were 0-2 students, 3-4 students or 5-6 students. For T3 and T4, the alternatives were 0-8 students, 9-16 students or 17-24 students.
[24] However, for the questions concerning income and political opinion, the participants could choose the option "Don't want to answer" since these questions can be considered sensitive.
[25] Average for Mars, 2018, USD 1 = SEK 8.23 (Statistics Sweden 2017).

number of observations per treatment and in total. The table also displays the average values for the control variables used, excluding field of education for which descriptive statistics are available in Table A2 in Appendix A. In the whole sample, 50.6% were older than the median age of 23 years, and slightly more women than men participated (57.4%). Moreover, only 22.4% rated the difficulty of the instructions as a 3, 4 or 5, where 5 means very difficult and 1 means not at all difficult. A majority of the participants, 73.6%, chose to receive payment. Concerning political affiliation, 37.2% participants were left-wing, 25.3% were right-wing, 37.5% were categorised as other. Finally, 31.9% believed many others cooperated while 46.1% believed around half of the group members cooperated. Only 22% believed few others cooperated.

Table 1. Percentages for explanatory variables and number of observations across treatments and in total.

	T1	T2	T3	T4	Total
Older (>23)	41.3%	56.8%	53.0%	51.1%	50.6%
Female	63.3%	51.8%	54.5%	59.2%	57.4%
Difficult (>2)	23.9%	26.1%	23.0%	17.6%	22.4%
Payment	82.6%	70.3%	73.0%	69.5%	73.6%
Political opinion					
Left-wing	36.7%	38.7%	41.0%	33.6%	37.2%
Right-wing	22.9%	26.1%	22.0%	29.0%	25.3%
Other	40.4%	35.2%	37.0%	37.4%	37.5%
Beliefs					
High beliefs	38.5%	31.5%	29.0%	29.0%	31.9%
Medium beliefs	47.7%	44.1%	48.0%	45.0%	46.1%
Low beliefs	13.8%	24.3%	23.0%	26.0%	22.0%
Obs.	109	111	100	131	451

Note: Older (>23)=1 if age>23. Difficult (>2)=1 if instructions were rated as a 3, 4 or 5 on a Likert scale. Payment=1 if chose to receive payment. Left-wing includes Green Party, Feministic Initiative, Left Party and Social Democrats. Right-wing includes Centre party, Christian Democrats, Moderates and Liberals. Other includes unsure voters, Swedish democrats, other specified parties, blank votes and refusals to answer.

For each variable, differences across treatments (T1-T4) are investigated by using Fisher's exact test.[26] P-values above 0.10 are obtained for all variables expects for *Payment*. This implies that, for all the former variables, the null hypothesis that these variables are independent of treatment group cannot be rejected. For *Payment*, the Fisher's exact test yields a p-value of 0.009. To examine this variable further, pairwise comparisons are conducted using the same testing method. Since six tests are conducted, the BH correction is applied. When this

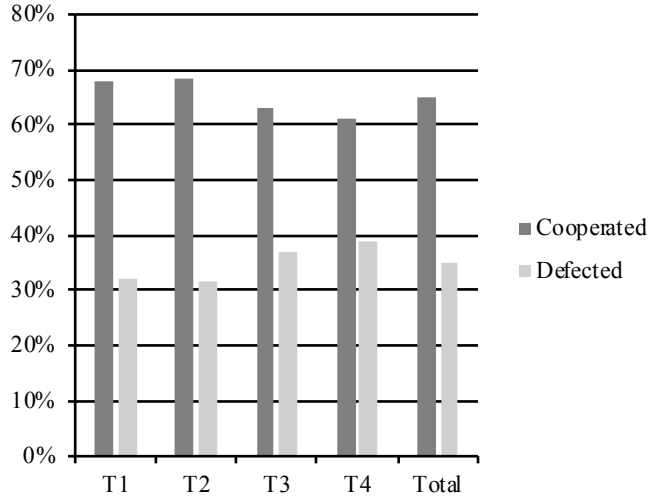
[26] Since there are four treatment groups and *Political opinion* and *Education dummies* have more than two categories, a single Fisher's exact test cannot be performed for these variables as the number of combinations becomes too large. Instead, the political opinion (field of education) compositions for different treatment groups are compared by pairing the treatment groups and making pairwise comparisons. As this implies multiple tests, the risk of committing a type 1 error increases. Nevertheless, the tests yield no significant differences for neither *Political opinion* nor *Education dummies* even without the BH correction.

correction is used, the pairwise comparisons yield no significant differences. Thus, I cannot with confidence reject the null hypothesis for this variable either.[27]

7. Results

As visible in Figure 2, 65.0% of the whole sample chose to cooperate. The highest level of cooperation was in T2 (68.5%) and T1 (67.9%), i.e. the treatments with a group size of 7 and 3 participants, respectively. For the treatment with a group size of 25 participants (T3) the rate was 63.0%, while it was slightly lower when a community frame was applied (T4) with 61.1%.

Figure 2. Percentage of participants who cooperated (dark grey bars) and defected (light grey bars) across treatments and in total.



The remaining results are organised into two subsections. First, I present the results of the group size effect, the label framing effect and the individual-specific determinants. I then conduct an explorative analysis of the motives for cooperating and defecting.

7.1. Results of group size effect, label framing effect and determinants

7.1.1. Non-parametric testing

To investigate if a negative group size effect exists, I compare the number of cooperators and defectors in T1 (small size), T2 (medium size) and T3 (large size). As the Fisher's exact test yields an overall p-value of 0.660, the null hypothesis that the choice to cooperate is independent of group size cannot be rejected. I then compare T3 (neutral frame) with T4 (community frame) to explore the presence of a label framing effect. A p-value of 0.786 is obtained. Thus, I cannot reject the null hypothesis that cooperation is independent of frame.

[27] For descriptive statistics on the three variables not included in the analysis (*Income*, *Interest (>3)* and *Knowledge*), see Table A3 in Appendix A. No significant differences at 10% between treatments are found for these variables using Fisher's exact test.

7.1.2. Probit approach

In Table 2, the marginal effects (with standard errors in parentheses) for four probit models are presented. The dependent variable in all models is *Cooperated*, which takes the value 1 if the participant chose to cooperate. In Model 1, only the treatment dummies are included, with T1 as the base category, i.e. the treatment with a small group size. In Model 2, three socioeconomic variables are included: *Older (>23)*, *Female* and *Education dummies,* where the base category for *Education dummies* is Pharmacy. In Model 3, background variables of more subjective nature are included, namely *Difficult (>2)*, *Payment* and *Political opinion*. The base category for *Political opinion* is left-wing voters. Finally, in the last model, *Beliefs* is included to capture expectations about others' behaviour, with base category high beliefs.

Table 2. Probit regression results (marginal effects at the mean) for Model 1-4. For Treatment, the base category is T1 (small group size). For Political opinion, the base category is left-wing. For Beliefs, the base category is high beliefs.

Cooperated	Model 1	Model 2	Model 3	Model 4
Treatment				
T2	0.006	-0.034	-0.049	0.033
	(0.063)	(0.064)	(0.064)	(0.071)
T3	-0.049	-0.072	-0.091	-0.034
	(0.066)	(0.066)	(0.066)	(0.075)
T4	-0.068	-0.102*	-0.136**	-0.059
	(0.062)	(0.062)	(0.062)	(0.068)
Older (>23)		0.054	0.055	0.016
		(0.049)	(0.050)	(0.052)
Female		-0.044	-0.012	-0.009
		(0.054)	(0.054)	(0.061)
Difficult (>2)			-0.174***	-0.171***
			(0.056)	(0.062)
Payment			-0.174***	-0.222***
			(0.054)	(0.058)
Political opinion				
Right-wing			-0.115*	-0.153**
			(0.061)	(0.066)
Other			-0.121**	-0.132**
			(0.053)	(0.055)
Beliefs				
Medium beliefs				-0.164***
				(0.040)
Low beliefs				-0.716***
				(0.051)
Education dummies	No	Yes	Yes	Yes
Observations	451	448	448	448
Pseudo R-squared	0.004	0.047	0.089	0.304

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

As visible in Table 2, across all four models, no significant effect is found for T2 (medium group size) or T3 (large group size) relative to T1 (small group size). The signs of the estimated marginal effects are negative in both Model 2 and 3, but when *Beliefs* is added, the estimated marginal effect for T3 is reduced by over half and the estimation for T2 even changes sign. No significant effect is found for T2 (medium group size) relative to T3 (large group size) either, as displayed in Table B1 in Appendix B, but estimates are consistently positive. In the main table (Table 2), a significant marginal effect is found for T4 relative to T1 in Model 2 and 3 at the 10% and 5% level, respectively. However, T1 and T4 are different from each other both in terms of group size and label framing. Thus, a possible group size effect cannot be disentangled from a possible label framing effect. Hence, T1 and T4 are not directly comparable.

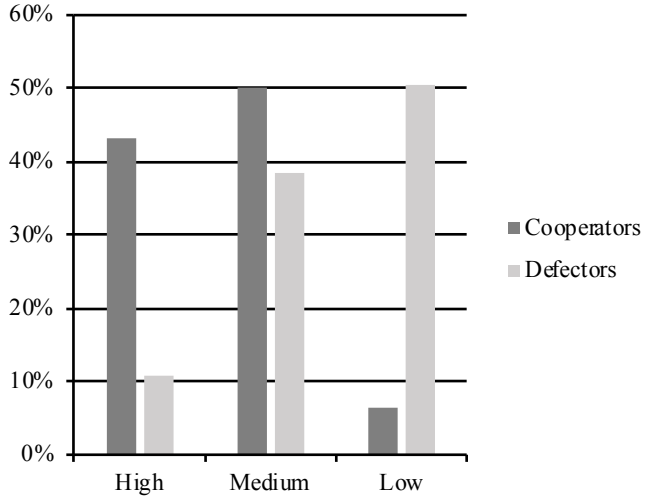
From Table 2, we can also see that right-wing voters and those of other political affiliation cooperate significantly less than left-wing voters. For both Model 3 and 4, the effects are significant at the 5% level except for right-wing voters in Model 3, which is significant at the 10% level. The estimated marginal effect for right-wing voters in Model 4 implies that the probability of a right-wing voter cooperating is 15.3 percentage points smaller than for a left-wing voter, holding all other variables at their means. Equivalently, for a participant of other political affiliation, the probability is 13.2 percentage points smaller relative to a left-wing voter.

In Table 2, we also see that the estimated marginal effect of *Difficult (>2)* is negative and highly significant (p-value<0.01) across models. In the last model, the estimated effect means that the probability that a participant who finds the instructions to be difficult cooperates is 17.1 percentage points smaller than for a participant who does not find them difficult. The marginal effect of *Payment* is also negative and highly significant (p-value<0.01) across models. The estimate in Model 4 implies that the probability that a participant who wishes to receive payment cooperates is 22.2 percentage points smaller than for a participant who relinquishes her payment. Finally, the estimated marginal effect of *Older (>23)* is positive across all models while the estimated effect of *Female* is negative across all models. However, the effects are not significant for any model.

In the last model, *Beliefs* is added and the pseudo R-squared increases greatly, from 0.089 to 0.304. The results show highly significant (p-values<0.001) differences in cooperation between participants with medium relative to high beliefs, and low relative to high beliefs. The marginal effect for the medium category implies that the probability of cooperating is 16.4 percentage points smaller for a participant with medium beliefs than for a participant with high beliefs, holding all other variables at their means. For the low category, the effect is even more dramatic. The probability that a participant with low beliefs cooperates is 71.6 percentage points

smaller than for a participant with high beliefs. Figure 3 illustrates the composition of beliefs for cooperators versus defectors. The figure can be interpreted as implying that cooperators have high beliefs concerning the number of other group members who cooperate, while defectors often believe others defect as well. A Fisher's exact test yields a significant, at the 1% level, difference in beliefs between cooperators and defectors.

Figure 3. Percentage of cooperators and defectors who believed a high, medium or low number of other group members cooperated.



To investigate the label framing effect, the base category in the probit approach is changed from T1 to T3 in Table B1 in Appendix B, thus enabling me to compare T3 (neutral frame) with T4 (community frame). Across all four models, the estimated marginal effect of T4 relative to T3 is negative, but highly insignificant.

7.1.3. Robustness check

As a robustness check for the probit results, I adopt an LPM approach as well. The results of the probit regressions are supported by the LPM regression results provided in Table C1 in Appendix C. All effect signs coincide, the significances are similar and the LPM coefficients are of fairly similar magnitude as the marginal effects estimated in the probit regressions. The pseudo R-squared values displayed for the probit models are in line with the R-squared values for the LPM models.

7.2. Explorative analysis of motives

7.2.1. Motives for cooperators

For cooperators, eight possible motivations were available in addition to an "other" option. The participants who chose the "other" option could describe their alternative motivation in their own words. The statements appealed to either beliefs, efficiency, fairness, pure altruism,

pure egoism, ethics, social norms or Kantian reasoning (see Section 4.2.2. for the full list of options).

As evident from Table 3, the most common reason provided for cooperating within any treatment was efficiency concerns. Specifically, between 44.7% and 61.9% appealed to efficiency depending on the treatment. The second most frequently chosen motivation was Kantian reasoning (36.5%-51.4%), followed by concerns for fairness (27.6%-32.4%). Few participants chose to provide their own motivation, of which most stated that their reason for cooperating was that the amounts were too small to provide them with an incentive to act selfishly (52.6%).

Table 3. Percentage of cooperators who appealed to each motivation across treatments.

Motivation	T1	T2	T3	T4
Beliefs	24.3%	14.5%	19.0%	18.8%
Efficiency	60.8%	44.7%	61.9%	47.5%
Fairness	32.4%	27.6%	31.7%	30.0%
Pure altruism	9.5%	23.7%	12.7%	13.8%
Pure egoism	20.3%	14.5%	12.7%	18.8%
Ethics	12.2%	18.4%	15.9%	22.5%
Social norms	10.8%	7.9%	9.5%	7.5%
Kantian reasoning	51.4%	47.4%	36.5%	43.8%
Other	4.1%	7.9%	9.5%	5.0%

To investigate whether group size affects people's rationale for cooperating, Fisher's exact tests are conducted in which T1-T3 are included. Eight Fisher's exact tests are conducted as there were eight possible motivations, excluding the "other" option which was chosen by mere 19 participants. These tests yield high p-values for all motivations except for efficiency and pure altruism. For efficiency, a p-value of 0.069 is attained and for pure altruism, a p-value of 0.050 is attained. However, a correction for multiple testing should be applied. No significant differences at the 10% level are found when using the BH correction. Moreover, when comparing T3 and T4 with Fisher's exact tests, the only low p-value obtained is for efficiency (0.094), but the difference is not significant when the BH correction is applied.

As discussed in Section 2.4., a third type of altruism is impure altruism, which is a combination of the two other types. Out of the 44 participants who appealed to pure altruism and the 49 who appealed to pure egoism, mere 18 appealed to both. In other words, only 6.1% of all cooperators appealed to impure altruism.

7.2.2. Motives for defectors

For defectors, eight motivations were available in addition to the "other" option (see Section 4.2.2. for the full list of options). Table 4 reveals that the most frequent motivation in T1

and T2 was concerns for profitability, followed by zero-profit avoidance and concerns for a low probability of reaching social optimum. For the treatment with the largest group size, T3, low-probability concerns moved up as the most important driver, followed by zero-profit avoidance and profitability concerns. For the last treatment, in which a community frame was applied, profitability concerns were once again dominant, followed by low-probability concerns and lastly concerns for what choices the other participants made. Only 6 participants chose the "other" option and no motivations are judged similar enough to group them in a meaningful way.

Table 4. Percentage of defectors who appealed to each motivation across treatments.

Motivation	T1	T2	T3	T4
Beliefs	14.3%	20.0%	13.5%	17.6%
Profitability	48.6%	57.1%	29.7%	51.0%
Zero-profit avoidance	45.7%	45.7%	40.5%	17.6%
Taken advantage	2.9%	14.3%	10.8%	13.7%
Who	25.7%	14.3%	2.7%	11.8%
What choices	28.6%	20.0%	21.6%	23.5%
Impact	8.6%	14.3%	13.5%	7.8%
Low probability	40.0%	31.4%	43.2%	39.2%
Other	2.9%	0.0%	5.4%	5.9%

To explore potential differences in motivations for different group sizes, Fisher's exact tests are done. These tests yield high p-values for all motivations except for profitability concerns (0.054) and concerns for who the other members are (0.014). However, applying the BH correction leads to neither of these differences being significant. To investigate potential differences due to label framing, Fisher's exact tests are conducted for T3 and T4, yielding high p-values for all motivations except for profitability concerns (0.052) and zero-profit avoidance (0.028). Again, applying the BH procedure leads to neither of these differences being significant.

8. Discussion & Conclusion

The primary objective of this master thesis is to assess the effects of group size and label framing on cooperation. In addition, I aim to explore individual-specific determinants of cooperation as well as people's personal motives for cooperating or defecting. To fulfil these aims, a one-shot N-person Prisoner's Dilemma experiment was conducted in a web survey format. A total of 500 Swedish university students participated in the experiment, which was monetarily incentivised. Four treatments were used, in which the groups size was set to 3 (T1), 7 (T2) or

25 (T3-T4) and the NPD was either referred to as "dilemma" (T1-T3) or "community dilemma" (T4).

I find that a large share, 65%, of the participants chose to cooperate. According to a meta-analysis by Sally (1995) in which NPD experiments with varying characteristics were included, cooperation rates differ greatly across experiments, but a slight majority fall within the range 20-50%. Thus, my rate can be considered higher than usual. A possible explanation is insufficient monetary incentives, which 10 participants stated as a motive for why they chose to cooperate. However, I used amounts that were almost 20 times higher than Barcelo & Capraro (2015) and almost 40 times higher than Dreber *et al.* (2012).[28] The former experiment obtained rates of 26-41% while the latter obtained rates of 58-65%. Both these studies used Amazon Mechanical Turk (MTurk) workers[29] as subjects, which might influence what amounts are judged adequate. In a study with the same type of subjects, cooperation rates around 30% were obtained when using only slightly higher amounts compared to my experiment (Ellingsen *et al.* 2012).[30]

As the results presented in Section 7 show, I do not find a statistically significant effect between any treatment and can thus not provide convincing support for Hypothesis 1. However, the consistently negative point estimates across both models and method for T3 relative to T1 could provide some indication of a negative group size effect for large-sized relative to small-sized groups. One possible explanation for why I cannot find a significant decline between treatments like numerous previous studies (Marwell & Schmitt 1972; Kahan 1973; Hamburger *et al.* 1975; Bonacich *et al.* 1976; Fox & Guyer 1977; Komorita & Lapworth 1982; Grujić *et al.* 2012; Barcelo & Capraro 2015; Bosch-Domènech & Silvestre 2017) is that the largest decline in cooperation might occur between dyads and triads, as the empirical evidence of Grujic *et al.* (2012) indicated. Close to all of the previously mentioned papers compared *dyads* with groups of various sizes and found a negative effect. On the other hand, there exist studies that have used 3 as the small group size and still found a negative effect (Hamburger *et al.* 1975; Bonacich *et al.* 1976; Fox & Guyer 1977). Another explanation could be the sample size. Based on a two-sample proportions power calculation, a sample size of 341 participants per treatment

[28] Barcelo & Capraro (2015) used b=0.30 USD and c=0.10 USD. Dreber *et al.* (2012) used b=0.15 USD and c=0.05 USD. None of the experiments paid show-up fees. In my experiment, b=4.6 USD and c=1.9 USD using average for Mars, 2018, USD 1 = SEK 8.23 (Statistics Sweden 2017).

[29] MTurk provides a marketplace in which individuals and firms can recruit workers to perform various tasks (Amazon Mechanical Turk n.d.).

[30] In Ellingsen *et al.* (2012), the students could receive at most 80 SEK and at least 5 SEK, while in my experiment the corresponding amounts were 64 SEK and 0 SEK. They did not pay a show-up fee.

group is required to detect a 9.1 percentage point difference in cooperation at the 10% significance level, which is the estimated difference between T1 and T3 in Model 3, Table 2.[31] Thus, this experiment's sample size of approx. 100 participants per treatment might be inadequate.

In the last model, for which *Beliefs* is included, the marginal effects of T2 and T3 become highly insignificant and change greatly in size. However, this is not surprising as it is possible that *Beliefs* mediates the effect of the treatments on cooperation, in similarity with the coordination hypothesis (see Section 2.3.). In other words, if T2 and T3 impact participants' beliefs about others' choices which in turn impacts the cooperation rate, controlling for beliefs would reduce the estimated effect of the treatments.

Moreover, I find no significant difference in cooperation when the NPD was referred to as "dilemma" as opposed to "community dilemma" and the group size was set to 25. Thus, I offer no support for Hypothesis 2. This is in line with Bernold *et al.* (2014). Given the great lack of consensus within the field of label framing (see Section 1), it is not very surprising that no effect is detected. The result can be interpreted as evidence in favour of the notion that there is no label framing effect for when the group size is large (N=25). However, to determine whether there is such an effect for any group size, further research is required.

Concerning potential individual-specific determinants of cooperation, a number of findings are made. The results imply that left-wing voters are about 15 percentage points more likely to cooperate than right-wing voters, and about 13 percentage points more likely than participants of other political affiliation. The estimated effects are highly significant, insensitive to changes in controls and robust over statistical methods. Only one previous study has investigated whether there is a relationship between political affiliation and cooperation in any social dilemma, but Balliet *et al*. (2018) were unable to find a significant difference. Hence, this is a novel finding in the literature.

Moreover, the results of this thesis show that participants tend to believe that others act as they themselves act, in line with the literature (e.g. Deutsch 1960; Dawes 1980; Messic & Brewer 1983; Yamagishi 1986, 1988; Fischbacher *et al.* 2001; Ferrin *et al.* 2008). They also show that participants who perceive the instructions as difficult to understand are significantly less likely to cooperate than those that do not. This is in line with Jones (2014)'s and Segal and Hershberger (1999)'s findings that intelligence is associated with more cooperation, but contradictory to papers which have found a positive correlation between cooperation and confusion

[31] The power calculation is based on Pearson's chi-squared test. Power is set to 0.8 and proportions are set to 0.6 and 0.691.

in social dilemmas (Andreoni 1995; Houser & Kurzban 2002; Burton-Chellew *et al.* 2016). The estimated marginal effect is highly significant and robust to changes in controls and method.

Furthermore, I find that participants who choose to receive payment are significantly less likely to cooperate than those that relinquish their payment, as expected from a theoretical perspective. Also, there appears to be no difference in cooperation between men and women, in line with the general finding of a meta-analysis by Balliet *et al*. (2011). Finally, I find no differences due to age, in accordance with the findings of Gutiérrez-Roig *et al.* (2014). However, as my experiment was conducted using students, there was little age variation in the data. Due to this limitation, caution in interpreting this result is advised.

Based on the explorative analysis of the motivations, cooperators appear to be most often driven by efficiency, Kantian reasoning and fairness. The importance of efficiency and Kantian reasoning is in line with the closed-format findings presented by Bosch-Domènech and Silvestre (2017). However, in their experiment, mere 9% chose fairness. One possible explanation for the lower share of participants choosing fairness in their experiment could be differences in the formulation of the motivational statement.[32] Another aspect could be the different samples (they employed Spanish students while this study used Swedish students). A final important difference between the experiments is that the participants in the Bosch-Domènech and Silvestre (2017) study could only choose one motivation, while I allowed the participants to choose up to three motivations. Thus, it is possible that the Spanish students who chose efficiency or Kantian thinking also considered the fairness of their choice, but that efficiency or Kantian thinking was the dominant driver. In fact, 65.9% of the participants who cooperated in my experiment motivated their choice with more than one statement. These suggested explanations could possibly also explain why the percentage of participants who appealed to either pure altruism (9.5-23.7%) or pure egoism (14.5-20.3%) in my experiment was far larger than the percentage who appealed to altruism in the Spanish experiment (4%).

For defectors, greater variability is observed, but they appear to be most often driven by profitability concerns, zero-profit-avoidance and concerns for a low probability of reaching social optimum. That profitability is important is in line with the findings of Bosch-Domènech and Silvestre (2017). To the best of my knowledge, no previous study has assessed the importance of the latter two motivations. Interestingly, the results provide no indication of a decline in the share of defectors appealing to zero-profit-avoidance as the group size increases (T1-T3), even though the risk of getting zero profits dramatically decreases. The reason for this

[32] Specifically, the fairness motivation was "Taking advantage of others is not right" (Bosch-Domènech & Silvestre 2017, p. 255).

could be that the participants in my experiment did not fully understand the instructions. On the other hand, around 77% rated the instructions to be less than 3 on a difficulty scale (where 1 = Not at all difficult). However, given the small sample size at hand, interpreting differences in motivations between treatments should be done with caution. Due to the sample size, it is unsurprising that I find no statistically significant differences in motivations between treatments for neither cooperators nor defectors.

A limitation to my thesis is that I cannot be sure that the participants fully understood the proposed motives. For example, it is possible that some participants were unfamiliar with the term "social norms". Thus, my results can be subject to noise. Also, the differences between the motives could have been unclear, depending on the participants' view. For example, some participants possibly viewed the choice to cooperate as the ethically right thing to do *because* it is the fair option, and some possibly viewed acting fairly as a social norm. Thus, the participants might have struggled with which and how many motives to choose. Another limitation is that I cannot say whether the real reason for their action coincided with what they perceived to be their reason for cooperating/defecting. Nevertheless, the results do provide a rough map of what motivates people, according to themselves, to cooperate and defect. Yet another limitation is that I conducted the experiment via the Internet. Thus, I could not control the surrounding factors. Also, the students might have discussed the experiment, thereby influencing each other or even forming agreements with each other even though the instructions clearly asked them to not discuss the experiment with fellow students. Finally, as only students participated in the experiment, this can limit the generalizability of the results as students might not be representative for the entire population.

To tackle large-scale issues such as global warming and pollution, it is of utmost importance to extend the knowledge about cooperation. In the context of problems of global nature, it is especially important to understand how cooperation changes with group size (Capraro & Barcelo 2015). I strengthen the knowledge about cooperation in various ways. Most importantly, I find an indication of a negative group size effect and I find no support for a community label framing effect. I also make the novel finding that left-wing voters are more cooperative than others. Moreover, cooperators appear to be most motivated by efficiency while defectors are most motivated by profitability. A suggestion for future research is to investigate the relationship between political ideology and cooperation in social dilemmas further by for example using another type of social dilemma, different type of subjects and geographical setting.

References

Amazon Mechanical Turk. (n.d.). *How It Works*. www.mturk.com/how-it-works [Last Accessed 2018-09-02]

Andreoni, J. (1989). Giving with impure altruism applications to charity and Ricardian equivalence. *Journal of Political Economy, 97*(6), 1447-1458.

Andreoni, J. (1990). Impure altruism and donations to public goods a theory of warm-glow giving. *The Economic Journal: The Journal of the Royal Economic Society, 100*(401), 464-477.

Andreoni, J. (1995) Cooperation in public-goods experiments: Kindness or confusion. *American Economic Review, 85*(4), 891–904.

Andreoni, J. & Bernheim, B. (2009). Social Image and the 50–50 Norm: A Theoretical and Experimental Analysis of Audience Effects. *Econometrica, 77*(5), 1607-1636.

Andreoni, J. & Miller, J. (2002). Giving According to GARP: An Experimental Test of the Consistency of Preferences for Altruism. *Econometrica, 70*, 737–753.

Balliet, D., Parks, C., & Joireman, J. (2009). Social Value Orientation and Cooperation in Social Dilemmas: A Meta-analysis. *Group Processes & Intergroup Relations 12*, 533-47.

Balliet, D., Li, N., Macfarlan, S., Van Vugt, M., & Hinshaw, Stephen P. (2011). Sex Differences in Cooperation: A Meta-Analytic Review of Social Dilemmas. *Psychological Bulletin, 137*(6), 881-909.

Balliet, D., Tybur, J., Wu, J., Antonellis, C., & Van Lange, P. (2018). Political Ideology, Trust, and Cooperation: In-group Favoritism among Republicans Democrats during a US National Election. *The Journal of Conflict Resolution, 62*(4), 797-818.

Barcelo, H. & Capraro, V. (2015). Group size effect on cooperation in one-shot social dilemmas. *Scientific Reports, 5*(1), 7937.

Batson, C. (1991). *The altruism question: Toward a social-psychological answer.* New York: Psychology Press.

Bayer, R.-C., Renner, E. & Sausgruber, R. (2013). Confusion and learning in the voluntary contributions game. *Experimental Economics, 16*(4), 478–496.

Benjamini, Y. & Hochberg, Y. (1995). Controlling the false discovery rate: a practical and powerful approach to multiple testing. *Journal of the royal statistical society, 57*(1), 289-300.

Bernold, E., Gsottbauer, E., Ackermann, K.A. & Murphy, R.O. (2014). *Social framing and cooperation: the roles and interaction of preferences and beliefs* (unpublished, 23rd October)

Blount, S. (1995). When Social Outcomes aren't Fair: The Effect of Causal Attributions on Preferences. *Organizational Behavior and Human Decision Processes, 63*, 131-44.

Bolton, G. & Ockenfels, A. (2000). ERC a theory of equity, reciprocity, and competition. *American Economic Review, 90*(1), 166-193.

Bonacich, P., Shure, G. H., Kahan, J. P., & Meeker, R. J. (1976). Cooperation and group size in the n-person prisoners' dilemma. *Journal of Conflict Resolution, 20*(4), 687-706.

Bosch-Domenech, A. & Silvestre, J. (2017). The role of frames, numbers and risk in the frequency of cooperation. *International Review of Economics, 64*(3), 245-267.

Brandts, J. & Schwieren, C. (2009). *Frames and economic behavior: An experimental study.* Mimeo, Universitat Autònoma de Barcelona.

Brewer, M. & Kramer, R. (1986). Choice Behavior in Social Dilemmas: Effects of Social Identity, Group Size, and Decision Framing. *Journal of Personality and Social Psychology, 50*(3), 543-549.

Burton-Chellew, M. N., El Mouden, C., & West, S. A. (2016). Conditional cooperation and confusion in public-goods experiments. *Proceedings of the National Academy of Sciences, 113*(5), 1291-96.

Campbell, D. T. (1975). On the conflicts between biological and social evolution and between psychology and moral tradition. *American Psychologist, 30*, 1103-26.

Capraro, V. & Barcelo, H. (2015). Group Size Effect on Cooperation in One-Shot Social Dilemmas II: Curvilinear Effect. *PloS ONE, 10*(7).

Charness, G. & Rabin, M. (2002). Understanding social preferences with simple tests. *Quarterly Journal of Economics, 117*, 817–869.

Coleman, J. (1990). *Foundations of Social Theory.* Cambridge, MA: Harvard University Press.

Dawes, R. (1980). Social Dilemmas. *Annual Review of Psychology, 31*(169).

Dawes, R. & Thaler, R. (1988). Anomalies: Cooperation. *Journal of Economic Perspectives, 2*(3), 187-197.

Deutsch, M. (1960). Trust, trustworthiness, and the f scale. *The Journal of Abnormal and Social Psychology, 61,* 138 –140.

Dreber, A., Ellingsen, T., Johannesson, M. & Rand, D.G. (2012). Do people care about social context? Framing effects in dictator games. *Experimental Economics, 16*(3), 349–371.

Duffy, J., & Xie, H. (2016). Group size and cooperation among strangers. *Journal of Economic Behavior & Organization, 126*, 55-74.

Dufwenberg, M., Gächter, S. & Hennig-Schmidt, H. (2011). The framing of games and the psychology of play. *Games and Economic Behavior, 73*(2), 459–478.

Dufwenberg, M & Kirchsteiger, G. (2004). A theory of sequential reciprocity. *Games and Economic Behavior, 47*(2), 268-298.

Ellingsen, T., Johannesson, M., Mollerstrom, J. & Munkhammar, S. (2012). Label framing effects: Preferences or beliefs? *Games and Economic Behavior, 76*(1), 117-130.

Falk, A. & Fischbacher, U. (2006). A theory of reciprocity. *Games and Economic Behavior, 54*(2), 293-315.

Fehr, E. & Fischbacher, U. (2004). Third-Party Punishment and Social Norms. *Evolution and Human Behavior, 25*, 63–88.

Fehr, E. & Gächter, S. (2000). Fairness and Retaliation: The Economics of Reciprocity. *Journal of Economic Perspectives, 14*, 159–181.

Fehr, E. & Schmidt, K. (1999). A theory of fairness, competition, and cooperation. *Quarterly Journal of Economics, 114*, 817–868.

Ferrin, D. L., Bligh, M. C. & Kohles, J. C. (2008). It takes two to tango: An interdependence analysis of the spiraling of perceived trustworthiness and cooperation in interpersonal and intergroup relationships. *Organizational Behavior and Human Decision Processes, 107*, 161–178.

Fischbacher, U., Gächter, S. & Fehr, E. (2001). Are people conditionally cooperative? Evidence from a public goods experiment. *Economics letters, 71(3),* 397–404.

Fox, J. & Guyer, M. (1977). Group size and others' strategy in an N-person game. *Journal of Conflict Resolution, 21*(2), 323-338.

Grujić, J., Eke, B., Cabrales, A., Cuesta, J.A. & Sánchez, A. (2012). Three is a crowd in iterated prisoner's dilemmas: experimental evidence on reciprocal behavior. *Scientific Reports, 2*(638).

Gutiérrez-Roig, M., Gracia-Lázaro, C., Perelló, J., Moreno, Y. & Sánchez, A. (2014). Transition from reciprocal cooperation to persistent behaviour in social dilemmas at the end of adolescence. *Nature Communications, 5*(4362).

Hamburger, H., Guyer, M., & Fox, J. (1975). Group size and cooperation. *Journal of Conflict Resolution, 19*(3), 503-531.

Hardin, G. (1968). The tragedy of the commons. *Science, 162*, 1243–1248.

Hatfield, E., Walster, G. W. & Piliavin, J. A. (1978). Equity theory and helping relationships. In L. Wispé (ed.). *Altruism, sympathy, and helping: Psychological and sociological principles.* New York: Academic Press, 115-139.

Houser, D., & Kurzban, R. (2002). Revisiting kindness and confusion in public goods experiments. *American Economic Review, 92*(4), 1062-69.

Jones, G. (2008). Are smarter groups more cooperative? Evidence from prisoner's dilemma experiments, 1959–2003. *Journal of Economic Behavior and Organization, 68*(3), 489-497.

Kahan, J. P. (1973). Noninteraction in an anonymous three-person prisoner's dilemma game. *Behavioral Science, 18*(2), 124-127.

Krebs, D. L. (1970). Altruism – an examination of the concept and a review of the literature. *Psychological Bulletin, 73*, 258-302.

Krebs, D. L. (1982). Altruism – a rational approach. In N. Eisenberg (Ed.). *The development of prosocial behavior.* New York: Academic press, 53-76.

Kollock, P. (1998). Social Dilemmas: The Anatomy of Cooperation. *Annual Review of Sociology, 24*(1), 183-214.

Komorita, S. S. & Lapworth, C. W. (1982). Cooperative choice among individuals versus groups in an N-person dilemma situation. *Journal of Personality and Social Psychology, 42*(3), 487.

Krupka, E. & Weber, R. (2013). Identifying social norms using coordination games: Why does Dictator game sharing vary? *Journal of the European Economic Association, 11*(3), 495-524.

Kümmerli, R., Burton-Chellew, M.N., Ross-Gillespie, A. & West, S.A. (2010). Resistance to extreme strategies, rather than prosocial preferences, can explain human cooperation in public goods games. *National Academy of Sciences, 107*(22), 10125–30.

LaFollette, H. & Persson, I. (Eds.). (2013). *The Blackwell guide to ethical theory*. New Jersey: John Wiley & Sons.

Levine, D. (1998). Modeling Altruism and Spitefulness in Experiments. *Review of Economic Dynamics, 1*(3), 593-622.

Liberman, V., Samuels, S.M. & Ross, L. (2004). The name of the game: predictive power of reputations versus situational labels in determining prisoner's dilemma game moves. *Personality & Social Psychology Bulletin, 30*(9), 1175-85.

Lindbeck, A. (1997). Incentives and social norms in household behavior. *American Economic Review, 87*(2), 370 – 377.

Marwell, G., & Schmitt, D. R. (1972). Cooperation in a three-person Prisoner's Dilemma. *Journal of Personality and Social Psychology, 21*(3), 376-383.

McDonald, J.H. (2014). *Handbook of Biological Statistics*. 3rd ed. Baltimore: Sparky House Publishing, 77-85.

Messick, D. M. & Brewer, M. B. (1983). Solving social dilemmas: A review. In L. Wheeler & P. Shaver (Eds.). *Review of* personality *and social* psychology. Vol. 4. Beverly Hills: Sage publications, 11-44.

Midlarsky, E. (1968). Aiding responses: An analysis and review. *Merrill-Palmer Quarterly of Behavior and Development, 14*(3), 229-260.

Ostrom, E. (2000). Collective Action and the Evolution of Social Norms. *Journal of Economic Perspectives, 14*, 137–158.

Quinton, A. (1973). *Utilitarian ethics.* New York: Springer.

Rabin, M. (1993). Incorporating Fairness into Game Theory and Economics. *American Economic Review, 83*(5), 1281-302.

Rege, M., & Telle, K. (2004). The impact of social approval and framing on cooperation in public good situations. *Journal of Public Economics, 88*(7), 1625-1644.

Roemer, J. (2015). Kantian optimization: A microfoundation for cooperation. *Journal of Public Economics, 127*, 45-57.

Ross, L. & Ward, A. (1996). Naive realism in everyday life: Implications for social conflict and misunderstanding. In: Reed, E.S., *et al.* (Eds.). *Values and Knowledge*. Mahwah, NJ: Lawrence Erlbaum Associates, 103-135.

Sally, D. (1995). Conversation and Cooperation in Social Dilemmas. *Rationality and Society, 7*(1), 58-92.

Segal, N.L. & Hershberger, S.M. (1999). Cooperation and competition between twins: findings from a prisoner's dilemma game. *Evolution and Human Behavior, 20*, 29–51.

Statistics Sweden. (2017). Data available for download at: *Valutakurser, månadsgenomsnitt*. https://www.scb.se/sv_/Hitta-statistik/Statistik-efter-amne/22678/Allmant/Sveriges-ekonomi/Aktuell-Pong/31243/EK0205/32234/ [Last Accessed 2018-04-21]

Thaler, R. H., Sunstein, C. R. & Balz, J. P. (2012). Choice Architecture. In Shafer, E. (Ed.). *The Behavioral Foundations of Public Policy*. Princeton: Princeton University Press.

Thaler, R. H. & Sunstein, C. R. (2008). *Nudge: Improving Decisions about Health, Wealth, and Happiness.* Yale: Yale University Press.

Tversky, A. & Kahneman, D. (1981). The framing of decisions and the psychology of choice. *Science, 211*, 453–458.

United Nations. (n.d.). *Goal 17: Revitalize the global partnership for sustainable development.* http://www.un.org/sustainabledevelopment/globalpartnerships/ [Last Accessed 2017-11-08]

United Nations. (2017). *The Sustainable Development Goals Report 2017*. New York: United Nations.

Van Lange, P., De Bruin, E., Otten, W., & Joireman, J. (1997). Development of Prosocial, Individualistic, and Competitive Orientations: Theory and Preliminary Evidence. *Journal of Personality and Social Psychology 73*, 733-46.

Wooldridge, J. (2015). *Introductory Econometrics: A Modern Approach.* 6th edition. Cincinnati: South-Western College Pub.

Yamagishi, T. (1986). The Provision of a Sanctioning System as a Public Good. *Journal of Personality and Social Psychology, 51*(1), 110-116.

Yamagishi, T. (1988). The provision of a sanctioning system in the United States and Japan. *Social Psychology Quarterly, 51*, 265–271.

Appendix A – Data

Table A1. List of programmes, number of e-mail addresses which received an invitation, invitation and reminder date (in March 2018), number of responses, response frequency and a binary classification of each programme as either natural or social sciences oriented.

Programme	Addresses	Invitation	Reminder	Responses	Frequency	Science type
Biology	75	14th	19th	8	10.7%	Natural
Biomedical Analysis	175	14th	19th	46	26.3%	Natural
Data Science	128	8th	12th	41	32.0%	Natural
Geography	59	15th	19th	11	18.6%	Natural
Journalism	53	15th	19th	24	45.3%	Social
Law	235	8th	12th	54	23.0%	Social
Logistics	59	8th	12th	21	35.6%	Social
Marine Science	74	15th	19th	21	28.4%	Natural
Mathematics	80	14th	19th	23	28.8%	Natural
Pharmacy	102	15th	19th	23	22.5%	Natural
Physics	61	7th	12th	22	36.1%	Natural
Political Science	228	8th	12th	57	25.0%	Social
Public Administration	406	14th	19th	56	13.8%	Social
Social Work	202	8th	12th	38	18.8%	Social
Systems science	236	8th	12th	45	19.1%	Natural
Total	2173			490	22.5%	

Table A2. Programme composition across treatments and in total.

	T1	T2	T3	T4	Total
Biology	1.8%	1.8%	2.0%	1.5%	1.8%
Biomedical Analysis	5.5%	8.1%	8.0%	13.0%	8.9%
Data Science	10.1%	9.0%	6.0%	9.9%	8.9%
Geography	1.8%	0.9%	4.0%	2.3%	2.2%
Journalism	5.5%	4.5%	5.0%	4.6%	4.9%
Law	13.8%	9.0%	11.0%	9.9%	10.9%
Logistics	4.6%	2.7%	4.0%	5.3%	4.2%
Marine Science	4.6%	8.1%	1.0%	3.1%	4.2%
Mathematics	1.8%	4.5%	8.0%	4.6%	4.7%
Pharmacy	4.6%	4.5%	5.0%	3.8%	4.4%
Physics	1.8%	6.3%	4.0%	5.3%	4.4%
Political Science	16.5%	9.0%	11.0%	10.7%	11.8%
Public Administration	8.3%	15.2%	13.0%	9.9%	11.5%
Social Work	9.2%	8.1%	6.0%	5.3%	7.1%
Systems Science	8.3%	8.1%	11.0%	9.9%	9.3%
Other	1.8%	0.0%	1.0%	0.8%	0.9%
Natural Sciences	42.2%	51.4%	50.0%	53.4%	49.4%

Table A3. Descriptive statistics for variables not included in the analysis (Income, Interest (>3) and Knowledge).

	T1	T2	T3	T4	Total
Income					
High income	51.4%	60.4%	55.0%	46.6%	53.0%
Low income	46.8%	37.8%	42.0%	50.4%	44.6%
No answer	1.8%	1.8%	3.0%	3.0%	2.4%
Interest (>3)	67.9%	62.2%	68.0%	65.6%	65.9%
Knowledge					
Good knowledge	15.6%	18.9%	23.0%	18.3%	18.8%
Some knowledge	23.8%	24.3%	26.0%	31.3%	26.6%
None knowledge	60.6%	56.8%	51.0%	50.4%	54.6%

Note: Interest (>3) takes the value 1 for participants who rated their interest in community issues as a 4 or 5 on a Likert scale (5 = Very interested). Income and Knowledge are categorical variables with three levels. A participant's income is coded as high if it is above 10,000 SEK, otherwise low.

Appendix B – T3 as base category

Table B1. Probit regression results (marginal effects at the mean) using T3 (large size) as the base category for Treatment. For Education dummies, the base category is Pharmacy. For Political opinion, the base category is left-wing. For Beliefs, the base category is high beliefs.

Cooperated	Model 1	Model 2	Model 3	Model 4
Treatment				
T1	0.049	0.072	0.091	0.034
	(0.066)	(0.066)	(0.066)	(0.075)
T2	0.055	0.037	0.042	0.066
	(0.065)	(0.068)	(0.069)	(0.074)
T4	-0.019	-0.030	-0.045	-0.026
	(0.064)	(0.066)	(0.068)	(0.072)
Older (>23)		0.054	0.055	0.016
		(0.049)	(0.050)	(0.052)
Female		-0.044	-0.012	-0.009
		(0.054)	(0.054)	(0.061)
Difficult (>2)			-0.174***	-0.171***
			(0.056)	(0.062)
Payment			-0.174***	-0.222***
			(0.054)	(0.058)
Political opinion				
Right-wing			-0.115*	-0.153**
			(0.061)	(0.066)
Other			-0.121**	-0.132**
			(0.053)	(0.055)
Beliefs				
Medium beliefs				-0.164***
				(0.040)
Low beliefs				-0.716***
				(0.051)
Education dummies	No	Yes	Yes	Yes
Observations	451	448	448	448

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Appendix C – Robustness check

Table C1. LPM regression results for Model 1-4. For Treatment, the base category is T1 (small size). For Education dummies, the base category is Pharmacy. For Political opinion, the base category is left-wing. For Beliefs, the base category is high beliefs.

Cooperated	Model 1	Model 2	Model 3	Model 4
Treatment				
T2	0.006	-0.032	-0.042	0.036
	(0.063)	(0.064)	(0.063)	(0.055)
T3	-0.049	-0.068	-0.082	-0.016
	(0.066)	(0.067)	(0.066)	(0.060)
T4	-0.068	-0.093	-0.119**	-0.029
	(0.062)	(0.062)	(0.060)	(0.051)
Older (>23)		0.050	0.049	0.016
		(0.048)	(0.047)	(0.041)
Female		-0.043	-0.010	-0.013
		(0.054)	(0.053)	(0.046)
Difficult (>2)			-0.162***	-0.109**
			(0.055)	(0.050)
Payment			-0.153***	-0.142***
			(0.048)	(0.039)
Political opinion				
Right-wing			-0.111*	-0.119**
			(0.060)	(0.051)
Other			-0.111**	-0.091**
			(0.050)	(0.042)
Beliefs				
Medium beliefs				-0.161***
				(0.043)
Low beliefs				-0.662***
				(0.053)
Education dummies	No	Yes	Yes	Yes
Constant	0.679***	0.540***	0.731***	0.997***
	(0.045)	(0.127)	(0.133)	(0.088)
Observations	451	448	448	448
R-squared	0.005	0.058	0.106	0.349
Adjusted R-squared	-0.002	0.014	0.055	0.309

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Appendix D – Email invitation

The English version of the email invitation sent to the students is given below.

Hi [field of education] student,

If you complete my decision experiment that takes about 10 minutes you can get up to 70 kr. The experiment is part of my master thesis in economics.

It is of course completely voluntary to participate, but at the same time you cannot be replaced by somebody else – your answers are important! In a scientific survey, it is important that people of different views participate.

Financing has been obtained from Centre for Collective Action Research at Gothenburg University.

Your answers will be anonymised before processing to assure anonymity.

To participate, just follow the link:
[Link given]

Thank you for participating!
Ronja Sundborg
Supervisor: Elina Lampi

Appendix E – Instructions

The English version of the experiment instructions provided to treatment 3 and 4 are given below. For treatment 1 and 2, the group size and payoffs change.

Welcome to this decision experiment. If you complete the whole experiment, you can receive up to 70 kronor depending on your choices and the choices of others. You can choose to be paid via SWISH or collect your money in cash at the School of Business, Economics and Law. Details regarding payment are provided at the end of the experiment.

The experiment takes about 10 minutes to complete and consists of four parts.

It is important that you do not talk to anybody during the experiment and that you do not discuss the experiment with other students after you are done.

Are you born on an even/uneven day in an even/uneven month? Example: If you are born on April 15, you choose the option "Uneven day and even month".

- Even day and even month
- Uneven day and even month
- Even day and uneven month
- Uneven day and uneven month

Next page

Part 1: The [community] dilemma[33]

Below are the instructions to the [community] dilemma presented.

****

A computer chooses twenty-four other students at random so that you make up a group of twenty-five students together. The other students get exactly the same instructions as you. Neither you nor the other students will learn anything about each other at any point in time.

You start the [community] dilemma with 16 kronor and must choose option A or B. If you choose option A, you lose the 16 kronor while the other students get 2 kronor each. If you

[33] The instructions in Part 1 are primarily inspired by Barcelo and Capraro (2015) and Ellingsen *et al.* (2012).

choose option B, you keep the 16 kronor while the other students get nothing. Remember that all students face the same decision, which means that the amount of money each student exits the [community] dilemma with depends on the choices of all students.

Below, you see some examples of possible outcomes.

[Community] dilemma examples:

- If everybody chooses A, the [community] dilemma is ended with everybody getting **48** kronor each.
- If everybody chooses B, the [community] dilemma is ended with everybody getting **16** kronor each.
- If you choose A and all the other students choose B, the [community] dilemma is ended with you getting **0** kronor and the other students getting **18** kronor
- If you choose B and all the other students choose A, the [community] dilemma is ended with you getting **64** kronor and the other students getting **46** kronor

****

If you wish to see all possible outcomes, you can click on "Open table" below.

Table F1. The table over possible outcomes that was shown when the participants clicked the "Open table" button.

	IF YOU CHOOSE A		IF YOU CHOOSE B	
Number of others that choose A	Those that choose A get	Those that choose B get	Those that choose A get	Those that choose B get
0 participants	0 kr	18 kr	-	16 kr
1 participants	2 kr	20 kr	0 kr	18 kr
2 participants	4 kr	22 kr	2 kr	20 kr
3 participants	6 kr	24 kr	4 kr	22 kr
4 participants	8 kr	26 kr	6 kr	24 kr
5 participants	10 kr	28 kr	8 kr	26 kr
6 participants	12 kr	30 kr	10 kr	28 kr
7 participants	14 kr	32 kr	12 kr	30 kr
8 participants	16 kr	34 kr	14 kr	32 kr
9 participants	18 kr	36 kr	16 kr	34 kr
10 participants	20 kr	38 kr	18 kr	36 kr
11 participants	22 kr	40 kr	20 kr	38 kr
12 participants	24 kr	42 kr	22 kr	40 kr
13 participants	26 kr	44 kr	24 kr	42 kr
14 participants	28 kr	46 kr	26 kr	44 kr
15 participants	30 kr	48 kr	28 kr	46 kr
16 participants	32 kr	50 kr	30 kr	48 kr
17 participants	34 kr	52 kr	32 kr	50 kr
18 participants	36 kr	54 kr	34 kr	52 kr
19 participants	38 kr	56 kr	36 kr	54 kr
20 participants	40 kr	58 kr	38 kr	56 kr
21 participants	42 kr	60 kr	40 kr	58 kr
22 participants	44 kr	62 kr	42 kr	60 kr
23 participants	46 kr	64 kr	44 kr	62 kr
24 participants	48 kr	-	46 kr	64 kr

What option do you choose in the [community] dilemma?

- Option A
- Option B

Next page

Part 2(1): Motivation

Did you choose A(B) at random?

- No
- Yes

If the participant chose "No", she moved on to Part 2(2) on the next page. Otherwise, she moved straight on to Part 3.

Part 2(2): Motivation[34]

Below, a few suggested motivations are presented. Please choose those alternatives that you think best explains why you chose A(B) in the [community] dilemma. You can choose at least one and at most three alternatives.

The following statements were randomised and only visible to participants who chose A.

- ☐ I chose A because it is the choice I believe most other students in my group made
- ☐ I chose A because it leads to the group getting most money in total
- ☐ I chose A because I consider it to be the fair choice
- ☐ I chose A because I care about others
- ☐ I chose A because it feels good to help others
- ☐ I chose A because I think that it is the ethically right thing to do
- ☐ I chose A because I think that this choice is consistent with social norms
- ☐ I chose A because it is the choice that I'd like everybody to make in this situation
- ☐ I chose A for another reason

[34] The instructions in Part 2 are primarily inspired by Bosch-Domènech and Silvestre (2017).

The following statements were randomised and only visible to participants who chose B.

- □ I chose B because it is the choice I believe most other students in my group made
- □ I chose B because it is the most profitable choice for me
- □ I chose B because I want to avoid getting 0 kronor
- □ I chose B because I want to avoid being taken advantage of
- □ I chose B because I don't know who the other students are
- □ I chose B because I don't know what choices the other students made
- □ I chose B because I think that the choice I make has a small impact on how much the other students get
- □ I chose B because I believe that the probability that all students choose A is small
- □ I chose B for another reason

If the participant chose "I chose A(B) of another reason", the following question appeared.

Please shortly describe what other reason you had for choosing A(B).

[Text box]

Next page

Part 3: Other students[35]

You are now going to indicate how many of the other students in your group that you believe chose option A in the [community] dilemma. If the correct number matches your answer, you will get an additional 6 kronor.

As a reminder, the instructions for the [community] dilemma are provided one more time.

[Instructions again.]

How many of the other twenty-four students in your group do you believe chose option A in the [community] dilemma?

- 0-8 students
- 9-16 students
- 17-24 students

[35] The instructions in Part 3 are primarily inspired by Krupka and Weber (2013).

Next page

Part 4: Final questions

What is your gender?

- Woman
- Man
- Other: [Text box]

In what year were you born? Please write the whole year.

[Text box]

What is your typical monthly after-tax income in kronor (including governmental support and student loan)?

- Less than 5,000
- 5,001 - 10,000
- 10,001 - 15,000
- 15,001 - 20,000
- 20,001 - 25,000
- More than 25,000
- Don’t want to answer

What is your field of education?

- Pharmacy
- Biology
- Biomedicine
- Data science
- Physics
- Geography
- Journalism
- Law
- Logistics
- Marine science

- Mathematics
- Public administration
- Social work
- Political science
- System science
- Other: [Text box]

What party would you vote for if it was election day today?

- Centre party
- Feministic initiative
- Liberals
- Green party
- Conservatives
- Social democrats
- Swedish democrats
- Left party
- Don't want to answer
- Don't know
- Other: [Text box]

How interested are you in community issues on a scale from 1 to 5, where 1 means not at all interested and 5 means very interested?

(not at all interested) 1 2 3 4 5 (very interested)

How familiar are you with a game called "Prisoner's Dilemma"?

- I have no knowledge about the game
- I have some knowledge about the game
- I have good knowledge about the game

On a scale from 1 to 5, where 1 means not at all difficult and 5 means very difficult, how difficult was it to understand the instructions to the dilemma according to you?

(not at all difficult) 1 2 3 4 5 (very difficult)

Next page

The experiment is over

A big thank you for your participation!

If you choose SWISH, you will receive a SWISH payment during week 14. Due to tax reasons, you need to fill in your personal information on the next page if you choose SWISH.

If you choose to collect your money in cash, you can do this outside the economic library on the following dates. More information concerning how you collect your money in cash is given on the next page. You will need to provide your phone number on the next page.

Tuesday April 3rd between 09.00-12.00
Thursday April 5th between 13.00-16.00

All information that you on the next page provide to make payment possible will be separated from your previous answers to achieve anonymity.

If you choose to relinquish your payment, you do not need to fill in any more information.

Do you want to be paid via SWISH, collect your money in cash or relinquish your payment?

- I choose SWISH
- I choose cash
- I relinquish my payment

Depending on the choice, the participant was directed to one of the following three pages. On each page, there was a "Send in" button.

SWISH

Participating in an economic experiment is an activity of independent character and does not constitute an employment relationship. Participants are therefore responsible with regard to fiscal consequences. An Income Statement will be sent to Skatteverket if the compensation ex-

ceeds 99 kr and a copy of the Income Statement (KU) will be sent to the payee. Because participants in this experiment can receive at most 70 kr, an Income Statement will not be sent for participants who have participated solely in this experiment at Gothenburg University.

Collected personal information will by Gothenburg University be treated solely to enable payment for participation in experiments and provide Skatteverket with an Income Statement when needed. Gothenburg University saves the information for 10 years. By transmitting personal information, the information provider accepts that such information is treated in accordance with Personuppgiftslagen (1998:204).

If you have any questions, you can e-mail beslutsexperiment2018@gmail.com.

Department of Economics
School of Business, Economics and Law, Gothenburg University
Vasagatan 1, E533
411 24 Gothenburg
Organisation number 202100-3153

I hereby certify that I in Mars 2018 via internet have participated in an economic experiment sent by a master's student at the School of Business, Economics and Law, Gothenburg University.

- o Yes

Please fill in your phone number. You are responsible for providing a correct phone number and that it is connected to SWISH.
[Text box]

Please fill in your e-mail address.
[Text box]

Please fill in your full name.
[Text box]

Please fill in your civic registration number.

[Text box]

Please fill in your home address.

[Text box]

Cash

To receive your money, you need to provide the same phone number upon collection as you fill in below. You collect your money outside the economic library. The library is located on the floor above the main entrance to the School of Business, Economics and Law, Vasagatan 1. You get your money from a representative dressed in a dark blue T-shirt with the school's logo on. You can collect your money on the following dates:

Tuesday April 3rd between 09.00-12.00
Thursday April 5th between 13.00-16.00

If you have any questions, you can e-mail beslutsexperiment2018@gmail.com.

Please fill in your phone number. You need to provide the same phone number upon collection.

[Text box]

If you want the instructions about how you collect your money to be sent to your email, you can type in your e-mail address.

[Text box]

Thank you for your participation!

Because you have chosen to relinquish your payment, you do not need to fill in any more information.

If you have any questions, you can e-mail beslutsexperiment2018@gmail.com.