iscte

**INSTITUTO
UNIVERSITÁRIO
DE LISBOA**

Essays on behavioural economics: uncovering drivers of altruistic behaviour

António Filipe Monteiro dos Santos Vieira Rodrigues

PhD in Economics

Supervisors:

PhD Mónica Alexandra Vilar Ribeiro de Meireles, Assistant Professor, Instituto Universitário de Lisboa (ISCTE-IUL)

PhD Marieta Alexandra Moreira Matos Valente, Assistant Professor, Escola de Economia e Gestão da Universidade do Minho (UMinho)

October, 2022

Department of Economics

Essays on behavioural economics: uncovering drivers of altruistic behaviour

António Filipe Monteiro dos Santos Vieira Rodrigues

PhD in Economics

Jury:

PhD Maria Conceição Costa Pereira, Assistant Professor, Faculdade de Economia da Universidade de Coimbra
PhD Lígia Maria Costa Pinto, Associate Professor, Escola de Economia e Gestão da Universidade do Minho
PhD Ana Cristina Narciso Fernandes Costa, Assistant Professor, Instituto Universitário de Lisboa (ISCTE-IUL)
PhD Mónica Alexandra Vilar Ribeiro de Meireles, Assistant Professor, Instituto Universitário de Lisboa (ISCTE-IUL)
PhD Sofia de Sousa Vale, Assistant Professor, Instituto Universitário de Lisboa (ISCTE-IUL)

October, 2022

Resumo

Esta tese de doutoramento visa estudar as bases económicas do comportamento pro-social de várias formas distintas: Em primeiro lugar, enfatiza que o comportamento altruísta pode ser o resultado de diferenças individuais em seres humanos, quando se recolhem dados através de inquéritos, mas também em países, quando se analisa informação a um nível agregado. Em segundo lugar, demonstra que o comportamento altruísta emerge de uma forma mais notória quando são dadas mais opções às pessoas para escolherem entre alternativas para doar. Para o efeito, apresento uma revisão da literatura generalizada e quatro ensaios empíricos que sugerem novas evidências sobre estes tópicos, em particular. O primeiro ensaio faz uma análise sobre o altruísmo à escala global utilizando dados do Banco Mundial e do relatório The World Happiness Report referente ao período de 2020. A análise empírica é conduzida utilizando dados de uma amostra de 128 países em 6 continentes. Os resultados sugerem que as nações que apresentam níveis de generosidade mais elevados são também bastante distintas em relação às restantes, nomeadamente ao nível do desenvolvimento económico, na vertente sociodemográfica e ainda culturalmente. Os outros três ensaios baseiam-se na recolha de dados através de inquéritos com o objetivo de identificar novos fatores que possam explicar o comportamento pro-social em indivíduos. Especificamente, o segundo tenta estabelecer uma relação entre crenças no livre-arbítrio e generosidade, o terceiro com capacidades cognitivas/estratégicas e o último com o número de opções disponíveis para doação. Os resultados sugerem que as pessoas que possuem crenças mais robustas no livre-arbítrio revelam também ter maiores tendências generosas. Os resultados sugerem ainda que as competências cognitivas e as capacidades de pensamento estratégico têm também uma relação com o altruísmo. No entanto, o primeiro fator tem uma influência negativa enquanto o segundo positiva. Finalmente, no último ensaio, foi observado que a generosidade aumenta quando estão disponíveis mais opções para doar. Globalmente, esta tese contribui para aumentar a nossa compreensão do comportamento pro-social em termos das características individuais que lhe estão correlacionadas.

Palavras-Chave: altruísmo, diferenças individuais, jogo do ditador, inquéritos, livre-arbítrio, capacidades cognitivas, capacidades estratégicas, o efeito das escolhas em excesso.

JEL Classification: C26, C64, C72, D64, D91, E7

Abstract

This Ph.D. thesis aims to study the economic foundations of prosocial behaviour in multiple significant ways. First, it emphases that altruistic behaviour can be the result of individual differences in people when using survey experiments, but also in nations when analysing information at an aggregate level. Second, it also states that altruism appears more prominently when more options are given for decision-makers to choose among alternatives to donate. For that purpose, I present a broad literature review and four empirical essays that provide new evidence on these particular topics. The first essay makes an overall analysis on altruism at a global scale using a database from The World Bank and The World Happiness report for the period 2020. The empirical analysis is conducted using cross-sectional country data from a sample of 128 worldwide countries in the 6 continents. The results suggest that nations which exhibit higher generosity levels are also quite distinct from the others, such as in the level of economic development, in some socio-demographic variables and cultural dimensions. The other three essays are based on the collection of experimental survey data aiming at identifying new factors that may explain generous behaviour in individuals. Specifically, the second tries to stablish a relationship between free will beliefs and giving, the third relates cognitive skills with strategic thinking abilities and the last one studies how the number of options available affects giving. The results suggest that higher free will beliefs have a statistically significant effect on generous concerns. Personal cognitive skills and strategic thinking abilities also have a relationship with giving. However, the former has a negative influence while the latter is positive. Finally, in the last essay, I observe that generosity increases when more recipient options are available and this effect is statistically significant, as well. This thesis contributes to our understanding of prosocial behaviour in terms of individual and country characteristics that are correlated with altruistic behaviour.

Keywords: altruism, individual differences, dictator game, survey experiment, free will, cognitive skills, strategic thinking abilities, too-much-choice effect

JEL Classification: C26, C64, C72, D64, D91, E71

Acknowledgments

Contents

x

List of Tables

List of Figures

Abbreviations

BCG – Beauty contest game

CRT – Cognitive reflection test

DG – Dictator game

FAD – Fee will and determinism

FD – Fatalistic determinism

FMC – Freedom to make life choices

FW – Free will

GDP – Gross domestic product

GMM – Generalized method of moments

HLE – Healthy life expectancy at birth

KW – Kruskal-Wallis statistical test

ML – Maximum likelihood

NE – Nash equilibrium

POC – Perception of corruption

SD – Scientific determinism

SS – Social support

UG – Ultimatum game

UNP – Unpredictability

US – United States

WHO – World Health Organization

Introduction

This PhD thesis explores the role of a set of variables to explain differences in altruism, with particular attention to three issues: national attributes that relate to different levels of altruism, individual characteristics and choices, and decision framing to improve generous behaviour. To reach that purpose, the thesis is composed by six chapters covering four essays in total.

The first chapter is composed by an extensive literature review on the state of the art of altruism from an Economics perspective with particular attention to three aspects: understanding altruism as an evolutionary concept, identifying the potential human motivations behind it and establishing how altruism is methodologically measured.

The second chapter (Essay 1: Which variables explain altruism? A cross-country econometric analysis) makes an overall analysis of altruism on a global scale pursuing not only to identify which factors affect altruism but also how those factors in an econometric model affect altruism, as well. For that purpose, I combine cross-sectional country data on generosity with macroeconomic and social information from a sample of 128 countries in 6 continents.

The third chapter (Essay 2: Some implications of belief in free will for altruism: evidence from a survey experiment) focuses on individual factors that may impact altruistic behaviour, namely differences in free will beliefs. Since in the second chapter (Essay 1) we observe strong and significant correlations between altruism and the reported levels of freedom to make life choices (one of the several independent variables used in the study), those results motivated further exploration in this chapter. This is not a topic of much analysis in the literature, and as such I propose a different methodological approach.

The fourth chapter (Essay 3: Cognitive skills, strategic thinking and altruism) also focuses on individual differences in altruistic behaviour, namely how strategic thinking abilities are linked with altruism. So far, this particular topic has received little attention in the literature, since the priority has been to establish a relationship between cognitive skills and strategic thinking abilities. In this essay, I extend the existing evidence by exploring how these two individual characteristics affect altruism.

The fifth chapter (Essay 4: Altruism under multiple choices: testing the too-much-choice effect on donations) explores an often observed behavioural bias related to how choices are framed (often in consumption setups), and extends it to the analysis of

altruistic behavioural differences. I explore whether the too-much-choice effect is present in donation decision situations.

The sixth chapter concludes.

This PhD thesis contributes to better understand prosocial behaviour[1] at two different levels of focus, namely at the country level, exploring aggregate national altruistic behaviour, and at the individual level, exploring personal characteristics and the choice setup (through an experimental approach). Regardless of the level of analysis, the thesis takes a Behavioural Economics approach by assuming that prosocial preferences matter for choices at an aggregate and individual level. At the individual level, an experimental approach was used through surveys, which were either monetarily incentivized (essay 3) or hypothetical (essay 2 and essay 4).

This study clarifies that most altruistic nations are particularly different in several dimensions comparing to less altruistic nations. However, considering other levels of altruism among nations the differences are almost non-existent. Most altruistic nations report higher GDP *per capita*, superior happiness scores, more people living in urban areas, less women in the community, an older population and a culture quite distinct from others.

The thesis also clarifies how individual differences, less explored in the literature, may affect prosocial behaviour. Individuals with higher free will beliefs and better cognitive skills are on average more altruistic than the remaining ones. However, no significant correlation was observed between strategic thinking abilities and altruism. Regarding decision framing it was observed that if the number of options to donate increase, donations increase on average, as well.

The following points provide a more detailed overview of each chapter.

Overview of Chapter II: Essay 1

Chapter 2 seeks to examine variation in generosity at the country level across the world. For that purpose, we combine cross-sectional country data on generosity with macroeconomic and social variables from a sample of 128 worldwide countries in 6 continents. The analysis begins by identifying and describing the nature of the variables

---

[1] In this thesis, a behaviour or outcome will be described as prosocial, altruistic or generous, signifying that the individual sacrifices own income for the sake of others. However, while altruism is a specific type of prosocial behaviour that is motivated solely by a desire to benefit others, prosocial behaviour encompasses a broader range of actions that are intended to benefit others, regardless of the underlying motivation (Eisenberg et al., 2006).

that previous literature on the topic recognises as having an association with altruistic behaviour. Subsequently, a Pearson's correlation test is used in order to identify which variables have indeed a significant correlation with generosity. A model is then defined as the most suitable for the data collected to estimate an econometric relation between those variables. The data reveals that 35% of the variation in the generous behaviour is associated with variables such as *happiness*, *anonymity*, *deservingness* and *the proportion of women* in the general population. Furthermore, if we introduce the Hofstede's six cultural dimensions into the econometric model, we find that *uncertainty avoidance* and *long-term* are significant in explaining the generous behaviour by increasing its explanatory power in 18 percentage points.

Overview of Chapter III: Essay 2

Recent studies have shown that inducing people not to believe in free will creates a feeling of helplessness and greatly diminishes prosocial behaviour. In fact, people are more likely to cheat in an academic test or to be aggressive towards other individuals. Since altruism is a strong manifestation of prosocial behaviour, we test if belief in free will can have an influence on giving behaviour. For that purpose, in chapter 3, we designed three distinct treatments, which were implemented through a survey experiment, namely one where the notion of free will was reinforced, another where the notion of free will was refuted, and another under a neutral context. Results for giving behaviour in a hypothetical dictator game were compared. We found that on average respondents were less generous under the treatment refuting the existence of free will than in the pro-free will treatment or in the neutral treatment. Furthermore, we found that when a relationship between belief in free will and amounts given in the dictator game existed, it was just for those individuals who reported higher beliefs in free will (using the FAD-Plus scale). We also found a positive and significant relationship between belief in scientific determinism (a subscale of the complete FAD-Plus scale) and generosity.

Overview of Chapter IV: Essay 3

In recent decades, cognitive abilities have received special attention in interdisciplinary literature, since they are considered to be crucial determinants of decision making. The results of previous literature on the topic typically show that individuals with better cognitive skills realize better choices overall. However, to the best of our knowledge, no previous attempt has been made to establish a relationship between ability skill for solving

strategic thinking problems (measured by a beauty contest game) and altruism. Are individuals with more efficient strategic thinking also more altruistic individuals? In chapter 4, we conduct an online experiment involving 74 participants reporting results from a beauty contest game, a cognitive reflection test and a dictator game. Responses were incentivized with a payment to the participant who won the beauty contest game. Our results suggest that respondents with higher scores in the cognitive reflection test played the beauty context game better, but we did not observe any relationship between CRT (cognitive reflexive test) scores and altruism. The same is valid for the relationship between strategic abilities and altruism, though in the econometric analysis we did observe that both cognitive skills and strategic abilities were significant to explain the amounts given in the dictator game when respondents chose to give. The effect of cognitive skills on generous behaviour was negative but for strategic abilities was positive.

Overview of Chapter V: Essay 4

The too-much-choice effect has been identified in the literature in the context of consumption decisions, in which individuals find it a harder task to choose from large rather than small assortments, and are thus more likely to regret their choices or not to make a choice at all in the former setup. Yet, this effect is not universally observed in decision making. The expected effect on donation decisions is unclear. Donating can be a simple decision when people have well-defined preferences, but in other cases it can be complex if, for example, donors do not donate frequently. In order to clarify this question, we designed, in chapter 5, three distinct scenarios of the classic dictator game with charity recipients: one where the number of donation options is limited to just one charity; another where the number of available charities increases to six; and another one with twenty-four alternatives. For the scope of this study the too-much-choice effect would translate into lower individual donations or no donations as the number of recipient charities increases. The results show that the too-much-choice effect does not emerge when comparing the three scenarios. Nevertheless, even if participants allocate more resources to charities when more donation options are available, individual charities on average, under those conditions, receive less.

Chapter I

An economic approach to altruism: overview of the literature

Self-interested behaviour has been one of the main assumptions of economic models concerning the major motivation behind any human action (Mullainathan and Thaler, 2000; Berg and Gigerenzer, 2010). Yet, over the past 40 years, many researchers have questioned this tenet. At first sight, it might seem counterintuitive, if an altruistic person increases the well-being of others by sacrificing his or her own well-being (Becker, 1976; Simon, 1990; Simon, 1993), from where does the motivation for altruistic behaviour come? If there is no evident incentive, why do we observe benevolent actions? For example, in the United States of America, in recent decades, the non-profit sector is growing in the number of organisations that compose it (Rose-Ackerman, 1996; Zhao et al., 2010). In fact, altruism seems to be a growing global phenomenon (Gautier and Pache, 2015).

As a starting point, Trivers (1971), a biologist, considers that if an individual in a species has a long-life expectancy, it is plausible that she will face several possible situations in her life where she could behave altruistically. This idea relates to Selten's "trembling hand" (1975) equilibrium in game theory, which explains that a player could choose any available (even unintended) strategy, even if the possibility is extremely low. Putting together these two ideas, if an individual faces several decisions throughout her lifetime, the possible number of times that she could behave altruistically increases, even if it is just by chance or mistake or even if the probability to do so is extremely small each time she makes a decision. Still, this condition does not answer the question of why we observe altruistic behaviour consistently.

Becker (1976), an economist inspired by sociobiological literature, developed a model of altruism in order to demonstrate that altruistic behaviour can be a consequence of individual rationality and human evolution. If an altruistic person gives away some of his wealth to be consumed by selfish people, the wealth of the self-seeking will be greater than the wealth of altruistic individuals. However, since altruism is associated with the well-being of at least two people, the self-interested person will not want to decrease the income of the altruistic individual since some of that income will eventually be given to her in the future. So, the interaction between altruistic and selfish individuals creates an incentive for mutual cooperation. Therefore, it can be rational for poorer people not to

desire a decrease in the wealth of altruists because some of that wealth might benefit them in the future[2]. This is also a reason why donations are usually not anonymous, as Becker argues (1981: 9):

"Even altruists want beneficiaries to know their benefactor so that they can incorporate his interests into their behaviour."

This explains why altruism is more likely to emerge in a society of non-anonymous people (Bester and Güth, 1998) or why we observe more altruistic acts in the presence of a crowd (Van Vught et al., 2007). Philanthropists are making their altruistic actions getting more efficient results, since if more individuals are aware of their altruistic acts, their positive reputation grows faster. Altruistic acts provide a greater benefit if they help creating a benevolent reputation (as a social good) for the decision-maker. The more people become aware of these actions, treated positively in wider society, the greater is the positive reputation for the individual.

However, there are not just synergies between beneficiaries and donors. In some cases, when countless individuals ask for assistance, it is difficult to distinguish between those who actually deserve or need it from those that do not. In those circumstances, it may be rationally impossible to make such distinction and the support by altruistic individuals might be avoided at all. Also, the beneficiaries would logically prefer to receive a higher level of aid, than the donors are willing to give. This result is expressed through the Samaritan's Dilemma (Buchanan, 1975), which is explained in a simplified form by Bruce and Waldman (1991); if the recipient anticipates that the donor will always act with altruism towards her, then the recipient will behave in such a manner that raises the possibility that she will need help again in the future.

The problem arises because the incentives between beneficiaries and donors are not aligned. In Lindbeck and Weibull (1988)'s opinion, the solution could be to establish a commitment between both of them. Although the recipient would not receive more overall, she could allocate their resources more efficiently over time, consequently saving the donor's money. Even so, these kinds of agreements are not common in everyday life. Consequently, the motivation for people to give must be related to something else.

---

[2] This only works if interactions are not limited to a one off, or if the contributions to the beneficiary are not completely beyond the control of the beneficiary herself.

Andreoni (1988, 1990) argues that there must exist non-altruistic motives for giving, such as social pressure, regret, guilt, sympathy, fairness or duty that can naturally arise in a society of selfish people. Since altruistic people also try to maximise their utility, it is possible that the simple act of giving can result in a feeling of well-being for donors (Rose-Ackerman, 1996). This non-monetary component of the utility function probably comes from the fact that an individual needs to consider herself useful, important to society, in order to raise or maintain her level of self-esteem. For example, Levitt and List (2007) conceived a model of utility with a monetary component (wealth) and a non-monetary component (morality). The non-monetary component represents the moral costs, or the moral benefits associated with the action. Strong social norms in a society imply greater costs to those actions perceived as immoral, even if they result in an increase in personal wealth. Under this model, social norms can also make people choose an action that lowers wealth if it involves a rewarding moral benefit.

Therefore, even behaviours that appear to be entirely altruistic, such as charity, there seems to exist, to some extent, a selfish motivation behind it (utility maximization), which is inextricable from apparently benevolent behaviour. For that reason, Schwartz (1977) considers that helping can only be altruistic when it is motivated by internal values, not when it is done to match social expectations.

In a simple model, Simon (1990) demonstrates why altruism has survived to the present day. Since altruists contribute to the well-being of individuals within a group - in his model, altruistic behaviour contributes to increase the number of offspring of other members of the group - altruists will reproduce less than selfish people. However, since they help the group to grow faster at their own expense, altruistic behaviour become necessary for a group's survival, and therefore altruism as a quality may survive in a context of interaction and competition between different groups.

Becker (1976) also explains the survival of altruistic behaviour, in this case between siblings. Since brothers have 50 percent of their genes in common, it could be rational for an altruistic brother to lower his own genetic fitness[3] to enable his brother to be twice as efficient in terms of expected fitness than he is. This is a rational action to increase the chances for his genes to survive. This doctrine gained popularity through Richard

---

[3] Understood as "the relative contribution of one genotype to the next generation's distribution of genotypes" (see Wilson, 1975).

Dawkins' book "The Selfish Gene"[4] (1976), which justifies acts of altruism in close relatives through the "programming" of the selfish gene. Animals, including humans, are programmed for the survival of their own genes. As close relatives have a high percentage of genes in common, it will be rational to support these relatives if the possibility of them passing on their genes to future generations is sufficiently high.

This fact is mathematically expressed as follows:

$$C_i < B_u * r \hspace{4cm} (1.1)$$

Where, C_i is the cost for individual i to be altruistic to individual u, B_u is the utility that individual u gets from the altruistic act of individual i, and r is the degree of kinship between them with $r \in]0, 1]$. Altruism will spread if the cost to individual i is less than the benefit to individual u, adjusting for the degree of kinship among them (which is the proportion of genes the beneficiary shares with the donor).

Thus, this whole line of thought leads Becker (1981) to argue that altruism dominates family behaviour to the same extent that selfishness dominates transaction markets and, since families have considerable importance in shaping the behaviour of their members, altruism might be more important to economics than is commonly expected. Nevertheless, for some researchers like Trivers (1971), altruism among family members is not really considered "pure" altruism, since people are "programmed" to worry only about the survival of their own genes, and as individuals share genes with family members, it is a selfish motivation after all. This point is important because there are various forms of altruism, some of which are discussed in the next section.

1.1. Different concepts of altruism

Altruism has many forms, including pure altruism, reciprocal altruism, strong reciprocity, and impure altruism. Since the result of these different types of altruism can be the same, they are quite difficult to distinguish – in order to do so we would need to distinguish between individual intentions or motivations, rather than actions. Nevertheless, the first concept, pure altruism, is considered the usual standard definition of altruism. Individuals that practice pure altruism do not expect any reward for being altruistic – people are simply motivated by the positive payoffs of others (Dawes and Thaler, 1988; Rabin,

---

[4] The book could also be called "Game Theory in the Animal Kingdom" due to the numerous strategic considerations the author makes about animal behaviour.

1998). This situation is mathematically represented as follows (adapted from Camerer, 1997; Ellingsen et al., 2012):

$$U_{ui} = m_{ui} + \alpha m_{uj} \tag{1.2}$$

Where, U_{ui} is the utility for individual i if she chooses the action u, m_{ui} is the utility that individual i gets from choosing the action u for her own benefit and αm_{uj} is the utility/disutility that individual i gets from the well-being of individual j for picking the action u. If α > 0 individual i gets utility from the well-being of individual j (enjoyment, justifying altruistic behaviour), if α < 0 individual i gets disutility (envy), if α=0 individual i is simply indifferent about what individual j gets from her choosing u.

Truly altruistic people characterise their behaviour not on the basis of maximising their economic rewards; their behaviour is better characterised by utility maximisation (Becker, 1981). They can gain utility not only in financial rewards, but also in circumstances where no money is involved, such as volunteering, helping the community or in promoting knowledge, which are all situations that allow altruistic individuals to gain pleasure on those activities.

Other dimensions of pure altruism recognise that people, in order to reach a goal, also need to actively lower their own well-being. Individuals have to make a sacrifice, even if it is a small one, to increase another's welfare for it to be "pure" altruism (Rabin, 1998). Bester and Güth (1998) give two examples. They argue that when people risk their own life to rescue others or when soldiers go to war, people behave as if they do not pursue their own self-interest, since they are risking their lives for the good of others.

Another type of altruism is the reciprocal altruism or reciprocal cooperation. In this concept, people are altruistic to others hoping that they will also benefit from altruism in return in the future. So, individuals are making sacrifices today expecting a benefit from the other person in the future, even if that benefit will occur over a longer time horizon. In cases where the probability of future interaction between the same individuals is low, cooperation based on reciprocal altruism may vanish. Therefore, reciprocal altruism for an individual is rational if:

$$\theta \leq \delta * \pi * p \iff \theta + \delta * \pi * p \geq 0 \tag{1.3}$$

Where, Θ is the cost of the altruistic action to the altruistic person, π is the profit return for the altruist of the altruistic action from the other individual, δ is the discount

factor since the return can occur in different time moments and p is the probability estimated by the altruistic person that the return will ever happen with $0 \leq p \leq 1$. Therefore, when two people are involved in a symmetric relationship it seems reasonable to believe that the two individuals are able to give equivalent benefits to each other at equivalent costs, increasing the possibilities for reciprocal altruism[5] to arise (Trivers, 1971).

The origins of reciprocal altruism are not clear, though some authors like Johnson (2011) reported that human beings in the hunter-gatherer societies in the Pleistocene[6] had no technology to store food and consequently, sharing food was a common behaviour within a primitive group. Even considering that dominant individuals eat typically first, they had no possibility of significantly possessing more food than others. Consequently, the act of sharing food was indeed a selfish strategy, which implied that hunter-gatherers individuals shared more food when it was more abundant to them, hoping that somebody in the future would share food with them when they had less.

Reciprocal altruism distinguishes from strong reciprocity (when $p \approx 0$) since strong reciprocators penalise people who do not cooperate in a group (force cooperation within a group) even when punishing is personally costly with the purpose to benefit the group interests (Gentis, 2000; Gentis et al., 2003; Gentis et al., 2008)[7]. They do so, even in conditions where the probabilities of future interactions among members are extremely low. In contrast, reciprocal altruism as a strategy does not subsist under those extreme conditions, since interaction between individuals is improbable to promote future reciprocity or cooperation. In primitive times, strong reciprocity could have helped human groups to survive when there was a major threat to the group such as wars, famines, natural disasters, etc. Therefore, it is reasonable to conclude that since individual survival is more likely when one belongs to a group, the genes of strong reciprocators survive even (specially) when they sacrifice for the common good.

Finally, a consequence of impure altruism is that people prefer to pay for public goods directly through donations rather than involuntarily through taxes, even when it results in the same level of wealth for the donor. Andreoni (1990) calls this phenomenon the "warm

---

[5] Rand and Nowak (2013) call this concept as direct reciprocity when the probability of another interaction between two people is sufficiently high to lead them to cooperate.

[6] Diamond (2005) claims that primitive hunter-gather societies are usually described as being deeply egalitarian concerning the fact that there is no social stratification or formal leadership, nonetheless within group members there are still individuals with higher prestige than others.

[7] Gentis (2000) argues that this behaviour is well documented in experimental games when subjects cooperate even in the last period of the play.

glow" effect - individuals gain utility in the act of giving[8]. By contrast, in pure altruism people have no preference between these two types of giving. In some circumstances, impure altruism is present even when people need to make sacrifices on behalf of others. Choi and Bowles (2007) call individuals that fight in favour of their own group against a rival group as "parochial altruists". This type of individuals is willing to sacrifice/risk their own lives fighting a common enemy of their group members. Thus, they are altruists towards their fellow group members, but they are simultaneously hostile against individuals from other groups. In the past, parochial altruists could form a large proportion in groups since intergroup aggression was common in a context of scarce resources, and the surviving parochial altruists had the chance to mate with the surviving population to reproduce their genes for future generations.

Occasionally, altruism can be associated with or mistaken by group loyalty. If it is good for a group to have altruistic people, altruistic behaviour can be encouraged among its members. Simon's concept (1993) was to connect altruism to bounded rationality, and bounded rationality to obedience. As seen previously, for a civilisation to grow faster it needs altruistic people, individuals who sacrifice themselves for the common good. But for individuals the incentive is to free ride on others' effort. However, since it is impossible for people to verify everything that society claims as "right" or "wrong" for its citizens, altruism will emerge among society members if the costs of being altruistic are lower than the benefits that altruistic people receive from being obedient. That is, if individuals internalise societal discourse as being true and "good" for them, they do not need to spend time verifying whether the "rules of society" are correct or not. In return, they internalise societal demands to help that society to grow faster at their own expense. This is an example of how cultural forces can exert a significant influence on humans to be altruistic (Fehr and Fischbacher, 2003), even if it is not in people's personal self-interest to act so.

Simon (1990, 1993) and Becker (1976), as noted previously, were both trying to explain altruism in the social sciences but from different starting points and reaching

---

[8] To show how important charity is for American society, Andreoni (1988) and Mullainathan and Thaler (2000) highlighted some statistic data about donations to show the enduring significance that charity has on American society. Even over time the results remain quite similar, with donations at around 2% of GDP. Accordingly, the latter authors consider it more appropriate to propose that human behaviour is better represented by bounded self-interest than by pure self-interest (Bounded self-interest is one of the three pillars of behavioural economics - the others being bounded rationality and bounded willpower).

distinct conclusions. For Becker, altruism is the result of individual rationality, taking it to an extreme of rational thinking – people can behave altruistically if they perceive some future benefit for helping. His idea is well supported in terms of evolutionary behavioural biology, as per the Darwinian expression, "survival of the fittest". On the other hand, Simon considers altruism the result of human cognitive limitation, which makes people behave altruistically if the norms of society say so. Others, like Devetag and Warglien (2003), also invoke to explain altruistic behaviour the human cognitive limitations when people try to maximise their payoffs in generalised settings. Their study suggests that there is a link between short-term memory constraints and errors in choosing the payoff-maximisation solution. Therefore, when researchers observe mistakes in payoff-maximisation problems, those errors might be derived from cognitive limitations rather than manifestations of social preferences.

In other circumstances, altruism can be associated with the formation of reputation (Engelmann and Fischbacher, 2009). People can signal themselves as altruistic people to convey to others an image of generosity, strength of character, intelligence, wealth or simply that they can help others rather than themselves, which are all considered to be positive attributes for an exchange partner (Van Vught et al., 2007). Reputation formation arises when individuals behave more altruistically when there is the possibility of interacting with the same individual on multiple occasions in the future (Gächter and Falk, 2002), which is the usual case in the workplace or in the family. Trivers (1971) claims that when a person repeatedly interacts with the same individuals it is positive for herself to attempt a good relationship with those people. This is the main reason why reciprocal cooperation naturally arises between workers in a company. Therefore, we cannot deduce anything about the altruistic level of individuals since under those circumstances people are forced to cooperate in order to retain their jobs or to get a promotion. In situations like this, where there is a threat of punishment or a reward motivation, selfish incentives will encourage people to behave in an altruistic manner, if the costs of performing such behaviour are not perceived as too high. Van Vught et al. (2007) claim that if the performance is costly, it is possible to discriminate between selfish and genuine altruistic people, since under normal circumstances[9] having an altruistic reputation brings benefits

---

[9] Van Vught et al. (2007) suggest that sometimes helping members of a different group, although it is an act of altruism, may not be seen as positive for the members to which the individual belongs. This is typical in situations where groups are in conflict, like war or when workers help other workers from a competing company.

to individuals. The same researchers state that the benefits of being altruistic can cause competitive altruism to emerge. Individuals want so much to be perceived as altruistic that they can try to help others even when other people do not want or ask for their help[10], assuming that the costs are not regarded as too high. This could be a reason why we see, in so many workplaces, people trying to gain favour with small offerings. Having a generous reputation is rational and could engender help from others in the future when needed.

Literature on the topic suggests that there exists a great number of situations where people act as if they had at least some altruistic concern for others. On the other hand, since young children in experimental games behave more selfishly than adults, like the classical economic model predicts, it seems that individual preferences are greatly influenced by social norms (Camerer, 2003b) – children as they grow up learn the rules of cooperation.

1.2.   Altruism in game theory

Self-interested behaviour plays an important role across game theory. As stated by Fehr and Fischbacher (2004a: 188):

 "(…) the vast majority of game theory applications assume that all people care only for their economic self-interest."

Dawes and Thaler (1988) also support this vision that in game theory one of the assumptions is that individuals are rational egoists. Since selfishness is also the common behaviour of any economic agent in market transactions (Becker, 1981), if we consider that game theory is a close representation of an interaction between agents in markets, then it is reasonable to assume that selfishness will be the predominant behaviour among economic options.

More recently, other studies also seem to support the classical selfish model. For example, Dreber et al. (2014), in a study of a repeated prisoner's dilemma game using survey questions, noted that subjects who choose cooperative strategies are primarily motivated by long-term payoff maximisation rather than social preferences to behave

---

[10] In the same spirit of the book "The knight in rusty armor" by Robert Fisher (1990) in which the knight saved several princesses even those who do not need or did not want to be saved, simply to fulfil his purpose of being a brave knight.

altruistically. They also detected that the cooperation rates change with the payoff specification, a sign that social preferences are determined by payoffs.

Nevertheless, sometimes selfishness results in quite unsatisfactory outcomes for individuals. In games such as the prisoner's dilemma or the tragedy of the commons (Hardin, 1968), where there is a strong incentive for players to pursue self-interest, the Nash Equilibrium (the equilibrium that results from a game when both players play it in a rational selfishly way) will be worse than the equilibrium that would be achieved if both players cooperate. Such results have led many researchers to question whether this is actually the behaviour that is always observed when people interact.

Some studies have emerged claiming that people are not always entirely selfish. Individuals, as stated by Rabin (1993) or Falk and Fischbacher (2006), seem comfortable performing reciprocal behaviours, increasing the possibility of obtaining fair equilibrium in games. In game theory this strategy can be recognised by tit-for-tat[11] (Axelroad and Hamilton, 1981), where players identify the last strategy chosen by the opponent and imitate it. If the opponent chose a selfish action, the player will also play selfishly, if the opponent chose to be altruistic, the player will also choose to be altruistic. However, when the game is simultaneous, if players want to choose the tit-for-tat strategy, they must guess the strategy of the opponent (through intentions or past reputation). This strategy is no more than the usual fairness behaviour.

Fehr and Fischbacher (2006), via experimental games, also noted people's preference for choosing reciprocal actions in their interactions with other players. Their theory of reciprocity stated that people evaluate the kindness of an action not only by its consequence but also by the intention underlying the action. Consequently, people can show altruism for people who they think were kind to them and punish those who they think were unkind, even when they need to hurt themselves to do so[12].

Therefore, in order to evaluate the kindness of an action, people will need to distinguish between generous action by choice and those actions that have no alternative

---

[11] The tit-for-tat strategy is based on cooperation only if both players cooperate. When a player defects the other will stop cooperation in retaliation, but just for one period, after that, cooperation can be re-established if both players agree. It is different from the trigger strategy since in this one the first player to defect will stop the cooperation between both players forever.
[12] This behaviour is defined as altruistic punishment (Fehr and Gächter, 2002). It emerges when enacting the punishment is costly and yields no direct material gain for the individual who chooses it but can induce non-cooperators to cooperate in the future. Other researchers define this phenomenon as strong reciprocity (Gentis, 2000), a tendency for humans to prefer cooperative actions.

than to be "nice" (Rabin, 1993; Camerer, 1997). In brief, the kindness of a person depends on her intention to be kind to others (Gentis et al., 2003; Dufwenberg and Kirchsteiger, 2004), according to the fairness behaviour theory.

The explanation for behaving in a fair way might also be related to the fact that people suffer from inequity aversion (Fehr and Schmidt, 1999). People lose utility in disadvantageous situations, but also when the situation is advantageous for themselves (although less than for others). The fairness equilibrium is more stable than an equilibrium that can cause a dissatisfied player to retaliate in the future against the initial opponent for having a result that she considered unfair. Another simpler explanation is that the "winning" player could just be trying to avoid a feeling of guilt for breaking the rules of fairness.

Trivers (1971) also supports the notion that reciprocal altruism may be used to prevent possible revenge. The fair equilibrium makes both players satisfied with the result and therefore they have less reason to complain under fairness conditions. Axelrod and Hamilton (1981) also observed the same fact in a repeated prisoner's dilemma game, where the "cooperation" strategy based on reciprocity could be the "winning" strategy if individuals had a sufficiently large probability of meeting again and if they had the ability to distinguish between different individuals[13]. In other words, the game must be repeated and not anonymous.

One question immediately arises, is altruistic behaviour displayed when people interact only once? Gentis (2000) observed that in some experimental games (such as the public goods game), subjects cooperate to the very end, even when any threat of retaliation has already passed. Besides, even if interactions between subjects end when the game finishes, if the game is not anonymous it does not mean that people cannot talk when the experience ends and it could be embarrassing to have to justify to other opponents why they did not cooperate towards the end. With certainty, we can be entirely sure that interaction between two people ends definitively when one of them deceases (Delton et al, 2011). Of course, if the game is anonymous it may simply be that the negative psychological feeling of non-cooperation may not be compensated by the marginal monetary gain of the non-cooperation round. In this case, altruism can be enforced by rational feelings.

---

[13] Except for some rare diseases this last condition is innate to humans.

Rabin (1993), using another approach, responded to this issue in terms of how people act in one shot normal-form games, through the frame of people's beliefs. If a Person A presupposes that Person B will act with kindness, Person A will be kind to Person B, otherwise, she will be judged to have acted unkindly. Fehr and Fischbacher, (2004a) refer to this as a social norm of conditional cooperation. This norm prescribes cooperation if the other person also cooperates. Nevertheless, in one-shot interactions, for beliefs to emerge there must exist some previous knowledge about the degree of altruism of the other player, as a result of previous interaction or information from others. In a sequential game this issue does not apply since the second player will usually cooperate if the first player chooses a cooperative strategy but will defect if the first mover defects (Fehr and Schmidt, 1999). According to Dufwenberg and Kirchsteiger's (2004) model for a sequential game played multiple times, players will change their initial beliefs according to unexpected moves from the other player. Therefore, players' choices will depend on their personal motivation to cooperate but also on the behaviour of the other player. So, in each stage of the game all players will update their game strategy according to their belief about the intentions behind the other players' choices, wherein momentary preferences will depend on biological states (Camerer et al., 2004). However, Dreber et al. (2014) argue that if a game is simultaneously played, cooperation in the first round would depend only on each player's strategy, since in the initial round each players' behaviour is independent of the cooperativeness of the opponent, and consequently it is an indication of the players' initial intentions or preferences for cooperation to occur.

Related to this, and noted previously, since people can have a preference for "good" behaviour, other researchers as Bester and Güth (1998) have developed a procedure to estimate possibilities for altruistic behaviour to survive through the success (efficient outcomes) of the interaction between altruists and selfish people in a non-cooperative game. Although in their model the interaction between altruistic people always yields better results than the interaction between selfish people, if a selfish person interacts with an altruist, the self-interest individual will always obtain a better result. So, altruists are vulnerable against selfish people and if successful behaviour is imitated, selfishness may arise. Still, considering there is always a learning consequence in any interaction, in the future the altruistic person will certainly not want to play the game again with the same selfish individual. Besides, he can also communicate to the remaining players that the selfish individual is not to be trusted. This is the punishment available to the altruistic player - discrediting the selfish player and avoiding further interactions. Simply put,

16

altruists can choose to change their friends when their altruism is not being reciprocated (Trivers, 1971). The key point here is, as altruistic people receive a larger payoff when interacting with each other and because individuals interact more with those around them, human populations tend to be structured and not randomly mixed. Cooperative people are more likely to interact with other people that also tend to cooperate, even if people around them are defectors – the spatial selection concept (Rand and Nowak 2013). Furthermore, as long as there exists a third group of observers of the game (non-anonymous), they can exclude the selfish players from the group (threats), and altruism may survive, even through one-shot non-cooperative games between players that will never meet again. This situation reflects the concept of indirect reciprocity, if the probability of knowing someone's reputation is sufficiently high, cooperation within a population can survive and evolve (Rand and Nowak 2013).

Therefore, for completely selfish people the game that they want to play is a one-shot completely anonymous game where consequences do not exist. They will want to interact with the highest number of people that do not know them. Alternatively, they could try to build an altruistic reputation, helping people when the costs for doing so are very low, and cheating when the stakes are higher, leaving the game after that to avoid consequences. As a result, even a person that has an altruistic reputation could behave selfishly if it is really important for her to do so. Trivers (1971) also mention that self-centred people can also cheat subtly, by simply cooperating but giving less than the altruistic person has given to her and not be detected. This notion can work well in complex situations where the results are not completely clear, for instance, when the payoff for each player is not directly comparable since the utility for each player is particularly unique or uncertain.

Some behavioural games support this point, in a one-shot game played anonymously, where there are no future consequences, subjects do not behave completely selfishly – they do not always choose a non-cooperative strategy (Delton et al, 2011). Dawes and Thaler (1988) and Camerer (2003a) observed 50 percent cooperation rates in single trial experiments (repeated prisoner's dilemma and public good game), and normally subjects never reach complete defection even in the final round of multi trial games such as public good games (even knowing that at this stage of the game, cooperation decreases when there is no punishment). The question is why cooperation happens so frequently.

Some authors (for example, Delton et al., 2011) suppose that people have imperfect discrimination capacities; they cannot discern with completely certainty whether an

interaction is a one-shot interaction when the decision to cooperate or not has to be taken. Therefore, people will decide under conditions of uncertainty and sometimes they will make mistakes. Generally, to avoid more expensive errors (to defect in a repeated interaction) human minds evolve by requiring a very high level of evidence before they can conclude with a 100 percent certainty that the interaction is a one-shot situation. Since people have ambiguity aversion for small probabilities of suffering a loss (Viscusi and Chesson, 1999) – e.g. this is why people buy insurance, even when the chance of suffering a loss is extremely low – cooperation in a one-shot interaction is a cheaper error that people make to avoid expensive errors (missing the opportunity of a long-term mutually beneficial exchange). People play safe since individuals can never be completely certain that they are in a one-shot interaction. Nonetheless, in Rand and Nowak's opinion (2013), one-shot games are important to reveal some individuals' preference since in a repeated game it can be of particularly self-interest to cooperate in order to maximize long-term payoffs.

Like Rand and Nowak (2013), Gintis et al. (2003) also propose that cooperation evolved in our ancestors as a good habit since most interactions are repeated and typically advantageous (people lived in small groups with their relatives), consequently cooperative strategies developed in the context of reciprocity, and are misapplied to one-shot games (social heuristic hypothesis). People behave in an anonymous, non-repeated interacting experiment as if they were trying to maximise their utility in a repeated, non-anonymous environment. Yet, others (Camerer and Thaler, 1995) prefer simply to describe this behaviour as the rules of manners (social norms) that people learn in everyday life and adopt them regardless of the situation, since it is just rude to behave otherwise.

In summary, only "pure" selfishness cannot describe in theory how people interact with others. Some of the reasons derive from strategic concerns, social norms opposed to selfish decisions, avoiding future problems from having a "bad" reputation, etc. The evidence from economic experiments sheds further light on this issue.

1.3.   Altruism in experimental economics

Experimental economics is a branch of economics that uses laboratory experiments (a controlled environment) to test economic theories or hypotheses (Smith, 1982). Experimental economics uses money as the primary reward medium (i.e., economic experiments motivate participants with monetary rewards, assuming rewards are salient

and dominant for participants when making choices), assumes a linear relationship between incentives and behaviour (monotonicity), presumes that all factors have equal influence in decision-making, and assumes that all participants will perceive and value incentives in the same way.

Behavioural economics is a branch of Economics, often based on empirical regularities which were observed within economic experiments. This branch of Economics acknowledges the possibility of non-monotonic behaviour, recognizes that some factors may be more influential than others, and considers that people's behaviour can be influenced by for example the presentation of the decision and incentives (Loewenstein, 1999; Gneezy and Rustichini, 2000). Behavioural economics thus accepts that individuals may have prosocial motivations in general, and altruistic preferences in particular.

In this thesis, we focus economic experiments that have addressed prosocial behaviour and some of its underlying drivers.

We will describe a set of experimental games that are useful for measuring prosocial behaviour. The games we opt to describe were chosen because they involve at least some type of altruism described in subchapter 1.1, even if in some cases the interpretation goes beyond prosocial motivations. For a summary of experimental economic games used to measure social preferences see Camerer and Fehr (2004) or Levitt and List (2007).

1.3.1. The Dictator Game

In recent years, experimental economics has reported consistently examples of behaviour that is not always in conformity with the classical selfish model. The classical theory is quite radical by predicting that subjects will not give any resources to another player under any circumstances. People are completely selfish, they have no concern for others, just for themselves. Nonetheless, altruism appears to arise in the simplest experimental economic game, the dictator game (DG)[14].

In the standard version of the game, the first subject, the dictator, must choose how to split an initial endowment[15] between herself and a stranger. Usually, the dictator chooses to give something. However, the classical economic theory predicts that people would give nothing to others if they can – the Nash Equilibrium is zero on giving, and

---

[14] The original version was first published by Kahneman et al. (1986) for the purpose of showing that under some circumstances, individuals can act fairly.
[15] Which is often 10 US dollars.

consequently the dictator player keeps everything for herself. The second player, the recipient player, just waits for the dictator decision. Since the recipient cannot reject it, the DG is not a "pure" game as there is no interaction among players; the dictator is fully responsible for the decision.

Engel (2011), reviewing more than one hundred DGs published between 1992 and 2009, found that on average dictators give 28.35% of the pie, 36.11% give nothing (pure selfish decision), 16.74% choose the equal split (exhibiting inequity aversion or fairness concerns) and 5.44% give the recipient everything (entirely altruistic decision). As a result, just one third of the subjects behave in the way that classic economic tenets would predict. This is quite a deviation between theoretical predictions and empirical studies, as the majority of subjects abandon the behaviour predicted by the theory.

Therefore, are we observing altruism in a laboratory experiment? Levitt and List (2007) and Bardsley (2008), for example, argue that probably not. In this kind of experiment subjects can read the signs in the environment of the lab[16] and act in accordance with what they think are the researcher's expectations. It is the so-called "experimenter effect". In fact, under subject-experimenter anonymity the donated amount normally decreases considerably (Hoffman et al., 1994), but it does not reach zero completely.

On the other hand, Benz and Meier (2008) observed a significant time-consistent correlation between donations in an experiment in the lab and donations in the field (two years separated both experiments), emphasizing the importance of personality traits over the situational factor. In their study, there were few differences between field and laboratory experiment, implying that people can behave consistently over time under similar circumstances. They observed a positive correlation between prosocial behaviour in the lab and in the field between 0.25 and 0.4. Three reasons are put forward to explain the results, namely that there might exist different "types" of persons, whereby some are more altruistic than others, altruistic behaviour might be driven by personal income situation and finally, people may have a natural tendency for consistency in behaviour.

Other researchers (Camerer and Thaler, 1995; Camerer, 2003a; Bernhard et al., 2006) have observed that the average offer in these types of games varies widely with empathy

---

[16] Haley and Fessler (2005) observed that subjects in the dictator game are significantly more generous (over 55% higher) if they have "eyespots" in their computer desktop when deciding how much to allocate to the recipient player. Camerer (1997) also argues that the way in which a game is described or framed in experimental games may affect subjects' behaviour.

between dictator subjects and recipient subjects. Generally, the more information the dictator player knows about the personal characteristics of the recipient player, the more the offer made tends to increase if both players have similar individual characteristics. Shared language, similar styles of dress and familiar behaviour are all features that indicate that the people around the subject belong to the same social group, a fact that corresponded for ancestral populations to an increase in the likelihood of future interaction and consequent increase in advantageous cooperation possibilities (Haley and Fessler, 2005). Furthermore, if the recipient player is a well-known charity organisation, donations have been observed to triple (Eckel and Grossman, 1996, as per their study of the American Red Cross as a recipient). In addition, gender also seems to influence subjects' decisions on giving. Men are more likely to be completely selfless or selfish while women prefer more equal distribution of payoffs even when the costs of being altruistic increase (Andreoni and Vesterlund, 2001). A recent meta-analysis approach on gender by Doñate-Buendía et al. (2022), in a set of 136 studies, found that women are significantly more generous than men and this result is consistently present even when controlling for other relevant variables (e.g. age).

Women's more altruistic behavior than men's can be the consequence of the evolution of the human birth process. As soon as human brains became more complex and bigger (a new-born's head is relatively large compared with his/her body), the complicated configuration of women birth canal (narrow) might led women to seek assistance from others in birth[17], which would result in better chance of survival for herself and her child[18] Even if the human species is not the only one that requires and provides assistance at birth (Demuru et al., 2018; Li el al., 2020), it is considered that it is at least one of the species that most requires assistance due to the extreme difficulties of the delivery process. Consequently, natural selection may favour those women who seek birth assistance (i.e., are more familiarized with cooperation) compared to women who give birth on their own and perish more frequently. The genes of those women subsisted and may have a strong impact on women behaviour even nowadays. Regardless of what reasons are the most important ones for the behaviour between men and women to be different, the gender of the individuals in any sample must be as balanced as possible to minimise the gender effect – generally, women cooperate more than men.

---

[17] See Rosenberg and Trevathan, 2001, for a brief summary in the topic.
[18] According to the WHO (2019) quality midwifery reduces new-born mortality by 80 per cent.

Engel (2011), in his literature review on DGs, also concluded that variables such as the deservedness of the recipient player (for example, if it is a well-known charity) or whether the recipient player increased the money being split (through a successful skill test) are both cases that can increase donations if those conditions are observed.

Other factors, such as if the dictator is identified by the remaining participants (which increases social control and reputation concerns), or if there is more than one recipient or if the game is played with real coins or banknotes, are all variables that, if present, can make dictator players become consistently more generous.

In these last two features, it is not clear why generosity increases, but they may be related with fairness concerns and money's utility. For those dictators who have fairness concerns, when there are more recipients, the division of money to be fair among all participants should imply that the donation made by them has to be greater than when recipients are in less number.

Real coins and notes could make dictators perceive more easily that low-value coins or notes donated by themselves do not provide much utility to them and as such, they are expendable more easily – may work like an almsgiving in a church, low-value coins are nonessential to givers.

On the other hand, other variables can, if presented, decrease the level of the dictator's generosity. These include, if the dictator earned the money being split (property rights), if the dictator role is played by students or children (younger people are more driven by primitive instincts such as selfishness and old age people prefer the equal split – they had more time to familiarize themselves with the benefits of cooperation), or if the final decision is a group decision (individuals who better defend the interest of the group tend to be more popular within the group) or if the game is non-repeated (can be rational to be selfish since there is no reciprocity opportunities).

A selected list of experimental papers on DGs and their main conclusions is presented in table 1.1. See Engel (2011) for additional details and Camerer (1997) for a brief summary on DGs.

Table 1.1 – Dictator Game (DG): selected experimental literature organized chronologically by topic

Topic in analysis	Journal article	Findings
Age	Benenson et al. (2007)	Altruistic behaviour seems to increase with age specially through a "good" socialization.
	Bekkers (2007)	Generosity increases with age; The availability of a single donation option (all-or-nothing) lowered generosity.

Topic in analysis	Journal article	Findings
Anonymity	Hoffman et al. (1994)	Fairness can be related to social reputation.
	Franzen & Pointner (2012)	Greater anonymity can indeed decrease the rate of giving.
Covid-19	Halevy (2020)	A novel model of strategic thinking with four components may be important to explain social behaviour in a pandemic.
	Buso et al. (2020)	Selfishness increases when the lockdown (Covid-19) becomes longer.
	Lotti (2020)	Self-report concern for the pandemic (Covid-19) has a positive impact on donations.
Deservingness (recipients)	Eckel & Grossman (1996)	People's generosity is related with deservingness of those who need help.
	Thunström et al. (2006)	Given the option to know or not the recipient deservingness, most dictators choose to reduce the social distance.
	Brañas-Garza (2006)	Increasing the deservingness of the recipient player will make people more generous; Increasing the level of confidence that the money donated will be properly spent makes people on average even more generous.
	Oxoby & Spraggon (2008)	When dictators earned the endowment, they give nothing to recipients; when recipients earned the endowment, dictator gave on average more than they gave in the standard DG.
	Cherry & Shogren (2008)	The origin of endowments matters but also the deservingness of the recipient player.
Endowment origin	Cherry (2001)	Other-regarding behaviour is significantly driven by the allocated nature of the money.
	Cherry et al. (2002)	Altruistic behaviour is greatly diminished when it involves earned wealth.
	Carlsson et al. (2013)	Subjects' mean donations in laboratory treatment and in the field are higher if the endowment is a windfall gain but in the laboratory subjects are more generous.
	Li et al. (2019)	Subjects donate more to charities if the funds come from "windfall" gains.
Gender	Bolton & Katok (1995)	Gender does not appear to influence the outcome of a DG.
	Eckel & Grossman (1998)	On average women donate twice as much as men.
Gender	Andreoni & Vesterlund (2001)	Men are more likely to be totally or nothing altruistic, women prefer equality.
	Rosenblat (2008)	Female dictators give more to physically attractive recipients, otherwise males seem unaffected by the recipients' attractiveness.
	Doñate-Buendía et al. (2022)	Women are significantly more generous than men even when controlling for other relevant variables.
Group choices	Cason & Mui (1997)	Teams' choices tend to be dominated by the more other-regarding behaviour than self-regarding behaviour.
	Luhan et al. (2009)	Teams make more selfish decisions comparing to individual decisions.
Fairness	Dana et al. (2006)	Dictators are motivated to take the action they think that others (recipients) expect them to take.
	Franzen & Pointner (2013)	Subjects who showed more fairness in the lab, also showed more fairness in the field.
Framing effect	Haley & Fessler (2005)	Cues of observability seem to increase generosity.
	Brañas-Garza (2007)	A social framing effect may cause other-regarding behaviour.

Topic in analysis	Journal article	Findings
	Shariff & Norenzayan (2007)	Religious and justice cues seem to increase generosity; self-report as being a religious person do not increase donations.
Framing effect	Rigdon et al. (2009)	A minimal social cue had no significant impact on subjects' donation but activated greater generosity from males.
	Niwa et al. (2011)	A presence of a mirror did not increase subjects' generosity
	Ahmed & Salas (2011)	Religious representations can affect the generosity of religious and non-religious subjects.
	Nettle et al. (2013)	Watching eyes make people more resistant to extreme strategies (to give nothing or give large amounts).
Individual differences	Cason & Mui (1998)	Dictator players who show more self-regarding behaviour on their first decision are less likely to change future choices.
	Eckel & Grossman (2000)	Pseudo-volunteer subjects are on average more generous than true volunteers.
	Henrich et al. (2001)	Social preferences vary widely across societies.
	Ben-Ner & Levy (2005)	More altruistic individuals are more willing to be more generous with real money than with fictional money, less altruistic individuals behave otherwise.
	Koch & Normann (2008)	Giving behaviour seems to be more related to internal motivation, not so much to external factors.
	Knafo et al. (2008)	The length of the altruistic gene (AVPR1a RS3) seems to have a major impact on human generosity
	Wang et al. (2011)	Economics students selected more selfish choices than students from other fields.
	Dawes et al. (2012)	Generally, "left-wing" dictators are more generous.
	Ponti & Rodriguez-Lara (2015)	Reflective persons are more selfish than impulsive ones. Inequity aversion behaviour describes quite well impulsive persons in DGs.
Punishment	Ruffle (1998)	Individuals are more willing to reward a good skill performance than punish a bad one.
	Fehr & Fischbacher (2004b)	Individuals can punish a third party if he/she observe an unfair action, but they punish more harshly if the injustice directly involves them.
	Bernhard et al. (2006)	Individuals punish more harshly when the punished do not belong to the same social group.
	Stüber (2019)	Unfair dictators are punished quite often, and fair dictators are almost never punished.
Rationality	Forsythe et al. (1994)	Generosity can be strategic.
	Bolton et al. (1998)	Dictators choose how much to give based on the total endowment available for the experimental session and not so much on what is available per game.
Rationality	Andreoni & Miller (2002)	Altruism is rational - dictators give more when it is cheap, and they give less when it is expensive.
	Broberg et al. (2007)	Just one third of the subjects have a reservation price consistent with selfish theories.
	Benz & Meier (2008)	Dictators' behaviour in laboratory experiments is correlated with behaviour in the field.
	Tan & Forgas (2010)	Individuals in a happy mood appear to consistently behave more selfish than sad individuals.
	Dreber et al. (2013)	Cooperation can be strategic.
	Halali et al. (2013)	Cognitive fatigue led dictators to become more selfish compared to non-depleted dictators.
	Winking & Mizer (2013)	Donating a portion of the endowment to a stranger seems unnatural in real life.

Topic in analysis	Journal article	Findings
	Panchanathan et al. (2013)	The bystander effect seems to be present (dictators give less if there are other dictators).
	Schulz et al. (2014)	The deliberate system adjusts behaviour in a self-serving manner, when it is highly loaded people show on average more generosity.
	Campos-Mercade et al. (2020)	Prosociality is stable.
Reciprocity	Kahneman et al. (1986)	People can act fairly, and they are especially fair to those who were fair as well.
	Ben-Ner et al. (2004)	Individuals behave with great reciprocity.
	Wu et al. (2011)	Subjects are particularly resentful to unfair offers from friends but not from strangers (social expectancy violation).
	Gray et al. (2014)	If recipients receive generous offers, it led them only to give equality offers.
Risk	Oberholzer-Gee & Eichenberger (2008)	Keeping the money becomes more attractive in the presence of a lottery option.
	Krawczyk & Le Lec (2010)	Introducing risk in a DG make dictator subjects less generous.
	Brock et al. (2013)	Dictators' decisions are affected by the recipient's exposure to risk, more risk for the recipient, less generosity is displayed by dictators.
Social distance	Bohnet & Frey (1999)	Decreasing social distance between subjects increases dictators' generosity.
	Johannesson & Persson (2000)	Increasing the social distance between subjects about one third of the dictators still deviated from the assumption of pure selfishness.
	Charness & Gneezy (2008)	Providing family names (decrease social distance) results in more generous allocation in DG.
	Ben-Ner & Kramer (2010)	Subjects give more to kin, followed by collaborators, neutral and competitors.
	Soyer and Hogarth (2011)	Dictators give more to entities they knew better. Donations increase with the number of entities available for donation but at a decreasing rate.
	Gross & Wronski (2019)	The amount of money individuals donate seems to have an inconsistent connection with the deservingness factor of the recipient player.
	Lönnqvist & Walkowitz (2019)	Increasing empathy toward recipients did not increase donations.
Stake size	List & Cherry (2008)	Subjects are less concerned with equality when stakes increase.
	Larney et al. (2019)	Stake size has a small but significant impact on generosity.
Survey studies	Camerer (1997)	Usually, dictators offer an average of 20–30% of the amount in division.
	Engel (2010)	Just one third of subjects give nothing.
Taking options	List (2007)	Introducing taking options in a DG reduce generosity.
Taking options	Bardsley (2008)	Taking options in a DG seem to reduce generosity.
Type of subject	Carpenter et al. (2008)	An average community member is more generous than an average student.
	Belot et al. (2015)	Students behave more like the selfish model predicts than non-students.

1.3.2. The Ultimatum Bargaining Game

The Ultimatum Bargaining Game (UG) is a more appealing and clever behavioural game since now there exists interaction between players. It was first developed by Güth et al.

(1982) as an instrument to prove that people under certain circumstances can act fairly. This game is similar to the previous one (DG), but now the recipient player (or responder) can refuse the offer. It starts by being given an initial endowment (usually 10 US dollars) to a subject (proposer/allocator), then she needs to offer a proportion of this initial endowment to another subject (the initial endowment given to player one is common knowledge for both players under standard conditions), and the other player (responder/recipient) can accept or refuse the offer. If she refuses the offer, both players receive nothing.

The subgame perfect assumption predicts that the initial player will offer the smallest value that she can, and that the other player will accept any offer above zero (the recipient player is indifferent between accepting or not an offer of zero monetary units). However, what is commonly observed is that offers below 25% of the available money are rejected with a very high probability (Fehr and Fischbacher, 2003) and offers below 20% are rejected about half the time (Camerer, 1997; Camerer, 2003a). Rarely are very low offers made or accepted (Camerer and Thaler, 1995). For responders, showing displeasure for receiving a low offer seems to be more important than accepting a small amount of money. Consequently, anticipating this scenario makes proposers to realize fairer agreements than what is commonly done in the DG (Forsythe et al., 1994).

Therefore, these results can lead to the perception that the way people play this game is not completely selfish. For instance, as argued by Fehr and Fischbacher (2003: 787):

"Rejections in the ultimatum game can be viewed as altruistic acts because most people view the equal split as the fair outcome."

Considering that players (responders/recipients) reject unfair offers, if they were completely selfish and totally focused on their own payoffs, they would not be willing to harm themselves by rejecting even small offers of money. In Kahneman's opinion (2003) the players' behaviour seems to be determined more by other motives than by profit maximisation (monetary maximisation), an idea that is also supported by Loewenstein (1999) about subjects' behaviour in economic experiments.

Nevertheless, the rejection of subjects' actions can also be connected to less virtuous feelings and altruistic outcomes could simply be a positive manifestation of these. Levine (1998) associates subject rejection behaviour to feelings of spitefulness more than to reciprocal altruism, since the rejection seems to be a punishment for an unfair offer. Some people can obtain pleasure in penalising someone who they feel deserves it.

26

Camerer and Thaler (1995), for example, argue that if players have risk aversion, they will make very generous offers in order to avoid the offer being rejected by the other player. They also state that if proposers have the opportunity to merely adopt a behaviour that has the appearance of fairness (but is not), subjects seem to be perfectly comfortable in making a proposal with these features. Also, introducing competition into this game (market games)[19], can push ultimatum offers close to zero (Camerer and Thaler, 1995; Fehr and Schmidt, 1999) as predicted by classical economic tenets (the self-interest model). Levine (1998) also suggests that in experimental games the selfish player model works well when there is a high degree of competitiveness, which is also the case in the vast majority of markets (e.g. goods markets, financial markets, etc.).

Since the economic environment is crucial in determining the subject's behaviour (Fehr and Schmidt, 1999; Rabin, 1993), it is plausible that subjects are primarily thinking about their own outcomes and are not too worried about those of the other player(s). However, they still require in some situations the other subject's cooperation in order to ensure a good result (strategic concerns), especially in bilateral UGs (the standard UG) where bargaining power is almost symmetrical among players. Nonetheless, this is not true in DGs, since under those conditions as we have seen in the previous subchapter, the dictator player has all the bargaining power, so she does not need the other player's cooperation in order to maximise her own payoff. Hence, DGs are better than UGs if we want to observe subjects' social preferences.

For a brief review of the more significant literature about UGs see table 1.2 and see also Fehr and Schmidt (1999).

Table 1.2 – Ultimatum Game (UG): literature review

Topic in analysis	Journal article	Findings
Gender	Eckel & Grossman (2001)	Women seem to be more cooperative; women and men tend to accept lower offers if the offer is made by a woman.
Deservingness	Ruffle (1996)	Deservingness and demerit seem to play a small role in UGs.
Fairness	Güth et al. (1982)	Proposers' offers are usually above zero and recipient players sometimes refuse money, especially if the split is not fair.
	Kahneman et al. (1986)	A significant number of recipients are willing to reject positive offers.
	Roth et al. (1991)	Fairness may be culture dependent; Introducing competition in an UG (multiple buyers) converges the equilibrium payoff to the prediction of the subgame-

---

[19] Basically, this methodology simply involves adding more players (proposers/allocators or responders/recipients) to the game in an unbalanced way, which results in one type of players having to make or accept more disadvantageous deals since they have more competition.

Topic in analysis	Journal article	Findings
		perfect equilibrium (offers close to zero are much more frequent and accepted).
	Kirchsteiger (1994)	Proposers do their offers not motivated by fairness concerns but by fear that envious responders may reject their offers.
	Kagel et al. (1995)	Asymmetric information seems to reduce fairness concerns.
	Blount (1995)	Intentions matter, not only money; individuals have a non-monetary component in their utility function.
Framing effect	Larrick & Blount (1997)	Framing can lead subject to increase cooperation rates.
	Van der Bergh & Dewitte (2006)	Sexual cues seem to increase cooperation rates.
Punishment	Fehr & Rockenbach (2003)	Punishments must have a fair reason to be accepted.
Rationality	Forsythe et al. (1994)	Players are more generous in the UG than in the DG (generosity can be strategic).
	Straub & Murnighan (1995)	Information is used strategically, overcoming generosity.
	Croson et al. (2003)	People are perfectly comfortable in the use of asymmetric information to maximize their own payoffs.
	Grimm & Mengel (2011)	Delaying response time to a proposal increases its acceptance
	Halali et al. (2013)	Cognitive fatigue led proposers to offer significantly more equal splits than non-depleted proposers.
Social distance	Charness & Gneezy (2008)	Providing family names has no relevant effect on UGs.
	Henrich et al. (2001)	Members of small-scale societies around the world cooperate when they have the habit (in other contexts) to do so.
Stake size	Hoffman et al. (1996)	Increasing stakes does not change offers.
	Slomin & Roth (1998)	No significant effect was observed between low and higher stakes for inexperience players but offers decline in higher stakes as proposers gain experience.
	Larney et al. (2019)	Stake size does not affect offers in the UG.
Survey study	Camerer (1997)	Usually, proposers offer an average of 40–50% of the amount in division.

1.3.3. The Public Goods Contribution Game

The Public Goods Contribution Game is another example of an economic experiment that seems to involve altruistic concerns (Levine, 1998). In this experiment, all players can choose to contribute some or all the initial endowment to a common project or choose not to contribute anything at all. After the initial stage, the total sum of all players' contributions is multiplied by a certain number (greater than one and smaller than the total number of players) and the final amount is distributed to all players in equal proportions. Therefore, all players can consume the public good, even those who did not suffer the cost of contributing to it. Consequently, any participant in the game has an incentive to consume the good without making any contribution towards it – the Nash Equilibrium of the game is simply, and once again, not to contribute at all.

In a multi period version of a public good game, typically subjects start the game cooperating[20], until they realise that some players are taking advantage of them (Dawes and Thaler, 1988; Fehr and Schmidt, 1999). Typically, cooperation decreases if the subjects do not have the opportunity to punish free-ride behaviour, and under those conditions, in the final rounds the cooperation rate falls close to zero[21] (Levitt and List, 2007). However, when there is the opportunity to punish, cooperation remains high and stable even in the last rounds[22] (Fehr and Schmidt, 1999; Fehr and Gächter, 2002; Fehr and Fischbacher, 2004a).

Botelho et al. (2009) also observed that, on average, people are 13% more likely to be free riders if there is no chance of encountering the same people in a future stage of the game than if the possibility is very small but not completely nil. People try to form a positive reputation in order to avoid a punishment, since noncooperative behaviour is punished more often.

In some particular cases, in societies with weak norms of civic cooperation (like Greece and Oman), antisocial punishment is observed (i.e. punishment of people who behave prosocial) in public goods contribution games (Herrmann et al., 2008). However, these cases were exceptions and not the prime rule of punishment, even if antisocial punishment is observed in all societies.

Moreover, Lozada et al. (2011) argue that social contexts, including culture, policy and historical issues, can also increase or decrease the rate of cooperation observed in a society. Others such as Gentis et al. (2003) use economic variables like "market integration" and "cooperation in production" to explain a substantial behavioural variation between different cultural groups in experimental games – the higher both variables are, the higher the tendency to cooperate between players (i.e., people cooperate more if they have the habit of doing it or if social norms say so). Bester and Güth (1998) also support this idea, that the preference to act with altruism or selfishness may be context dependent (in some cases influenced by culture).

---

[20] In one-shot public goods contribution game, usually subjects contribute 50% of their endowment (Levitt and List, 2007).

[21] Not to cooperate is the available strategy for players with altruistic preferences to punish others in public good games. They avoid further cooperation.

[22] In public good contribution game without punishment, 73 percent of the subject do not cooperate in the last round, but in a game with punishment nearly 80 percent fully cooperates (Fehr and Schmidt, 1999).

Therefore, and once again, we may not be observing pure altruistic behaviour but the enforcement of cooperation, which is usually the case when a threat punishment to a non-ideal behaviour exists. However, Fehr and Gächter (2002) offer the opinion that this punisher behaviour (in public goods contribution game) is a different form of altruism since those who choose to punish are also sacrificing a portion of their own income in order to penalise those who are not cooperating, hoping that in the future they will be discouraged from this "bad" behaviour. In the short-run, they are sacrificing themselves for the common good, though Fehr and Gächter (2000) observe that in the long-run the sacrifice of punishers is usually full repaid.

Nevertheless, punishment does not always encourage cooperation. To increase altruistic behaviour the punishment action must have moral legitimacy behind it. In trust games – in which the first player decides how much from an initial endowment she will give to a second player, after which the investment is multiplied by a certain number and it is given to the second player, who will then decide how much to give back to player one – Fehr and Rockenbach (2003) find that threats of punishment for not returning an expected value do not work well, especially when sanctions are used for receiving an unfair final payoff. Punishment works fine in public goods games since the player who punishes uses some of his own endowment to do so, and in Fehr and Rockenbach's (2003) experiment they are not sacrificing themselves, they are only threatening the other player in order to receive a better payoff. Consequently, the altruistic response disappears since threatening behaviour is seen as unfair and immoral.

Furthermore, analysing data results from public good games, Dawes and Thaler (1988) consider that when people do not cooperate in those games, the feeling of "greed" – hoping that others will contribute but they will not in order to maximise results – seems to be better able to explain people's behaviour (free riding) than the feeling of "fear" – to be afraid that the other players will not cooperate, and thus any cooperation will be useless. They observe that cooperation arises when the "greed" variable was removed from the game (which implies that cooperators and noncooperators received the same amount) rather than when the variable "fear" was removed (which was a mechanism in the game that ensures that if not enough people contribute there exists a money back guarantee). Once again, cooperation seems context dependent, and not so much the consequence of peoples' social preferences.

In summary, in public goods games behavior can be understood partially as resulting from altruistic motivations but it is more accurately explained as a cooperation problem.

For a brief review of Public Goods Contribution Games see table 1.3.

Table 1.3 – Public Goods Contribution Game: literature review

Topic in analysis	Journal article	Findings
Anonymity	Laury et al. (1995)	Complete anonymity does not change subjects' behaviour when playing a public goods game.
	Botelho et al. (2009)	Subjects are more likely to be free-riders when they meet another player just one time.
Gender	Cadsby & Maynes (1998)	No gender effect was found in the contribution behaviour; however, women contribute more in the initial round. Also, women react quicker to others' actions and move closer to equilibrium.
Endowment origin	Cherry at al. (2005)	Free-rider behaviour is not an effect of the endowment origin; heterogenous endowments (among players) lower the contribution rate.
Deservingness	Rege & Telle (2004)	Social approval increases cooperation rates significantly.
Fairness	Palfrey & Prisbey (1997)	Subjects seem to have a non-monetary component in their utility function (they gain utility in the act of contributing); Decreases in the contribution rate seem to be connected with experience.
	Fischbacher et al. (2001)	Subjects seem to react positively to other players' contributions but with bias in the selfish direction.
	Henrich et al. (2001)	People cooperates when social norms of the society in which they live are positive towards cooperation.
Framing effect	Andreoni (1994)	A positive frame condition can increase cooperation, yet a negative one can decrease it.
Group size	Isaac & Walker (1988)	Group size seems not to affect cooperation rates, but people contribute more with higher incentives.
	Bagnoli & Mckee (1991)	People cooperate more with guarantees, larger groups can reach the same efficient levels, but it will take more time than smaller ones.
Individual differences	Kurzban & Houser (2001)	Types of players: 28% free riders, 29% conditional cooperators, 25% strong cooperators, 18% revealed no consistent behaviour.
Punishment	Fehr & Gächter (2000)	Punishment possibilities increase cooperation immediately and in the long-run it rewards punishers.
Punishment	Masclet et al. (2001)	Non-monetary and monetary punishments both increase cooperation, peer-pressure is a good example when non-monetary sanctions work well.
	Fehr & Gächter (2002)	Punishment possibilities increase cooperation rates and they are triggered by negative emotions.
Punishment	Sefton et al. (2006)	Sanctions keep cooperation over time higher than rewards; however, to be efficient, sanctions cannot be too costly, threatening is the right solution.
	Herrmann et al. (2008)	Anti-social punishment decreases cooperation rates.
	O'Gorman et al. (2009)	The possibility of one subject punishing is enough to force and maintain cooperation rates.

1.4.   Chapter conclusions

In this chapter, the literature review on prosocial behaviour suggests that people behave as if they are altruistic individuals since their choices imply better results for other players than classic economic theory would predict. However, there exist many variables such as reputation formation, strategic concerns, social pressure from social norms or peers,

inequity aversion, fairness, empathy or the "warm-glow" effect that may lead subjects to demonstrate an artificial altruistic behaviour under some particular conditions. Selfishness represents quite well how usually individuals behave (mainly if the outcome is really important for the decision-maker), but the act of being selfish is more subtle than economic science usually presumes.

As regards the socio-demographic characteristics of individuals who exhibit a prosocial behaviour more consistently, we did observe, for example, that on average women are more altruistic than men (Eckel and Grossman, 1998; Falk et al., 2018; Doñate-Buendía et al., 2022) and individuals are more altruistic as they get older (Carpenter et al., 2008; Belot et al., 2015). Under conditions of greater anonymity, altruism is less frequent (Hoffman et al., 1994; Franzen and Pointer, 2012), the perception of deservingness of the recipient matters (Eckel and Grossman, 1996; Ruffle, 1998; Brañas-Garza, 2006; Thunstrom et al., 2016; Oxoby and Spraggon, 2008), as well as the happiness level of the giver (Tan and Forgas, 2010; Aknin et al., 2013; Helliwell et al, 2017; Park et al., 2017). Besides all those factors, framing effects can also be extremely important in shaping people's behaviour. Ellingsen et al. (2012) observed that framing effects – describing a prisoner's dilemma game as cooperative or competitive – can enable coordination in a one-shot simultaneous game. The results suggest that social frames under certain contexts can change people's mentality, increasing or decreasing prosocial behaviour significantly.

Furthermore, altruism is better measured in experimental economics by a DG than by an UG or a Public Goods Contribution Game. Mainly because the DG has no strategic concerns, just one player (the dictator) makes the decision. In the other games there exists interaction between players and consequently it is more difficult to distinguish altruism from other self-regarding motivations.

Chapter II

Which variables explain altruism? A cross-country econometric analysis (Essay 1)

2.1. Introduction

Most literature about altruistic behaviour focuses on experimental evidence at the individual level. However, much less on the topic is known at the aggregate level. For example, do the same factors that explain altruism at the individual level also exhibit the same influence at the aggregate level?

This chapter explores this previous question by using data from CIA The World Factbook (2020), Helliwell et al. (2020) and from The World Bank (2018a, 2018b, 2018c, 2019a, 2019b) which covers information from several nations about altruistic behaviour and other relevant parameters.

We start this study by identifying which factors the most altruistic nations have in common. Furthermore, do the less altruistic nations also exhibit homogenous characteristics? What differences exist between nations with different degrees of altruism? For that purpose, we combine cross-sectional country data on generosity with macroeconomic and social variables from a sample of 128 countries.

Second, we created a regression-based model of generosity variation with endogenous instruments in which the variables follow from the experimental evidence at the individual level, such as gender, age, anonymity, deservingness of receivers, demand for altruism or happiness. The model considers that the last parameter (happiness) is an endogenous variable explained by other variables such as GDP *per capita*, freedom to make life choices, healthy life expectancy and social support. The latter variables are from the study of Helliwell et al. (2020) for the World Happiness Report.

Third, we extend the analysis to include cultural dimensions, namely Hofstede's six cultural dimensions (Hofstede et al. 2005; Hofstede, 2011), which have been often used to explain economic phenomena (Franke et al., 1991; Hofstede and Usunier, 2003; Tsakumis et al., 2007; Mooiji and Hofstede, 2011; Hofstede et al., 2012; Kristjánsdóttira et al., 2017; Handoyo, 2018; DeBode et al., 2020).

The essay is structured as follows. A literature review on the topic is provided in section 2.2 focusing on determinants of altruistic behaviour at an individual level. While hypotheses for relations at an aggregate (country level) may be drawn for some variables,

for others it is not clear how individual behaviour regularities will translate into relations between aggregate (country) variables. In section 2.3 we present the empirical strategy and the descriptive analysis of the dependent variable (*generosity*). The econometric model is displayed in section 2.4. In section 2.5 we extend the econometric analyses to include cultural dimensions. Section 2.6 concludes the study, presents its limitations and gives suggestions for future research on the topic.

2.2.   Literature review on determinants of altruistic behaviour at an individual level

Altruistic behaviour has often been studied with focus on individual behaviour through experimental evidence. Typically, researchers observe the influence of one parameter in altruism using dictator games. It is a simple game in which a dictator player must choose how to split a monetary amount between him/ her (the dictator) and another unknown person or persons (the recipient). As the recipient cannot refuse the offer, the decision power is in the hands of the dictator and for that reason it is considered to be an important instrument to assess the altruistic level of dictator subjects.

There are several individual factors that influence behaviour in a dictator game that have been identified through economic experiments on individual behaviour. For instance, using dictator games, some authors did not find any gender effect in the outcome of that kind of games (Bolton and Katok, 1995; Niwa et al., 2011), but others found that women donate twice as much as men (Eckel and Grossman, 1998). Others are more specific and conclude that on average women and men donate the same, even though women prefer more equal payoffs while men prefer more often unbalanced outcomes (Andreoni and Verterlund, 2001). Falk et al. (2018) in a study to analyse individual economic preferences worldwide, found that altruism is indeed more pronounced among women than it is among men. Rosenblat (2008) observed that under non-anonymous conditions women are more generous to physically attractive recipients while males are unaffected by recipient's attractiveness. Recently, Doñate-Buendía et al. (2022) found in a meta-analysis study on 136 experimental dictator games that women are significantly more generous than man, even when controlling for several control variables. That being the case, we can conclude that there are more probabilities to observe women being more altruistic than men on average.

Besides gender, another socio-demographic variable often analysed in dictator games is the age. The importance of age influencing altruistic behaviour has been analysed by

Benenson et al. (2007) in young children. They observed that, although altruistic behaviour is common in younger children, it increases considerably with age. Carpenter et al. (2008) examining the difference in behaviour between students and non-students' groups observed that an average community member is much more generous than an average college student. In the same line, Belot et al. (2015) observed that non-student populations are twice more generous on average than students who behave more like the selfish model predictions in economics. On the other hand, Falk et al. (2018) analysing the global variation in economic preferences found no evidence that altruism is significantly related to age. Still, most studies seem to indicate that age and altruism have a positive and significant relationship.

Besides socio-demographic parameters, the context in which altruistic behaviour is analysed has assumed higher importance. Anonymity has been pointed out has a crucial factor in the levels of altruistic behaviour observed in laboratory experiments. One of the most popular studies involving altruism and anonymity was made by Hoffman et al. (1994). They observed that under nearly complete anonymity between the experimenter and the subjects, donations on average decreased around 30 percentual points. In the same line, Franzen and Pointer (2012) increasing anonymity in a lab experiment using a randomized response technique[23], observed that only 7% of the initial endowment in a dictator game was given under greater anonymity. On the other hand, there also exist a considerable number of experiments that instead of increasing anonymity, they decrease it, but in the end the conclusions go in the expected direction, as well (under conditions of greater anonymity less generosity is observed). For instance, Haley and Fessler (2005), introducing eyespots in a computer desktop, observed that subjects allocated much more to the recipient player than when no eyespots where presented. Others, like Nettle et al. (2013) found no effect of the watching eyes in a dictator game, but subjects with the eyes condition donate more often, even if on average no statistical difference was observed between the two conditions. In the same perspective, Niwa et al. (2011) used a mirror in front of the subjects during the allocation decision process, but in the end, they observed no statistical differences between conditions where the mirror was present and not.

---

[23] First, a coin toss decides if subjects can choose from an open or a close envelope. If they get the close envelope, their endowment is given by chance among eleven possibilities. If they get the open envelope, they can choose the allocation they like the most - using this technique experimenters do not know if the allocation is chosen by chance or preference, increasing anonymity considerably.

Nevertheless, overall anonymity seems to have a significant and negative relationship with altruism.

The deservingness of the recipient player is also a crucial factor in altruistic decision-making. Probably, the first study trying to observe this factor was made by Eckel and Grossman (1996) who observed that replacing the usual unknown recipient player by the American Red Cross on average tripled the amounts donated[24]. Furthermore, if instead of a charity, the recipient player is replaced by a poor individual, donations increased by 5.5 times relative to an unknown individual (Brañas-Garza, 2006). Thunstrom et al. (2006) observed in a dictator game that between low and high deserving recipients, more deserving ones received on average almost twice more. Cherry and Shogren (2008) also observed that dictators give more to recipients who did not have an opportunity to receive money than recipients who had the opportunity but opted not to take such opportunity. In the same line of thought, Ruffle (1998) observed that when the recipient player increased the endowment through a (successful) skills challenge, the dictators' donations increased on average around 33%. Oxoby and Spraggon (2008) achieve similar conclusions. They found that the dictator always gives something to recipients with higher performances. Indeed, good performances by the recipient player in order to increase the endowment to be divided, always implies receiving something from the dictator. On the other hand, Gross and Wronski (2019) found modest evidence of a positive relationship between deservingness and donation behaviour and Lonnqvist and Walkowitz (2019) also found that increasing empathy of recipients in fact increase the equal split more often, but the effect was not statistically significant. Except for the last two cases, it seems clear that increasing the deservingness of those who can receive help implies a general increase in the generous behaviour towards them.

The association between happiness and altruism is less clear. If on the one hand, Tan and Forgas (2010) observed that happy students are on average less altruistic, on the other hand both Aknin et al. (2013) and Helliwell et al. (2017) observed that prosocial behaviour is linked with general higher levels of subjective well-being. Besides, Aknin et al. (2012) even pointed out that the link between altruism and happiness is circular: prosocial behaviour increases happiness, which in turn encourages prosocial behaviour.

---

[24] On average, individuals donate 20% to 30% of the endowment in dictator games (Camerer, 1997; Engel, 2011).

Park et al. (2017) established a neural link between altruism levels and happiness. They concluded that the relationship between both variables exists and is positive.

Furthermore, Lane (2017) in a survey study about the effect of happiness on economic behaviour claimed that exists a clear negative correlation between happiness and selfishness, and the typical effect of happiness on selfishness is also negative in both the short and in the long-run. Overall, it is reasonable to conclude that typically more altruistic individuals seem to be happier with their life.

After a brief introduction about the variables that explain altruism in experimental economics evidence literature at an individual level, we will investigate whether at the countries level (using cross-sectional country data), the relationship between altruism and these variables at an aggregate level continue to exist.

2.3. Generosity: A cross country analysis

In the previous section, we identify which variables exhibit a more promising relationship with generosity through a brief literature review on individual behaviour as observed mostly in the laboratory, using incentivized economic experiments. The next step is to describe those variables to switch the focus from the individual to the aggregate level and test at the country level whether they help explain differences in generosity levels. We will also discuss their expected effect on generosity based on the relations already documented in the literature reviewed.

2.3.1. Variables description

- Age (*age*). Most lab experiments have students as subjects in their experiments, because researchers have an easy access to a high number of students in universities. However, some studies have begun to point out that students are more selfish than an average community member who is on average older than students (Carpenter et al., 2008; Belot et al., 2015). As most students do not have a paid job, their selfishness may stem from the fact that they simply do not receive a regular remuneration. We expect that societies with older individuals will reveal higher levels of generosity than societies with a younger demographic.

- Gender *(female)*. The impact of gender in generosity has mixed results. Some observe that women on average donate much more than men (Eckel and Grossman, 1998; Doñate-Buendía et al., 2022), others find no difference between men and women behaviour on average (Bolton and Katok 1995; Andreoni and Miller, 2002; Niwa et al.,

2011). However, to the best of our knowledge, no study supports men as being more generous than women on average. There is however no clear hypothesis concerning how the share of women in society in aggregate impacts generosity.

- Anonymity *(urban)*. It is relatively consensual in behavioural science that higher anonymity at the individual level decreases generous acts substantially (e.g. Hoffman et al., 1994; Franzen and Pointner, 2012). The opportunity for anonymity is highly enhanced in the urban environment compared to rural areas (Form and Stone, 1957; Dewey, 1960; Nissenbaum, 1999). Indeed, at an aggregate level it thus is expected that societies with higher rates of urban population are more familiar with anonymity of their members' activities and therefore they do not feel so much social pressure to behave altruistically. In fact, crime rates are higher in US largest cities than in smaller cities, and 20% of the urban crime can be explained by the lower probability of recognizing the criminals (Glaeser and Sacerdote, 1999). Under anonymity there are less reputation or strategic concerns to behave altruistically. However, the anonymity in urban areas is not 100% complete, though it is considered to be greater than in rural areas where communities have less members.

- Deservingness *(PoC)*. At an individual level, people are more willing to help if they consider others deserve it. The perception of corruption (*PoC*) in the public sector or in business could be a guiding point for people to consider helping others in the society. A society guided by corruption increases mistrust that third parties will use in the wrong way (inefficiently or dishonestly) the money they receive from givers. Even if perception of corruption is not the same as the current level of corruption, they are related since the perception of corruption may affect both the demand and supply of corruption. Countries, which exhibit high levels of perception of corruption, also display higher deterioration of the relationship among individuals, institutions and the State (Melgar et al., 2019). So, it is expected that when people perceive the public sector or business as highly corrupted, generous behaviour should be observed less frequently.

- Demand for altruism (*poverty*). The demand for altruism increases when the number of individuals in a population who require solidarity in order to have a life beyond the poverty threshold or just to survive is relatively high. Besides, since money has a declining marginal utility, altruistic individuals will get more efficient results if they focus their help mainly on individuals who really need help (extreme poor) – the effective altruism concept (Gabriel, 2017). A developed society has less reason for its members to be altruistic since less people need assistance, and those who need, the State typically

supports them (although they can help individuals in other countries). In this study, the demand for altruism is given by the percentage of the population living with less than $1.90, $3.20 and $5.50 per day (*poverty1*, *poverty2* and *poverty3*, respectively).

- Happiness (*happiness*). Generosity and happiness have a relationship of mutual benefit. Altruism increases happiness, which thereby motivates more generous behaviour (Akin et al.; 2012; Park et al., 2017). Therefore, it is expected that in countries which exhibit higher levels of happiness score also exhibit higher generosity. Furthermore, since happiness or subjective well-being, which refers to people's evaluations of their own lives has been studied as a dependent variable that is influenced by factors such as social relations (Bjørnskov, 2003; Sun et al., 2020), institutional quality (Bjørnskov et al., 2003), income and health (Deaton, 2008), overall quality of life (Diener et al., 1998; Minkov, 2009) or specifically by economic indicators (Frey and Stutzer, 2002; Inglehart et al., 2008), it is reasonable to treat this parameter as endogenous in this system.

Next, it will be analysed the relationship between generosity and four variables that are the cause of happiness score in the study of Helliwell et al. (2020). The reason for including these variables is also related with the fact that frequently there are reasons for people to assess their lives in a positive or negative way, consequently it is expected that happiness is also an endogenous variable as well as generosity and consequently deserves a more detailed analysis.

- Log(GDP per capita) (*GDP*). It seems reasonable to assume that this variable may directly affect *happiness* and *generosity* since having more resources at one's disposal implies the expected possibility of having a better life, and also to be able to help others more frequently. For example, Inglehart et al. (2008) found that between 1981 and 2007 happiness rose in 45 out of 52 nations where economic growth was present. On the other hand, some authors claim that national economic growth does not necessarily imply greater happiness for all citizens (e.g. Easterlin, 1994; Easterlin et al., 2010). Other authors like Veenhoven and Vergunst (2014) argue that there are effectively cases (nations) where happiness remains at the same level under economic growth, although those cases are exceptions and not the rule. Even though this is an open discussion, it seems reasonable to presume that exists a positive correlation between economic growth and happiness levels in the same population.

- Freedom to make life choices (*FMC*). A society in which its members can freely express their opinions and wishes, will plausibly be happier than a repressive one. For example, Inglehart et al. (2008) found that the extent to which a society allows free choice

has a major impact on overall happiness. The relationship with altruism is more tenuous but if people have more freedom to make choices, one of those choices might be prosocial spending.

- Social Support (*SS*). It is natural that more social support implies that people will feel more satisfied knowing they have someone to support them in difficulty times. For example, O'Connor (2017) found that, on average, welfare-state policy is positively associated with life satisfaction across 104 nations during the period 2005-2012. He concluded that a nation with one standard deviation higher spending on social support implies nearly a half point higher outcome in life satisfaction. However, the relationship between *SS* and *generosity* is harder to establish, but reciprocity theories indicate that people tend to be more generous if someone was previously generous to them.

- Healthy life expectancy at birth (*HLE*). Typically, higher levels of *HLE* imply higher happiness. People will be happier if they expect to have a long-life expectancy, which in return will increase their happiness. Moreover, as the literature indicates that happiness influences altruism (e.g. Tan and Forgas, 2010; Aknin et al., 2013; Helliwell et al., 2017; Park et al., 2017), consequently *HLE* may have an influence on altruism, as well. Table 2.1 summarizes the source and description of the variables employed in the study.

The countries selected for this study are those with available data regarding all variables described in table 2.1. Consequently, we obtain 128 valid observations for a cross-sectional analysis. On appendix A.1 we display the expected effect of each variable on altruism. It should be noted that the data was not collected at the same time in all countries, however the date range is short and as such we can assume that a uniform collection year would not have altered the magnitude of the variable significantly.

Table 2.1 – Variables measurement and source

Variable	Measure	Source	Year
Altruism (Generosity)	The residual of regressing the national average of GWP responses to the question "Have you donated money to a charity in the past month on GDP *per capita*.	Helliwell et al. (2020)	2017-2019
Gender *(female)*	The ratio of females in the population.	The World Bank (2019a)	2020

Variable	Measure	Source	Year
Age (*age*)	The average age of the population.	CIA The World Factbook (2020)	2020
Urban population (*urban*)	The ratio of individuals living in urban areas.	The World Bank (2019b)	2014-2018
Deservingness (*PoC*)	Share of individuals in each country that reply "yes" to the question. *"Is corruption widespread throughout the government or not?"* or *"Is corruption widespread within businesses or not?"* when data for government is missing.	Helliwell et al. (2020)	2017-2019
Demand for altruism (*poverty*)	Is the percentage of the population living with less than $1.90, $3.20 and $5.50 per day.	The World Bank (2018a, 2018b, 2018c)	2011-2018
Happiness (*happiness*)	The answer to the question how satisfied people are with their lives in a 10 points Likert-scale from 0 (the worst possible life) to 10 (the best life).	Helliwell et al. (2020)	2017-2019
Log (GDP per capita) (*GDP*)	The natural logarithm of GDP per capita in terms of purchasing power parity adjusted to international dollars.	Helliwell et al. (2020)	2017-2019
Freedom to make life choices (*FMC*)	The response to the binary question *"Are you satisfied or dissatisfied with your freedom to choose what you do with your life?"*.	Helliwell et al. (2020)	2017-2019
Social Support (*SS*)	The response to the binary question: *"If you were in trouble, do you have relatives or friends you can count on to help you whenever you need them, or not?"*.	Helliwell et al. (2020)	2017-2019

Variable	Measure	Source	Year
Healthy life expectancy at birth (*HLE*)	Based on data from the World Health Organization and the World Development Indicators.	Helliwell et al. (2020)	2017-2019

2.3.2. Descriptive statistics

Table 2.2 presents the descriptive statistics of all variables including *generosity*.

Table 2.2 - Descriptive statistics of the variables

Variable	N	Mean	SD	Min.	Max.
Generosity	128	0.277	0.158	0.035	0.825
Female	128	0.507	0.011	0.480	0.544
Age	128	31.106	9.578	14.800	48.600
Urban	128	0.382	0.159	0.020	0.800
PoC	128	0.739	0.171	0.168	0.936
Poverty1	128	0.135	0.207	0.001	0.774
Poverty2	128	0.243	0.301	0.000	0.914
Poverty3	128	0.374	0.359	0.000	0.977
Happiness	128	5.511	1.107	3.299	7.809
GDP	128	17,954.130	17,336.880	660.000	93,965.000
FMC	128	0.785	0.111	0.467	0.975
SS	128	0.809	0.124	0.319	0.975
HLE	128	64.272	6.896	45.200	75.001

Source: The World Bank (2018a, 2018b, 2018c, 2019a, 2019b), CIA The World Factbook (2020) and Helliwell et al. (2020)

The dependent variable (*generosity*) in the original study (Helliwell et al. 2020) is an aggregate indicator (at the country level) of whether respondents reported having donated to charity in the last month, and ranges between 0 and 1. The average *generosity* obtained for each country was 0.276 [Median=0.232; Std. Dev.=0.158; minimum 0.035 (Morocco), maximum 0.825 (Indonesia)]. If we calculate a weighted average according to the population of each country, we obtain a global *generosity* level that is slightly higher than the average (0.324). Figure 2.1 exhibits the histogram of generosity.

Figure 2.1 – Histogram of generosity
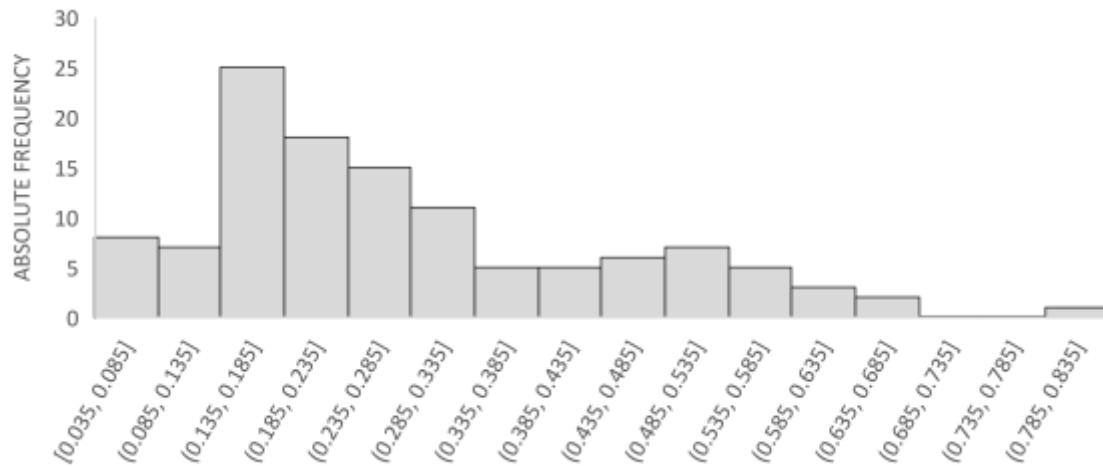
We can observe that the dependent variable is not normally distributed (left-skewed distribution). Table 2.3 shows how the sample is distributed by continent.

Table 2.3 – Descriptive statistic for generosity by continents

Continent	N	Frequency	Generosity
Africa	39	0.304	0.198
Asia	20	0.157	0.343
Europe	45	0.352	0.318
North America[25]	13	0.102	0.302
Oceania	1	0.008	0.594
South America	10	0.078	0.198

We can observe in table 2.3 that respondents were on average more generous in Oceania and Asia and least generous in Africa and South America. Performing a Kruskal-Wallis equality-of-populations rank test (KW)[26], we can observe that the differences between continents are statistically significant at a 1% level (x^2=22.604; p=0.000). Table 2.4 shows the same test but now applied among all continents. We can observe that at a 5% significance level, generosity in Africa is different from all other continents, with the exception of South America. In Europe, at the same significance level, generosity is different from Africa and South America only. In North America, at a 5% significance level, generosity is not different from Europe and Asia. In South America, it is different from Asia, Europe and North America, but in this last case just at a 10% significance

---

[25] Include in the North America continent six countries from Central America.
[26] The variable is not normally distributed, see again figure 2.1.

level. This fact occurs, since six Central American countries belonging to the North American continent (46.15% of the sample of the North American nations) have a generosity level (0.232) closer to the one that exists in the South American continent (0.198) than the average generosity levels of European or Asian nations.

Table 2.4 – KW equality-of-populations rank test between generosity among continents

	Africa	Asia	Europe	North America
Africa	-			
Asia	X^2=11.149*** p=0.001	-		
Europe	X^2=11.956*** p=0.001	X^2=0.284 p=0.594	-	
North America	X^2=5.357** p=0.021	X^2=0.465 p=0.495	X^2=0.153 p=0.695	-
South America	X^2=0.104 p=0.747	X^2=6.737*** p=0.009	X^2=5.452** p=0.020	X^2=3.349* p=0.067

Notes: The symbols ***, **, * denote the levels of statistical significance at 1%, 5% and 10% respectively.

In brief, generosity in Asia, Europe and North America remains at a similar level. On the other hand, in Africa and South America the generosity is also similar but at a lower level (see also figure 2.2).

Figure 2.2 – Generosity by continents (box plot)
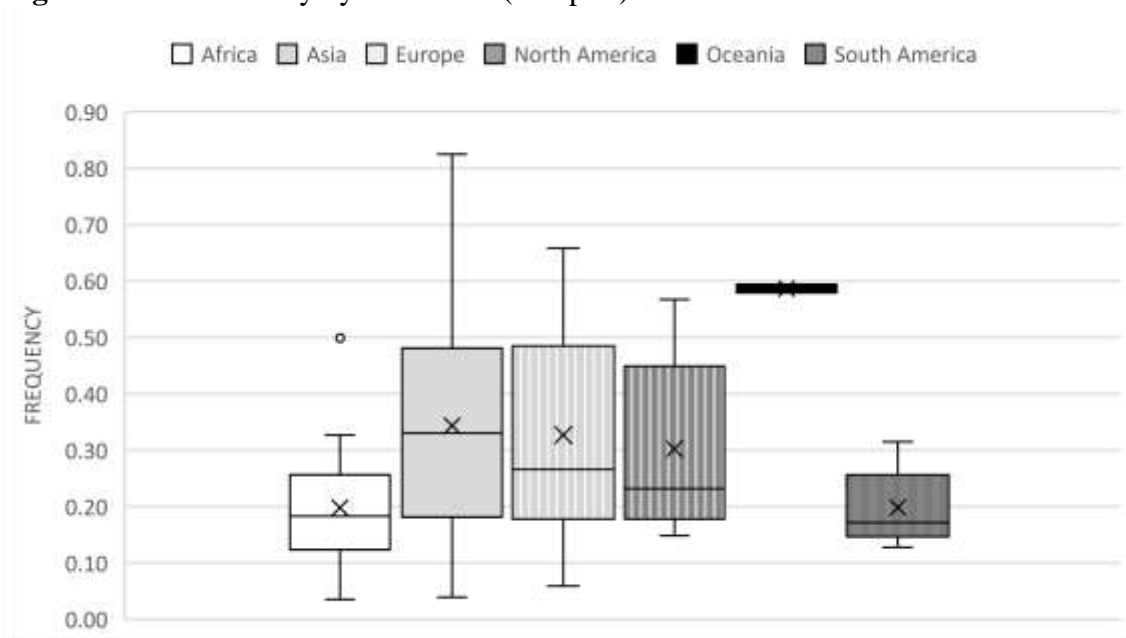
Source: Adapted from Helliwell et al. (2020)

On table 2.5 we can observe further support for these results. It presents a quartile analysis where the sample was divided into four different quartiles, from the least (Q4)

to the most generous nations/cluster (Q1). In Q1 are only two African countries (Gambia and Kenya) and no South American country.

Regarding the European and North American continents, they are represented by around 1/3 of the samples from the respective continents and Asian by 50%, highlighting, once again, the differences in altruism that exist between the diverse geographical areas of the world.

The next section presents the quartile analysis by generosity focusing on the variables described in table 2.5 (columns 4 to 11).

Table 2.5 – Average statistics by generosity quartiles

	N by continents	Percentage of total countries by continents	Cumulative frequency	Living with less than $1.9, $3.2 & $5.5	Log (GDP per capita)	FMC SS HLE PoC	Happiness Score	Urban Population	Females	Age	Generosity
Q1	Africa – 2	5.13	5.13	0.057	32133.469	0.850	6.256	0.395	0.504	35.375	0.509
	Asia – 10	50.00	50.00	0.131		0.868					
	Europe – 15	33.33	33.33	0.236		67.824					
	N. America – 4	30.77	30.77			0.620					
	Oceania – 1	100	100								
	S. America – 0	0.00	0.00								
Q2	Africa – 9	23.08	28,21	0.119	16763.032	0.781	5.487	0.384	0.505	31.700	0.289
	Asia – 4	20.00	70.00	0.230		0.816					
	Europe – 13	28.89	62.22	0.360		64.776					
	N. America – 2	15.38	46.15			0.767					
	Oceania – 0	0.00	100								
	S. America – 3	30.00	30.00								
Q3	Africa – 13	33.33	61.54	0.187	10954.545	0.768	5.301	0.373	0.508	28.424	0.193
	Asia – 4	20.00	90.00	0.314		0.779					
	Europe – 9	20.00	82.22	0.448		62.169					
	N. America – 4	30.77	76.92			0.772					
	Oceania – 0	0.00	100								
	S. America – 3	30.00	60.00								
Q4	Africa – 15	38.46	100	0.174	12146.969	0.741	5.005	0.377	0.509	29.028	0.120
	Asia – 2	10.00	100	0.294		0.774					
	Europe – 8	17.78	100	0.448		62.692					
	N. America – 3	23.08	100			0.796					
	Oceania – 0	0.00	100								
	S. America – 4	40.00	100								

Source: The World Bank (2018a, 2018b, 2018c, 2019a, 2019b), CIA The World Factbook (2020) and Helliwell et al. (2020)

2.3.3. Quartile and correlation analysis

In this section we will analyse the generosity level by quartiles and proceed with some correlations.

As regards the demand for altruism (*poverty1*, *poverty2* and *poverty3*) they all increase from Q4 to Q3, but after that point they all decrease until Q1. However, performing a KW test the differences are just significant at a 5% level between the Q1 (most generous nations) and the others (Q2, Q3 and Q4). The other differences between quartiles are not significant (appendix A.2a, A.2b and A.2c). This trend remains quite stable for the remaining variables.

GDP per capita is almost monotonic positive from quartile to quartile, with one exception, it slightly decreases between Q4 and Q3, but the differences are just statistically significant between Q1 and the others (appendix A.3a).

For the remaining variables of the World Happiness Report, *FMC*, *SS* and *HLE*, they are also monotonic positive with just one exception (between Q4 and Q3 the *HLE* slightly decreases). Again, with a KW test the differences are significant at a 5% level between Q1 and the others, with just one exception, HLE between Q2 and Q1 is just significant at a 10% (appendix A.3b, A.3c and to A.3d). *PoC* is monotonic negative, but again the differences are just significant between Q1 and the others (appendix A.3e). For the last variable of the World Happiness Report, the *happiness* is monotonic positive and again it is significant between Q1 and the remaining quartiles (appendix A.3f).

For the socio-demographic variables, the percentage of female population decreases *generosity* from quartile to quartile, but the differences are never statistically significant (see appendix A.4a). The tendency for *age* is to increase, but there is one exception (between Q4 and Q3 it decreases slightly). The differences are significant between Q1 and Q3 and between Q1 and Q4 (appendix A.4b). For urban population the tendency is for the variable to increase, except between Q4 and Q3, which slightly decreases, but the differences between quartiles are never significant (see appendix A.4c).

In brief, almost all variables are just statistically significantly different at a 5% level between Q1 (most altruistic nations) and the other quartiles; between Q4, Q3 and Q2 the differences are not statistically significant in almost all cases. Consequently, when analysing generosity worldwide, researchers may need to pay special attention when comparing the nations with higher levels of altruism with the remaining nations, since it is between those nations that the most significant differences are observed.

In the next step, we analyse and discuss the results from the Pearson's correlation matrix among the same variables previously described. In table 2.6, we can observe the results of the Pearson's correlations matrix between all variables.

The three variables that represent demand for altruism (*poverty1*, *poverty2* and *poverty3*) have a significant and negative correlation at a 5% level with generous behaviour (coeff=-0.233, p=0.008; coeff=-0.239, p=0.007; coeff=-0.270, p=0.002). Regarding socio-demographic variables, we also can observe a negative and significant correlation between the proportion of females in population (*female*) and *generosity* (coeff=-0.210; p=0.017) and a significant but positive correlation with *age* (coeff=0.300, 0.001). As we have seen previously, older individuals are on average more generous than younger ones (Benenson et al., 2007; Carpenter et al., 2008) and the phenomenon is consistent even among children groups (Benenson et al. 2007). Still, we did not find any study which support the vision that populations with higher percentage of women are on average less altruistic. However, in the original study (Halliwell et al., 2020) we do not know, for each nation, both the mean age and gender of responders. Consequently, we must analyse the results with some caution.

For the variable urban population *(urban)*, we observe a positive correlation with *generosity* (coeff=0.068, p=0.445), but the correlation is not significant.

For the variables in the World Happiness Report (happiness, GDP, SS, HLE, FMC and PoC) and generosity we did observe a positive and significant correlation between reported happiness scores and generosity (coeff=0.478; p=0.000). Lane (2017), through the analysis of several studies (47), observed that the correlation between generosity and selfishness is negative in both the short and long-term. Furthermore, most of the other variables in the World Happiness Report exhibit a positive and significant relationship with generosity even at a 1% level, as well (coeff=0.514, p=0.000; coeff=0.333, p=0.000; coeff=0.345, p=0.000; coeff=0.416, p=0.000). The only exception is perception of corruption (PoC), which exhibits a negative, but also significant correlation with generosity (coeff=-0.425; p=0.000). When the perception of corruption in society is high, people will be more suspicious that others will not be able to handle others' money honestly and efficiently.

We can also observe in table 2.6 that the variable *happiness* is highly correlated with the variables created for the World Happiness Report by Helliwell et al. (2020). *GDP per* capita has a positive and significant correlation with *happiness* (coeff=0.776, p=0.000) like some authors claim (Inglehart, 2008; Veenhoven and Vergunst, 2014), since if more

48

resources are at people's disposal, in theory, people have a higher possibility to live better than when fewer resources are available.

We also expected that social support (*SS*) should have a positive relationship with *happiness* and our results support that view (coeff=0.766; p=0.000). If people know they have a strong social protection in adverse circumstances, they will be happier by knowing that relatives or friends or national/local institutions will not allow him/ her to live below poverty or human dignity (O'Connor, 2017).

We also expected freedom to make life choices (*FMC)* would have a positive and significant impact on *happiness*. Autonomy implies that people have more control over their lives and therefore they are less forced to accept less optimal options (Inglehart et al., 2008). Overall, they have freedom to look for better options for their lives, which implies generally higher sense of purpose and happiness. Table 2.6 support that *FMC* and *happiness* have a positive and significant correlation (coeff=0.556, p=0.000).

We also expected that healthy life expectancy at birth (*HLE*) should have a positive and significant impact on *happiness*. People live happier if their life expectancy is longer and more enjoyable, and they live longer if they are happy with their lives. Table 2.6 support the view that *HLE* and *happiness* are highly correlated (coeff=0.778; p=0.000), as well.

In the next section, we present the econometric model and the results.

Table 2.6 – Pearson's correlations matrix

	generosity	happiness	LGDP_PC	SS	HLE	FMC	PoC	Poverty1	Poverty2	Poverty3	Urban	Female
happiness	0.478*** 0.000	-										
LGDP_PC	0.514*** 0.000	0.776*** 0.000	-									
SS	0.333*** 0.000	0.766*** 0.000	0.648*** 0.000	-								
HLE	0.345*** 0.000	0.778*** 0.000	0.726*** 0.000	0.745*** 0.000	-							
FMC	0.416*** 0.000	0.556*** 0.000	0.408*** 0.000	0.431*** 0.000	0.425*** 0.000	-						
PoC	-0.425*** 0.000	-0.412*** 0.000	-0.533*** 0.000	-0.177** 0.046	-0.281*** 0.001	-0.423*** 0.000	-					
Poverty1	-0.233*** 0.008	-0.616*** 0.000	-0.546*** 0.000	-0.718*** 0.000	-0.751*** 0.000	-0.250*** 0.005	0.032 0.718	-				
Poverty2	-0.239*** 0.007	-0.694*** 0.000	-0.604*** 0.000	-0.762*** 0.000	-0.831*** 0.000	-0.258*** 0.003	0.074 0.407	0.957*** 0.000	-			
Poverty3	-0.270*** 0.002	-0.758*** 0.000	-0.748*** 0.000	-0.782*** 0.000	-0.869*** 0.000	-0.287*** 0.001	0.158* 0.074	0.856*** 0.000	0.958*** 0.000	-		
Urban	0.068 0.445	0.435*** 0.000	0.380*** 0.000	0.392*** 0.000	0.519*** 0.000	-0.099 0.266	-0.019 0.835	-0.530*** 0.000	-0.600*** 0.000	-0.605*** 0.000	-	
Female	-0.210** 0.017	0.050 0.576	0.041 0.649	0.240*** 0.006	-0.1724* 0.052	-0.101 0.259	0.118 0.184	-0.162* 0.068	-0.210** 0.017	-0.246*** 0.005	0.017 0.850	-
Age	0.300*** 0.001	0.684*** 0.000	0.735*** 0.000	0.710*** 0.000	0.837*** 0.000	0.274*** 0.002	-0.201*** 0.023	-0.728*** 0.000	-0.818*** 0.000	-0.882*** 0.000	0.401*** 0.000	0.368*** 0.000

Notes: The symbols ***, **, * are the levels of statistical significance of 1%, 5% and 10% respectively.

2.4.   Econometric analysis

2.4.1. Econometric model

Our model of generosity variation is a regression-based model focusing on potential determinants of altruistic behaviour. For that purpose, we use data from The World Bank (2018a, 2018b, 2018c, 2019a, 2019b), from CIA The World Factbook (2020) and from Helliwell et al. (2020).

However, since some variables represent the same effect within the demand for altruism (*poverty1*, *poverty2* and *poverty3*), we keep the one, which, according to the literature, allows altruistic acts to be more effective (*poverty1,* hereafter referred as just *poverty*), and exclude the others (*poverty2* and *poverty3*).

Also, we do not include in our model the variables created for the World Happiness Report (Helliwell et al., 2020) that display a strong relationship with *happiness* through a linear regression model estimated by maximum likelihood, which can be observed in appendix A.5a. In theory, we consider that those parameters first affect *happiness* and then through *happiness* they may influence *generosity*. In the literature review the influence of those parameters on altruism is much less clear than it is for happiness parameters. Besides, since it is common to exist motives for people to feel pleased or unhappy with their lives it is plausible that *happiness* could be an endogenous variable explained by exogenous variables. Also, since the literature refers that *happiness* has an association with *generosity* (Tan and Forgas, 2010; Aknin et al., 2012; Aknin et al., 2013; Helliwell et al., 2017; Park et al., 2017), by including it in the model as an endogenous variable it might help explaining altruism better.

We can also observe in the appendix A.5a that all variables are important to explain *happiness* at a 5% significant level except for *generosity* and perception of corruption (*PoC*). Consequently, we removed those variables from the first-stage model and tested the first-stage regression model with the remaining variables (*GDP*, *SS*, *HLE* and *FMC*), which can be consulted in the appendix A.5b.

Overall, our model can be presented in figure 2.3 with arrows representing plausible relationships between parameters and the dependent and the explanatory variables within the rectangular boxes. The expected sign of the effect of each variable is in brackets below the variables' name.

Figure 2.3 – Model of altruism with expected effects in brackets
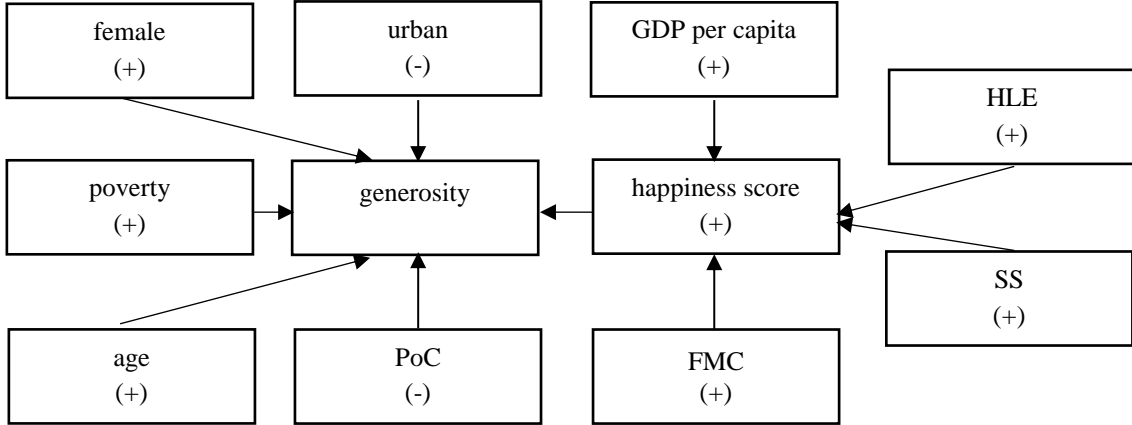
Therefore, our first stage is expressed by:

$$happiness = \alpha + \beta_1 Log(GDP) + \beta_2 FMC + \beta_3 SS + \beta_4 HLE + \varepsilon \qquad (2.1)$$

So, the main model is represented by:

$$Y = \alpha + \beta_5 female + \beta_6 age + \beta_7 urban + \beta_8 PoC + \beta_9 poverty$$
$$+ \beta_{10} happiness + \varepsilon \qquad (2.2)$$

Where Y is the dependent variable and represents generosity; PPP is a variable representing the demand for altruism, the percentage of the population in each country living with less than 1.9 dollars per day; poc is a variable representing deservingness, the perception of corruption in the public sector or in business; $urban$ is the percentage of population living in urban areas (which we interpret as a *proxy* for anonymity); age is a variable representing the mean age of the population; $female$ is a variable representing the proportion of females in the population; and finally, $happiness$ is a variable which represents the offer of altruism, the happiness people report with their lives. This last variable is an endogenous variable, which is represented by four other variables. GDP is the natural logarithm of GDP per capita, FMC is freedom to make life choices, SS is social support and HLE is healthy life expectancy at birth.

The linear model with endogenous regressors is estimated by the generalized method of moments (GMM) with unadjusted matrix.

2.4.2. Results of the linear regression model with endogenous variable

The results for the linear econometric model with endogenous regressors, estimated by the generalized method of moments (GMM) with unadjusted matrix, can be observed in table 2.7.

Table 2.7 – Linear regression model results with instrumental variables

Variable	Coefficients	Standard Error	P > |z|
Female	-3.349***	1.169	0.004
Age	0.001	0.002	0.575
Urban	-0.182**	0.087	0.037
PoC	-0.151*	0.086	0.078
Poverty	0.019	0.094	0.836
Happiness	0.076***	0.025	0.002
Constant	1.689***	0.610	0.006
Pseudo R-squared	0.342		
Prob > chi2	0.000		
Number of observations	128		

Notes: The symbols ***, **, * denote that the coefficient is statistically different from zero at 1%, 5% and 10% levels of statistical significance respectively.

The variables *poverty* and *age* are not significant in the model. Even so, the effect of both variables goes in line with the theory.

The other variables are significant to explain altruism at least at 10% level of statistical significance. As expected, urban population *(urban)* has a negative impact on *generosity*, more individuals living in urban areas means that anonymous behaviour is more frequent and therefore there is less social control among its members to behave positively towards society. Under those circumstances people do not feel so much pressure to be generous. In our model increases by one percentage point of people living in urban areas imply a decrease in 0.182 units in *generosity, ceteris paribus*.

Perception of corruption (*PoC*) also has a negative effect on *generosity*. Perception of corruption (*PoC*) in our model translates into perceived levels of corruption in the public sector or business. In this point, it is conceivable that the relationship to *generosity* is more indirect. If we believe that the public sector or general business will not use the resources they have at its disposal in a honourable and efficient way, then the other individuals in that society, the poor in this case, probably will not be able to take care of those resources, as well. When this happens, altruism decreases since it diminishes deservingness of others to receive assistance, even when it is not the corruption level of

the poor people that is being assessed. In our data increases in perception of corruption (*PoC*) in 1 unit imply decreases in generous behaviour of 0.151 units.

The only variable that does not exhibit an expected behaviour is female, which is negative in our model. This result shows that countries with a greater percentage of females are on average less generous than countries with lower percentage of females in the general population; it should be noted that nothing can be concluded about the generosity of women individually. However, as *generosity* gets the highest value in Asia (see section 3.2) and Asian societies have fewer women in their populations, this could be the reason why variable *female* takes on negative values in the model.

Finally, the variable *happiness* is endogenously determined and depends on four other variables. GDP *per capita*, social support (*SS*), freedom to make life choices (*FMC*) and healthy life expectancy at birth (*HLE*). Social support (*SS*) represents how people evaluate the support they receive from family and friends and freedom to make life choices (*FMC*) represents how satisfied people are with the freedom to choose in their lives. All instrumental variables have a positive and significant impact at a 1% level with *happiness*. The greater these variables the happier people report to be with their lives. On average, increases in *happiness* score in one unit imply increases in *generosity* by 0.076 units. Lane (2017), in a survey about the effect of happiness towards economic behaviour, observed that the effect of happiness on selfishness tend to be negative in the short and in the long run. Giving further support that our results are consistent with previous literature on the topic.

Appendix 2.5c shows the model with all significant variables. For the next steps we verify if our model is in a well specified form.

To check if the instrumental variables are correlated with *happiness*, we perform the F/ Wald test with results in table 2.8. To act as an instrumental variable, *GDP*, *SS*, *FMC* and *HLE* have to be correlated with the endogenous explanatory variable (*happiness*).

Table 2.8 – First-stage regression summary statistics

Variable	R-Squared	Adjusted R-Squared	Partial R-Squared	$F_{(4,126)}$	Prob > F
Happiness	0.798	0.766	0.653	59.787	0.0000

The null hypothesis is rejected at a 1% level (p=0.000), thus instruments and *happiness* are significantly correlated. Besides, since the *F* statistic is above 10, instruments are not weak and thus, *GDP*, *SS*, *FMC* and *HLE* are valid instruments for our model.

In the next step (table 2.9) we test endogeneity of the instrumental variables with an Eichenbaum, Hansen and Singleton (1998) C test. To act as an instrumental variable, *GDP*, *SS*, *FMC* and *HLE* need to be exogenous.

Table 2.9 – Eichenbaum, Hansen and Singleton's (1998) C test (endogeneity)

H0:	Variables are exogenous
GMM C statistic chi2(1)=	5.054 (p=0.025)

The hypothesis of *happiness* being exogenous is rejected both at 5 and 10% significance level. At 1% level, the hypothesis of happiness being exogenous is not rejected. Since the previous result is somehow ambiguous, we apply also the Hansen's J statistic test.

Table 2.10 – Test of endogeneity of the instrumental variables

Hansen's J chi2(3) =	2.335 (p=0.506)

In this case, the hypothesis of the instrumental variables being exogenous is not rejected. Consequently, we conclude that our model is correctly specified.

2.5.   Summary of results

In this study we found that around 35 per cent of the variation in generous behaviour in a nation can be explained by the degree of anonymity in a society, by the deservingness givers consider other individuals possess, by the proportion of females in the population and by overall happiness with life.

Other variables like age and the percentage of poor people living in the population do not have any explanatory power in our model but the effects are in line with the literature.

For the significant variables, the effects go in line with the expected path, anonymity and deservingness both have a negative effect on generosity and happiness has a positive effect. The only exception is the proportion of females in the general population, which has a negative and, therefore, an unexpected impact on generosity. However, as generosity reaches its highest point in Asia and Asian populations have fewer women comparing to the other continents, this may be the explanation for the observed results.

Nevertheless, our model only explains around 34.2% of the variation in generosity across countries, the rest of the variation remains an open question. For further analysis, it could be interesting to notice how variations in cultural factors could affect altruism, which will be presented in the next chapter.

2.6. Extending the analysis of altruism to include cultural dimensions

2.6.1. Introduction to Hofstede's six cultural dimensions theory

In this chapter, we will investigate how other variables like culture may affect altruism. Previous studies have already reported that personal cultural worldviews may affect altruism (Thunstrom el al, 2006), and that generosity varies widely across small world societies (Henrich et al., 2001, Ensminger, 2004; Henrich et al., 2005). However, less is known about how the multiple dimensions of culture are related to altruistic behaviour. To answer this question, we use the popular Hofstede's six cultural dimensions (Hofstede et al., 2005; Hofstede, 2011) - (*power distance*, *individualism*, *masculinity*, *uncertainty avoidance*, *long-term orientation* and *indulgence*) in an effort to improve the explanatory power of the previous model (chapter 2.5) and check the effect of those dimensions on altruism. Therefore, it seems natural to use the Hofstede's definition of culture as the collective mode of thinking and behaving "mental programming", which distinguishes the members of a group from another one (Hofstede and Usunier, 2003; Hofstede et al., 2005; Hofstede, 2011).

Hofstede's cultural dimensions have been used worldwide with different objectives, for example, to improve international negotiations (Hofstede and Usunier, 2003; Hofstede et al., 2012), to explain consumer behaviour (Mooiji and Hofstede, 2011), economic performance, like economic growth (Franke et al., 1991), international trade (Kristjánsdóttira et al., 2017), tax evasion (Tsakumis et al., 2007), economic freedom (DeBode et al., 2020) or innovation (Handoyo, 2018)[27].

In the first step, we describe Hofstede's six cultural dimensions individually[28]. Data was collected from Hofstede et al. (2010).

- Power distance. It reflects the level of acceptance that power asymmetry has within less powerful members of a society. Nations with higher scores in *power distance* tend to be overall more unequal. On those societies, the relationships among citizens are based on rigid status hierarchies with less powerful individuals highly dependent on more powerful ones. We expect that a society with higher levels of *power distance* should have higher levels of generosity, since less powerful individuals are less independent as well. Typically, they will need the help from others to live in decent human conditions. On the

---

[27] For a brief introduction to the history of Hofstede's Model see Shi and Wang (2011).
[28] For a more in-depth description of each dimension see Hofstede et al. (2010).

other hand, inequality is more frequent in underdeveloped countries, as under those societies fewer resources are available to assist poor people. Besides, there exists a correlation between nations with lower scores in *power distance* and higher wealth (Hofstede, 2011). Consequently, it is an open question if the effect of *power distance* on aggregate *generosity* is rather the result of resources availability or the effect of asymmetric human relationships.

- *Individualism*. It reflects the degree of ties among members of a society. Nations with lower scores in *individualism* tend to have its members more often integrated into groups (collectivism[29]). On the other hand, higher scores imply that on that society it is expected that society members take care of themselves and their closer family mainly. Those societies, where *individualism* is stronger, are expected to be overall less altruistic, as well.

- *Masculinity*. It reflects the degree to which a society distributes its roles between genders. Societies with higher score in masculinity tend to be more competitive and more focused in financial incentives (and less focused in relationships and quality of life). Personal ambition is seen as positive and is highly encouraged, especially between male members. It is expected that more competitive societies should be less altruistic. Besides, Hofstede (2011) initially observed that there was a strong correlation between femininity (nations with lower scores in masculinity) and income spent on development aid of less developed countries, which can be interpreted as altruism between nations.

- *Uncertainty avoidance*. It reflects the extent to which a society is uncomfortable with uncertainty. Members of a society with higher scores in *uncertainty avoidance* tend to feel more stress in everyday life. Typically, people on those communities are more emotional and less rational. Also, on those societies, any kind of difference is not welcomed (opinions, customs), and overall, investments tend to be more conservative (less risky). Previous studies have pointed out that introducing risk in a dictator game make dictator subjects on average less generous (Krawczyk and Le Lec, 2010; Brock et al., 2013). Even if uncertainty avoidance is not the same as risk aversion, which is a concept more related to the discomfort everybody feels in the face of a certain risk, unquestionably both have a common ground, and typically more risk-averse individuals also have a lower tolerance for ambiguity. Thus, the correlation between risk and

---

[29] In this sense it does not have any political connotation.

ambiguity is expected to be positive and consequently, higher *uncertainty avoidance* may imply less generous behaviour, as well.

- *Long-term orientation*. It reflects the level of openness of a society to new ideas in order to deal with the challenges of the present and the future. Societies with lower scores in this parameter tend to prioritize tradition and norms over societal change. The relationship of this parameter with altruism is at first sight unclear. However, Hofstede et al. (2010) observed that short-term orientation nations exhibit more social pressure towards spending, consequently we should conclude that nations with lower score in long-term are more materialistic and consequently less altruistic, as well.

- *Indulgence*. It reflects the level to which a society allows its members to enjoy overall life without restraints (such as moral restraints). Nations with a lower score in this dimension supress gratification of needs more often. Typically, those societies are regulated by strict social norms to control basic human desires. Nations with high levels of indulgence may consider their members to be more responsible individuals than societies that need tighter social norms to control human desires and consequently the relationship with generosity may be positive.

2.6.2. Correlations between altruism and Hofstede's six cultural dimensions

Appendix A.6 summarizes the descriptive statistics of Hofstede's six cultural dimensions and table 2.11 presents the Pearson's correlation matrix between those variables and *generosity* collected by Helliwell et al. (2020) for the World Happiness Report.

Table 2.11 – Pearson's correlation matrix for generosity and Hofstede's six cultural dimensions

Hofstede'6	Generosity	Power_distance	Individualism	Masculinity	Uncertainty	Long-term
Power_distance	-0.452***	-				
	0.000					
Individualism	0.439***	-0.679***	-			
	0.000	0.000				
Masculinity	-0.125	0.094	0.055	-		
	0.226	0.361	0.593			
Uncertainty	-0.399***	0.322***	-0.257***	-0.012	-	
	0.000	0.001	0.011	0.907		
Long-term	0.036	0.0064	0.218**	-0.008	0.252**	-
	0.746	0.563	0.047	0.944	0.021	
Indulgence	0.340***	-0.383***	0.146	0.064	-0.289***	-0.555***
	0.002	0.001	0.197	0.576	0.010	0.000

Note: The symbols ***, **, * denote the levels of statistical significance at 1%, 5% and 10% respectively

Also, in table 2.11, we can observe that the variables representing *masculinity* and *long-term orientation* do not exhibit a correlation with *generosity*. However, in both cases

the effect on *generosity* is the expected one (coeff=-0.125; coeff=0.036). Societies with a more competitive spirit are less generous and the long-term orientation exhibit a positive correlation with generosity as anticipated.

For the variables that exhibit a significant correlation with generosity, their effects are in most of the cases the expected. *Uncertainty avoidance*, as anticipated, has a strong negative correlation with *generosity* (coeff=-0.399).

With regard to *indulgence,* the correlation with generosity is positive and significant (coeff=0.340, p=0.002). However, the explanation might be less clear, though it can possibly have an association with deservingness. More tolerant societies may consider other individuals more worthy of help than societies that need strict social norms to control their members' behaviour. Besides, if we perform a Pearson's correlation test between this parameter and *perception of corruption (PoC)*, from the model of the previous chapter 2.5, we can observe that exists a strong significant correlation between both variables (coeff=-0.321, p=0.004). Societies with higher indulgence levels also exhibit lower levels of *perception of corruption* (*PoC*). Therefore, it seems reasonable to consider that societies demonstrating higher levels of indulgence may also display higher generosity, because those who need help seem to have greater deservingness by those who provide help.

Power distance also exhibit a strong negative correlation with *generosity* (coeff=-0.452, p=0.000), but in this case, it is an unexpected result since more unequal societies need more generosity from the most powerful members towards the less powerful members (Hofstede et al., 2010). However, our data does not support this view.

Individualism also as an unexpected positive correlation with *generosity* (coeff=0.429, p=0.000). However, in this case it can also be interpreted in a more practical way: since societies with higher individualism values are more successful than societies with lower individualism values (see table 2.12), individuals from those societies have also more resources that can be sent to charities, even if on those nations individuals take care of themselves and their families first. Besides, when describing the first steps of his cultural model, Hofstede (2011) observed the existence of a strong positive correlation between national wealth (Gross National Product *per capita*) and *individualism.* Table 2.12, which exhibits a quartile analysis by separating our sample into four different GDP *per capita* groups, also supports that information. More wealthy nations have a significant higher score in *individualism* than the remaining ones. The KW test confirms that point. The differences are just significant when comparing the wealthy nations (Q1) to the

nations in the other quartiles. (Q4 vs. Q3, X^2=0.020, p=0.887; Q4 vs. Q2, X^2=1.932, p=0.165; Q4 vs. Q1, X^2=17.598, p=0.000; Q3 vs. Q2, X^2=2.185, p=0.139; Q3 vs. Q1, X^2=29.451, p=0.000; Q2 vs. Q1, X^2=24.743, p=0.000).

Table 2.12 – Quartile analysis of GDP per capita by individualism, power distance and generosity

Quartile	N	Individualism	Power_distance	Generosity
Q1	32	61.452	46.194	0.412
Q2	32	30.966	72.759	0.224
Q3	32	25.769	75.500	0.244
Q4	32	24.000	70.000	0.227

Furthermore, in table 2.12 we can also observe that richer nations (Q1) have also lower scores in *power distance*. Again, a KW test indicates that the differences are only significant when comparing the wealthy nations (Q1) to the nations in the other quartiles (Q4, Q3 and Q2), whereas between the other quantiles there are no significant differences (Q4 vs. Q3, X^2=2.787, p=0.095; Q4 vs. Q2, X^2=0.085, p=0.771; Q4 vs. Q1, X^2=13.239, p=0.000; Q3 vs. Q2, X^2=0.274, p=0.601; Q3 vs. Q1, X^2=24.390, p=0.000; Q2 vs. Q1, X^2=19.905, p=0.000). So, it seems that *power distance,* as well as *individualism* have an association with higher wealth levels in nations, though for *individualism* the association with wealth is positive while for *power distance* is negative.

Table 2.12 also shows that *generosity* is different between higher wealthy nations (Q1) and the other nations in the remaining quartiles (Q4 vs. Q3, X^2=0.095, p=0.757; Q4 vs. Q2, X^2=0.065, p=0.799; Q4 vs. Q1, X^2=17.384, p=0.000; Q3 vs. Q2, X^2=0.046, p=0.830; Q3 vs. Q1, X^2=15.692, p=0.000; Q2 vs. Q1, X^2=19.046, p=0.000). Wealthy nations exhibit a much higher *generosity* than nations with lower levels of GDP *per capita*.

Additionally, we will split the sample in four different groups from the least to the most generous nations, to see how Hofstede's six cultural dimensions differ across generosity quartiles (table 2.13).

Table 2.13 – Hofstede's cultural dimensions by generosity quartiles (average scores)

Quartile	Power_distance	Individualism	Uncertainty	Masculinity	Long-term	Indulgence
Q1	46.760	54.640	53.760	44.400	44.304	60.667
Q2	72.269	35.346	73.269	46.885	50.208	39.913
Q3	73.250	31.292	71.875	46.125	46.316	36.947
Q4	66.619	32.333	73.238	51.952	39.944	46.412

The differences in *power distance* using a KW test are just significant at a 5% level between the most generous nations (Q1) and the others (Q4, Q3 and Q2). Among the other quartiles the differences in *power distance* are never significant at a 5% level (see appendix A.7a).

The same is valid for *individualism, uncertainty avoidance* and *indulgence*, where the differences in all three cases are just significant at a 5% level by comparing the most generous nations (Q1) with the others (see appendix A.7b, A.7c and A.7e).

The differences in *masculinity* are never significant in any case and the same is valid for *long-term orientation* (see appendix A.7e and appendix A.7f). This is no surprise since no significant correlation was observed between generosity and those two parameters. In brief, almost all significant differences in these variables, whenever they exist, are between nations in the most generous quartile (Q1) comparing to nations in the other quartiles. Statistically significant differences at 5% level between nations in the Q4, Q3 and Q2 were not found.

2.7.   The model of altruism with Hofstede's six cultural dimensions

The extended model is based on the same assumptions of the model presented in chapter 2.5. It is a linear regression model with endogenous regressors estimated by the generalized method of moments (GMM) with unadjusted matrix.

Happiness is also an endogenous variable, with the same instrumental variables as the ones used in chapter 2.4 (*GDP*, *FMC*, *SS* and *HLE*). The variables *urban*, perception of corruption (*PoC*) and *female,* also remain in the model since they were all significant to explain generosity in the previous chapters. See figure 2.4 for the expected sign of each cultural dimension on altruism and their relationships.

Figure 1.4 – Model of altruism with Hofstede's six cultural dimensions with expected effects in brackets
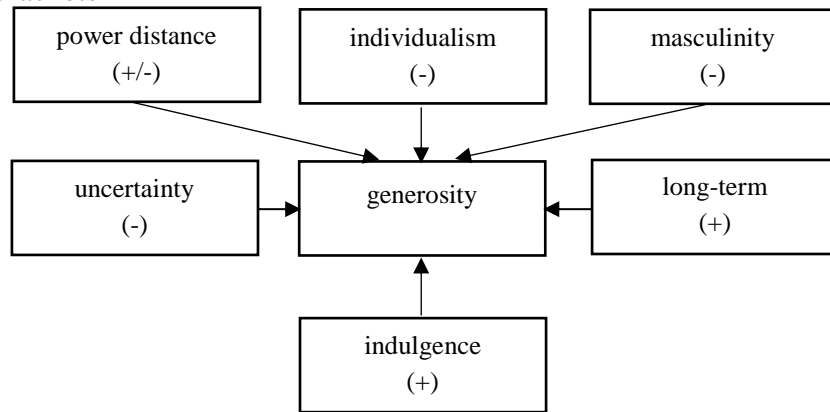
We introduce in our model all the Hofstede's six cultural dimensions, maintaining all the significant variables from section 2.5 (*happiness*, *urban*, *female* & *PoC*). Consequently, the model is now represented by:

$$Y = \alpha + \beta_5 poc + \beta_6 urban + \beta_7 female + \beta_8 happiness$$
$$+ \beta_9 powerdistance + \beta_{10} individualism$$
$$+ \beta_{11} masculinity + \beta_{12} uncertainty + \beta_{13} longterm$$
$$+ \beta_{14} indulgence + \varepsilon \tag{2.3}$$

Where Y is the dependent variable and represents generosity; poc is the perception of corruption in the public sector or in business (and captures deservingness); $urban$ is a variable representing anonymity, the percentage of population living in urban areas; $female$ is a variable representing the proportion of females in the population; finally, *happiness* is a variable which represents the offer for altruism, the happiness people report with their lives. $Powerdistance$ is a variable that represents the acceptance of power asymmetry by less powerful members in a society; $individualism$ is a variable that indicates the degree to which members of a society divide themselves into groups; $masculinity$ is a variable that reflects the degree in which jobs in a society are allocated by gender; $long-term$ is a variable which reflects the tolerance of a society to accept new ideas; finally, $indulgence$ is a variable representing the degree of conservatism/liberalism about traditions in society. The model kept all the technical assumptions from the model described in chapter 5.

2.8.   Results of the econometric model with Hofstede's cultural dimension

In Table 2.14, the variables *masculinity*, *uncertainty* and *long-term* from the Hofstede's six cultural dimensions are significant at a 5% level to explain *generosity* and the effect goes in line with the expected path. Both *masculinity* and *uncertainty avoidance* have a negative effect on *generosity*. We have anticipated these results for the credible negative relationship between competitiveness (*masculinity*) and altruism. Individuals living under a culture of competitiveness are less willing to "waste" resources with others.

Table 2.14 – The model for altruism with Hofstede's six cultural dimensions

Variable	Coefficients	Standard Error	P > |z|
Happiness	0.070**	0.027	0.010
PoC	0.123	0.103	0.232
Urban	-0.068	0.099	0.491
Female	-5.181***	1.131	0.000
Power_distance	-0.046	0.108	0.669
Individualism	0.067	0.103	0.516
Masculinity	-0.159**	0.074	0.031
Uncertainty	-0.249***	0.088	0.006
Long-term	0.192**	0.086	0.026
Indulgence	0.115	0.092	0.210
Constant	2.568***	0.651	0.000
Pseudo R-squared	0.555		
Prob > chi2	0.000		
Number of observations	79		

Notes: The symbols ***, **, * denote that the coefficient is statistically different from zero at 1%, 5% and 10% levels of statistical significance respectively.

Furthermore, higher *uncertainty avoidance* implies less confidence to share resources in the present moment. *Long-term orientation* has a positive and significant association with altruism. Since short-term orientation nations exhibit more social pressure towards spending (Hofstede et al., 2010), we can infer that societies with higher long-term orientation are less materialistic and therefore are typically more generous.

The variables *power distance* and *individualism* have no individual explanatory power in the model. *Individualism* has a positive effect in *generosity* and *power distance* has a negative effect, but overall, both variables do not improve our model. In addition, *power distance* and *individualism* have a strong correlation with wealth (Hofstede, 2011), and a high negative correlation with each other (coeff=-0.679, p=0.000). Therefore, it is

not surprising that they are not significant in the model, since they probably represent similar effects, plausibly the level of economic development of a nation. Besides, we use the GDP *per capita* as an explanatory variable affecting individual *happiness* and consequently altruism. Furthermore, both variables are also significantly correlated with *uncertainty avoidance* (see table 2.11). The explanation may lie in the fact that the more difficulty it is in dealing with *uncertainty*, the easier is to accept a stable but asymmetrical relationship. In addition, the more *uncertainty* there is in life, the more likely is to someone to find a group to face the future in better conditions. In brief, we think that *power distance* and *individualism* do not have any explanatory power in the model since both parameters represent quite well the wealth of a nation, but the *uncertainty* effect may also cover the effects from those parameters as well.

Also, *indulgence* has no explanatory power in the model, but the effect on generosity is positive as expected. A Pearson correlation test shows that *indulgence* and *PoC* have a significant negative correlation (coeff=-0.321, p=0.004). It is possible that both represent the same dimension, the level of confidence/ trust individuals have in other members of the same society. Furthermore, *indulgence* also displays a negative significant correlation with *uncertainty* (coeff=-0.289, p=0.010). People are more generous when they are certain that the resources they give to others will be put into good use. Societies more comfortable with *uncertainty* may also display less distrust levels towards other individuals.

Overall, even considering that *perception of corruption* (*PoC*) *and urban* are no longer significant as in the previous model, R^2 has increased. The justification for the variable *PoC* to be no longer significant may be associated to its higher correlation coefficient with the new variable *indulgence*. Both may represent the same effect previously described (mistrust/ distrust in others).

Moreover, if we want to keep in the regression model just the significant variables, only the variables *uncertainty avoidance, masculinity* and *long-term* among the variables from the Hofstede's six cultural dimensions hold as significant, though *masculinity* is weakly significant (see appendix A.8). With this model we can explain 51.31% of the variation in generosity. For the next steps, we perform the same tests as we did for the previous model (chapter 2.5) in order to test if our regression is well specified.

First, to check if the instrumental variables are correlated with *happiness*, we perform the F/ Wald test with results in table 2.15. To act as an instrumental variable, *GDP*, *SS*,

FMC and *HLE* have to be correlated with the endogenous explanatory variable (happiness).

Table 2.15 – First-stage regression summary statistics

Variable	R-Squared	Adjusted R-Squared	Partial R-Squared	F(4,126)	Prob > F
Happiness	0.806	0.785	0.800	75.057	0.0000

Again, the null hypothesis is rejected at a 1% level (p=0.000). Instruments and *happiness* are significantly correlated. Besides, since the *F* statistic is above 10, instruments are not weak and thus, *GDP_PC*, *SS*, *FMC and HLE* are valid instruments for our model. In the next step (table 2.16) we test endogeneity of the instrumental variables with an Eichenbaum, Hansen and Singleton's (1998) C test. To act as an instrumental variable, *GDP*, *SS*, *FMC* and *HLE* need to be exogenous.

Table 2.16 – Eichenbaum, Hansen and Singleton's (1998) C test (endogeneity)

H0:	Variables are exogenous
GMM C statistic chi2(1)=	2.368 (p=0.124)

At all significance levels (1%, 5% and 10%), the hypothesis that happiness is exogenous cannot be rejected. Consequently, we also apply the the Hansen's J statistic test in order to give more clarity to the previous results.

Table 2.17 – Test of endogeneity of the instrumental variables

Hansen's J chi2(3) =	0.633 (p=0.889)

Again, the hypothesis of the instrumental variables being exogenous is not rejected. Consequently, we conclude that our model is correctly specified.

2.9.   Summary of results

Hofstede's culture dimensions model has been used to explain several collective behaviours, including economic performances. In this brief study, we observe that some of the Hofstede's cultural dimensions exhibit a strong correlation with generosity, and half of them were significant in the linear regression model to explain altruism.

Power distance and *individualism* both represent quite well the wealth of a nation. Nevertheless, even if the variables display a strong correlation with altruism, they did not hold significant in the model, possibly because generosity is a wealth-related phenomenon, and consequently differences in national wealth can be a better explanation for generosity than these two cultural dimensions.

Indulgence exhibits a strong correlation with altruism, but it was not significant in the regression, perhaps because it also displays a strong correlation with other three Hofstede's cultural dimensions (*powerdistance*, *long-term* and *uncertainty*).

Masculinity and *long-term orientation* did not display any significant correlation with altruism, but in the regression model both were significant to explain altruism at a 5% level. However, *masculinity* became weakly significant when we removed the non-significant variables from the model.

From Hofstede's six cultural dimensions, *uncertainty avoidance* seems to have the strongest negative relationship with altruism. Previous studies have already reported a strong and negative correlation between risk and altruism (Krawczyk and Le Lec, 2010; Brock et al., 2013) supporting these results. Moreover, even if risk aversion is not the same as *uncertainty avoidance*, both surely have a common ground, since it is expected that more risk-averse individuals, naturally also exhibit a lower tolerance for ambiguity. Furthermore, since short-term orientation nations exhibit more social pressure towards spending (Hofstede et al., 2010) it is natural the positive and significant relationship with generosity.

2.10. Chapter conclusions

This chapter addresses the question of which macroeconomic and social variables can better explain altruistic behaviour at an aggregate country level. Most of previous studies in this topic try to establish a connection between generous behaviour and a single parameter. However, much less is known about how altruistic behaviour is influenced by several variables at once. We found that happiness, percentage of female in the population, uncertainty avoidance and long-term orientation all exhibit a statistically significant relation with altruistic behaviour in our econometric model with endogenous regressors. In our data, those variables together can explain around 51.31 percent of the overall variation in generous behaviour.

The study can be important in advising worldwide charities of which cultural contexts are more associated with better donation rates. For example, in countries with higher levels of *uncertainty avoidance* and lower scores in *long-term*, they are unlikely to raise significant income and it is better for them to focus their fundraising efforts on countries with more ambiguity tolerance and with long-term focus. The explanation may lie in the fact that if people consider that the future is highly uncertain, they will be willing to donate less in the present moment, since they might think they will need that money in

the future. Furthermore, if there is high social pressure to spend, it is unlikely that people under those circumstances will care about donations.

However, our study presents some data limitation, which implies that we must analyse our conclusions with some caution. First, we did not collect our data at first-hand. Consequently, we had to rely on the validity of data provided by previous research [The World Bank (2018a, 2018b, 2018c, 2019a, 2019b); CIA World Factbook (2020); and Helliwell et al. (2020)]. Second, we do not have data on all variables for all countries, consequently the sample used is limited and conclusions may be biased. Third, the variables we used are from the pre-pandemic years, therefore not all of them are the most recent ones or were collected in the same year. Therefore, for future research it would be interesting to identify other variables that might also have an impact in altruistic behaviour since our best model only explains around fifty per cent of the altruistic variations between nations.

Chapter III

Some implications of belief in free will for altruism: evidence from a survey experiment (Essay 2)

3.1.   Introduction

Belief in the existence of free will has been the target of much debate in the last 50 years, especially in psychology and philosophy. For the purpose of this study, we define free will as the ability of each individual to act as they wish, within their capabilities, limited by context opportunities. Free will is an important assumption in modern societies as it makes every individual responsible for the choices they make. Therefore, it is no surprise that among the many conclusions drawn by previous studies, it is worth noting that lower belief in free will decreases pro social behaviour substantially (Vohs and Schooler, 2008; Baumeister et al., 2009; Shariff et al., 2014). To the best of our knowledge, no previous attempt was made to stablish a connection between beliefs in free will and generous behaviour, using an experimental approach through a hypothetical survey.

To explore this point, we design an online questionnaire with three different treatments, each one in an attempt to prime participants into different beliefs in free will. The first stage includes the experimental treatments, where we include a task designed to induce beliefs in free will (pro-free will - *PFW*), against free will beliefs (no free will - *NFW*) and a neutral condition (*neutral*). Next, responders play a hypothetical dictator game, namely, how to split a hypothetical resource between themselves and another fellow student.

In the last stage in order to capture participants' beliefs in free will we include the 27-item measure using a 5-point Likert scale of lay beliefs in free will and three closely related constructs: scientific determinism (SD), fatalistic determinism (FT), and unpredictability (UNP) from the FAD-Plus scale[30] (Paulhus and Carey, 2011). This last task is crucial to verify if there is an induced effect of the first-stage, but also to capture beliefs in free will of participants.

---

[30] The FAD-Plus scale is a more reliable and developed instrument to measure lay beliefs in free will than the preliminary version from Paulhus and Margesson (1994), which was never published due to a psychometric weakness. Besides, the FAD-Plus instrument exhibits a much higher subscale reliability than the previous version (FAD-4), and overall is considered to be suitable to be administered to people without formal training on the free will debate (Paulhus and Carey, 2011).

68

The essay is structured as follows. Section 3.2 discusses some implications of belief in free will for society and for the economy, in particular in what concerns pro social behaviour and the research hypotheses. In sections 3.3 and 3.4, we present the experimental design and provide the details of the experiment implementation. In section 3.5 we present, analyse and discuss the obtained results and Section 3.6 concludes.

3.2. Literature review

3.2.1. Free will and altruism

The existence of free will has been the subject of long-standing debates throughout human history and scientific domains, seemingly with no conclusive outcome. Still, some consensus exists about some principles of what is commonly understood as free will. For example, free will can be simply interpreted as the ability people have to act differently from what they have done (Van Inwagen, 1975; Nichols, 2004). Libet (1999) supports this notion that free will is our independence to make choices and actions. Clark et al. (2014) summarise the layperson's view of free will as people having several options for action, choosing without social pressure and having the ability to do otherwise.

Although there exists some consensus on its definition, the existence (or not) of free will is debatable, that is, we can never have absolute certainty as to whether our actions are ruled out only by natural laws that exclusively command our brain cells, making free will just an illusion for all of us (Libet, 1999). In fact, some authors like Diamond (2005) understand the world today as mainly the result of environmental and geographic causes rather than of human choices.

This is a difficult discussion since the existence of free will is impossible to verify because it is unfeasible to prove that the state of the world, at a given moment, could be different than it is, since time does not repeat itself. In addition, believing in free will is a much more pleasant idea since it is simply not an attractive thought that our actions are not entirely controlled by us. People like to think that they have some control over their lives. Other explanations have been given for belief in free will. For example, Clark et. al. (2014) concluded through five studies that belief in free will is greatly supported by the desire to make others responsible for their wrong acts. Stillman et al. (2010) observe that belief in free will can indeed improve people's lives, leading to greater positive attitudes about expected career success but also gives better real workplace performances. Nevertheless, it is somehow difficult to conclude if belief in free will is the cause or the

effect of the quality of people's lives. Indeed, individuals who already have good lives may believe that their better life is the result of the choices they make, even if outcomes depend on chance for instance.

On the other hand, beliefs in free will may indeed move people to realize better choices (Stillman et al., 2010).

Setting the discussion aside from the benefits of believing in free will, the standard assumption about free will is that under normal circumstances individuals believe that they have free will (Baumeister et al., 2009) or at least believe that their actions are partially free (Baumeister, 2008). For example, Nahmias et al. (2005) observed, with inquiries about a third person acting in multiple deterministic scenarios, that even under inevitable conditions such as those scenarios, a significant majority of responders considered the third person act to be of his own free will. Beliefs in free will appear early in life and are spread throughout global societies. Sarkissian et al. (2010) witnessed a cross-cultural convergence about beliefs in free will around the world with a large majority of subjects considering that we do not live in a deterministic world. Even four/ five-year-old children regard individuals as having the capacity to act differently, especially in moral choices (Nichols, 2004).

However, if individuals start believing that free will does not exist, why would people continue to choose actions carefully since they are not responsible for them? We could easily imagine a world where people would choose with less responsibility for other individuals (e.g. less social responsibility) but also for themselves (e.g. less self-control). It is not the purpose of this study to analyse whether free will actually exists, we are interested in more modest but realistic goals. What would happen if the belief in free will changed? In modern societies, beliefs in free will are important as they hold individuals responsible for the choices they make. The religion and justice systems are based in the punishment of wrong acts, which is just conceivable if we consider that under normal circumstances people have the capacity to choose among alternatives. If individuals are no longer responsible for what they do, the need to comply with rules and social norms will vanish quickly (Critchlow, 2019). In the next section, we analyse those implications.

3.2.2. Previous empirical studies

One of the first empirical studies to test the hypothesis of free will was carried out by Libet in 1985. In a series of experiments, Libet (1985) asked subjects to make a random finger movement and to indicate precisely when they decided to do it. Brain activity was

recorded through electrodes on subjects' scalps during the decision process and the result obtained was surprising. There was a spike in neutral activity, on average, around 345 milliseconds before participants recorded the initial intention to make the movement.

For many people this was a strong evidence that free will is just an illusion, since the desire to make the finger movement occurred after the brain activity and not before it (see the disparity in Fig. 3.1). However, there were some limitations in Libet's experiments (see for example Shariff et al. (2008) for a brief summary), which leaves the question open until today.

Figure 3.1 - Free will hypothesis versus Libet's experiments

Free will hypothesis	Libet's experiments (1985, 1999)
Desire $\Rightarrow$ Brain activity $\Rightarrow$ Action	Brain activity $\Rightarrow$ Desire $\Rightarrow$ Action

Meanwhile, some researchers like Burmeister et al. (2008) consider free will to be better identified by willpower (self-control) rather than random choices. They consider that free will is a personal energy that everybody uses in daily life in order to get better results in the long run, as rationality in the decision process increases with higher self-control. Libet (1985) study also supports this view; even if an act arises involuntarily in the brain, conscious control still has time to prevent or to allow implementation, which is nothing more than the usual concepts of self-control and rational thought.

Other empirical studies have explored how belief or disbelief in free will changes people's decision process. For example, Vohs and Schooler (2008) found that participants cheated more frequently on an arithmetical task after reading an anti-free will essay, which reduced participants' belief in free will, than subjects that read a neutral control essay. They as well found, in a second experiment, that cheating behaviour under anti-free will concepts also appear when subjects need to actively choose the cheating action. Baumeister et al. (2009) also observed that people induced in anti-free will concepts are less willing to help others in need than people induced by neutral statements or by pro free will ideas. They also observed in a lab experiment that participants who were rejected to form groups for an experiment showed more aggressive behaviour if they were induced in anti-free will concepts. They also associated chronic disbeliefs in free will with reduced helping behaviour.

Consequently, people with manipulated or chronic disbelief in free will seemed more motivated towards antisocial behaviour, regardless of whether the less desired behaviour is the result of an active or passive action.

Along the same lines, Shariff et al. (2014) noticed that participants with strong belief in free will are more willing to support punishment based on moral blame than participants with less strong belief. Inducing anti free will ideas, through reading a text, also made participants in a hypothetical scenario to recommend lighter prison sentences than participants who read a neutral text. It seems that people with weaker free will convictions also tended to underestimate the personal responsibility of others, and not just of themselves.

Despite that fact, Genschow et al. (2021) in a meta-analysis across 146 experiments (95 unpublished) observed that the effect of exposing subjects to anti-free will ideas was plausible, but the effects were rather small. They also observed that a considerable number of studies failed to manipulate free will beliefs.

However, little is known about how decreases in free will would affect for instance the formation of social preferences. In the past, some economists have considered economic behaviour to be incompatible with other-regarding behaviour. Yet, even in primitive human societies, people usual cooperate within a group to increase their chances to survive, especially if the probability of knowing someone's reputation is sufficiently high. Consequently, it is somehow natural that altruism has proliferated among human civilizations until nowadays (Rand and Nowak, 2013).

Furthermore, other-regarding behaviour is well documented in experimental economics especially in dictator games. In this kind of game, a dictator must choose how to divide (for example) $10 between himself/ herself and another player. Standard economic theory would predict that individuals would give nothing, although several empirical studies have found that people usually give between 20 to 30 percent of the initial endowment in most dictator game situations (Camerer, 1997; Ensminger, 2004; Henrich et al., 2005; Engel, 2011). The dictator game undoubtedly suggests that individuals are not as selfish as classical economic theory predicted under the self-interest hypothesis.

Furthermore, it has already been reported that inducing subjects to believe or disbelieve in other subjective concepts can also change giving decisions. Shariff and Norenzayan (2007) found that subjects who were influenced by cues related with God and justice concepts were more generous in allocating money to the other player in the dictator game than subjects not exposed to any cues, and that this behaviour was not related with being religious or not, but just being exposed to the concepts. Ahmed and Salas (2011), to some extent, replicated this study with a larger sample getting the same

results. Religious representations indeed increased generosity of religious and nonreligious people in a dictator game. Those studies are noteworthy since they validated the methodological approach used. Expose an individual to certain concepts/ ideas can impact generous behaviour.

Other studies of the dictator game, involving small changes in the environment, can also be interpreted as indirect tests of the association of free will and generosity. For instance, cues in the environment that can be interpreted as social pressure, can decrease individual free will. Haley and Fessler (2005) found that putting eyespots in a computer desktop made dictator subjects allocate much more money to the recipient player than in a situation free of eyespots. Nettle et al. (2013) tried to replicate this study and noticed that eyespots in the environment of a dictator game made people more resistant to extreme strategies, that is, to give nothing or to give everything (avoiding being seen as an heartless person or a fool). In either case, both studies illustrate how small contextual changes in the environment influence our decisions even if we think that we are making a completely free choice.

These examples suggest that altruistic behaviour may be conditioned by other factors than just by free will.

3.3. Research hypotheses and experimental design

To the best of our knowledge, no previous attempt has been made to observe the relationship between the amounts given in the dictator game with manipulations of beliefs in free will. Baumeister et al. (2009), though, give a clue about this issue, observing that inducing disbelief in free will can reduce the willingness to help others, for example to give money to a homeless person. This was a hypothetical helping situation and since helping implies effort, in a real-life situation we might expect that the support would be less frequent.

Considering this argument, our study investigates whether a relationship between beliefs in free will and generosity exists. It is expected that individuals with lower belief in free will, would also behave with less generosity, since they may experience lower motivation to engage in pro social behaviour. In order to test that hypothesis, we have developed three treatments that induce belief in free will (*treatment PFW* – pro free will), anti-free will (*treatment NFW* – no free will) and neutral suggestions (*treatment neutral*). On the second-stage, we ask subjects for an allocation decision in a hypothetical dictator game, and in the end, subjects respond to the FAD-Plus scale (Paulhus and Carey, 2011),

which will allow us to test two hypotheses: first, if individual exposed to anti-free will concepts are less generous (comparing *NFW* treatment with *neutral* and *PFW* treatments) and second, whether differences in beliefs in free will (elicited at the end of the questionnaire) are related to the willingness to be generous in the dictator game.

In summary, following the literature review we formulate the following two hypotheses:

H1: Exposing individuals to information against the existence of free will decreases giving in a hypothetical dictator game.

H2: Different beliefs in free will can explain generosity in a dictator game.

We expect that under the anti-free will treatment, participants will behave less generously since individuals with higher beliefs in free will are typically more open to follow rules and social norms. We believe that by exposing participants to anti free will concepts, is enough to make individuals believe that their actions are not just responses of their own will, and consequently pro social behaviour tends to decrease considerably.

In the present study we opted for three different treatments (*neutral*, *PFW*, *NFW*) each of them seeking to have a different impact on participants' belief in free will. In the initial stage of the questionnaire, respondents are asked to reorganize a group of words in order to get three logical sentences, which varies according to the three treatments, so as to engage them with concepts about free will. Respondents are randomly allocated to one of the treatments. See Fig. 3.2 for a brief scheme of the questionnaire.

Figure 3.2 - The structure and the sequence of the questionnaire
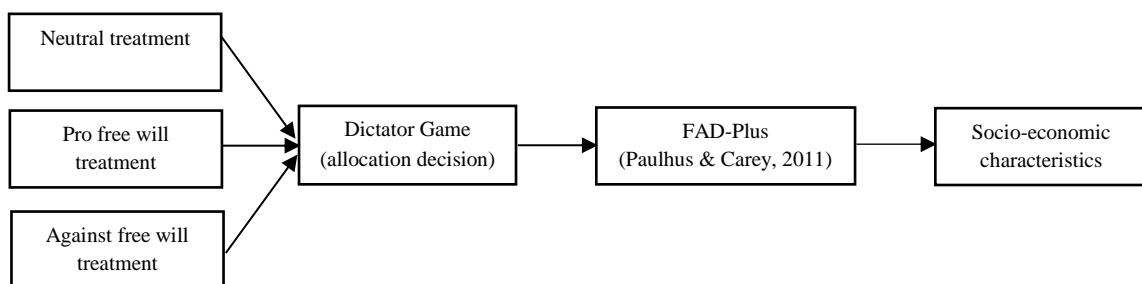
The initial stage is different in all treatments. In the treatment NFW, subjects need to reorganize a group of words to get three sentences contrary to free will concepts. In treatment *neutral* respondents need to reorganize a group of neutral sentences and in treatment *PFW* a group of pro free will sentences are used. Most sentences were adapted from Baumeister et al. (2009), but rather than reading a text, the participants needed to

74

reorganize words in order to get a logical sentence. The only two exceptions are the first and the second sentence from the *NFW* treatment. The first is an adaptation of Crick (1994) book about free will, and the second is a headline from a newspaper article (The Economist, 2006). Subjects can only advance to the next stage upon completing the first stage successfully. Table 3.1 shows the final sentences respondents had to find. The Portuguese version is in the appendix (appendix B.1) with the original reorganisation of words.

Table 3.1 - Sentences used in the initial task by treatment

Neutral	PFW	NFW
Control	Pro free will	Against free will
"Oceans cover 71% of the earth's surface"	"I demonstrate my free will every day when I make decisions"	"Most scientists recognize that free will is an illusion"
"Alkaline power cells generally work longer than ordinary batteries"	"I know that ultimately I am responsible for my actions"	"Modern neuroscience is eroding the idea of free will"
"Pocket calculators became common items only after 1970."	"I am able to override the environmental factors that sometimes influence my behaviour"	"The laws of physics explain the universe, as well as human behaviour"

This methodology is quite similar to Ahmed and Salas (2011), although they have used it to induce religious concepts instead of free will. We expect that by using this method we can induce subjects towards disbelief about free will since it is expected that under normal circumstances people believe in free will. This stage is the only difference among the three treatments (*neutral*, *PFW* and *NFW*).

In the second stage, we present a hypothetical allocation decision, which is the classic dictator game with hypothetical stakes. Participants need to decide on a hypothetical allocation of 10 Euros between themselves and another random student from the same university. The dictator game is commonly used in experimental economics to measure subjects' altruism. In this simple game, a dictator subject must select how to divide an initial endowment, usually around $10, between themselves and a second subject (the recipient). With this simple decision, researchers believe that they can measure altruism and avoid strategic concerns about payoff maximization, which exists in games with

interaction such as the ultimatum game[31]. On average dictators give around 28.35% of the endowment and just one third (36.11%) of subjects give nothing (Engel, 2011). However, the generosity that people show in these games could be the result of reputational concerns (if the game is not anonymous amongst experimental subjects or towards the experimenter), since if dictator players are too selfish they could form a "bad" reputation and nobody will want to cooperate with them in the future. Nevertheless, reputation issues in experimental designs have been minimized since the Hoffman et al. (1994) double-blind procedure, which has increased anonymity not just between subjects but also between them and those carrying out the experiments. Even so, subjects did not give as little as zero, but generosity did decrease. In our study, reputational concerns are not a problem since the applied questionnaire (online) is anonymous and in such cases those conducting the experiments can only identify each survey individually by the IP address and not by the name of the user.

The difference between hypothetical stakes and real stakes is more problematic and has been the subject of much debate in dictator games. Ben-Ner et al. (2008) found that on average with hypothetical stakes, subjects give more 14% than in a dictator game with real stakes ($10) but the difference is not statistically significant. They also observed that more altruistic individuals are more willing to be more generous with real money than with fictional money and less altruistic individuals behave otherwise. Consequently, we can expect the results of the hypothetical dictator game to be a reasonable approximation to experimental settings.

Besides, since we opted for hypothetical stakes as well, we used the dictator game[32] description used by Ben-Ner et al. (2008).

By the end of the second stage, we can observe if H1 is verified by using statistical instruments (Wilcoxon-Mann-Whitney two-sample statistic test) to check if there exist significant differences in giving behaviour among treatments.

In the third stage, we apply a questionnaire to find the subject's opinion about free will. The third stage is important to measure beliefs regarding free will. The third stage is based on Paulhus and Carey (2011) inquiry about lay beliefs in free will and three other closer related constructs: Scientific Determinism (SD), Fatalistic Determinism (FT) and Unpredictability (UNP). We have collected data from all these concepts through a 5-point

---

[31] This game differs from the dictator game since the recipient player can refuse the offer, in which case both players receive nothing.

[32] On appendix B.2 and appendix B.3 are the instructions in English and Portuguese respectively.

Likert scale [1-strongly disagree to 5-strongly agree] as the original study did. The final data collected about this topic will be the average of the responses given by participants for each subscale on a 5-point Likert scale.

The following two statements are examples of free will sentences participants had to assess:

"People have complete control over the decisions they make."

"People must take full responsibility for any bad choices they make."

The other three closer constructs have an interpretation different from free will (FW), namely free will is more focused on the responsibility of people's choices, and the other subscales are aimed at assigning motives for past or future events. Scientific Determinism (SD) uses biological and environmental forces to explain life outcomes (e.g. *"People's biological makeup determines their talents and personality"*). Fatalistic Determinism uses supernatural forces (e.g. *"I believe that the future has already been determined by fate"*), and Unpredictability (UNP) uses random events (e.g. *"Chance events seem to be the major cause of human history"*). However, neither concepts are mutually exclusive. For instance, beliefs in free will and determinism do not need to be opposite. Participants can believe in internal control (free will), but also consider that the major events in the world are the result of forces beyond their will (determinism) or just luck (unpredictability).

The questionnaire (Portuguese version) is in the appendix (appendix B.4), whereas the original version in English from Paulhus and Carey (2011) is in appendix B.5.

The final part of the questionnaire includes a set of socio-demographic questions to characterize respondents, such as age, gender, university course attended, political preferences, religious preference, financial well-being or past donation frequency.

Hypothesis H2 will be tested through a statistical and econometric analysis. H1 will also be tested through econometric analysis using as control variables the parameters from the FAD-Plus scales and a set of socio-demographic variables obtained from questionnaire.

3.4.   Implementation

The questionnaire was implemented via internet between May and June of 2020 and sent to undergraduate and master students of economic and business management background

from Iscte Business School (Iscte – Lisbon University Institute, Portugal). Qualtrics software was used for this purpose. Table 3.1 (in section 3.3) identifies the frame used for each treatment and the group of words they needed to rearrange in order to get a logical sentence, the rest of the questionnaire was the same for all respondents.

Participants were allocated at random to one of the three treatments (*Neutral*, *PFW* and *NFW*). The online setup guaranteed anonymity of responses. Respondents were identified only by the IP address.

In total, 141 people have answered our survey, but 9 of those were excluded since they did not fully complete the three stages of the study. Therefore, in the end, we got 132[33] valid inquiries for analysis.

3.5.   Results

3.5.1. Sample characteristics

The mean age of respondents was 21.91 years (SD=4.18, mode 19, minimum 18, maximum 47) and 67.42% were female. The majority (93.94%) were students from Iscte Business School enrolled in an undergraduate (62.88%) or in a master's program (32.58%). Most respondents were Portuguese, as expected (97.73%).

On average, respondents reported good financial condition [mean 3.44 from a scale between 1 (living with much difficulties) and 4 (living comfortably)] and frequent participation in elections [3.41 from 0 (I haven't had a chance to vote) to 4 (whenever there are elections I vote)] with a political stance majority closer to the left wing [in an overall scale (1-10), 59.09% have political preferences to the *left* (1-5) and 40.91% to the right (6-10)]. The dominant religion is catholic (34.09%), but most subjects reported having no affinity with a religion [50.76%, agnostic (25.00%) and atheist (25.76%)]. Finally, the reported habit of making donations was intermediate [mean 2.37 on a scale from 1 (I've never donated) to 4 (whenever I can, I make a donation)].

3.5.2. Generosity in the dictator game

The results obtained in the dictator game with all the three treatments together show that, on average, respondents give 30.04% of the initial endowment (10 Euros) to the other

---

[33] We observed that one internet IP address was repeated eight times and two others two times each one. We opted not to exclude these data since different people can use the same computer, and students can access the internet using the same University VPN. Besides, if we had opted to remove those observations in the end, our results would not change significantly.

student and 62.12% of all respondents give at least some money. Those who give choose to donate almost the equal split (mean share donated of those who give is 48.35%). Therefore, the most common decision was to give 5 Euros (46.21%). The median obtained across treatments was 4 Euros. It should be noted that 37.88% (n=50) of participants acted in accordance with the canonical model of self-interest, i.e. they gave nothing to others, which in previous incentivized studies occurred for one third of subjects (Engel, 2011).

Furthermore, Camerer (1997) and Engel (2011) reported, from the analysis of several empirical studies that in a dictator game people, on average, give between 20 to 30 percent of the initial endowment. The overall results from this questionnaire place the mean on the upper limit interval of the results in the literature, which given the hypothetical nature of the allocation decision, is not surprising.

Comparing donation behaviour across treatments (figure 3.3), the results demonstrate that respondents on *neutral* treatment were the most generous (mean=3.38; SD=2.51) while those on *NFW* treatment were the least generous (mean=2.48; SD=2.44). Treatment *PFW* is in the middle (mean=3.00; SD=2.67). Performing a Wilcoxon Mann-Whitney two sample statistic test in order to test if both samples are from the same distribution we can reject the null hypothesis at the 5% significant level for treatments *neutral* vs. *NFW* (z=-2.106, p=0.035) but not for *neutral* vs. *PFW* (z=0.866, p=0.386) or *PFW* vs. *NFW* (z=-1.115, p=0.265).

Figure 3.3 - Histogram of the giving behaviour for all treatments
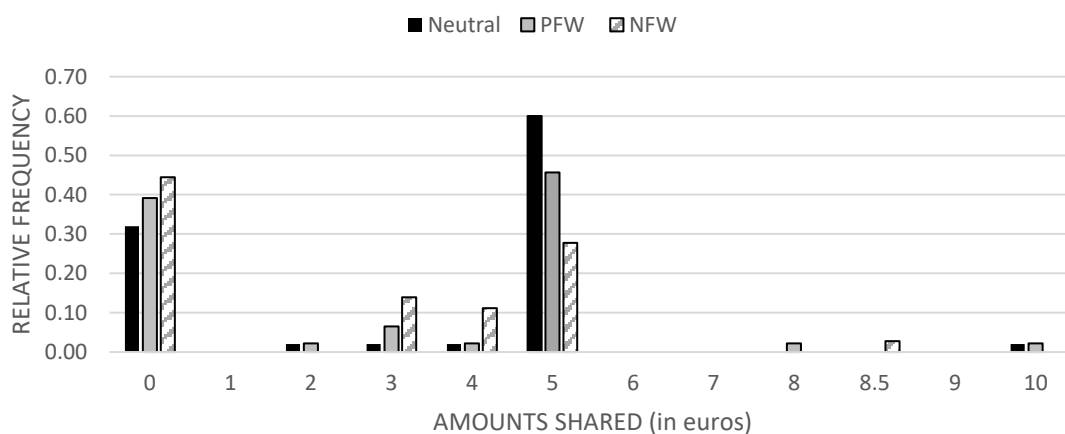
From table 3.2 we can also observe that the modal transfer was the equal split in the neutral and in the *PFW* treatments, though in the *PFW* case it was much less common (minus 14.35 p.p.). In the *NFW* treatment, the most common response was to give

nothing. Also, there was no observation that in the *NFW* treatment the respondents had opted for the maximum giving option.

Table 3.2 - Donation results across treatments

Treatments	N	Mean	Median	Mode	SD	Min.	Max.
Neutral	50	3.380	5	5 (60.00%)	2.506	0	10
PFW	46	3.000	4.5	5 (45.65%)	2.675	0	10
NFW	36	2.486	3	0 (44.44%)	2.442	0	8.5

These results follow what we would expect from the literature review, namely that people subject to information against free will concepts will demonstrate less generosity than those subject to neutral or pro free will sentences. The difference between the control group (*neutral*) and the *PFW* was not statistically significant, and neither was that the case for the difference between dictator giving in the pro free will and anti-free will treatments. However, if we perform again the same statistical test between the *NFW* treatment against the other two groups as one, the difference is statistically significant at 10% (z=1.849, z=0.064).

Overall, there is some evidence supporting H1, as participants in treatment *NFW* were indeed less generous than participants in the neutral setup or in the pro free will treatment.

3.5.3. Free will scale and the other subscales

Belief in free will and other beliefs of the FAD-Plus subscales are reported in table 3.3 Note that all variables range between 1 and 5, in increasing order of agreement.

Table 3.3 – Reported belief in free will and other subscales: descriptive statistics

FAD-Plus subscale	N	Mean	SD	Min.	Max.
Free will (FW)	132	3.333	0.600	1.857	4.714
Scientific determinism (SD)	132	3.054	0.522	1.857	4.286
Fatalistic determinism (FD)	132	2.542	0.744	1.000	4.200
Unpredictability (UNP)	132	3.236	0.507	2.000	4.750

Overall, these results are similar to those obtained by Paulhus and Carey (2011) when they used a student population [FW=3.366 (0.578); SD=3.034 (0.558); FD=2.288 (0.737); UNP=3.275 (0.576)]. Moreover, performing a two-sample t-test for difference of means, the results reject the null hypothesis that they came from different distributions in almost all cases with just one exception [FW: t=0.539, p=0.590; SD: t=0.349, p=0.727; FD: t=3.282, p=0.001; UNP: t=0.670, p=0.503)], our participants reported higher levels

in FD, but no other significant differences were observed. Consequently, we have considered that overall belief in free will in this study's sample is consistent with the literature. Besides, the subscale of free will (FW) has overall good internal consistency (reliability): Cronbach's Alpha=0.713 with the other subscales ranging from acceptable to good: SD (0.613); FD (0.767); UNP (0.618).

Calculating the Person correlation coefficients among the four variables in the FAD-Plus subscales we can note that belief in free will does not have any significant correlation with the other subscales (SD, coeff=0.067 p=0.443; FD, coeff=-0.001, p=0.990; UNP, coeff=0.1337, p=0.126), and scientific and fatalist determinism have a positive correlation between them, but just significant at a 10% level (coeff=0.166, p= 0.057). Finally, unpredictability has a positive and significant correlation with both types of determinism (SD, coeff=0.229, p=0.008; FD, coeff=0.226, p=0.009).

Analysing beliefs by treatments (table 3.4), we can observe that respondents reported having slightly less belief in free will in treatment *NFW* than in treatment *PFW* and *neutral*, but overall, the reported level in belief in free will across all treatments is quite similar. Performing a Wilcoxon-Mann-Whitney two-sample test we did not find any statistically significant difference at 5% level across groups for belief in free will [*neutral* vs. *PFW* (z=-0.570, p=0.569); *neutral* vs. *NFW* (z=0.110, p=0.913); *PFW* vs. *NFW* (z=-0.384, p=0.701)].

Table 3.4 – Free will and other subscales across treatments (means)

Treatments	Free will (FW)	Scientific determinism (SD)	Fatalistic determinism (FD)	Unpredictability (UNP)
Neutral	3.320	3.069	2.468	3.323
PFW	3.366	3.134	2.548	3.136
NFW	3.310	2.933	2.639	3.243

Consequently, the results suggest that the framing effect was not sufficient to change structural beliefs about free will (although we cannot rule out sample differences, even though assignment to treatments was random). A recent meta-analysis by Genschow et al. (2021) also reported that the manipulation of free will beliefs is more difficult than the literature on topic usually recognises.

In addition, performing the previous statistical test, we did not find any statistically significant difference at a 5% level across treatments for the remaining subscales of the FAD-Plus scale [Scientific Determinism (SD), Fatalistic Determinism (FD) and Unpredictability (UNP)].

Moreover, if we analyse in detail all the questions from the subscale of free will (Q4, Q8, Q12, Q16, Q21, Q23 and Q26 in appendix B.5) just one question (Q12) has some small but significant correlation at a 5% significance level using a Pearson's Correlation test with the amounts shared in the dictator game (coeff=0.209; p=0.016). The other questions have a very low correlation with the variable reporting the amounts shared in the dictator game, but with no statistical significance [Q4(coeff=0.051; p=0.560); Q8(coeff=0.015; p=0.861); Q16(coeff=-0.046; p=0.605); Q21(coeff=0.095; p=0.277); Q23(coeff=-0.083; p=0.347); Q26(coeff=0.092; p=0.296)]. Nevertheless, the relation is positive as expected in most cases (the only exceptions are Q16 and Q23).

Next, we examine how generosity varies with different levels of free will beliefs.

3.5.4. Generosity and free will beliefs

To test H2, that is, if differences in generosity depend on beliefs in free will, table 3.6 shows giving in the dictator game by levels of free will. We divided the sample in three different quantiles according to belief in free will, namely a lower quantile for individuals who reported lower belief in free will (lower), a middle quantile for individuals who reported intermediate belief in free will (middle) and an upper quantile for individuals who reported higher belief in free will (upper). We undertake this analysis in order to observe how the amounts shared in the dictator game behave for different levels of belief in free will.

The same table (table 3.5) shows that individuals with higher belief in free will in our sample (upper) were also the most generous ones. Between individuals who reported lower and intermediate belief in free will the generous levels observed are almost the same.

Table 3.5 – Amount shared in the dictator game by free will levels (in euros)

Quantile	N	Mean	Median	SD
Lower	54	2.704	3	2.668
Middle	37	2.865	4	2.238
Upper	41	3.524	5	2.650

However, performing a Wilcoxon-Mann-Whitney two-sample statistic test, the differences in giving are never significant between any of the three groups [lower vs. middle (z=-0.200, p=0.842); lower vs. upper (z=-1.598, p=0.110); middle vs. upper (z=-1.520, p=0.129)]. Still, if we compare the generosity level of individuals with higher

beliefs in free will (upper) to individuals with lower and middle beliefs in free will (the last two as one group), the differences are significant at a 10% level (z=-1.777, p=0.076). Consequently, in our sample, there is some evidence, but weak, that the reported belief in free will can explain differences in generosity levels between those who report higher belief in free will relative to the others.

3.6. Generosity: econometric analysis of determinants

The definition and the descriptive statistics of the variables used in the econometric analyses are summarized in appendix B.6.

To explore the determinants of generosity in the dictator game, we establish an econometric model with two stages. For the first stage, we use several probit models to account for whether individuals share something in the dictator game. For the second-stage model, we use several tobit models, which considers the dependent variable as continuous, but acknowledging that there is a lower limit of generosity of zero. The first and the second stage models are estimated by maximum likelihood and robust standard errors reported.

Model – 1a includes two dummy variables as independent variables, which represent treatments *NFW* and *PFW*.

In model – 1b we introduce a set of control variables for the socio-demographic characteristics of the respondents (gender, age, political preferences, religiosity, economic situation, donation frequency). For the set of the sociodemographic variables, we generate several dummies. A dummy variable *female* which gets value 1 if the respondent is a female and 0 otherwise (male). A dummy variable for *left* wing political preferences, created from the original scale of [1-10], which gets value 1 if individuals have political preferences to the *left* [1-5] and 0 otherwise (right). We also created a dummy variable for highly religious individuals (*h_religious*), from the original scale of [0-7], getting value 1 when participants report that they have high religious affiliation [5-7 in the original scale] and 0 otherwise. We created another dummy variable for the financial well-being (*financial_comfort*), from the original scale of [1-4], which gets value 1 when people report that they are living without financial problems [3-4] and 0 otherwise. Finally, we also generated a dummy variable for the reported past donation frequency (*donated_before*), from the original scale [1-4], that gets value 1 when people report that they have already donated in the past [2-4] and 0 otherwise.

In Model 2a we replace the effect of both treatments (*NFW* and *PFW*) by the free will scale (FW) using the remaining set of the sociodemographic control variables. In Model 2b we introduce the remaining subscales of the FAD-Plus scale (*SD, FD* and *UNP*). Finally, in model 2c we replace the FAD-Plus subscales by *upper*, a dummy variable which represents individuals with higher beliefs in free will, since we had observed that the major differences among generous behaviour by free will beliefs are focused on that point.

Next, we show the results of both models (table 3.6 and table 3.8). The marginal effects are on appendix B.7.

Most variables are not statistically significant at a 5% level to explain whether participants indicate they would give something to the other person.

Regarding the two treatments (*NFW* and *PFW*), both are not significant to explain when participants give something comparing with treatment *neutral*, which is not surprising since in table 3.5 we observe that the effect of both treatments in influencing beliefs in free will was weak. The treatments are still not significant when we remove the control variables from the probit model (1a).

About reported beliefs on the FAD-Plus subscale, only beliefs in scientific determinism (*SD*) are important in explaining when participants give, at a 5% significance level. For each additional increase on reported beliefs in *SD*, on average participants were 18.15% more willing to give something. The other variables in the FAD-Plus subscales including *FW* and *upper* are not statistically significant at any level.

Also, with this data, we found that age and gender have no explanatory power to justify when participants give. The same is valid for political preferences (left-wing versus right-wing) and for past donations (*donated_before*).

Table 3.6 – Probit regression of the probability of giving

Variable	1a	1b	2a	2b	2c
NFW	-0.328	-0.276	-	-	-
	(0.242)	(0.337)			
PFW	-0.192	-0.283	-	-	-
	(0.467)	(0.312)			
FW	-	-	0.185	0.149	-
			(0.357)	(0.471)	
Upper	-	-	-	-	0.237
					(0.349)
SD	-	-	-	0.531**	-
				(0.022)	
FD	-	-	-	-0.161	-
				(0.365)	
UNP	-	-	-	-0.020	-
				(0.935)	
Age	-	-0.025	-0.026	-0.040	-0.026
		(0.344)	(0.330)	(0.162)	(0.336)
Female	-	0.075	0.059	0.169	0.042
		(0.770)	(0.817)	(0.522)	(0.868)
Financial_comfort	-	-0.807*	-0.820*	-0.791*	-0.783*
		(0.065)	(0.066)	(0.072)	(0.078)
Left	-	0.286	0.289	0.227	0.277
		(0.273)	(0.249)	(0.375)	(0.267)
H_religious	-	0.894**	0.859**	0.936**	0.893**
		(0.013)	(0.018)	(0.014)	(0.013)
Donated_before	-	-0.102	-0.171	-0.204	-0.171
		(0.774)	(0.629)	(0.561)	(0.629)
N	132	132	132	132	132
Prob > chi2	0.494	0.106	0.116	0.079	0.103
Pseudo R2	0.008	0.069	0.066	0.096	0.066

Notes: The symbols ***, **, * denote that the coefficient is statistically different from zero at 1%, 5% and 10% respectively; omitted category for treatments is *neutral* treatment; p values between parentheses.

For religiosity, highly religious individuals were on average more willing to donate (31.97%) than individuals with less religious beliefs (2b), but no difference was observed in donation behaviour between religious and non-religious individuals [see table 3.7, Wilcoxon-Mann-Whitney two-sample statistic test (z=-0.027, p=0.978)]. Shariff and Norenzayan (2007) found that self-reporting as being religious does not increase donations in a dictator game. Ahmed and Salas (2011) also support the same conclusion:

in a dictator game, they did not observe significant differences in giving behaviour between religious and non-religious individuals.

Table 3.7 – Generous behaviour between religious and non-religious individuals

Religiosity	N	Giving (mean)
Religious	65	2.969
Non_religious	67	3.037

Finally, those who reported better economic wellbeing were on average less likely to give to others (27.02%), but the parameter is just significant at a 10% level (2b). Table 3.9 shows the result for the second-stage model.

Table 3.8 – Tobit regression of the amount given in the dictator game

Variable	1a	1b	2a	2b	2c
NFW	-1.322	-1.094	-	-	-
	(0.132)	(0.203)			
PFW	-0.600	-0.795	-	-	-
	(0.464)	(0.327)			
FW	-	-	0.636	0.507	-
			(0.345)	(0.431)	
Upper	-	-	-	-	1.103
					(0.131)
SD	-	-	-	1.756***	-
				(0.007)	
FD	-	-	-	-0.609	-
				(0.244)	
UNP	-	-	-	0.104	-
				(0.887)	
Age	-	-0.062	-0.070	-0.108	-0.071
		(0.498)	(0.434)	(0.250)	(0.436)
Female	-	0.003	-0.103	0.322	-0.189
		(0.997)	(0.896)	(0.675)	(0.809)
Financial_comfort	-	-1.573*	-1.644*	-1.482*	-1.486
		(0.080)	(0.079)	(0.093)	(0.113)
Left	-	0.784	0.879	0.713	0.876
		(0.328)	(0.273)	(0.354)	(0.271)
H_religious	-	2.016**	1.979**	2.261***	2.061***
		(0.010)	(0.012)	(0.007)	(0.008)
Donated_before	-	-0.521	-0.662	-0.647	-0.638
		(0.655)	(0.567)	(0.547)	(0.578)
N	132	132	132	132	132
Prob > chi2	0.318	0.062	0.073	0.035	0.044
Pseudo R2	0.004	0.018	0.016	0.030	0.018

Notes: The symbols ***, **, * denote that the coefficient is statistically different from zero at 1%, 5% and 10% levels of statistical significance respectively; omitted category for treatments is *neutral* treatment; p values between parentheses.

Again, the effect of both treatments (*PFW* and *NFW*) comparing with treatment *neutral* is not statistically significant (1a and 2b).

Also, in terms of reported beliefs on the FAD-Plus subscale, only scientific determinism (*SD*) was important to explain the dependent variable at 5% significance level. For each unit increase in beliefs on scientific determinism (*SD*), participants who donated were on average more willing to give 1.76 Euros. Scientific determinism (*SD*)

consists in believing in biological as well as environmental forces to explain the state of the world at a given moment (Paulhus and Carey, 2011). Believing that the state of the world is the result of forces beyond our will can make people more generous, at least in a dictator game, since dictator individuals will realize that the power position in their hands is just the result of luck, they cannot take real credit for it.

For the socio-demographic data, once again, just individuals with highly religious beliefs (*h_religious*) were important to explain the amounts donated. In this case, highly religious individuals were on average more willing to give 2.26 Euros conditional on giving than individuals with lower religious beliefs (2b). Finally, those who reported better economic wellbeing were on average less likely to give to others 1.48 Euros, but the parameter is just significant at a 10% level (2b).

Even if the effect of both treatments in the previous two models were inexistent, they can still be important to explain altruistic behaviour at a different level. In order to verify that argument, we performed another probit model, similar to the previous one, but now the dependent variable takes the value 1 if the participants choose to donate 5 Euros or more and 0 otherwise. We think that under this new formulation we can capture better equality and extreme altruistic concerns. The rest of the model remains the same as previously described. Table 3.9 shows the coefficients of the new probit models (marginal effects are on appendix B.8). Now, we can observe that individuals under the treatment *NFW* were less willing (30.81%) to give 5 Euros or more to the other party than individuals in treatment *neutral*, and the effect is significant at a 1% level, even when we use control variables (1b). The effect of treatment *PFW* is never significant (1a and 1b).

Table 3.9 – Probit regression results of the probability of giving of at least €5.00

Variable	1a	1b	2a	2b	2c
NFW	-0.814***	-0.844***	-	-	-
	(0.004)	(0.004)			
PFW	-0.305	-0.365	-	-	-
	(0.238)	(0.177)			
FW	-	-	0.165	0.142	-
			(0.385)	(0.464)	
Upper	-	-	-	-	0.531**
					(0.032)
SD	-	-	-	0.573**	-
				(0.014)	
FD	-	-	-	-0.182	-
				(0.310)	
UNP	-	-	-	-0.105	-
				(0.660)	
Age	-	0.001	0.002	-0.014	0.001
		(0.972)	(0.946)	(0.626)	(0.964)
Female	-	-0.009	-0.074	0.048	-0.132
		(0.970)	(0.762)	(0.851)	(0.599)
Financial_comfort	-	-0.497	-0.537	-0.515	0.460
		(0.187)	(0.174)	(0.192)	(0.252)
Left	-	-0.001	0.072	0.016	0.107
		(0.998)	(0.766)	(0.949)	(0.662)
H_religious	-	0.397	0.404	0.473	0.460
		(0.243)	(0.214)	(0.163)	(0.150)
Donated_before	-	0.484	0.357	0.345	0.377
		(0.169)	(0.290)	(0.301)	(0.265)
N	132	132	132	132	132
Prob > chi2	0.017	0.073	0.511	0.268	0.152
Pseudo R2	0.046	0.079	0.036	0.071	0.057

Notes: The symbols ***, **, * denote that the coefficient is statistically different from zero at 1%, 5% and 10% levels of statistical significance respectively; p values between parentheses.

The results suggest that subjecting participants to anti free will ideas may have induced individuals to have lesser equality or higher altruistic concerns. The rest of the model remains similar to the previous analysis, but now no sociodemographic variable is significant. In the FAD-Plus subscales, just the variable *SD* was important to explain it at a 5% significant level. The variable *upper* is significant at a 5% level in the model only if we remove the effect of both treatments and the effect of the remaining FAD-Plus

subscales (2c). This result is further evidence that if there is an effect of belief in free will on generosity it is just for those individuals with higher belief, who also exhibit on average higher levels of equality concerns, rather than for those with lower or intermediate belief in free will.

3.7.   Chapter conclusions

Previous investigations reported that people who disbelieve in free will are also more likely to be involved in anti-social activities (Vohs and Schooler, 2008; Baumeister et al., 2009; Shariff et al., 2014). The results we obtained are in line with those studies: individuals subjected to anti free will concepts showed less generosity in a dictator game than individuals subjected to neutral or pro free will ideas. However, the reported beliefs in free will were not significantly different across the three treatments and although the differences in generosity between individuals subjected to pro free will ideas and anti-free will ideas existed, they were not statistically significant. Indeed, Genschow et al. (2021) in a recent meta-analysis found evidence that manipulating free will beliefs had only a slight impact on attitudes, behaviour or cognition.

For the literature, this study has provided further insight into the relationship between generosity and beliefs in free will. The results suggest that if any significant relationship between beliefs in free will and generosity exists, it is mostly for those individuals with higher beliefs, who on average are more generous than individuals with lower or intermediate beliefs in free will.

Furthermore, no gender effect was observed, males and females reported similar generosity levels and similar beliefs in terms of free will; the same is valid for political preferences or for religiosity affiliation.

Regarding the four variables in FAD-Plus subscales, just the scientific determinism (SD) exhibits a significant correlation with reported generosity. Although we have put forward explanations for this fact, it may still be a topic to explore in further investigation.

Chapter IV

Cognitive skills, strategic thinking and altruism (Essay 3)

4.1. Introduction

Previous literature on the topic of decision making typically indicates that individuals with better cognitive skills make better choices overall. Consequently, this fact has led many researchers to conclude that some principles of neoclassic economics that have not been empirically supported, such as perfect rationality in decision making, may continue to be valid as a representation of how more cognitively skilled people behave and how the remaining individuals should ideally behave too.

In order to evaluate cognitive abilities, Frederick (2005) proposes three simple questions (constituting a cognitive reflection test) to focus specifically on individual reflective thinking. Due to its simplicity, this study has been widely replicated to classify individuals according to cognitive ability (Brañas-Garza et al., 2015). Previous studies on the topic observe that higher cognition individuals are on average more patient (Frederick, 2005) and show less risk aversion (Frederick, 2005; Carpenter et al., 2013; Drouvelis and Lohse, 2020). They are also less susceptible to be affected by behavioural biases (Oechssler et al., 2009; Hoppe and Kusterer, 2011) and they share less resources with others when they have the chance (Ponti and Rodriguez-Lara, 2015; Czerwonka et al., 2018).

Strategic behaviour is a component of individual reflective thinking, which is present in many economic decisions, such as those taken in financial markets, but more generally, they are present in any transaction between economic agents. In economic experiments, strategic behaviour has been usually analysed through beauty contest games, which were first referred by Keynes (1936) and formalized by Nagel (1995). The game has a simple format. All participants guess a number in the range between 0 and 100 and the winner is the one who guesses the number closer to "p" times the average of all chosen numbers. The strategic component is present since players must estimate the guesses from the remaining participants. Previous literature shows that higher cognition individuals are likewise more suitable to have a better performance under strategic setting problems (Burnham et al., 2009; Schnusenberg and Gallo, 2011; Brañas-Garza et al., 2012; Gill and Prowse 2012; Carpenter et al., 2013) and are on average less altruistic individuals as well (Ponti and Rodriguez-Lara, 2015; Czerwonka et al., 2018).

To the best of our knowledge, no previous attempt was published to establish a connection between cognitive abilities (using the CRT), strategic thinking (specifically measured by a beauty contest game) and generous behaviour (in a dictator game), even if previous literature suggests that this relationship should be significant and negative. In order to verify that hypothesis we implement a beauty contest game (BCG) in which the prize is the allocation decision chosen in the dictator game (DG), namely a charity dictator game. DGs are commonly used in experimental economics to assess individual generosity. It is a simple game in which participants must decide the allocation of resources (usually money) between two entities, where one is the decision-maker (dictator) and the other the recipient. If individuals with better strategic behaviour are on average less altruistic, this evidence would be supportive of the concept of the classic economic agent - rational and selfish. In this essay, the methodological approach is through an experimental survey, where the DG was incentivized depending on the performance in the BCG game (one participant would be selected at random from the best performers in the BCG to receive and implement the DG).

The essay is organized as follows. Section 4.2 presents the literature review and section 4.3 the empirical strategy. In section 4.4 the details of the experiment implementation are provided. In section 4.5 we analyse the results and establish the econometric model. Section 4.6 concludes. The questionnaire instructions are on the appendix.

4.2.   Literature review

4.2.1. Cognitive reflection test (CRT)

The cognitive reflection test (CRT) is an instrument commonly used to attest individual tendency to override a quick easy response and engage in a deeper reflection that leads to the correct answer[34]. It was first developed by Frederick (2005) and is based on the concept that decision making is supported by two different cognitive systems. System 1 which is typically fast, automatic, processes information easily and is generally associated with intuition. System 2 is slow, deductive, processes information with effort and is commonly associated with reason or reflective thinking (Epstein, 1994; Kahneman and Frederick, 2002; Slovic et al., 2002; Kahneman, 2003; Slovic et al., 2004). The CRT initially triggers System 1 with a rapid incorrect answer, but System 2 might override the

---

[34] For a review on CRT results see Brañas-Garza et al. (2015).

previous answer and determine the correct result through reflective thinking. CRT efficiency has been documented not only as a predictor of performance on heuristic-based tasks but also has become an instrument to measure rational thought accurately (Toplak et al., 2011). The original CRT consists of just three simple questions which on average do not take more than 10 minutes to solve (Campitelli and Gerrans, 2013), as an example:

"A bat and a ball cost $1.10 in total. The bat costs $1.00 more than the ball. How much does the ball cost?" (incorrect intuitive answer: $0.10; correct reflective answer: $0.05)

Participants in the CRT usually receive one point for each correct answer, and do not receive points otherwise. Overall, higher scores reveal better mental abilities and lower scores lower mental abilities (Blacksmith et al., 2019). Some authors also use the incorrect intuitive answers for classifying subjects, with higher scores implying greater impulsivity (Cueva et al., 2015; Ponti and Rodriguez-Lara, 2015).

Frederick (2005), in the original study, noted that subjects who scored higher on the CRT showed greater patience (lower discount rates) for short-term choices and exhibited more tolerance to risk in the domain of gains but not in the domain of losses (both hypothetical situations). Thus, people with higher cognitive ability tend to be more patient and closer to neutral risk aversion (Carpenter et al., 2013). Those conclusions are similar to Cueva et al. (2015) who observed that higher reflective subjects in CRT show less risk aversion than impulsive ones. More recently, Drouvelis and Lohse (2020) also found identical results, participants with high CRT scores take on average higher risks.

Higher cognitive individuals are also less susceptible to be affected by certain behavioural biases (Oechssler et al., 2009; Hoppe and Kusterer, 2011)[35], they cooperate more frequently in a one-shot public good game (Lohse, 2016) and they are also less likely to be altruistic individuals (Ponti and Rodriguez-Lara, 2015; Czerwonka et al., 2018). In contrast, individuals who score high in intuition show a marked inequality aversion attitude (Cueva et al., 2015; Ponti and Rodriguez-Lara, 2015).

CRT has also been associated with political orientation. Social conservatives showed to be less reflective than social liberals (Deppe et al., 2015). Furthermore, individuals

---

[35] High cognition subjects were less affected by the base rate fallacy, conjunction fallacy and overconfidence than lower cognitive subjects. Yet, no significant effect was observed in the endowment effect and anchoring.

with stronger beliefs in God on average scored lower in the CRT than non-believers (Shenhav et al., 2012)[36].

Other authors point out that the CRT has some limitations, for example it is not a good measure of intuitive thinking (Pennycook et al., 2016), it is essentially associated with numerical abilities (Welsh et al., 2013) and typically men have better results than women (Frederick, 2005; Cueva et al., 2015; Ring et al., 2016; Zhang et al., 2016). Furthermore, due to its worldwide popularity the efficiency of the original three CRT items to assess individual cognitive abilities has become somehow compromised (Toplak et al., 2014; Stieger and Reips, 2016; Haigh, 2016; Thomson and Oppenheimer, 2016). In order to avoid those limitations Toplak et al. (2014) formulate four new questions which display a high correlation with cognitive abilities of the original version and has the advantage of being less known test to the general public. We used them in the empirical study.

4.2.2. Strategic thinking

Beauty contest games (BCG) are classic examples of strategic thinking[37]. They were first introduced by Keynes (1936: 156) to reflect professional thinking in stock markets. In his words:

"...professional investment may be likened to those newspaper competitions in which the competitors have to pick out the six prettiest faces from a hundred photographs, the prize being awarded to the competitor whose choice most nearly corresponds to the average preferences of the competitors as a whole; so that each competitor has to pick, not those faces which he himself finds prettiest, but those which he thinks likeliest to catch the fancy of the other competitors, all of whom are looking at the problem from the same point of view."

In experimental economics the usual setup of BCGs is to ask subjects to pick up a number x from a range of numbers, usually from the closed interval [0, 100], that is closer to "p" times the average of the numbers chosen by all participants to win a prize [target number is $x = "p" * \bar{x}$].

---

[36] For a brief review on several studies reporting a negative correlation between reflective thinking and religious beliefs see Pennycook et al. (2016).

[37] See for example Camerer (2011) for a brief review on BCGs.

Usually, the distance "p" to the average number can be 2/3 but 1/2 is also a common choice (usually 0 < "p" < 1). Nagel (1995) found that the distance "p" to the mean indeed influenced subjects' choices in BCGs. Individuals do not choose at random, higher values of "p" imply larger means and lower values of "p" lower means. In the case of 2/3, we conclude that choosing a number bigger than 66 is a dominated strategy since it will never win (the average number cannot be bigger than 100). Hence, numbers between 67 and 100 violate first-order iterated dominance. If all participants believe that everybody understands that first step, in the next step participants will clearly understand that picking a number bigger than 44 is a strategy that will also never wins. So, choosing a number between 45 and 67 is consistent for a player who obeys one step of dominance but not two and so on (Camerer, 2003).

If we apply infinite steps of dominance, we get the only undominated strategy of the game which is to pick zero. Consequently, zero is the Nash Equilibrium for this game and the only strategy that survives the elimination of weakly dominated strategies (Nagel, 1995). However, most studies have reported that choosing zero was never the winning strategy (Nagel, 1995; Camerer, 1997; Duffy and Nagel, 1997; Bosch-Domenech et al., 2002; Güth, et al., 2002; Camerer, 2003), since it will be enough for one player to pick a number different from zero for the average to be bigger than zero. The winning strategy is to pick a number closer to zero but never zero itself. Moreover, Coricelli and Nagel (2009) observed, through functional resonance imaging (fMRI), that subjects who were closer to the winning strategic in BCGs were those whose thinking behaviour was based in a less self-referential way – the ability to reason in a third person perspective. So, in order to win, individuals must choose one step further the average player's thought (in deletion of dominated strategies) but nothing further (Alba-Fernández et al., 2006; Sbriglia, 2008).

Camerer (1997) also noted that in one-round BCGs played around the world with different samples (e.g. portfolio managers, Ph.D. economics students, CEOs, undergraduate students and high school students), on average participants chose around 37.79 (25 to win); Ph.D. students are the ones who choose zero most of the times (probably because they have some previous knowledge of the game), and even so, they just do it in 13% of times. Yet, if the game is played multiple times with feedback in each round, on the tenth round, the mean drops to 13.89 (who chooses closer to 9 wins) and the percentage of people who choose zero reaches 19%. This conclusion is consistent with Nagel (1995) and Ho et al. (1998), which concluded that subjects in BCGs decrease

their choices over time when 0 < "p" < 1. Even in situations where no feedback is given BCGs numbers decrease with repetition, but with direct feedback results come closer to zero faster (Weber, 2003).

Other studies have observed that usually teams in BCGs perform better (i.e. win most of the times) than teams with just one individual and they also converge faster to the Nash Equilibrium (Ho et al., 1998; Kocher and Sutter, 2005; Sutter, 2005), but once again zero is never completely reached even in the last rounds. Besides, if the BCG group is homogenous, those groups are on average closer to zero than heterogeneous groups (Güth et al., 2002).

Finally, Bosch-Domenech et al. (2002) ran a BCG in three different newspapers[38] (basically a field experiment with lower control and a larger number of participants) and obtained equivalent results among the three experiments, with outcomes very similar to lab experiments as well.

Summarising, the main theory and empirical results from BCG indicate that choosing a number x which $x > "p" * \bar{x}$ is a dominated strategy (never wins), choosing zero is the only strategy that survives the elimination of weakly dominated strategies, but also never wins (provided that one participant chooses a non-zero number). If the game is repeated, individuals learn from past experience and the average number tends to decrease if $0 <$ $"p" < 1$. Students also performance better in the BCG than non-students (Belot et al., 2015).

4.2.3. Reflective and strategic thinking

Previous literature about reflective and strategic thinking has established that the relationship between those two thinking processes is positive and significant. For instance, Brañas-Garza et al. (2012) found that subjects with higher scores in CRT are more prone to play dominant strategies in BCGs. Burnham et al. (2009) supported the same results, namely that subjects with high cognitive ability (measured by a standard psychometric test) exhibit a behaviour closer to the Nash Equilibrium in BCGs, whereas subjects with lower cognitive skills are more willing to choose dominance violation strategies [$x > "p" * \bar{x}$].

Furthermore, Schnusenberg and Gallo (2011) observed that cognitive ability is important to explain the first round of a BCG, but subsequent round responses are not

---

[38] In Germany (Spektrum der Wissenschaft), in Spain (Expansión) and in the United Kingdom (Financial Times).

significantly related to CRT scores (in fact, experience seems to be more important than cognitive ability). A conclusion that is somewhat contradicted by Gill and Prowse (2012) who observed that high cognitive ability subjects (measured by a Raven test[39]) choose lower numbers in the first round of BCGs than low cognitive ability subjects, but the difference was not statistically significant at a 5% level. Yet, in their study, high cognitive ability subjects on average converge faster to lower numbers and get closer to the Nash equilibrium with the repetition of the BCG, even if both types of subjects (high and low cognitive subjects) learn with experience. High cognitive ability subjects learn quicker how to play the game, but they also respond better to opponents' strategic play, since they also get closer to the winner number. The same conclusions are also observed between experienced and inexperienced players. In BCGs, experienced players converge faster for the equilibrium point, even if in the initial round there is no difference between experienced and inexperienced players (Ho et al, 1998).

Carpenter et al. (2013) also found that participants who perform better in the CRT and Raven tests are on average closer as well to the winning guess in BCGs than individuals who score lower in the CRT and Raven's questions. A conclusion that is in part supported by Brañas-Garza et al. (2012) who showed that subjects with higher scores in the CRT are less prone to play dominated strategies in the BCG, but no relationship is observed between the Raven test and the BCG.

Finally, Fehr and Huck (2016) also demonstrated that cognitive ability (measured by a CRT) is strongly correlated with strategic sophistication in BCG – higher cognitive ability participants adjust their choices based on their expectations about the cognitive ability of the remaining participants.

In brief, the relationship between reflective thinking and cognitive abilities seems to be significant and robust. Individuals with better scores in CRT are also more sophisticated in playing games of strategic thinking such as the BCG.

4.3.   Empirical strategy

4.3.1. Overall structure of the survey

We design an online survey with incentivized decisions. The survey (see figure 4.1 for the sequence of parts) initiates by explaining to all participants the purpose of the study,

---

[39] Consists of non-verbal multiple-choice questions used to measure analytic intelligence.

highlighting the total number of questions and the estimated time required for conclusion (10 minutes).

Figure 4.1 - The structure and the sequence of the study

Dictator game **(Task 1)**	→	Beauty Contest Game **(Task 2)**	→	Cognitive Reflection Test **(Task 3)**	→	Beauty Contest Game-PM **(Task 4)**	→	Socio-demographic information **(Task 5)**
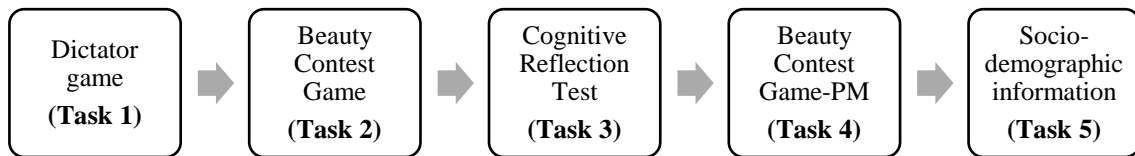
The survey starts with the DG since this is the way to prevent that other questions in the survey may influence participants' choices in the allocation decision process. For instance, Halali et al. (2013) and Schulz et al. (2014) found that cognitive load affects subjects' giving in DGs, although both studies achieved opposing results. Therefore, second and third tasks were presented to assess respondents' cognitive abilities and strategic thinking-process afterwards, since if both had come first, they could influence participants' decisions in the DG by the cognitive exhaustion they might cause.

The DG game is a dictator game with a charity for 50 Euros, which is contingent on the respondent being the winner of the BCG in task 2. Respondents can also earn a cash prize in Task 4, which is not linked to the DG.

The third group of questions (CRT), besides assessing participants' cognitive abilities, it has also the purpose to untie those participants who were equally closer to the correct answer in Task 2 (BCG) and in Task 4 (BCG-PM) since it is possible that more than one participant is equally close to the correct answer in each game.

Between Task 3 and Task 4 we also inquire respondents with three more questions. First, if they had any previous contact with the prior four questions (CRT). Second, how many questions they believe they answered correctly. Third, how many questions they think the remaining participants on average got right. The first question is important to assess the validity of the CRT, the second to establish a relationship between direct and indirect cognitive ability measures, and the last question to assess the belief about the level of sophistication of the other participants.

Task 4 is a game similar to the BCG but with some modifications, which we will discuss in section 4.3.4.

The survey concludes with questions about socio-demographic information (age, gender, university, academic level, academic course and personal e-mail for contact in case of winning).

4.3.2. The BCG

Respondents played the classical BCG in which the winner prize was the allocation decision in the DG which goes from 0 (zero) to 50 (fifty) Euros. See the game instructions bellow:

"In this game we ask you to choose a number between zero (0) and one hundred (100). The winner will be the one who chooses the nearest number to 2/3 of the average of the numbers chosen by all participants. The one who wins will receive the amount determined by the answer he/ she gave concerning the allocation of money between himself /herself and the charity (Task 1). The charity will also receive the corresponding amount."

We opt for a parameter "p" of 2/3 as this was also one of the initial parameters used by Nagel (1995) in the original BCG study.

4.3.3. The CRT

In order to avoid the fact that original CRT version has become popular worldwide we used the four items CRT proposed by Toplak et al. (2014) instead, which display a high correlation with cognitive ability of the original version and has the advantage of being a less known test by the general public:

CRT1: *If John can drink one barrel of water in 6 days, and Mary can drink one barrel of water in 12 days, how long would it take them to drink one barrel of water together?* (incorrect intuitive answer: 6 days; correct answer: 4)

CRT2: *Jerry received both the 15th highest and the 15th lowest mark in the class. How many students are in the class?* (incorrect intuitive answer: 30 students; correct answer: 29)

CRT3: *A man buys a pig for $60, sells it for $70, buys it back for $80, and sells it finally for $90. How much has he made?* (incorrect intuitive answer: $10; correct answer: $20)

CRT4: *Simon decided to invest $8,000 in the stock market one day early in 2008. Six months after he invested, on July 17, the stocks he had purchased were down 50%. Fortunately for Simon, from July 17 to October 17, the stocks he had purchased went up*

75%. At this point, Simon has: a. broken even in the stock market, b. is ahead of where he began, c. has lost money. (incorrect intuitive answer: b.; correct answer: c.)

Comparing to the original questions, we introduce minor changes. For example, personal names have been adapted to the Portuguese culture, but we also introduced other changes to prevent participants from finding the answers on the internet easily[40]. For example, if we search in google for the first sentence of the original problem *"If John can drink a barrel of water in…"* we get around 22,300,000 results with some of those results exposing the correct answers right away. However, in the Portuguese version *"Se o João beber um barril de limonada em…"* we get only around 5,740 results and none of those first results are associated with CRT answers. Notwithstanding these changes, the questions are close to the original version, so individuals should be engaged in the same thinking process that the original version triggers.

4.3.4. The BCG-PM

The fourth task is another game (similar to BCG) that has the key objective to keep participants motivated until the end of the questionnaire since in this game participants can also earn some money regardless of the choice they made in task 1 (DG) or in task 2 (BCG).

It is quite similar to the original BCG, participants must choose again a number between zero and one hundred, but in this game participants have to find the highest number that has been the least chosen by the other players in order to win a prize, which is the winner number in euros.

For example, if the biggest number less chosen by all participants is one hundred, the participant who choose it wins one hundred Euros, if the winner number is ninety-nine, the participant who choose it wins ninety-nine Euros and so on. In this situation individuals have an incentive to choose the highest number (maximize earnings), but they also know that if they choose smaller numbers, they increase the chances of winning the game.

If we take into account that each individual has the same goal as the others (wealth), in order to achieve it he/she can think like the majority, for example if he/she is the "best runner" it can be effective, but otherwise (which happens in most cases) the goal becomes

---

[40] First problem, "water" is replaced by "lemonade", second problem, "Jerry" is replaced by "Guilherme", third problem, "pig" is replaced by "donkey" and forth problem, "2008" is replaced by "2020".

extremely hard to reach. Alternatively, that individual can obtain the same goal, but through alternative "outside the box" thinking. That is, thinking completely differently from the majority in order to achieve the objective that everybody else have in mind. We think that this new game best translates that particular behaviour.

Also, since we believe that this new format better portrays the behaviour of investors to get profit maximization we will call this new game BCG-PM (see the description of the game below).

"In this game we ask you again to choose a number between zero (0) and one hundred (100). But now, the winner will be the one who chooses the highest number that has been the least chosen by all participants. The one who wins will receive the number he/ she chose in euros."

Furthermore, it is expected that individuals with higher scores in the CRT will notice strategies to be closer to success in any game. Therefore, it is expected that in this game (BCG-PM) smarter individuals (measured by higher scores in the CRT) will also be closer to the winner strategy.

4.4.   Implementation

Our questionnaire was implemented via internet between February and March of 2021 and sent mainly to undergraduate students of economics and business background from Iscte Business School (Iscte – Lisbon University Institute) and from University of Aveiro (UA). Qualtrics software was used for this purpose. Participation was voluntary, and with some probability incentivized. As previously explained, the participant who chose the number closer to 2/3 of the average of all numbers in the BCG, got the division he/ she chose in the DG between himself/ herself and the charity (Portuguese Red Cross), which goes from zero to fifty Euros. Also, in Task 4 (BCG-PM) the participant who chose the highest number less chosen by all participants won the number he/ she chose in euros (between 0 and 100).

Participants were only able to respond to the survey once. All IP addresses registered more than once were excluded from the analysis, since with financial rewards participants could be tempted to answer the inquiry more than one time.

The translation of the instructions given for participants can be found in the appendix C.1. The original instructions were given in Portuguese.

## 4.5.	Results

In this section we analyse the data, reporting descriptive statistics and statistical tests, as well as an econometric analysis. For the econometric analysis, we opt for two distinct models in order to explain when participants give (logit, probit and cloglog models) and the amounts shared conditional on giving (tobit model).

4.5.1. Descriptive statistics

In total, 83 people answered to our survey. However, we exclude 4 observations since they have the same IP address. We also exclude 5 other observations since they did not report the questionnaire completely. In the end we got 74 valid observations.

The average age of respondents was 20.28 years (SD=4.71, modal 18 (51.35%), minimum 18, maximum 45) and 55.41% were female. The majority were undergraduate students from the Iscte-Business School and from the University of Aveiro (UA). Each participant took on average around 18 minutes to complete the survey. The descriptive statistics of the variables used in the analysis are summarized in table 4.1.

Table 4.1 - Descriptive statistics of the variables

Variable	N	Mean	SD	Min.	Max.
Giving	74	0.591	0.369	0	1
Crt_total	74	2.216	1.426	0	4
Crt_i_total	74	0.986	1.027	0	3
BCG	74	49.770	27.413	0	100
Winner_distance	74	25.275	19.568	0.180	66.820
BCG-PM	74	68.784	28.917	0	100
Winner_distance (BCG_PM)	74	30.486	28.628	1	99
Female	74	0.554	0.500	0	1
Age	74	20.284	4.712	18	45
Financial_comfort	74	6.095	1.960	1	10
Working_time	74	0.635	0.485	0	1

Note: Giving is the share of the DG endowment donated to charity; Crt_total is the total number of correct answers in the CRT test measured on a scale ranging from 0 to 4; Crt_i_total is total number of incorrect intuitive answers in the CRT measured on a scale ranging from 0 to 4; BCG is the average number participants chose in the beauty contest game (Task 3) ranging from 0 to 100; Winner_distance represents the average distance that participants stayed from the correct guess in the BCG; BCG-PM is the average number participants chose in Task 4; Winner_distance (BCG_PM) represents the average distance that participants stayed from the correct guess in BCG-PM; Female is the proportion of females in the sample; Age is the average age of participants; Financial_confort represents the well-being of participants on an increasing scale ranging from 0 to 10 and Working_time is a dummy variable which gets value 1 if respondents deliver the questionnaire during working hours (9:00 to 17:00) and 0 otherwise.

In our study, respondents chose to donate 59.05% from the 50 Euros. Usually in previous DGs, participants give between 20 to 30 percent of the initial endowment (Camerer, 1997; Ensminger, 2004; Henrich et al., 2005; Engel, 2011). Since we give

small financial incentives, our results are not surprising. Appendix C.2 shows the histogram of giving.

Also, on average, participants selected 55.41% correct answers in the CRT. In Toplak et al. (2014) participants on average selected 24.50% of correct answers.

Furthermore, 83.78% of participants reported that they had never had contact with any of the CRT questions previously, and on average, participants think they got 74.32% of the questions right. Furthermore, the Pearson correlation coefficient between measures of indirect (CRT) and direct assessment of cognitive ability is positive and significant (coeff=0.544, p=0.000). In this point, participants revealed some awareness of their performance on the CRT. To complete the point about cognitive abilities, participants also reported that they thought that other participants got correct 69.59% of the questions. The average number chosen in the BCG[41] was 49.770, therefore the winner number was 33.180. In this sample, individuals with a level-k[42] of thinking around 2 were closer to find the winner strategy. Appendix C.4 displays the level-k of thinking of all rational players.

In appendix C.5 we can observe the results of BCG-PM. In this game the participant who chose the number 98 won the contest.

Next, we will analyse choices in the four tasks proposed in the survey. We will start by exploring gender differences in the four tasks (4.5.1). In section 4.5.2. we will partition respondents according to their scores in the BCG and explore how their choices differ in the other three tasks.

4.5.2. Gender differences

On table 4.2 we can observe that females were on average more generous than males, but a Kruskal-Wallis equality-of-populations rank test (KW) indicates that the difference is not statistically significant.

---

[41] Appendix C.3 displays the histogram of the chosen numbers in the BCG.
[42] A model that characterizes individuals' strategic thinking by the "depth" of their strategic thought (Gill and Prowse, 2012). For instance, individuals with a level-0 of thinking choose at random.

104

Table 4.2 - CRT scores and BCG results across genders (averages)

Gender	N	Giving	Crt_total	Crt_i_total	BCG	Winner_distance
Male	33	0.527	2.727	0.727	43.303	20.871
Female	41	0.641	1.805	1.195	54.976	28.819
KW test	-	(X^2=1.454, p=0.228)	(X^2=7.708, p=0.006)	(X^2=4.043, p=0.044)	(X^2=3.030, p=0.082)	(X^2=2.992, p=0.084)

About CRT scores, males obtain better scores on average than females and the difference is statistically significant as anticipated. On the other hand, females obtain higher intuition scores on CRT than males and once again the differences are statistically significant at a 5% level. Both results are in line with previous literature on the topic, which shows that typically men obtain better scores than women on the CRT (Frederick, 2005; Cueva et al., 2015; Ring et al., 2016; Zhang et al., 2016).

Besides, males were also closer to the winning number in the BCG than women, but the difference is not statistically significant. Male participants also show higher sophistication in playing the BCG (they chose lower numbers) than females, but the difference is again not statistically significant.

Furthermore, males were also closer to the winning number in BCG-PM[43] (table 4.3), and they also show higher sophistication than females in playing the game; the differences are statistically significant at 5% level in both cases**.**

Table 4.3 - BCG-PM results across genders (averages)

Gender	BCG-PM	Winner_distance (BCG_PM)
Male	75.455	23.970
Female	63.415	35.732
KW test	(X^2=5.035, p=0.025)	(X^2=5.113, p=0.024)

In summary, most significant differences between genders are found in the results obtained in the CRT. Males are more rational and women more intuitive.

4.5.3. BCG results

We divided our sample into two groups (table 4.4). The first group contains participants that gave a non-rational answer (non_rational) in the BCG game $[x > \frac{100}{3}]$, the second group contains participants who gave rational answers (rational) in the same game $[x \leq \frac{100}{3}]$.

---

[43] Appendix C.5 displays the histogram of the game.

Table 4.4 - Generous behaviour and CRT scores from rational and non-rational participants

Rationality	N	Giving	Crt_total	Crt_i_total	Winner_distance (BCG_PM)
Non_rational	23	0.600	1.565	1.304	26.609
Rational	51	0.586	2.510	0.843	32.235
KW test	-	(X^2=0.032, p=0.859)	(X^2=7.134, p=0.008)	(X^2=4.096, p=0.043)	(X^2=0.437, p=0.509)

Participants who play the BCG rationally obtain better scores on average in the CRT than those who played it non-rationally, and a KW equality-of-populations rank test indicates that the difference is statistically significant at a 5% level. Furthermore, individuals who play it rationally also exhibit lower results on the CRT intuition score, and the difference among rational and non-rational participants is also significant at a 5% level.

However, there is no statistically significant difference in the giving behaviour among rational and non-rational participants. Rational players are slightly less generous than non-rational players, but the differences are statistically insignificant. Furthermore, the differences observed in the winner distance of the BCG-PM are also non-significant.

For the following steps, we separate our analysis into two groups (table 4.5). The first group includes individuals that got all the answers on the CRT correct (Highest), and in the other group are the individuals who got none to three answers right (others)[44].

Table 4.5 - Mean choices in DG and BCG by cognitive ability

Cognitive abilities	N	Giving	BCG	Winner_distance	Winner_distance (BCG_PM)
Highest	20	0.480	38.850	15.114	22.500
Others	54	0.631	53.815	29.038	33.444
KW test	-	(X^2=2.081, p=0.149)	(X^2=4.185, p=0.041)	(X^2=9.267, p=0.002)	(X^2=2.362, p=0.124)

We can observe on table 4.5 that individuals with highest CRT scores are indeed less generous, but the differences are not statistically significant. With these results we cannot confirm a negative relationship between rationality (measured by a CRT) and altruism as some previous studies suggest (Ponti and Rodriguez-Lara, 2015; Czerwonka et al., 2018).

---

[44] Appendix C.6 display CRT scores by generosity and strategic skills.

Furthermore, there are significant differences in the numbers participants pick in the BCG and also with the distance participants stay from the winning number in the same game, in both cases the differences are significant at 5% level. Overall, the results suggest that participants with higher scores in CRT are on average closer to the correct number in BCG. Besides, also in BCG-PM, the highest cognitive ability individuals are closer to the winner number (98), but the difference is not statistically significant at 5%. We also observe that there exists a negative and significant correlation between CRT scores and the distance to the winner's number in both games (coeff=-0.307, p=0.008; coeff=-0.234, p=0.045). Which is not surprising given the previous results.

Furthermore, in table 4.6 we observe that individuals closer to the NE (<30) of the BCG exhibit a generosity quite similar to the remaining participant.

Table 4.6 - Mean generosity by BCG results

BCG	N	Giving
>30	53	0.579
≤30	21	0.619
KW test	-	(X^2=0.204, p=0.652)

Once again, performing a KW test, we can observe that no statistically significant differences exist.

4.5.4. Analysis by BCG quantiles

Table 4.7 shows a quantile analysis where we divide our sample in three groups by differences in the winner distance in the BCG (closer, intermediate and away). We can observe that the differences between groups are just statistically significant at a 5% level in the CRT and intuition CRT scores between groups closer vs. away. No other statistically significant differences are observed between the variables shown on table 4.7.

Table 4.7 - Mean choices in DG and CRT by BCG winner distance quantiles

Quantile	N	Given	Crt_total	Crt_i_total
Closer	25	0.632	2.760	0.720
KW test	-	(X^2=1.263, p=0.261)	(X^2=2.563, p=0.109)	(X^2=1.306, p=0.253)
Intermediate	25	0.524	2.220	1.000
KW test	-	(X^2=0.968, p=0.325)	(X^2=2.109, p=0.146)	(X^2=0.947, p=0.331)
Away	24	0.617	1.667	1.250
KW test (closer vs. away)	-	(X^2=0.024, p=0.878)	(X^2=6.640, p=0.010)	(X^2=4.126, p=0.042)

Overall, individuals closer to the winner number in BCG, exhibit better cognitive skills, but no other differences are observed. Besides, we did not confirm that individuals closer to the winner number in BCG are on average less altruistic. These individuals were on average more generous, but the differences for the other groups are not statistically significant.

4.6.   Econometric analysis

To further explore giving behaviour, we chose to establish an econometric model with two stages. For the first stage, we test three different models in order to justify whether individuals donate (logit, probit and cloglog). For the second-stage model we use a tobit model to justify the quantities given. The following first-stage model is then used:

$$\Pr(Y_i = 1|\dots) = \alpha + \beta_1 Highest\_CRT + \beta_2 Level\_2 + \beta_3 Female$$
$$+ \beta_4 Financial\_comfort + \beta_5 Working\_time + \varepsilon \qquad (4.1)$$

where Y_i is the dependent variable and is equal to 1 if respondent chooses to donate something in the DG and 0 otherwise; $Highest\_CRT$ is a dummy variable which represents individuals with the highest CRT scores (all questions correct); $Level\_2$ is a dummy variable which gets value of 1 if the respondent have a level-k of thinking of 2 or higher and 0 otherwise; $Female$ is a dummy variable which takes value 1 if the respondent is a women and 0 if is a male; $Financial\_comfort$ is a variable which represents the self-evaluation that each respondent makes of their financial comfort; and finally, $Working\_time$ is a dummy variable which gets value 1 if the participant deliver the questionnaire during working hours (9:00 to 17:00) and 0 otherwise[45].

---

[45] Golder and Macy (2011) observed that in a typical day there is a peak in happiness later in the evening.

We exclude from the analysis some variables that represent the same parameter. For instance, we generated a dummy variable (*Level_2)* which represents strategic thinking abilities, therefore we exclude *BCG*, *BCG-PM*, *Winner_distance* and *Winner_distance (BCG_PM)* since they represent the same dimension. Similarly, we exclude the variable *Crt_total* and *Crt_i_total* since *Highest_CRT* already represents participants' cognitive skills. We also exclude the variable *Age* since most of respondents have the same age.

The following second-stage (tobit) model is then used:

$$Y_i^* = \alpha + \beta_1 Highest\_CRT + \beta_2 Level\_2 + \beta_3 Female$$
$$+ \beta_4 Financial\_comfort + \beta_5 Working\_time + \varepsilon \quad (4.2)$$

$$Y_i = \begin{cases} y_i^*, & if \ y_i^* > 0 \\ 0, & if \ y_i^* \le 0 \end{cases}$$

where $Y_i > 0$. The independent variables are the same of the first-stage model. Both equations are estimated by maximum likelihood (ML) with robust standard errors. In the next step we show the results of the first-stage econometric models (table 4.8).

Table 4.8 – Logit, probit and cloglog regression results for giving in the DG (coefficients)

Variable	Logit	Probit	Cloglog
Highest_CRT	-0.842	-0.443	-0.329
Level_2	-0.109	-0.166	-0.249
Female	1.642	0.859*	0.722*
Financial_comfort	-0.167	-0.064	-0.032
Working_time	-0.436	-0.232	-0.165
N	74	74	74

Note: levels of statistical significance * p<0.05; ** p<0.01 and *** p<0.001

Most variables are not statistically significant at a 5% level to explain when participants give. The only exception is *Female* in the probit and cloglog models. Using a RESET test we conclude that the three models cannot reject the null hypothesis that they have a well-specified functional form in a 5% significant statistical level [chi2(1)=2.47, Prob>chi2=0.116; chi2(1)=1.41, Prob>chi2=0.236; chi2(1)=0.00, Prob>chi2=0.997]. Consequently, the analysis of the results from now on focuses exclusively on the model that overall gives slightly better results (Cloglog)[46].

---

[46] Logit: Prob > chi2=0.052; Probit: Prob > chi2=0.024; Cloglog: Prob > chi2=0.020.

Table 4.9 – Cloglog model results

Variable	Average marginal effects	Standard Error	P > | z |
Highest_CRT	-0.074	0.080	0.353
Level_2	-0.056	0.069	0.411
Female	0.163*	0.066	0.013
Financial_comfort	-0.007	0.019	0.701
Working_time	-0.037	0.064	0.559
Prob > chi2	0.020		
N	74		

Notes: The symbols ***, **, * denote that the coefficient is statistically different from zero at 1‰, 1% and 5% levels of statistical significance respectively.

On average, female participants were more willing to give something than male participants (16.31%) and the dummy variable is statistically significant in the model at 5% level. The other variables were not significant to explain when participants donated (*Highest_CRT*, *Level_2*, *Financial_comfort* and *Working_time*).

Table 4.10 shows the results for the second-stage model.

Table 4.10 – Tobit regression results (coefficients)

Giving	Coefficient	Standard Error	P > | t |
Highest_CRT	-0.248*	0.118	0.040
Level_2	0.187*	0.093	0.048
Female	0.107	0.100	0.290
Financial_comfort	-0.005	0.028	0.850
Working_time	-0.304**	0.084	0.001
Pseudo R-squared	0.160		
Prob > F	0.001		
N	74		

Notes: The symbols ***, **, * denote that the coefficient is statistically different from zero at 1‰, 1% and 5% levels of statistical significance respectively.

In this econometric model the variables *Highest_CRT*, *Level_2* and *Working_time* were all significant to explain variations in giving behaviour conditional on giving at a 5% level. Participants with the highest CRT score showed themselves on average less altruistic, as previous studies already suggested (Ponti and Rodriguez-Lara, 2015; Czerwonka et al., 2018).

For the variable *Level_2* we would expect that individual with higher strategic abilities would be less altruistic, however the econometric analysis shows a different effect. Individuals who have a level-k of thinking of 2 or higher were more altruistic than the others. The result suggests that the relationship between strategic skills and altruism

may be more complex than we initially suppose. However, it is plausible that individuals with better strategic skills may easily recognize the long-term beliefs of giving even under conditions of greater anonymity. For example, a high self-esteem derived from giving can have a positive effect on personal health.

Working_time was also significant. In this case we are not aware of any research which tried to figure it out if altruism varies throughout the day. However, Golder and Macy (2011) analysing emotions on Twitter observe that day length influences people's mood, people throughout a day are happier later in the evening (when working time is finished). If mood or happiness have an impact in altruism as some researchers claim (Tan and Forgas, 2010; Aknin et al., 2012; Aknin et al., 2013; Helliwell et al., 2017; Park et al., 2017) it is plausible that the time of the day can have an impact in generous behaviour as well. Since the variable *Working_time* gets value of 1 during 9:00 to 17:00 our results are not surprising, since individuals are likely to exhibit greater altruism when they are happier. We cannot rule out the simpler interpretation that individuals who are willing to respond to a survey after working hours are more generous (in this case with their time), and as such are also more generous in the DG.

4.7.   Chapter conclusions

In this chapter, we proposed to analyse mainly the existence of relationships between cognitive abilities, strategic sophistication and altruism. We did observe that higher cognitive ability participants indeed played the BCG with higher sophistication (they chose lower numbers, and those numbers were closer to the winner number). In the econometric analysis we observed that individuals with higher scores in the CRT were actually less altruistic as previous studies indicated (Ponti and Rodriguez-Lara, 2015; Czerwonka et al., 2018). In the same analysis, we also observed that individuals with higher level-k of thinking were more altruistic than the other respondents. This is a surprising result since initially we expect the opposite outcome. Nevertheless, it is possible that individuals with better strategic abilities may recognize the positive points of generous behaviour in the long run even under conditions of great anonymity (higher self-esteem).

However, some limitations suggest that we must analyse the results with caution namely the small sample size and the fact that some anonymity was lost by using the email address as a means to make payments. While the later procedure ensured an easy

means of rewarding subjects, it may have somewhat increased generosity by reducing anonymity.

For other studies, it would be interesting to observe if the relationship between strategic abilities and altruism is persistent and if the effect goes in the same path as this study suggests.

Chapter V

Altruism under multiple choices: testing the too-much-choice effect in donations (Essay 4)

5.1.   Introduction

The too-much-choice effect has been a puzzle in economics since theory predicts that when more choices are available it is at least weakly better for consumers to achieve an better-quality match between personal preferences and available options. However, recent empirical studies have observed that the decision process when many options are available is not always particularly pleasant, which translates into people not consistently making the right decision for themselves (i.e. they are more likely to experience regret with their decision afterwards) or even not making a choice at all. This problem is known as the too-much-choice effect[47]; people experience greater difficulties in choosing from larger than smaller assortments.

Although there are several studies on the too-much-choice effect, not many have related this phenomenon with the decision process in donations. Even so, existing studies point out that when more choices are available, people on average donate more frequently (Scheibehenne et al., 2009; Soyer and Hogarth, 2011). Even so, Scheibehenne et al. (2009) found the too-much-choice effect, by observing fewer subjects choosing to donate, when individuals need to justify their choices.

In order to clarify this point, we have created three different scenarios of a hypothetical dictator game with the recipient player being matched with several charities with different causes. In the first scenario, participants have the possibility to donate to just one charity (condition 1C); in the second scenario to six charities (condition 6C) and in the last scenario to twenty-four (condition 24C). Afterwards, participants report their feelings about the allocation decision process.

We implemented these three different treatments randomly as a between subject design through an online questionnaire.

The study is structured as follows. A brief literature review on the topic is carried out in the next section. In section 5.3 and 5.4 we present the (hypothetical) experimental design and provide the details of the implementation. In section 5.5 we present, analyse

---

[47] There are other equivalent designations in the literature: tyranny of freedom, menu effect or choice overload.

and discuss the results and section 5.6 concludes. The three versions of the questionnaire are in the appendix (appendix D.1 to D.3).

5.2.   Literature review

5.2.1. The too-much-choice effect

The too-much-choice effect has been documented in recent years in a wide range of circumstances. For example, Iyengar and Lepper (2000) found, through three field experiments in which they changed the number of choices available among conditions, that although people report more choices as being more pleasant, in the end, individuals ended up buying more products (jams) or engaging in more complex intellectual tasks (writing a better academic essay) when the choices available for them were more limited in number. They also noted that people reveal more frequently a feeling of regret with the final choice when there were many choices than when choices were fewer.

As another example, Rice and Hanoch (2008) and Hanoch et al. (2009) observed the problem of too-much-choice in healthcare settings (namely choosing a drug insurance plan). They found that older individuals were less likely to choose the best plan for themselves, the one that minimised total annual costs, yet older adults were also more confident than younger adults that they had chosen the best plan. Consequently, another effect of the too-much-choice effect can be overconfidence in the outcome of choices. Sethi-Iyengar et al. (2004) observed the same effect of choice overload when employees chose whether to participate and how much to participate in a retirement plan. When more potential funds were presented, there was a decrease in the participation rate. For every ten funds added, the participation rate dropped 1.5% to 2%. The same effect was observed in an online privacy context (Korff and Bohme, 2014). Participants confronted with a larger amount of privacy options reported less trust in the website, less satisfaction with the decision process and experienced more regret with the choices they made. An equal phenomenon was noticed on online dating choices (Lenton and Francesconi, 2011). Increasing variety of choice led some participants not to choose at all and some others to report lower quality choices. As variety of choices increased, the number of dates proposals decreased, suggesting that choice variety yields mostly confusion among users. Park and Jang (2013) documented choice overload in tourist destinations. Having more than 22 options increased the likelihood of individuals making "no choice" and having less than 22 lead participants to report less regret in their choices.

The too-much-choice effect has been also reported in volunteer choices. Carroll et al. (2011) analyse the relationship between deferment likelihood and the number of organisations considered for volunteering. They observed that if more volunteering options had been considered, the decision-making process would have been more difficult and more likely to put volunteers off, making no decision at all.

However, even if there is some universality in choice overload across products and services, the too-much-choice effect seems to have a different impact depending on human culture or social classes (Markus and Schwartz, 2010). For instance, Roets et al. (2012) noted that living in a society where choice is abundant might increase the well-being of "satisficers" but not of "maximizers"[48]. Indeed, for those who are always looking for the best options, living in a society of unlimited options may cause more feelings of regret with the choices they make than for those who are just looking for an option that meets guidelines sufficiently. Schwartz et. al. (2002: 1194) explain:

"So, in a world of limited options, a maximizer might be more disappointed than a satisficer with the results of his or her decisions without taking personal responsibility for the disappointing results. But in a world of limitless options, there is simply no excuse for failure."

Reutskaja and Hogarth (2005) also found that in Eastern European countries it was more important to have more options available than in Western European countries. The suggested underlying explanation states that as these countries have been subject to historically more restrictions, when more options become available to their inhabitants, they become happier compared to those in another contexts where choices have been always more abundant.

Furthermore, other authors, such as Shah and Wolford (2007), consider that the preference for an option set-size is not monotonic but rather an inverted U-shape function. It increases in the beginning but after a peak is reached it declines when the number of options increases. For example, Lenton et al. (2008) observed this pattern on online mate choices. Increasing variety in potential mates lead subjects to greater confusion and lower quality choices after an optimum number of options is reached. In this case, participants showed a preference to choose from a set size of 20 potential mates. Johns et al. (2013)

---

[48] "Maximizer" is a person that desires always the best possible outcome. In turn, a "satisficer" looks for a result that is good enough in order to meet some criterion (Schwartz et al., 2002).

supported the same point in a study regarding the optimal number of meals from restaurant menus. They found that there was an ideal number of menus options: below that number customers feel restricted in their choices and above that number the effort required to go through the choices and reach a decision is excessive. Precisely, 6 was the ideal number of options for quick service meals and 10 options for main courses in fine restaurants. Reutskaja and Hogarth (2005) also observed that the satisfaction function was an inverted U-shape function of the number of alternatives in a set (gift boxes). More options were better for satisfaction with the decision process until a peak was reached, after which increasing the number of options decreased satisfaction. In their field experiment, the peak was also affected by the visual presentation of the assortments.

All these issues about choice overload may arise because, as Thaler (1988) states about a vast set of options, a choice among several options raises expectations greatly, to the point that the selection made may produce a lower result than imagined. Schwartz (2000) calls this phenomenon the "tyranny of freedom". Individuals from modern societies have so much control over their lives[49] that any minor unsuccessful result in a particular life domain, may be seen as a huge failure leading people to blame themselves for the bad result, and more importantly it may lead them to some health complications like depression or anxiety. As Schwartz et al. (2002: 1194) also argue:

"In a world in which options are few, it is reasonable to think that people will blame the world for disappointing results. But in a world in which the options are many, people will blame themselves."

The unpleasant feeling from the too-much-choice may also be the result of the human nature. As Schwartz (2000) argues, individuals must gather information from all available options in order to make a rational choice, which is a hard task and in extreme cases even impossible to do. This happens simply because the human cognitive skill to process information is limited (Simon, 1956).

Summarising, DellaVigna (2009), in a survey about the menu effect, indicates that the inefficient behaviour that causes sub-optimal results is triggered by heuristic problems that cause people to engage in five erratic behaviours. People diversify their choices too much, they delay making the choice as much as possible, they express an excessive

---

[49] Life control which can be lower than people normally believe. Langer (1975), with six field experiments, observed that people behave as if they have control over the outcome even if those outcomes were only the result of chance situations.

preference for what is familiar or for what is salient, and individuals can simply make a wrong choice due to overall confusion.

On the other hand, other studies have reported the inexistence of choice overload in some circumstances. Scheibehenne et al. (2010) reviewed more than 50 published and unpublished studies and found a mean effect size of the number of options of virtually zero but with a huge variance among studies. Besides, they did not identify any variable with sufficient explanatory power over the too-much-choice effect (e.g. culture or option arrangement), even if some preconditions have shown some potential to be significant.

For instance, Chernev (2003) observed that individuals with articulated preferences (a well-defined preference for certain attributes) were more likely to choose from a large than small assortment size. However, they were generally more confident that they had chosen the best alternative when choosing from a small than a large assortment. They concluded that people with well-defined preferences process less information since they know very well what attributes they are looking for in a product/ service. Consequently, in markets where people do not have well-defined preferences or in novel situations where past experiences are not enough to form an opinion, inefficient results may arise from having too-much-choice. In situations where previous experiences define people's preferences very well50, those unlimited choices may be perceived as limited in number, and they do not negatively affect the decision-maker (Iyengar and Lepper, 2000). People can simply discard most options immediately without the need to spend much time evaluating them. Information analysis seems to be a key variable in the extent to which choice overload arises.

Time pressure is also an important variable when we analyse the too-much-choice effect (Jessup et al., 2009; Inbar et al., 2011). Normally, in large assortments people have a greater tendency to feel that they do not take all the time they need in order to make a well-founded decision and, consequently they experience more time pressure and greater regret than those who can choose from a small assortment set (Inbar et al., 2011). Besides, if there is insufficient time to analyse all available options to make a choice, people may essentially leave the decision process without choosing any option at all (Jessup et al., 2009).

---

[50] On the other hand, in cases where previous experiences provoke too much vacillation between preferred options, people may interpret it as an indicator that they do not have a strong preference, and consequently may not choose an option at all (Jessup et al., 2009).

In another context, Scheibehenne et al (2010) also give an interesting explanation for the evidence of the choice overload effect, unrelated to how individual choose but related to the publishing process. They observe a slight publication bias in favour of choice overload. Since choice overload is an interesting and surprising result, scientific journals may be more willing to publish surprising results than standard ones, especially when the choice overload effect was first observed. Nowadays, this is more balanced since it also has become attractive for scientists to deny the too-much-choice effect initially reported.

In summary, having too-much-choice available can cause discomfort during the decision process and dissatisfaction with the final result in particular contexts; on the other hand, increasing people's options can in theory achieve a better match between preferences and available choices when consumers know precisely what they are looking for (see a brief summary of the consequences of the too-much-choice effect documented in the literature in table 5.1).

Table 5.1 - Some examples of the consequences of the too-much-choice effect

Consequences	Studies
Buy fewer products/ services	Iyengar and Lepper (2000), Sethi-Iyengar (2004), Rice and Hanoch (2008), Hanoch et al. (2009), Korff and Bohme (2014)
Lower quality choices	Lenton et al. (2008), Lenton and Francenconi (2011)
Overconfidence in the outcome of choices	Rice and Hanoch (2008), Hanoch et al. (2009)
Less satisfaction with the decision-process	Reustska and Hogarth (2005), Korff and Bohme (2014)
Regret with the choice made	Park and Jung (2013), Korff and Bohme (2014)
More difficulties in the decision-process	Fasolo et al. (2007), Carroll et al. (2011), Johns et al. (2013)

5.2.2. Why the too-much-choice effect may emerge: evidence from a simulation

Other studies about the too-much-choice effect, like Greifeneder et al. (2010) found that the source of the problem is designed by complexity. If the number of attributes increases in an option, the process of choosing becomes immediately more complex and satisfaction with the decision process decreases. Fasolo et al. (2007) found the same effect using a simulation process, more attributes in a product make individuals more unwilling to choose and less satisfied with the decision process. We can observe this case by performing a simple computation using *matlab software* to find a dominant choice in a

set, according to the number of options and attributes available. In line with the previous approach, the following formula captures a process by which the number of options and attributes influence the probability of finding a dominant choice set:

$$p = \left(\frac{1}{n}\right)^{x} . n \qquad (5.1)$$

where:

p is the probability of finding a dominant option.

n is the number of options.

x is the number of attributes.

We can observe in Figure 1 that within "3 attributes" if the set compounds more than five options available, the chances of getting a dominant option are very low (below 5%).

Figure 5.1 – Probability of finding a dominant choice according to the number of choices and their attributes
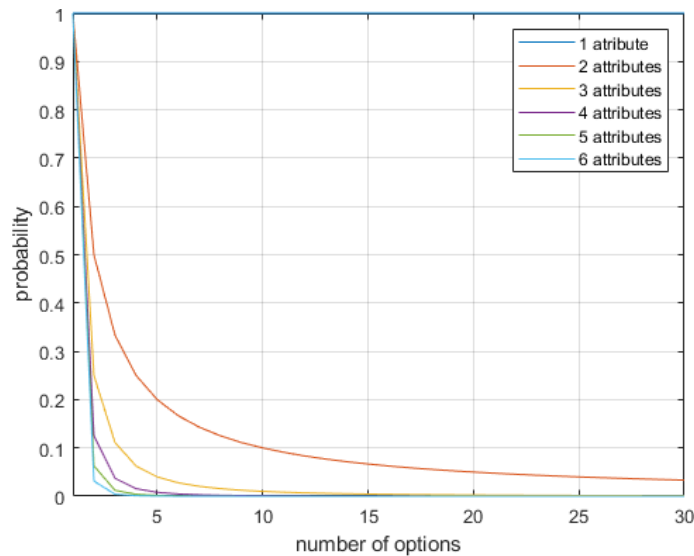
After that point, if we increase the number of available options or the number of attributes, the probability of finding a dominant solution is approximately zero. Consequently, this fact helps explaining the decrease in the likelihood of choosing from a large assortment set size that can be found in some literature. The task of finding the best option becomes cognitively more difficult when more options or attributes are available since the best option is simply harder to get. People under those circumstances (large assortments) could be wasting time analysing option after option and in the end, they do not find the "best solution", simply because it does not exist at all. In order to get a result, individuals could decrease the number of attributes they want to maximize, but

120

consequently they also need to decrease their expectations and therefore the satisfaction with the decision process.

In a situation where people just want to maximize one attribute, a unique best solution is always possible, and more choices is always better if, for instance, we do not have time constraints or if we have some boundaries to our ambition level[51]. Again, we undertook simulations (2500 times for each point) using *matlab software*, pondering that the enjoyability of any option is any random number between [0, 1][52]. We can see in figure 5.2 that more options in the beginning increase exponentially the possibility of getting higher utility in cases where there is just one attribute to maximize. However, we can also observe that the marginal utility of having one more option available after 15 options is almost zero.

Figure 5.2– Maximum average utility given the number of options and its marginal utility
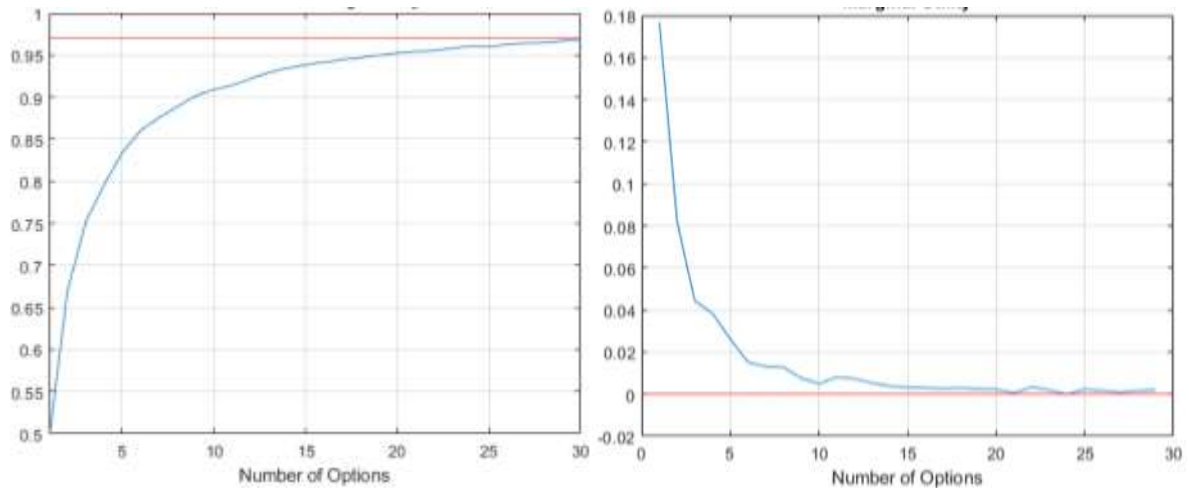
This result could be the reason why, even when people try to maximize just one attribute, the decision process is not always pleasant. In large assortments of more than 15 units, in order to maximize utility, it may simply not be worth analysing one unit more for the marginal utility enhancement that it offers. More alternatives are always better if the best solution is really important to get for the decision-maker. However, under regular circumstances, as we can see in figure 2, having among 10 to 20 available options seems to be good enough for most decision situations since the marginal utility of having one more option almost reaches zero and time consumption of analysing one more alternative might just not reward the decision-maker.

---

[51] Once it is reached, we no longer seek a better solution. Without a boundary we are looking eternally for the best solution.
[52] Simply means that the quality of a set of products/ services follows a uniform distribution.

5.2.3. The too-much-choice effect on donations

Typically, in donation settings individuals must choose from a vast number of available charities, those who are worthy of receiving their money (Scheibehenne et al., 2009; Soyer and Hogarth, 2011). Under those conditions, where choices are abundant, if the too-much-choice effect exists it should be observed. For the purpose of this study, we consider that the too-much-choice effect will be revealed in donation settings if we observe that individuals donate less in circumstances where the choice set is larger. However, there are points in favour or against the existence of the too-much-choice effect in donations. If on the one hand, when more options are available (charities) they can lead to a higher consumption of time and thus to higher dissatisfaction with the decision process, on the other hand, they can potentially increase people's donations since they can choose causes that best represent their concerns.

Some recent studies involving the dictator game and donations have been conducted to find or to discard the too-much-choice effect on donation settings. Scheibehenne et al. (2009) carried out an all-or-nothing dictator game played anonymously in a lab with small stakes (1 Euro). They observed that subjects were more willing to donate if they choose from the large assortment than if they choose from the small one. The too-much-choice effect was only observed in situations where individuals needed to explain why they choose to donate, probably because it is more difficult to find arguments in favour of giving when options become more similar (more difficult to distinguish between options), which happens when assortments increase in size. However, the main conclusion of that previous study is that under normal circumstances the too-much-choice effect does not arise in donation settings.

Another reason to justify that an increase in the number of charities can increase donations is that it can mitigate the responsibility diffusion effect.

This fact can be observed in a dictator game. A game in which a player (the dictator) must choose how to split an initial endowment with a recipient. For instance, it is plausible that if the dictator knows that other dictator players are also playing the game with the same entity, they may think that this entity does not need so much help anymore (each dictator feels less responsible for the final outcome). If we present more than one entity, dictator players do not know which entity the other players have chosen. Another example, Panchanathan et al. (2013) observed that in a dictator game with more than one dictator, on average dictators give less money to the recipient, even if they have the chance to give an amount conditional on the other dictator's choice. This fact is also

122

known as the bystander effect: people are less willing to help others if there is somebody else present that can also provide assistance.

Soyer and Hogarth (2011) also try to analyse the too-much-choice effect under donation settings. They analyse the distribution of a 50 Euros lottery prize between subjects and three sets of charities and solidarity campaigns that vary only in the number available in each set. In the end they observed that donations increase with the number of recipients but at a decreasing rate.

In brief, the existing literature about the too-much-choice effect on donation settings, typically does not support the existence of adverse effects of choice overload (Eckel and Grossman, 2000; Scheibehenne et al., 2009; Soyer and Hogarth, 2011; Li et al., 2019).

Thus, following previous studies and to further test the absence of the too-much-choice effect in charitable giving we formulate the following hypothesis:

H1: The amounts donated in a dictator game increase if we increase the number of charities available for donation.

Moreover, it seems plausible that by increasing the number of potential charities we are also increasing the competition among them to capture resources. Besides, previous studies have already pointed out that donors typically give more to a particular charity if there are fewer charities in the choice set. Furthermore, if a particular charity receives more funds, giving to other charities decreases significantly (Reinstein, 2007) and the effect is particularly strong among charities with substitute causes (Filiz-Ozbay and Uler, 2019). This effect is even present when the causes of the charities in the choice set are dissimilar (Ek, 2017). In brief, in our study even if individuals donate more when more charities are available (Scheibehenne et al., 2009; Soyer and Hogarth, 2011), it is expected that each charity individually may receive less. Therefore, we formulate another hypothesis:

H2: The amount that a specific charity receives decreases if we increase the number of available charities for donation.

Our three experimental conditions described in the next section will aim to test these two hypotheses.

5.3.   Experimental design

We opted for three different scenarios, which are variations of the classic dictator game not incentivised (i.e. with hypothetical stakes). The dictator game is mainly used in experimental economics to measure subjects' generosity, since it does not have strategic concerns to maximize income (Forsythe at al., 1994) as there is just one player making a choice (usually there is no interaction between players – the second player cannot refuse the offer), or reputation concerns if the game is played anonymously (Hoffman et al., 1994).

In the standard version, a dictator must select how to divide an initial endowment between him/ her and a second subject/ player, usually a stake of 10 dollars. The recipient player is often another experimental participant and as such is an unknown student from the same university about whom the dictator player knows nothing much. Since our study is focused on a donation problem, in all scenarios we replaced the unknown student by charities (as in Eckel and Grossman, 1996). It is also important to use charities for another key reason. As Brañas-Garza (2006) observed, individuals donate more not only when the recipient player deserves it (e.g. a poor person from a less developed country) but also when they know that their money will be properly spent (e.g. dictators give more medicine instead of money). Charities not only represent altruistic causes, but they can also increase trust that the money from donations will be properly spent. Therefore, people usually prefer entrusting their funds to charities that help, for example, homeless people than giving it directly to the poor.

The use of hypothetical money in an allocation decision problem could be seen as problematic. However, Ben-Ner et al. (2008) found that the differences between a "no money scenario" and a "money scenario" in a dictator game is not statistically significant even if they observe a gap between real and fictional money. They found that more altruistic individuals were more willing to be more generous with real money than when no real money is involved, and that less altruistic individuals behaved in the opposite direction. Nevertheless, the difference between scenarios was weak and not statistically significant. Reinforcing this idea, Scheibehenne et al. (2010) in a meta-analysis of more than 50 studies about the too-much-choice effect found that the effect of multiple options did not depend on whether the choice task was hypothetical or real.

Besides, without money incentives, people could just avoid participating in the study, which is also a decision similar to real life situations: individuals sometimes just skip a

124

decision when the situations are not worth their time. In our setup, participants could freely leave the study whenever they wanted.

Our first scenario (1C) is similar to Eckel and Grossman (1996), the recipient entity is also the (Portuguese) Red Cross. In the second scenario (6C), we replace the recipient entity by six possible well-known charities (one of which is the Portuguese Red Cross). In the last scenario (24C), the recipients are twenty-four Portuguese charities, six of which are identical to the previous condition. In the second (6C) and third (24C) treatments we use six and twenty-four charities since those numbers are the same used by Iyengar and Lepper (2000) who, as described earlier, observed in a field experiment the effect of too-much-choice in the buying behaviour of jam consumers.

The instructions given in all scenarios are similar to those presented by Ben-Ner et al. (2008), who similarly designed a dictator game with hypothetical stakes. Each respondent was randomly presented with just one scenario and had to split 10 Euro with one or several charities.

In the questionnaire, after the allocation decision, participants had to fill some socio-demographic information (gender, age, university, university course, economic situation, political preferences and religious affiliation), and to answer three simple questions about the allocation decision process (specifically about their perception as to the number of options available, difficulty of the decision process and whether the answer respondents gave was really the one they wanted - all these questions were presented on a 5-point Likert scale). The survey was as brief as possible to avoid participants' demotivation (by fatigue) since they were not paid to participate in the study.

5.4.   Implementation

Our questionnaire was implemented via the internet between May and June 2020 and sent mainly to bachelors and masters students of economics and management from the Iscte Business School (Iscte – Lisbon University Institute). Qualtrics software was used for this purpose. Participation was voluntary and no financial incentives were used. The instructions given for participants to fill in the questionnaire can be found in the appendix (D.1-D.3). The instructions were given in Portuguese as this is the native language of most participants.

Table 5.2 shows the options available across conditions. Respondents were allocated at random to one of the three conditions. The original names of the charities are shown in table 5.2 in bold text, and the purpose of the organizations is described below the original

name. The list of charities was presented in alphabetical order. The online setup guaranteed anonymity of responses. Respondents were identified only by their IP address.

Table 5.2 - Options available across conditions

1C	6C	24C
Cruz Vermelha Portuguesa Portuguese Red Cross	**Associação Bombeiros Voluntários** Firefighters' association	**Abraço** HIV/AIDS Organization
	Banco Alimentar Contra a Fome Food bank	**Acreditar** Support children with cancer
	Cruz Vermelha Portuguesa Portuguese Red Cross	**SOS Children's Village** Support children without parental care
	Liga Portuguesa Contra o Cancro Portuguese cancer league	**AMI** International Medical Assistance
	União Zoófila Animal welfare	**Associação Ajuda de Berço** Children support
	UNICEF Child protection and inclusion	**Associação Ajuda de Mãe** Pregnant women and mother support
		Associação Cuidadores Informais Informal care association
		Associação Bombeiros Voluntários Firefighters' association
		Banco Alimentar Contra a Fome Food bank
		Cáritas Catholic humanitarian organisation
		Cruz Vermelha Portuguesa Portuguese Red Cross
		GAIA Environmental organization
		ILGA Gay and lesbian association
		Liga Portuguesa Contra o Cancro Portuguese cancer league
		Make-A-Wish Support children with critical illnesses
		Médicos do Mundo Humanitarian NGO
		Operação Nariz Vermelho Children support
		PAR Refugee support
		Quercus Environmental organization
		Raríssimas Support people with rare and mental disorders
		SOS Animal Animal welfare
		União Zoófila Animal welfare
		UNICEF Child protection and inclusion

5.5.   Results

5.5.1. Sample characteristics

In total, 186 people responded to our survey, however we drop 9 observations since those participants did not fully complete the survey. Therefore, we obtained 177 valid inquiries for analysis[53].The average age of respondents was 22.29 years (SD=4.78, modal age 19, minimum 18, maximum 51) and 57.63% were female. The majority (92.66%) were students from the Iscte Business School enrolled in an undergraduate (60.45%) or in a master's course (33.33%). The Portuguese nationality was predominant (94.92%). Roughly half of respondents reported living comfortably in terms of financial well-being [from 1 (living with much difficulties) to 4 (living comfortably)], and the majority also showed to participate in political elections whenever they can (72.32%) [from 0 (I haven't had a chance to vote) to 4 (whenever there are elections I vote)] with a balanced political stance (50.28% self-identified as broadly left wing; 49.71% self-identified as broadly right wing). The modal religion was Catholic (47.46%), and the remaining participants mostly stated they did not practice any religion [42.94%; agnostics (22.60%) and atheists (20.34%)]. The reported habit of making donations was intermediate [mean 2.34 on a scale ranging from 1 (I've never donated) to 4 (whenever I can, I make a donation)].

5.5.2. Dictator game results

In this section, we explore the results from the dictator game and compare donations across conditions. Figure 5.3 displays the amounts given to charity in each scenario. Overall, just 7.91% (n=14) of participants acted in accordance with the canonical model of self-interest, they give nothing to charities.

---

[53] We observed that one internet IP address was repeated seven times and another twice. We opted not to exclude these data since different people may use the same computer, and students can access the internet using the university's VPN. Furthermore, if we had opted to remove those observations, in the end our results would not change significantly, and the conclusions would be the same.

Figure 5.3 – Dictator game results: amount given to charity (out of 10 euros endowment)
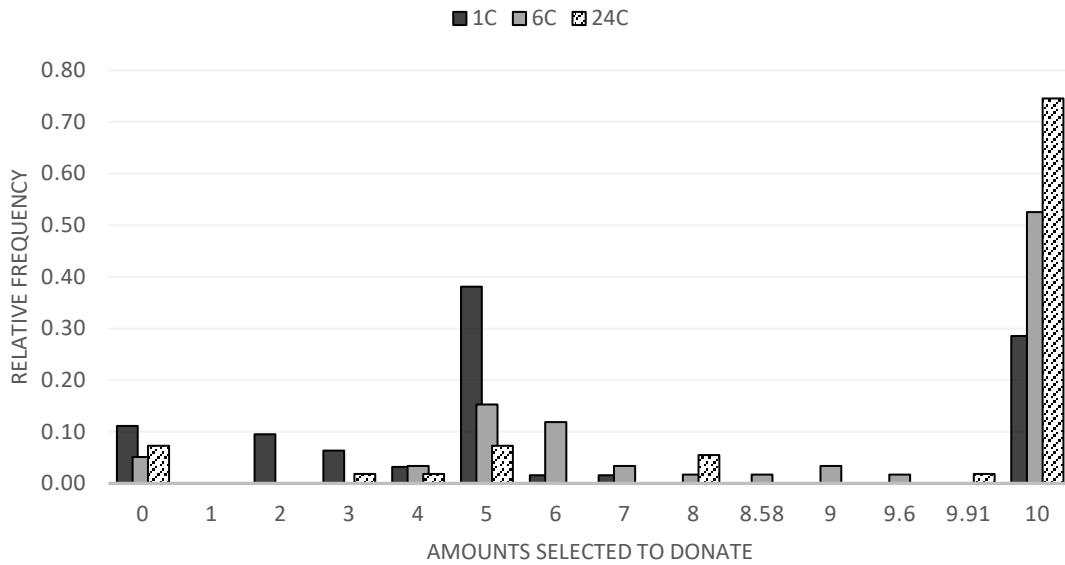
We should also note that the amounts donated to charities varied widely in each condition. Nonetheless, as expected, conditions with a larger number of charities lead to an increase on average in the donation amounts.

In the scenario with just one charity (1C), the mean average amount donated was 54.76% of the initial endowment, the modal transfer was 5 Euros (38.10%) and the median was also 5 Euros.

In the scenario with six charities (6C) the amount donated increased to 78.51%, the modal transfer was to give everything (52.54%) and the median was 10 Euros. Finally, in scenario with twenty-four charities (24C) the average amount donated increased to 85.62%, and again the modal transfer was to give everything (74.55%) and the median was 10 Euros.

We performed a Wilcoxon Mann-Whitney test in order to check if the samples were from the same distribution, and could reject the null hypothesis at the 5% significant level for all conditions [1C vs. 6C (z=-4.069, p=0.000); 1C vs. 24C (z=-4.841, p=0.000); 6C vs. 24C (z=-2.038, p=0.042). Therefore, the hypotheses that the samples came from the same distribution are rejected. These results are consistent with the hypothesis that the share donated is positively related to the total number of charities available for donation (as in Scheibehenne et al., 2009; Soyer and Hogarth, 2011), thus H1 was confirmed.

Furthermore, in the last two conditions (6C vs. 24C), the Pearson correlation between the position of a charity in the list and the average amounts received was not significant in any case (6C: coeff=0.338, p=0.513; 24C: coeff=-0.0038, p=0.986), indicating that the

list position of the charities was not an important factor to determine shared amounts in the dictator game.

After fulfilling the allocation decision process, three questions were posed to verify if the participants perceived the number of recipients differently between scenarios. Consequently, we asked, using a 5-point Likert scale, if people thought that the number of institutions available for donation was sufficient or excessive, the difficulties they had with the decision process and how certain they were about the option they chose (table 5.3).

Table 5.3 – Feelings about the allocation decision process

Conditions	Institutions	Difficulty	Certainty
1C	-	2.683	3.651
6C	3.000	2.712	3.525
24C	3.491	3.145	3.236

Note: average response per condition using a 5 point Likert scale (Institutions: "Do you consider that the number of charities available for donation was…", 1: very short to 5: very excessive; Difficulty: "How difficult was to answer the allocation decision process?"; 1: very easy to 5: very difficult; Certainty: "How sure are you that the answer you gave in the allocation decision process was precisely the one you would have done" 1: very unconfident to 5: very confident).

The results in table 5.3 show that indeed individuals perceived that scenario 24C had much more institutions than scenario 6C and performing a Wilcoxon Mann-Whitney two-sample statistic test the null hypothesis that both samples are from the same distribution is rejected at a 1% level (z=-4.077, p=0.000).

For the other questions, respondents perceived that the task to donate to twenty-four recipients is toughest than choosing from six or just one, but performing a Wilcoxon Mann-Whitney two-sample statistic test the null hypothesis was not rejected between treatment 1C and 6C only (z=-0.229, p=0.819). Between the other treatments it was rejected [1C vs. 24C (z=-2.546, p=0.011); 6C vs. 24C (z=-2.307, p=0.021)].

Besides, table 5.4 demonstrates that people indeed took more time deciding the allocation process in 24C than they did in 6C and 1C and the differences are statistically significant in all cases for Wilcoxon Mann-Whitney two-sample statistic test [1C vs. 6C (z=-4.905, p=0.000); 1C vs. 24C (z=-7.420, p=0.000); 6C vs. 24C (z=-4.568, p=0.000)].

Table 5.4 – Average time and clicks spent in the allocation decision

Conditions	Time (seconds)
1C	50.310
6C	79.732
24C	142.340

For the final question, people felt less certain about the choice they made when choosing from twenty-four than choosing from six or just one option. The null hypothesis

that both samples came from the same distribution using again a Wilcoxon Mann-Whitney two-sample statistic test is rejected between treatments 1C and 24C (z=2.444, p=0.015) but not between treatments 1C and 6C (z=0.676, p=0.499) and between 6C and 24C (z=1.812, p=0.070).

To summarize this point about perceptions of the allocation decision process, respondents (as expected) felt that twenty-four recipients meant an excessive number of options available relative to six recipients, and they also indeed recognised that choosing from twenty-four recipients was more difficult than choosing from six or just one, but in this case the difference was weak between treatments 1C and 6C. Participants felt that the task was indeed more difficult, but not so much more, possibly because the decision-process was just hypothetical. Furthermore, people considered themselves to be less certain in their choice when choosing between twenty-four options than when choosing between six or only one. Once again, the differences were not significant in some cases (1C vs. 6C and 6C vs. 24C). Possibly, since the game was not financially incentivised, individuals did not feel under so much pressure to get the right answer.

This last point is important to justify why the mean donation across all conditions was quite high (ranging from 54.76% to 85.62%)[54]. In any case, the differences between scenarios that we propose to analyse are highlighted. Increases in the number of recipients, imply an increase in the average amounts donated (out of the total endowment). The effect is most evident when the number of recipients available for donation increases once the initial number of available institutions is low (from 1C to 6C). In contrast, the rate of donation decreases as soon as the number of institutions available to receive donations becomes larger (see Figure 5.4, conditions 6C to 24C).

---

[54] Camerer (1997) and Engel (2011) point out that dictator subjects in a DG usually give on average between 20% and 30% of the initial endowment to be divided to the recipient player.

Figure 5.4 – Average donation rate in comparison to Soyer and Hogarth (2011)
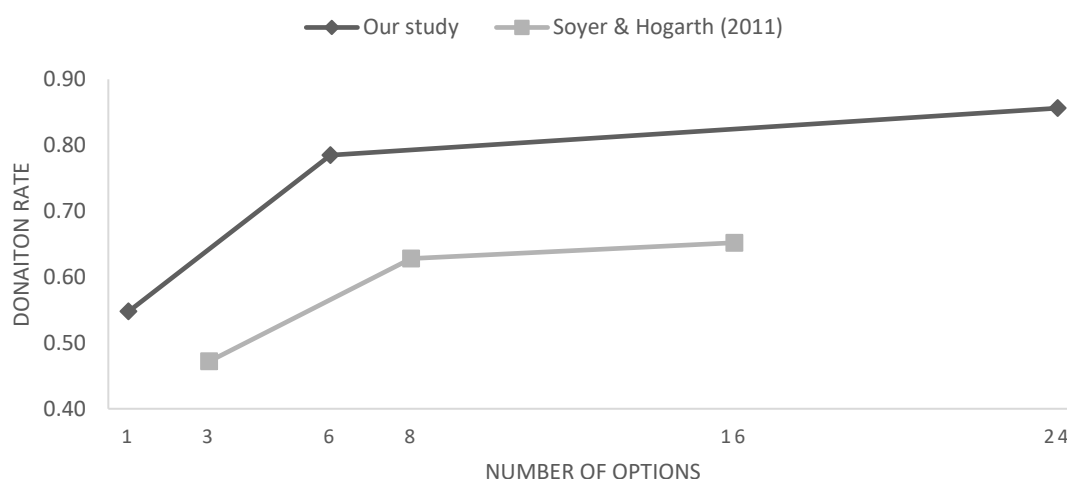
Comparing our results with other studies, we can observe in Figure 7 for instance, the differences between our study with no financial incentives and Soyer and Hogarth (2011) with small incentives[55]. Even if there is a significant gap (an increase of 28.09%) between the amounts donated, the effect between scenarios is clearly the same. In the beginning, the curve is steeper, with a tendency to be flatter as soon as the number of recipients increases considerably in number.

Our results are closer to Scheibehenne et al. (2009) who performed an all-or-nothing dictator game with small stakes (1 Euro) varying only in the number of charities among conditions. In their study in the condition with 5 options, 81% of the participants donated, whereas in the condition with 40 options, 87% chose to donate. Comparing with our conditions 6C (79%) and 24C (86%) the results are quite similar.

5.6.   Econometric analysis

The definition and the descriptive statistics of the variables used in the econometric analysis are summarised in table 5.5. The dependent variable (*giving*) represents how much people donated in the dictator game and yields values between 0 and 10.

Our models include, apart from the dependent variable, two dummy variables, which represent two different treatments (6C and 24C), two variables regarding feelings about

---

[55] Soyer and Hogarth (2011)'s research also has a major difference from our study, before the allocation decision process participants had to answer to a 40-minute market web survey. This task may have tired participants enough to the point of making them overall more selfish, as earning money from the questionnaire completion means, in fact, earned money, rather than windfall money and evidence suggests that subjects donate earned money much less (Cherry, 2001; Cherry et al., 2002; Cherry and Shogren, 2008; List and Cherry, 2008; Oxoby and Spraggon, 2008; Carlsson et al., 2013; Li et al., 2019).

the allocation decision process, and a set of control variables for the socio-demographic characteristics of the respondents (gender, age, education, political preferences, economic situation and past donation frequency).

Table 5.5 – Descriptive statistics

Variable description	N	Mean/ Freq.	Standard Deviation	Min.	Max.
Giving (in euros)	177	7.226	3.337	0	10
6C (1: yes; 0: 1C)	177	0.333	0.473	0	1
24C (1: yes; 0: 1C)	177	0.311	0.464	0	1
Difficulty (5-point Likert scale)	177	2.836	0.960	1	5
Certainty (5-point Likert scale)	177	3.480	0.899	2	5
Female (1: yes, 0: male)	177	0.576	0.496	0	1
Age (in years)	177	22.294	4.778	18	51
Left (1: left wing, 0: right wing)	177	0.503	0.501	0	1
Financial_comfort (1: yes; 0: otherwise)	177	0.921	0.271	0	1
Donated_before (1: yes; 0: otherwise)	177	0.836	0.371	0	1

We generated a dummy variable for the financial well-being, which is assigned the value 1 when people report they are living without financial problems (*financial_comfort*)[56], and zero otherwise. We also created a dummy variable for the reported past donation frequency that gets value 1 when people reported that they had donated before (*donated_before*)[57], and zero otherwise. Finally, two more dummy variables for left-wing political preferences [corresponding to responses 1-5] and for non-religious individuals [corresponding to individuals who self-report that they do not practise any religion] were considered. The question of how certain people responded to the allocation decision process can range from 1 (very unconfident) to 5 (very confident), although no one chose 1.

To explore the determinants of generosity in the dictator game under multiple options, we establish an econometric model with two stages.

For the first stage, we selected several probit models to capture the probability of donating. For the second-stage model, we use several tobit models, which considers the dependent variable as continuous, but acknowledging that there is a lower limit of

---

[56] We identified those participants as living without financial problems if they self-report that their financial well-being was "reasonable" or "comfortable".

[57] Participants who self-report that they "rarely", "regularly" or "frequently" donate to charities.

generosity of zero. The first and the second stage models are estimated by maximum likelihood and robust standard errors.

The model – 1a includes two dummy variables as independent variables which represents treatments 6C and 24C.

In model – 1b we introduce two variables which represents feelings about the allocation decision-process (difficulty and certainty).

Finally, in model – 1c we introduce a set of control variables for the socio-demographic characteristics of the respondents (gender, age, political preferences, economic well-being and donation frequency). Next, we show the results of both models (table 5.6 and table 5.7).

Table 5.6 – Probit regression of the probability of giving

Variable	1a	1b	1c
6C	0.416	0.404	0.521
	(0.345)	(0.374)	(0.379)
24C	0.235	0.000	0.069
	(0.329)	(0.363)	(0.369)
Difficulty	-	0.462**	0.568***
		(0.212)	(0.209)
Certainty	-	-0.167	-0.098
		(0.185)	(0.192)
Female	-	-	0.490
			(0.320)
Age	-	-	0.028
			(0.034)
Left	-	-	-0.194
			(0.285)
Financial_comfort	-	-	0.162
			(0.611)
Donated_before	-	-	0.770**
			(0.331)
N	177	177	177
Prob > chi2	0.467	0.012	0.002
Pseudo R2	0.016	0.128	0.219

Notes: The symbols ***, **, * denote that the coefficient is statistically different from zero at 1%, 5% and 10% levels of statistical significance respectively; p values between parentheses.

Most variables are not statistically significant at a 5% level to explain the situation in which participants donate. However, relevant differences emerge with respect to the level of difficulty individuals felt in making the allocation decision. Those who felt more difficulty were also those who were more willing to donate. For each additional point of difficulty, participants on average were 6.58% more willing to donate (model - 1c, see appendix D.4 for the marginal effects). As we have seen before, previous literature on the topic is not unanimous about the effects of cognitive load on altruism. For instance, Schulz et al. (2014) reported that high-loaded subjects were more generous on average in a dictator game than subjects who performed a low cognitive task. However, Halali et al. (2013) obtained opposite results and Tinghög et al. (2016) found no effects of cognitive load on altruistic behaviour.

We also found that individuals who reported that they had already made a donation previously were on average more willing to make a donation than individuals that

reported never having donated before (8.92%); this variable was also significant at a 5% level. It has already been reported in the literature the human preference for consistency in behaviour. For instance, Benz and Meier (2008) and Franzen and Pointer (2013) observe in a dictator game that subjects' behaviour in the laboratory was correlated with their behaviour later in the field. Individuals are likely to behave consistently in the same situation over time.

All the other variables were not statistically significant to explain if people donate.

Table 5.7 shows the results for the second-stage model. Individuals subjected to condition 6C who donated were on average willing to give to charities 2.39 Euros more than individuals in condition 1C. Also, individuals in condition 24C who donated were on average willing to give 3.14 Euros more compared again to condition 1C and in both cases the effect was statistically significant at a 1% level (model - 1c). This simple model suggests that the amounts donated to just one charity are notably different from the amounts donated when there is a chance to give to six or to twenty-four charities. This fact reinforces hypothesis H1, namely that the amounts donated in a dictator game increase if we increase the number of available charities.

Table 5.7 – Tobit regression of the amount given in the dictator game

Variable	1a	1b	1c
6C	2.472***	2.480***	2.387***
	(0.599)	(0.600)	(0.574)
24C	3.163***	3.036***	3.137***
	(0.628)	(0.646)	(0.628)
Difficulty	-	0.411	0.378
		(0.353)	(0.353)
Certainty	-	0.151	0.135
		(0.353)	(0.359)
Female	-	-	1.283**
			(0.490)
Age	-	-	-0.003
			(0.036)
Left	-	-	-0.328
			(0.486)
Financial_comfort	-	-	-0.091
			(0.941)
Donated_before	-	-	1.600*
			(0.817)
N	177	177	177
Prob > F	0.000	0.000	0.000
Pseudo R2	0.031	0.033	0.049

Note: The symbols ***, **, * denote that the coefficient is statistically different from zero at 1%, 5% and 10% levels of statistical significance respectively; p values between parentheses.

We can also observe that female is the only socio-demographic variable that at a 5% level was significant in terms of giving amounts, on average the amounts donated increase 1.28 Euros compared to males. Previous empirical research on this point is ambiguous. Some authors like Eckel and Grossman (1998) observe that on average women donate twice as men in an anonymous dictator game. Bolton and Katok (1995) observe that gender does not influence the outcome of the same game. Andreoni and Vesterlund (2001) also focusing on giving in a dictator game found that women prefer equality payoffs and men are more likely to be completely altruistic or selfish. Still, we must reinforce that in the latter examples the recipient player was an unknown individual, and the effect of gender when the recipient player is a charity (increased deservingness) could therefore be different.

All the other socio-demographic variables were not statistically significant in explaining the amounts donated to charities at a 5% significance level.

5.7.   Donations by charity

The only recipient charity that is included in all scenarios is the Portuguese Red Cross. As shown in table 5.8 an increase in the number of recipients available for donation implies a considerably decrease in the amounts received by the Portuguese Red Cross. A Wilcoxon Mann-Whitney two-sample statistic test proves that the differences are significant at 5% level in all situations [1C vs. 6C (z=7.463, p=0.000); 1C vs. 24C (z=8.335, p=0.000); 6C vs. 24C (z=4.469, p=0.000)]. These results are consistent with the hypothesis (H2) that the donations received by charities are negatively related with the total number of charities available for donation.

Table 5.8 – Amount donated to the Red Cross among conditions

Conditions	Red_Cross (mean)	Red_Cross (SD)
1C	5.476	0.420
6C	1.060	0.143
24C	0.257	0.072

Besides, in scenario 6C, the loss amount for the Portuguese Red Cross by including more competitors (five) was 4.42 Euros, that is 0.88 Euros by each additional competitor. Comparing scenario 24C with 6C, the loss amount was 0.80 Euros, meaning just 0.04 Euros by each additional competitor (eighteen). Clearly, the negative impact of adding more competitors is bigger per competitor when recipients are few than when they are many.

Besides, by comparing aggregate results between conditions 6C and 24C, we can observe that in the first condition individuals donated on average to 3.65 (out of six) charities and conditional on giving, they gave 2.68 Euros per charity (1.29 Euros per charity considering all available charities in the treatment). In the former scenario, individuals gave on average to 5.70 (out of twenty-four) charities and conditional on giving, they gave 3.09 Euros per charity (0.36 Euros per charity considering all available charities). Overall, these results suggest that even if participants donate more when more charities are available on average individual charities receive less.

Furthermore, in condition 24C, every charity that was also available in condition 6C received on average less money in condition 24C, where competition is more extreme.

Table 5.9 – Mean amount donated to the six charities common to conditions 6C and 24C

Conditions	Bombeiros	BAlimentar	LigaCCancro	UZoófila	UNICEF
6C	1.237	1.390	1.458	1.085	1.619
24C	0.394	0.858	0.885	0.545	0.448
Wilcoxon Mann-Whitney test	z=4.413 (p=0.000)	z=3.022 (p=0.003)	z=2.985 (p=0.003)	D=2.417 (p=0.016)	z=4.655 (p=0.000)

A Wilcoxon-Mann-Whitney two-sample statistic test indicates that the differences are significant at a 5% level in all cases [Bombeiros (z=4.577, p=0.000); BAlimentar (D=2.938, p=0.003); LigaCCancro (z=3.025, p=0.003); UZoófila (z=2.304, p=0.021); UNICEF (z=4.753, p=0.000)].

Again, the results support H2. Those charities common to conditions 6C and 24C always received fewer resources in the condition where more charities were available.

5.8. Chapter conclusions

Previous research had already reported that the too-much-choice effect is rare or even inexistent in donation situations (e.g. Scheibehenne et al., 2009; Soyer and Hogarth, 2011). Similarly to consumptions' situations, where too many options make individuals less likely to choose, we would expect lower donations or no donations. This study corroborates the empirical evidence, illustrating that the too-much-choice effect is absent when we present, as recipients, charities with different purposes (missions).

Furthermore, participants give more when more charities are available in the choice set, though charities individually receive less even when donations are conditional on giving. Nevertheless, we must analyse these results with extreme caution since observations are limited by the individuals' restricted budget, so total donations were necessarily capped at 10 Euros. We have used hypothetical stakes, and probably a low budget for donations, which limits the generalisability of the results to real world setups. Comparing our results to similar studies, we indeed observe a significant difference between our study and an incentivised one (Soyer and Hogarth, 2011), whereby more hypothetical money was shared in our case. However, the differences in conditions within studies ultimately end up following the same path. In the end, our results are more similar to an all-or-nothing dictator game with small stakes (Scheibehenne et al., 2009).

For further studies, it would be interesting to find out if there is indeed a number of charities after which the decision process to donate will become so complex that it leads people to donate less. Apparently, that number is not twenty-four.

Chapter VI

Conclusions, limitations and final remarks

6.1.   Summary of chapters and findings

This thesis primarily emphasises the differences between prosocial behaviour in nations and between individuals, establishing the predominant characteristics that most generous people possess. For that purpose, we developed five distinct chapters, which comprise four essays in total.

In the first chapter, we conducted a literature review, which covers the topic under analysis. This chapter includes an overview on the state of the art of altruistic behaviour, namely its evolution over time, the human motivation behind it and the definition of its several dimensions.

In the first essay (chapter 2), we identify which variables, that influence altruism at an individual basis, are also important at an aggregate level to explain prosocial behaviour, as well. The results suggest that the generosity level is correlated to the level of economic development of the country but also with some socio-demographic variables and other parameters (e.g. ratio of women, ratio of people living in urban areas, perception of corruption and happiness levels). Furthermore, we have also introduced cultural variables in the analysis (the Hofstede's 6 cultural dimensions) and we found evidence that the most generous nations are culturally quite distinct from the others. Namely, those nations exhibit lower competitiveness among its members, lower necessity of uncertainty avoidance and have a long-term focus. We consider that this first study may contribute to inform non-profit organizations to adjust their fundraising strategies to different country characteristics.

The other three essays are based on the collection of survey data using experimental approaches aiming at identifying new factors that may explain differences in generous behaviour as well. Specifically, the second essay establishes a relationship between free will beliefs and giving, the third essay a connection with cognitive skills and strategic thinking abilities, while the last one explores the impact of manipulating the number of options available for giving.

The motivation of the second essay is related with the results obtained in the initial essay. In the first essay we observe a strong and significant correlation between altruism and the reported levels of freedom to make life choices in each country. The results on

the second essay indeed suggest that individuals subjected to anti free will ideas showed less generosity than individuals subjected to neutral or pro free will ideas. Besides, in the econometric model individuals with higher free will beliefs engage in a more prosocial behaviour. This essay thus adds to the existing literature by providing further insights into the relationship between prosocial behaviour and personal assessment of individual responsibility.

The third essay also intended to identify individual differences that can be at the basis of generous behaviour. Mainly, the existence of a relationship between cognitive skills and strategic sophistication on altruism. The results suggest that individuals with better cognitive skill indeed played strategic games with greater sophistication. In the econometric analysis it was observed that those types of individuals were actually less altruistic. On the contrary, individuals with higher strategic sophistication skills were more altruistic, contrary to expectations.

The last essay aimed at observing if the too-much-choice effect is also present in donation decision problems. This issue has become a puzzle since the too-much-choice effect is frequently observed in consumption decisions but not in donations decision-making. Our results suggest that the too-much-choice effect does not emerge when more options to donate are available. In fact, the opposite is observed. When more options to donate are available people state they would donate more, and this effect is statistically significant in the econometric analysis.

Finally, the importance of this Ph.D. thesis is reinforced because it allows enriching the literature by exploring the macro behaviour of generosity, as well as zooming in on factors that can explain individual differences behind altruistic behaviour (considering personal beliefs, individual cognitive characteristics and a feature of the choice architecture).

6.2. Limitations of the study

The analyses reported here have limitations concerning the generalizability of the results. First, the sample size is small due to the recruitment method. If it was larger our results would indeed be more robust and significant. Nonetheless, this study points to several research directions that future work may follow and test for robustness.

The second limitation is that the second and fourth studies were not financially incentivized, and people are usually more generous with hypothetical stakes than with real ones. Despite this fact, I observe differences in stated behaviour related with

individual characteristics or treatment effects, which albeit eventually overestimated, are still noteworthy. On the other hand, I have incentivized the third study, and I obtained similar results to those of the fourth study, suggesting that financial incentives may play a less important role than it is usually attributed.

The third limitation is associated with the nature of the empirical analysis carried out in the first essay. In this case I did not collect or measure directly the data used, and consequently we had to rely on the accuracy of the data collected previously by other researchers. However, in this point, the credibility of the involved entities gives a higher guarantee of the analysis.

Further research is needed to overcome some of the limitations of this study. For example, a natural extension of this study is to verify if these results are representative of the general population. Besides, it is possible that several variables that cause differences in altruistic behaviour have not yet been identified and may be uncovered in a near future. To this end, further studies are needed to relate altruistic behaviour to less evident variables.

6.3.   Final remarks

The studies undertaken in this thesis have shown that individual differences provide a consistent explanation for observed differences in prosocial behaviour. Moreover, the results suggest new individual characteristics that support such behaviour, in particular cultural dimensions and free will beliefs. Furthermore, some variables that had previously been identified in the literature as having a relationship with generous behaviour, also behaved in a similar way in this study. That is the case of cognitive abilities and framing effects (too-much-choice effect).

The results are important for charities to identify the most likely scenarios for fund raising. Also, in a crucial moment of humanity that needs to solve social dilemmas such as climate change and social cohesion problems, it will be important for policymakers to encourage prosocial behaviour as a way of solving or minimising such issues.

Bibliography

Ahmed, A., & Salas, O. 2011. Implicit influences of Christian religious representations on dictator and prisoner's dilemma game decisions. *The Journal of Socio-Economics*, 40: 242-246.

Aknin, L, Dunn, E., & Norton, M. 2012. Happiness runs in a circular motion: Evidence for a positive feedback loop between prosocial spending and happiness. *Journal of Happiness Studies*, 13: 347-355.

Aknin, L., Dunn, E., Sandstrom, G., & Norton, M. 2013. Does social connection turn good deeds into good feelings?: On the value of putting the 'social' in prosocial spending. *International Journal of Happiness and Development*, 1: 155-171.

Alba-Fernández, V., Brañas-Garza, P., Jiménez-Jiménez, F., & Rodero-Cosano, J. 2006. Teaching Nash equilibrium and dominance: A classroom experiment on the beauty contest. *The Journal of Economic Education*, 37: 305-322.

Andreoni, J. 1988. Privately provided public goods in a large economy: the limits of altruism. *Journal of Public Economics*, 35: 57-73.

Andreoni, J. 1990. Impure altruism and donations to public goods: A theory of warm-glow giving. *The Economic Journal*, 100: 464-477.

Andreoni, J. 1995. Warm-glow versus cold-prickle: the effects of positive and negative framing on cooperation in experiments. *The Quarterly Journal of Economics*, 110: 1-21.

Andreoni, J., & Miller, J. 2002. Giving according to GARP: An experimental test of the consistency of preferences for altruism. *Econometrica*, 70: 737-753.

Andreoni, J., & Vesterlund, L. 2001. Which is the fair sex? Gender differences in altruism. *The Quarterly Journal of Economics*, 116: 293-312.

Axelrod, R., & Hamilton, W. 1981. The evolution of cooperation. *Science*, 211: 1390-1396.

Bagnoli, M., & McKee, M. 1991. Voluntary contribution games: Efficient private provision of public goods. *Economic Inquiry*, 29: 351-366.

Bardsley, N. 2008. Dictator game giving: altruism or artefact? *Experimental Economics*, 11: 122-133.

Baumeister, R. 2008. Free will in scientific psychology. *Perspectives on Psychological Science*, 3: 14-19.

Baumeister, R., Masicampo, E., & DeWall, C. 2009. Prosocial benefits of feeling free: Disbelief in free will increases aggression and reduces helpfulness. *Personality and Social Psychology Bulletin*, 35: 260-268.

Baumeister, R., Sparks, E., Stillman, T., & Vohs, K. 2008. Free will in consumer behavior: Self-control, ego depletion, and choice. *Journal of Consumer Psychology*, 18: 4-13.

Becker, G. 1976. Altruism, egoism, and genetic fitness: Economics and sociobiology. *Journal of Economic Literature*, 14: 817-826.

Becker, G. 1981. Altruism in the Family and Selfishness in the Market Place. *Economica*, 48: 1-15.

Bekkers, R. 2007. Measuring altruistic behavior in surveys: The all-or-nothing dictator game. *Survey Research Methods*, 1: 139–144.

Belot, M., Duch, R., & Miller, L. 2015. A comprehensive comparison of students and non-students in classic experimental games. *Journal of Economic Behavior & Organization*, 113: 26-33.

Benenson, J. F., Pascoe, J., & Radmore, N. 2007. Children's altruistic behavior in the dictator game. *Evolution and Human Behavior*, 28: 168-175.

Ben-Ner, A., & Kramer, A. 2011. Personality and altruism in the dictator game: Relationship to giving to kin, collaborators, competitors, and neutrals. *Personality and Individual Differences*, 51: 216-221.

Ben-Ner, A., Kramer, A., & Levy, O. 2008. Economic and hypothetical dictator game experiments: Incentive effects at the individual level. *The Journal of Socio-Economics*, 37: 1775-1784.

Ben-Ner, A., Putterman, L., Kong, F., & Magan, D. 2004. Reciprocity in a two-part dictator game. *Journal of Economic Behavior & Organization*, 53: 333-352.

Benz, M., & Meier, S. 2008. Do people behave in experiments as in the field? Evidence from donations. *Experimental Economics*, 11: 268-281.

Berg, N., & Gigerenzer, G. 2010. As-if behavioral economics: Neoclassical economics in disguise?. *History of Economic Ideas*, 18:133-165.

Bernhard, H., Fischbacher, U., & Fehr, E. 2006. Parochial altruism in humans. *Nature*, 442: 912-915.

Bester, H., & Güth, W. 1998. Is altruism evolutionarily stable? *Journal of Economic Behavior & Organization*, 34: 193-209.

Bjørnskov C. 2003. The happy few: cross-country evidence on social capital and life satisfaction. *Kyklos*; 56:3–16.

Bjørnskov, C., Dreher, A., & Fischer, J. 2010. Formal institutions and subjective well-being: Revisiting the cross-country evidence. *European Journal of Political Economy*, 26: 419-430.

Blacksmith, N., Yang, Y., Behrend, T., & Ruark, G. 2019. Assessing the validity of inferences from scores on the cognitive reflection test. *Journal of Behavioral Decision Making*, 32: 599-612.

Blount, S. 1995. When social outcomes aren′ t fair: The effect of causal attributions on preferences. *Organizational Behavior and Human Decision Processes*, 63: 131-144.

Bohnet, I., & Bruno Frey, S. 1999. The Sound of Silence in Prisoner's Dilemma and Dictator Games. *Journal of Economic Behavior and Organization*, 38: 43–58.

Bolton, G., & Katok, E. 1995. An experimental test for gender differences in beneficent behavior. *Economics Letters*, 48: 287-292.

Bolton, G., Katok, E., & Zwick, R. 1998. Dictator game giving: Rules of fairness versus acts of kindness. *International Journal of Game Theory*, 27: 269-299.

Bosch-Domenech, A., Montalvo, J., Nagel, R., & Satorra, A. 2002. One, two, (three), infinity, ..: Newspaper and lab beauty-contest experiments. *American Economic Review*, 92: 1687-1701.

Botelho, A., Harrison, G., Pinto, L., & Rutström, E. 2009. Testing static game theory with dynamic experiments: a case study of public goods. *Games and Economic Behavior*, 67: 253-265.

Brañas-Garza, P. 2006. Poverty in dictator games: Awakening solidarity. *Journal of Economic Behavior & Organization*, 60: 306-320.

Brañas-Garza, P. 2007. Promoting helping behavior with framing in dictator games. *Journal of Economic Psychology*, 28: 477-486.

Brañas-Garza, P., Garcia-Munoz, T., & Hernan, R. 2012. Cognitive effort in the beauty contest game. *Journal of Economic Behavior & Organization*, 83: 254-260.

Brañas-Garza, P., Kujal, P., & Lenkei, B. 2015. Cognitive Reflection Test: whom, how, when. (No. 68049). University Library of Munich, Germany.

Broberg, T., Ellingsen, T., & Johannesson, M. 2007. Is generosity involuntary?. *Economics Letters*, 94: 32-37.

Brock, J., Lange, A., & Ozbay, E. 2013. Dictating the risk: Experimental evidence on giving in risky environments. *American Economic Review*, 103: 415-37.

Bruce, N., & Waldman, M. 1990. The rotten-kid theorem meets the Samaritan's dilemma. *The Quarterly Journal of Economics*, 105: 155-165.

Buchanan, J. 1975. The Samaritan's dilemma. In: Phelps, E. (Ed.), Altruism, Morality and Economic Theory. Russell Sage Foundation, New York, pp. 71 – 85.

Burnham, T. C., Cesarini, D., Johannesson, M., Lichtenstein, P., & Wallace, B. 2009. Higher cognitive ability is associated with lower entries in a p-beauty contest. *Journal of Economic Behavior & Organization*, 72: 171-175.

Buso, I., De Caprariis, S., Di Cagno, D., Ferrari, L., Larocca, V., Marazzi, F., Panaccione, L., & Spadoni, L. 2020. The effects of COVID-19 lockdown on fairness and cooperation: Evidence from a lablike experiment. *Economics Letters*, 196: 109577.

Cadsby, C., & Maynes, E. 1998. Gender and free riding in a threshold public goods game: Experimental evidence. *Journal of Economic Behavior & Organization*, 34: 603-620.

Camerer, C. 1997. Progress in behavioral game theory. *Journal of Economic Perspectives*, 11: 167-188.

Camerer, C. 2003. **Dominance-Solvable Games**. In: Behavioral game theory: Experiments in strategic interaction. New Jersey: Princeton University Press.

Camerer, C. 2003a. Behavioural studies of strategic thinking in games. *Trends in Cognitive Sciences*, 7: 225-231.

Camerer, C. 2003b. *Behavioral Game Theory: Experiments in Strategic Interaction*. Princeton: Princeton University Press.

Camerer, C., & Fehr, E. 2004. Measuring social norms and preferences using experimental games: a guide for social sciences. In J. Henrich, R. Boyd, S. Bowles, C. Camerer, E. Fehr, & H. Gintis (Eds.), Foundations of human sociality: economic experiments and ethnographic evidence from fifteen small-scale societies (pp. 55 – 95). New York: Oxford University Press.

Camerer, C., & Thaler, R. 1995. Anomalies: Ultimatums, dictators and manners. *Journal of Economic Perspectives*, 9: 209-219.

Camerer, C., Loewenstein, G., & Prelec, D. 2004. Neuroeconomics: Why economics needs brains. *Scandinavian Journal of Economics*, 106: 555-579.

Campitelli, G., & Gerrans, P. 2014. Does the cognitive reflection test measure cognitive reflection? A mathematical modeling approach. *Memory & Cognition*, 42: 434-447.

Campos-Mercade, P., Meier, A., Schneider, F., & Wengström, E. 2020. Prosociality predicts health behaviors during the COVID-19 pandemic. University of Zurich, Department of Economics, Working Paper No. 346.

Carlsson, F., He, H., & Martinsson, P. 2013. Easy come, easy go-The role of windfall money in lab and field experiments. *Experimental Economics*, 16: 190-207.

Carpenter, J., Connolly, C., & Myers, C. 2008. Altruistic behavior in a representative dictator experiment. *Experimental Economics*, 11: 282-298.

Carpenter, J., Graham, M., & Wolf, J. 2013. Cognitive ability and strategic sophistication. *Games and Economic Behavior*, 80: 115-130.

Carroll, L., White, M., & Pahl, S. 2011. The impact of excess choice on deferment of decisions to volunteer. *Judgment and Decision Making*, 6: 629-637.

Cason, T., & Mui, V. 1997. A laboratory study of group polarisation in the team dictator game. *The Economic Journal*, 107: 1465-1483.

Cason, T., & Mui, V. 1998. Social influence in the sequential dictator game. *Journal of Mathematical Psychology*, 42: 248-265.

Charness, G., & Gneezy, U. 2008. What's in a name? Anonymity and social distance in dictator and ultimatum games. *Journal of Economic Behavior & Organization*, 68: 29-35.

Chernev, A. 2003. Product assortment and individual decision processes. *Journal of Personality and Social Psychology*, 85: 151-161.

Cherry, T. 2001. Mental accounting and other-regarding behavior: Evidence from the lab. *Journal of Economic Psychology*, 22: 605-615.

Cherry, T., & Shogren, J. 2008. Self-interest, sympathy and the origin of endowments. *Economics Letters*, 101: 69-72.

Cherry, T., Frykblom, P., & Shogren, J. 2002. Hardnose the dictator. *American Economic Review*, 92: 1218-1221.

Cherry, T., Kroll, S., & Shogren, J. 2005. The impact of endowment heterogeneity and origin on public good contributions: evidence from the lab. *Journal of Economic Behavior & Organization*, 57: 357-365.

Choi, J., & Bowles, S. 2007. The coevolution of parochial altruism and war. *Science*, 318: 636-640.

Clark, C., Luguri, J., Ditto, P., Knobe, J., Shariff, A., & Baumeister, R. 2014. Free to punish: A motivated account of free will belief. *Journal of Personality and Social Psychology*, 106: 501-513.

Coricelli, G., and Nagel, R. 2009. Beauty contest in the brain; a neural basis of strategic thinking. *Proceedings of the National Academy of Sciences*, 23: 9163–9168.

Crick, F. 1994. *The astonishing hypothesis: The scientific search for the soul*. New York: Simon & Schuster.

Critchlow, H. 2019. *Science of fate: Why your future is more predictable than you think*. London, UK: Hodder & Stoughton, Limited.

Croson, R., Boles, T., & Murnighan, J. 2003. Cheap talk in bargaining experiments: lying and threats in ultimatum games. *Journal of Economic Behavior & Organization*, 51: 143-159.

Cueva, C., Iturbe-Ormaetxe, I., Mata-Pérez, E., Ponti, G., Sartarelli, M., Yu, H., & Zhukova, V. 2016. Cognitive (ir) reflection: New experimental evidence. *Journal of Behavioral and Experimental Economics*, 64: 81-93.

Dana, J., Cain, D., & Dawes, R. 2006. What you don't know won't hurt me: Costly (but quiet) exit in dictator games. *Organizational Behavior and Human Decision Processes*, 100: 193-201.

Dawes, C., Johannesson, M., Lindqvist, E., Loewen, P., Ostling, R., Bonde, M., & Priks, F. 2012. Generosity and political preferences. IFN Working Paper, No. 941.

Dawes, C., Loewen, P., & Fowler, J. 2011. Social preferences and political participation. *The Journal of Politics*, 73: 845-856.

Dawes, R., & Thaler, R. 1988. Anomalies: cooperation. *Journal of Economic Perspectives*, 2: 187-197.

Dawkins, R. 1976. *The Selfish Gene*. Oxford: Oxford University Press.

Deaton, A. 2008. Income, health, and well-being around the world: Evidence from the Gallup World Poll. *Journal of Economic Perspectives*, 22: 53-72.

De Mooij, M., & Hofstede, G. 2011. Cross-cultural consumer behavior: A review of research findings. *Journal of International Consumer Marketing*, 23: 181-192.

DeBode J., Haggard D, Haggard K. 2020. Economic freedom and Hofstede's cultural dimensions. *International Journal of Organization Theory and Behavior,* 23:65–84.

DellaVigna, S. 2009. Psychology and economics: Evidence from the field. *Journal of Economic literature*, 47: 315-372.

Delton, A., Krasnow, M., Cosmides, L., & Tooby, J. 2011. Evolution of direct reciprocity under uncertainty can explain human generosity in one-shot encounters. *Proceedings of the National Academy of Sciences*, 108: 13335-13340.

Demuru, E., Ferrari, P., & Palagi, E. 2018. Is birth attendance a uniquely human feature? New evidence suggests that Bonobo females protect and support the parturient. *Evolution and Human Behavior*, 39: 502-510.

Deppe, K., Gonzalez, F., Neiman, J., Jacobs, C., Pahlke, J., Smith, K., & Hibbing, J. 2015. Reflective liberals and intuitive conservatives: A look at the Cognitive Reflection Test and ideology. *Judgment and Decision Making*, 10: 314–331.

Devetag, G., & Warglien, M. 2003. Games and phone numbers: Do short-term memory bounds affect strategic behavior? *Journal of Economic Psychology*, 24: 189-202.

Dewey, R. 1960. The rural-urban continuum: Real but relatively unimportant. *American Journal of Sociology*, 66: 60-66.

Diamond, J. 2005. *Guns, germs, and steel: the fates of human societies*. New York: Norton.

Diener, E., Diener, M., & Diener, C. 1995. Factors predicting the subjective well-being of nations. Journal of Personality and Social Psychology, 69: 851–864.

Doñate-Buendía, A., García-Gallego, A., Petrović, M. 2022. Gender and other moderators of giving in the dictator game: A meta-analysis. *Journal of Economic Behavior and Organization*, 198: 280-301.

Dreber, A., Ellingsen, T., Johannesson, M., & Rand, D. 2013. Do people care about social context? Framing effects in dictator games. *Experimental Economics*, 16: 349-371.

Dreber, A., Fudenberg, D., & Rand, D. 2014. Who cooperates in repeated games: The role of altruism, inequity aversion, and demographics. *Journal of Economic Behavior & Organization*, 98: 41-55.

Drouvelis, M., & Lohse, J. 2020. Cognitive abilities and risk taking: the role of preferences. Discussion Papers No. 20-02.

Duffy, J., & Nagel, R. 1997. On the robustness of behaviour in experimental 'beauty contest'games. *The Economic Journal*, 107: 1684-1700.

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

Easterlin, R. 1995. Will raising the incomes of all increase the happiness of all?. *Journal of Economic Behavior & Organization*, 27: 35-47.

Easterlin, R., McVey, L., Switek, M., Sawangfa, O., & Zweig, J. 2010. The happiness–income paradox revisited. *Proceedings of the National Academy of Sciences*, 107: 22463-22468.

Eckel, C. & Grossman, P. 1996. Altruism in Anonymous Dictator Games. *Games and Economic Behavior*, 16: 181-191.

Eckel, C., & Grossman, P. 1998. Are women less selfish than men?: Evidence from dictator experiments. *The Economic Journal*, 108: 726-735.

Eckel, C., & Grossman, P. 2000. Volunteers and pseudo-volunteers: The effect of recruitment method in dictator experiments. *Experimental Economics*, 3: 107-120.

Eckel, C., & Grossman, P. 2001. Chivalry and solidarity in ultimatum games. *Economic Inquiry*, 39: 171-188.

Eichenbaum, M., Hansen, L., & Singleton, K. 1988. A time series analysis of representative agent models of consumption and leisure. *Quarterly Journal of Economics*, 103: 51–78.

Eisenberg, N., Fabes, R., & Spinrad, T. 2006. Prosocial development. In N. Eisenberg, W. Damon & R. M. Lerner (Eds.), Handbook of child psychology vol. 3: Social, emotional and personality development (pp. 646-718). New York: Wiley.

Ek, C. 2017. Some causes are more equal than others? The effect of similarity on substitution in charitable giving. *Journal of Economic Behavior & Organization*, 136: 45-62.

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

Engel, C. 2011. Dictator games: A meta study. *Experimental Economics*, 14: 583-610.

Engelmann, D., & Fischbacher, U. 2009. Indirect reciprocity and strategic reputation building in an experimental helping game. *Games and Economic Behavior*, 67: 399-407.

Ensminger, J. 2004. **Market integration and fairness: evidence from ultimatum, dictator and public goods experiments in East Africa**, Chapter 12 in (Henrich et al., eds.), Foundations of Human Sociality. Economic Experiments and Ethnographic Evidence from Fifteen Small-Scale Societies, pp. 356–81, New York: Oxford University Press.

Epstein, S. 1994. Integration of the cognitive and the psychodynamic unconscious. *American Psychologist*, 49: 709-724.

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

Falk, A., Becker, A., Dohmen, T., Enke, B., Huffman, D., & Sunde, U. 2018. Global evidence on economic preferences. *The Quarterly Journal of Economics*, 133: 1645-1692.

Fasolo, B., McClelland, G., & Todd, P. 2007. Escaping the tyranny of choice: When fewer attributes make choice easier. *Marketing Theory*, 7: 13-26.

Fehr, D., & Huck, S. 2016. Who knows it is a game? On strategic awareness and cognitive ability. *Experimental Economics*, 19: 713-726.

Fehr, E., & Fischbacher, U. 2003. The nature of human altruism. *Nature*, 425: 785-791.

Fehr, E., & Fischbacher, U. 2004a. Social norms and human cooperation. *Trends in Cognitive Sciences*, 8: 185-190.

Fehr, E., & Fischbacher, U. 2004b. Third-party punishment and social norms. *Evolution and Human Behavior*, 25: 63-87.

Fehr, E., & Gachter, S. 2000. Cooperation and punishment in public goods experiments. *American Economic Review*, 90: 980-994.

Fehr, E., & Gächter, S. 2002. Altruistic punishment in humans. *Nature*, 415: 137-140.

Fehr, E., & Rockenbach, B. 2003. Detrimental effects of sanctions on human altruism. *Nature*, 422: 137-140.

Fehr, E., & Schmidt, K. 1999. A theory of fairness, competition, and cooperation. *The Quarterly Journal of Economics*, 114: 817-868.

Filiz-Ozbay, E., & Uler, N. 2019. Demand for giving to multiple charities: An experimental study. *Journal of the European Economic Association*, 17: 725-753.

Fischbacher, U., Gächter, S., & Fehr, E. 2001. Are people conditionally cooperative? Evidence from a public goods experiment. *Economics Letters*, 71: 397-404.

Fisher, R. 1990. *The knight in rusty armour*. New York: Fisher.

Form, W. & Stone, G. 1957. Urbanism, anonymity, and status symbolism. *American Journal of Sociology*, 62: 504-514.

Forsythe, R., Horowitz, J., Savin, N., & Sefton, M. 1994. Fairness in simple bargaining experiments. *Games and Economic Behavior*, 6: 347-369.

Franke, R., Hofstede, G., & Bond, M. 1991. Cultural roots of economic performance: A research notea. *Strategic Management Journal*, 12: 165-173.

Franzen, A., & Pointner, S. 2012. Anonymity in the dictator game revisited. *Journal of Economic Behavior & Organization*, 81: 74-81.

Franzen, A., & Pointner, S. 2013. The external validity of giving in the dictator game. *Experimental Economics*, 16: 155-169.

Frederick, S. 2005. Cognitive reflection and decision making. *Journal of Economic Perspectives*, 19: 25-42.

Frey, B., & Stutzer, A. 2002. What can economists learn from happiness research?. *Journal of Economic Literature*, 40: 402-435.

Gabriel, I. 2017. Effective altruism and its critics. *Journal of Applied Philosophy*, 34: 457-473.

Gächter, S. & Falk, A. 2002 Reputation and reciprocity: consequences for the labour relation. *Scandinavian Journal of Economics,* 104: 1-27.

Gautier, A., & Pache, A. 2015. Research on corporate philanthropy: A review and assessment. *Journal of Business Ethics*, 126: 343-369.

Genschow, O., Cracco, E., Schneider, J., Protzko, J., Wisniewski, D., Brass, M., & Schooler, J. 2021. Manipulating belief in free will and its downstream consequences: A meta-analysis. *Personality and Social Psychology Review,* 10888683221087528.

Gill, D. and Prowse, V. 2012. Cognitive ability and learning to play equilibrium: A level-k analysis. working paper (No. 38317). Oxford University and Cornell University.

Gintis, H. 2000. Strong reciprocity and human sociality. *Journal of Theoretical Biology*, 206: 169-179.

Gintis, H., Bowles, S., Boyd, R., & Fehr, E. 2003. Explaining altruistic behavior in humans. *Evolution and Human Behavior*, 24: 153-172.

Gintis, H., Henrich, J., Bowles, S., Boyd, R., & Fehr, E. 2008. Strong reciprocity and the roots of human morality. *Social Justice Research*, 21: 241-253.

Glaeser, E., & Sacerdote, B. 1999. Why is there more crime in cities?. *Journal of Political Economy*, 107: S225-S258.

Gneezy, U., & Rustichini, A. 2000. Pay Enough or Don't Pay at All. *Quarterly Journal of Economics*, 115: 791-810.

Golder, S., & Macy, M. 2011. Diurnal and seasonal mood vary with work, sleep, and daylength across diverse cultures. *Science*, 333: 1878-1881.

Gray, K., Ward, A., & Norton, M. 2014. Paying it forward: Generalized reciprocity and the limits of generosity. *Journal of Experimental Psychology: General*, 143: 247-254.

Greifeneder, R., Scheibehenne, B., & Kleber, N. 2010. Less may be more when choosing is difficult: Choice complexity and too much choice. *Acta Psychologica*, 133: 45-50.

Grimm, V., & Mengel, F. 2011. Let me sleep on it: Delay reduces rejection rates in ultimatum games. *Economics Letters*, 111: 113-115.

Gross, K., & Wronski, J. 2019. Helping the homeless: The role of empathy, race and deservingness in motivating policy support and charitable giving. *Political Behavior*, 1-29.

Grosskopf, B., & Nagel, R. 2008. The two-person beauty contest. *Games and Economic Behavior*, 62: 93-99.

Güth, W., Kocher, M., & Sutter, M. 2002. Experimental 'beauty contests' with homogeneous and heterogeneous players and with interior and boundary equilibria. *Economics Letters*, 74: 219-228.

Güth, W., Schmittberger, R., & Schwarze, B. 1982. An experimental analysis of ultimatum bargaining. *Journal of Economic Behavior & Organization*, 3: 367-388.

Haigh, M. 2016. Has the standard cognitive reflection test become a victim of its own success?. *Advances in Cognitive Psychology*, 12: 145-149.

Halali, E., Bereby-Meyer, Y., & Ockenfels, A. 2013. Is it all about the self? The effect of self-control depletion on ultimatum game proposers. *Frontiers in Human Neuroscience*, 7: 1-8.

Halevy, N. 2020. Strategic thinking and behavior during a pandemic. *Judgment and Decision Making*, 15: 648.-659.

Haley, K., & Fessler, D. 2005. Nobody's watching? Subtle cues affect generosity in an anonymous economic game. *Evolution and Human Behavior*, 26: 245-256.

Handoyo, S. 2018. The role of national culture in national innovative capacity. *The Asian Journal of Technology Management*, 11: 137-149.

Hanoch, Y., Rice, T., Cummings, J., & Wood, S. 2009. How much choice is too much? The case of the Medicare prescription drug benefit. *Health Services Research*, 44: 1157-1168.

Hardin, G. 1968. The tragedy of the commons. *Science*, 162: 1243-1248.

Helliwell, J. F., Huang, H., Wang, S., & Norton, M. 2020. Statistical Appendix for Chapter 2 of World Happiness Report 2020. New York: Sustainable Development Solutions Network.

Helliwell, J., Huang, H., & Wang, S. 2017. The social foundations of world happiness. World Happiness Report 2017. New York: Sustainable Development Solutions Network.

Henrich, J., Boyd, R., Bowles, S., Camerer, C., Fehr, E., Gintis, H., & McElreath, R. 2001. Cooperation, reciprocity and punishment in fifteen small-scale societies. *American Economic Review*, 91: 73-78.

Henrich, J., Boyd, R., Bowles, S., Camerer, C., Fehr, E., Gintis, H., McElreath, R., Alvard, M., Barr, A., Ensminger, J., Henrich, N., Hill, K., Gil-White, F., Gurven, M., Marlowe, F., Patton, J., & Tracer, D. 2005. "Economic man" in cross-cultural perspective: Behavioral experiments in 15 small-scale societies. *Behavioral and Brain Sciences*, 28: 795-815.

Herrmann, B., Thöni, C., & Gächter, S. 2008. Antisocial punishment across societies. *Science*, 319: 1362-1367.

Ho, T., Camerer, C., & Weigelt, K. 1998. Iterated dominance and iterated best response in experimental" p-beauty contests". *The American Economic Review*, 88: 947-969.

Hoffman, E., McCabe, K., & Smith, V. 1996. On expectations and the monetary stakes in ultimatum games. *International Journal of Game Theory*, 25: 289-301.

Hoffman, E., McCabe, K., Shachat, K., & Smith, V. 1994. Preference, property rights and anonymity in bargaining games. *Games and Economic Behavior*. 86: 653-669.

Hofstede, G. 2011. Dimensionalizing cultures: The Hofstede model in context. *Online Readings in Psychology and Culture*, 2: 2307-0919.

Hofstede, G., & Usunier, J. 2003. Hofstede's dimensions of culture and their influence on international business negotiations. *International Business Negotiation*, 60: 137-153.

Hofstede, G., Hofstede, G., & Minkov, M. 2005. **Cultures and Organizations: Software of the Mind**. New York: McGraw-Hill.

Hofstede, G., Jonker, C., & Verwaart, T. 2012. Cultural differentiation of negotiating agents. *Group Decision and Negotiation*, 21: 79-98.

Hoppe, E., & Kusterer, D. 2011. Behavioral biases and cognitive reflection. *Economics Letters*, 110: 97-100.

Inbar, Y., Botti, S., & Hanko, K. 2011. Decision speed and choice regret: When haste feels like waste. *Journal of Experimental Social Psychology*, 47: 533-540.

Inglehart, R., Foa, R., Peterson, C., & Welzel, C. 2008. Development, freedom, and rising happiness: A global perspective (1981–2007). *Perspectives on Psychological Science*, 3: 264-285.

Isaac, R., & Walker, J. 1988. Group size effects in public goods provision: The voluntary contributions mechanism. *The Quarterly Journal of Economics*, 103: 179-199.

Iyengar, S., & Lepper, M. 2000. When choice is demotivating: Can one desire too much of a good thing?. *Journal of Personality and Social Psychology*, 79: 995-1006.

Jessup, R., Veinott, E., Todd, P., & Busemeyer, J. 2009. Leaving the store empty-handed: Testing explanations for the too-much-choice effect using decision field theory. *Psychology & Marketing*, 26: 299-320.

Johannesson, M., & Persson, B. 2000. Non-reciprocal altruism in dictator games. *Economics Letters*, 69: 137-142.

Johns, N., Edwards, J., & Hartwell, H. 2013. Menu choice: satisfaction or overload?. *Journal of Culinary Science & Technology*, 11: 275-285.

Johnson, J. 2011. An evolutionary psychological analysis of intuitions about the fairness of wealth disparity. *Evolutionary Behavioral Sciences*, 5: 312-331.

Kagel, J., Kim, C., & Moser, D. 1996. Fairness in ultimatum games with asymmetric information and asymmetric payoffs. *Games and Economic Behavior*, 13: 100-110.

Kahneman, D. 2003. A perspective on judgment and choice: mapping bounded rationality. *American Psychologist*, 58: 697-720.

Kahneman, D., & Frederick, S. 2002. **Representativeness revisited: Attribute substitution in intuitive judgment.** In T. Gilovich, D. Griffin & D. Kahneman (Eds.), Heuristics and Biases (pp. 49–81). New York: Cambridge University Press.

Kahneman, D., Knetsch, J., & Thaler, R. 1986. Fairness and the assumptions of economics. *Journal of Business*, 59: 285-300.

Keynes, J. 1936. **The General Theory of Employment, Interest, and Money** (1957 edition). New York: St Martin's Press.

Kirchsteiger, G. 1994. The role of envy in ultimatum games. *Journal of Economic Behavior & Organization*, 25: 373-389.

Knafo, A., Israel, S., Darvasi, A., Bachner-Melman, R., Uzefovsky, F., Cohen, L., Feldman, E., Lerer, E., Laiba, E., Raz, Y., Nemanov, L., Gritsenko, I., Dina, C., Agam, G., Dean, B., Bornstein, G., & Ebstein, R. 2008. Individual differences in allocation of funds in the dictator game associated with length of the arginine vasopressin 1a receptor RS3 promoter region and correlation between RS3 length and hippocampal mRNA. *Genes, Brain and Behavior*, 7: 266-275.

Koch, A., & Normann, H. 2008. Giving in dictator games: Regard for others or regard by others?. *Southern Economic Journal*, 1: 223-231.

Kocher, M., & Sutter, M. 2005. The decision maker matters: Individual versus group behaviour in experimental beauty-contest games. *The Economic Journal*, 115: 200-223.

Korff, S., & Bohme, R. 2014. Too much choice: End-user privacy decisions in the context of choice proliferation. *In SOUPS: Symposium on Usable Privacy and Security*, pp. 69–87.

Krawczyk, M., & Le Lec, F. 2010. 'Give me a chance!' An experiment in social decision under risk. *Experimental Economics*, 13: 500-511.

Kristjánsdóttir, H., Guðlaugsson, Þ., Guðmundsdóttir, S., & Aðalsteinsson, G. 2017. Hofstede national culture and international trade. *Applied Economics*, 49: 5792-5801.

Kurzban, R., & Houser, D. 2001. Individual differences in cooperation in a circular public goods game. *European Journal of Personality*, 15: S37-S52.

Lane, T. 2017. How dos happiness relate to economic behaviour? A review of the literature. *Journal of Behavioral and Experimental Economics*, 68: 62-78.

Langer, E. 1975. The illusion of control. *Journal of Personality and Social Psychology*, 32: 311-328.

Larney, A., Rotella, A., & Barclay, P. 2019. Stake size effects in ultimatum game and dictator game offers: A meta-analysis. *Organizational Behavior and Human Decision Processes*, 151: 61-72.

Larrick, R., & Blount, S. 1997. The claiming effect: Why players are more generous in social dilemmas than in ultimatum games. *Journal of Personality and Social Psychology*, 72: 810-825.

Laury, S., Walker, J., & Williams, A. 1995. Anonymity and the voluntary provision of public goods. *Journal of Economic Behavior & Organization*, 27: 365-380.

Lenton, A., & Francesconi, M. 2011. Too much of a good thing? Variety is confusing in mate choice. *Biology Letters*, 7: 528-531.

Lenton, A., Fasolo, B., & Todd, P. 2008. "Shopping" for a mate: Expected versus experienced preferences in online mate choice. *IEEE Transactions on Professional Communication*, 51: 169-182.

Levine, D. 1998. Modeling altruism and spitefulness in experiments. *Review of Economic Dynamics*, 1: 593-622.

Levitt, S. & List, J. 2007. What do laboratory experiments measuring social preferences reveal about the real world? *Journal of Economic Perspectives*, 21: 153-174.

Li, H., Liang, J., Xu, H., & Liu, Y. 2019. Does windfall money encourage charitable giving? An experimental study. *VOLUNTAS: International Journal of Voluntary and Nonprofit Organizations*, 30: 841-848.

Li, Y., Zhong, T., Huang, Z., Pan, R., Garber, P., Yu, F., & Xiao, W. 2020. Male and female birth attendance and assistance in a species of non-human primate (Rhinopithecus bieti). *Behavioural Processes*, 181: 1-6.

Libet, B. 1985. Unconscious cerebral initiative and the role of conscious will in voluntary action. *Behavioral and Brain Sciences*, 8: 529-539.

Libet, B. 1999. Do we have free will?. *Journal of Consciousness Studies*, 6: 47-57.

Lindbeck, A., & Weibull, J. W. 1988. Altruism and time consistency: The economics of fait accompli. *Journal of Political Economy*, 96: 1165-1182.

List, J. 2007. On the interpretation of giving in dictator games. *Journal of Political Economy*, 115: 482-493.

List, J., & Cherry, T. 2008. Examining the role of fairness in high stakes allocation decisions. *Journal of Economic Behavior & Organization*, 65: 1-8.

Loewenstein, G. 1999. Experimental economics from the vantage-point of behavioural economics. *The Economic Journal*, 109: 25-34.

Lohse, J. 2016. Smart or selfish–When smart guys finish nice. *Journal of Behavioral and Experimental Economics*, 64, 28-40.

Lönnqvist, J., & Walkowitz, G. 2019. Experimentally induced empathy has no impact on generosity in a monetarily incentivized dictator game. *Frontiers in Psychology*, 10: 1-7.

Lotti, L. 2020. Generosity during Covid-19 the effect of social distancing and framing on donations in dictator games. MPRA Working Paper No 102144.

Lozada, M., D'Adamo, P., & Fuentes, M. 2011. Beneficial effects of human altruism. *Journal of Theoretical Biology*, 289: 12-16.

Luhan, W., Kocher, M., & Sutter, M. 2009. Group polarization in the team dictator game reconsidered. *Experimental Economics*, 12: 26-41.

Markus, H., & Schwartz, B. 2010. Does choice mean freedom and well-being?. *Journal of Consumer Research*, 37: 344-355.

Masclet, D., Noussair, C., Tucker, S., & Villeval, M. 2003. Monetary and nonmonetary punishment in the voluntary contributions mechanism. *American Economic Review*, 93: 366-380.

Melgar, N., Rossi, M., & Smith, T. 2010. The perception of corruption. *International Journal of Public Opinion Research*, 22: 120-131.

Minkov, M. 2009. Predictors of differences in subjective well-being across 97 nations. *Cross-Cultural Research*, 43: 152-179.

Mullainathan, S. & Thaler, R. 2000. Behavioral Economics. Working Paper, National Bureau of Economic Research: 7948.

Nagel, R. 1995. Unraveling in guessing games: An experimental study. *The American Economic Review*, 85: 1313-1326.

Nahmias, E., Morris, S., Nadelhoffer, T., & Turner, J. 2005. Surveying freedom: Folk intuitions about free will and moral responsibility. *Philosophical Psychology*, 18: 561-584.

Nettle, D., Harper, Z., Kidson, A., Stone, R., Penton-Voak, I., & Bateson, M. 2013. The watching eyes effect in the Dictator Game: it's not how much you give, it's being seen to give something. *Evolution and Human Behavior*, 34: 35-40.

Nichols, S. 2004. The folk psychology of free will: Fits and starts. *Mind & Language*, *19*: 473-502.

Nissenbaum, H. 1999. The meaning of anonymity in an information age. *The Information Society*, 15: 141-144.

Niwa, Y., Hiraishi, K., & Oda, R. 2011. A mirror has no effect on giving in the dictator game. *Letters on Evolutionary Behavioral Science*, 2: 16-19.

O'Connor, K. 2017. Happiness and welfare state policy around the world. *Review of Behavioral Economics*, 4: 397-420.

Oberholzer-Gee, F., & Eichenberger, R. 2008. Fairness in extended dictator game experiments. *The BE Journal of Economic Analysis & Policy*, 8: 1-21.

Oechssler, J., Roider, A., & Schmitz, P. 2009. Cognitive abilities and behavioral biases. *Journal of Economic Behavior & Organization*, 72: 147-152.

O'Gorman, R., Henrich, J., & Van Vugt, M. 2009. Constraining free riding in public goods games: designated solitary punishers can sustain human cooperation. *Proceedings of the Royal Society B: Biological Sciences*, 276: 323-329.

Oxoby, R., & Spraggon, J. 2008. Mine and yours: Property rights in dictator games. *Journal of Economic Behavior & Organization*, 65: 703-713.

Palfrey, T., & Prisbrey, J. 1997. Anomalous behavior in public goods experiments: How much and why?. *The American Economic Review*, 87: 829-846.

Panchanathan, K., Frankenhuis, W. & Silk, J. 2013. The bystander effect in an N-person dictator game. *Organizational Behavior and Human Decision Processes*, 120: 285-297.

Park, J., & Jang, S. 2013. Confused by too many choices? Choice overload in tourism. *Tourism Management*, 35: 1-12.

Park, S., Kahnt, T., Dogan, A., Strang, S., Fehr, E., & Tobler, P. 2017. A neural link between generosity and happiness. *Nature Communications*, 8: 1-10.

Paulhus, D., & Carey, J. 2011. The FAD–Plus: Measuring lay beliefs regarding free will and related constructs. *Journal of Personality Assessment*, 93: 96-104.

Paulhus, D., & Margesson, A. 1994. Free will and scientific determinism (FAD-4) scale. Unpublished instrument, University of British Columbia, Vancouver, BC, Canada.

Pennycook, G., Cheyne, J., Koehler, D., & Fugelsang, J. 2016. Is the cognitive reflection test a measure of both reflection and intuition?. *Behavior Research Methods*, 48: 341-348.

Pennycook, G., Ross, R., Koehler, D., & Fugelsang, J. 2016. Atheists and agnostics are more reflective than religious believers: Four empirical studies and a meta-analysis. *PloS one*, 11: e0153039.

Ponti, G., & Rodriguez-Lara, I. 2015. Social preferences and cognitive reflection: evidence from a dictator game experiment. *Frontiers in Behavioral Neuroscience*, 9: 146.

Rabin, M. 1993. Incorporating fairness into game theory and economics. *The American Economic Review*, 83: 1281-1302.

Rabin, M. 1998. Psychology and economics. *Journal of Economic Literature*, 36: 11-46.

Rand, D., Dreber, A., Ellingsen, T., Fudenberg, D., & Nowak, M. 2009. Positive interactions promote public cooperation. *Science*, 325: 1272-1275.

Rand, D., & Nowak, M. 2013. Human cooperation. *Trends in Cognitive Sciences*, 17: 413-425.

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

Reinstein, D. 2008. Substitution Between (and Motivations for) Charitable Contributions: An Experimental Study, Working paper No. 648, University of Essex, Department of Economics.

Reutskaja, E., & Hogarth, R. 2005. Satisfaction in choice as a function of the number of alternatives: When "goods satiate" but "bads escalate". Working paper ref. 903, Universitat Pompeu Fabra, Department of Economics and Business.

Rice, T., & Hanoch, Y. 2008. Can consumers have too much choice?. *Expert Review of Pharmacoeconomics & Outcomes Research*, 8: 325-327.

Rigdon, M., Ishii, K., Watabe, M., & Kitayama, S. 2009. Minimal social cues in the dictator game. *Journal of Economic Psychology*, 30: 358-367.

Ring, P., Neyse, L., David-Barett, T., & Schmidt, U. 2016. Gender differences in performance predictions: Evidence from the cognitive reflection test. *Frontiers in Psychology*, 7: 1680.

Roets, A., Schwartz, B., & Guan, Y. 2012. The tyranny of choice: A cross-cultural investigation of maximizing-satisficing effects on well-being. *Judgment and Decision Making*, 7: 689-704.

Rose-Ackerman, S. 1996. Altruism, nonprofits, and economic theory. *Journal of Economic Literature*, 34: 701-728.

Rosenberg, K., & Trevathan, W. 2001. The evolution of Human Birth. *Scientific American*, 285: 72-77.

Rosenberg, K., & Trevathan, W. 2002. Birth, obstetrics and human evolution. *BJOG: An International Journal of Obstetrics & Gynaecology*, 109: 1199-1206.

Rosenblat, T. 2008. The beauty premium: Physical attractiveness and gender in dictator games. *Negotiation Journal*, 24: 465-481.

Roth, A., Prasnikar, V., Okuno-Fujiwara, M., & Zamir, S. 1991. Bargaining and market behavior in Jerusalem, Ljubljana, Pittsburgh, and Tokyo: An experimental study. *The American Economic Review*, 81: 1068-1095.

Ruffle, B. 1998. More is better, but fair is fair: Tipping in dictator and ultimatum games. *Games and Economic Behavior*, 23: 247-265.

Sarkissian, H., Chatterjee, A., De Brigard, F., Knobe, J., Nichols, S., & Sirker, S. 2010. Is belief in free will a cultural universal?. *Mind & Language*, 25: 346-358.

Sbriglia, P. 2008. Revealing the depth of reasoning in p-beauty contest games. *Experimental Economics*, 11: 107-121.

Scheibehenne, B., Greifeneder, R., & Todd, P. 2009. What moderates the too-much-choice effect?. *Psychology & Marketing*, 26: 229-253.

Scheibehenne, B., Greifeneder, R., & Todd, P. 2010. Can there ever be too many options? A meta-analytic review of choice overload. *Journal of Consumer Research*, 37: 409-425.

Schnusenberg, O., & Gallo, A. 2011. On cognitive ability and learning in a beauty contest. *Journal for Economic Educators*, 11: 13-24.

Schulz, J., Fischbacher, U., Thöni, C., & Utikal, V. 2014. Affect and fairness: Dictator games under cognitive load. *Journal of Economic Psychology*, 41: 77-87.

Schwartz, B. 2000. Self-determination: The tyranny of freedom. *American Psychologist*, 55: 79-88.

Schwartz, B. 2004, January. **The paradox of choice: Why more is less**. New York: Ecco.

Schwartz, B., Ward, A., Monterosso, J., Lyubomirsky, S., White, K., & Lehman, D. 2002. Maximizing versus satisficing: Happiness is a matter of choice. *Journal of Personality and Social Psychology*, 83: 1178-1197.

Sefton, M., Shupp, R., & Walker, J. 2007. The effect of rewards and sanctions in provision of public goods. *Economic Inquiry*, 45: 671-690.

Selten, R. 1975. A reexamination of the perfectness concept for equilibrium points in extensive games. *International Journal of Game Theory*, 4: 25–55.

Sethi-Iyengar, S., Huberman, G., & Jiang, W. 2004. How much choice is too much? Contributions to 401 (k) retirement plans. *Pension Design and Structure: New Lessons from Behavioral Finance*, 83: 84-87.

Shah, A., & Wolford, G. 2007. Buying behavior as a function of parametric variation of number of choices. *Psychological Science*, 18: 369–370.

Shariff, A., & Norenzayan, A. 2007. God is watching you: Priming God concepts increases prosocial behavior in an anonymous economic game. *Psychological Science*, 18: 803-809.

Shariff, A., Greene, J., Karremans, J., Luguri, J., Clark, C., Schooler, J., Baumeister, R., & Vohs, K. 2014. Free will and punishment: A mechanistic view of human nature reduces retribution. *Psychological Science*, 25: 1563-1570.

Shariff, A., Schooler, J. & Vohs, K. 2008. The hazards of claiming to have solved the hard problem of free will. In: *Are we free? Psychology and free will*, pp. 181–204. New York: Oxford University Press.

Shenhav, A., Rand, D., & Greene, J. 2012. Divine intuition: Cognitive style influences belief in God. *Journal of Experimental Psychology: General*, 141: 423-428.

Shi, X., & Wang, J. 2011. Interpreting Hofstede model and GLOBE model: which way to go for cross-cultural research?. *International Journal of Business and Management*, 6: 93-99.

Simon, H. 1956. Rational choice and the structure of the environment. *Psychological Review*, 63: 129-138.

Simon, H. 1990. A mechanism for social selection and successful altruism. *Science*, 250: 1665-1668.

Simon, H. 1993. Altruism and economics. *The American Economic Review*, 83: 156-161.

Slonim, R. & Roth, A. 1998. Learning in High Stakes Ultimatum Games: An Experiment in the Slovak Republic. *Econometrica*, 66: 569-96.

Slovic, P., Finucane, M., Peters, E., & MacGregor, D. 2002. Rational actors or rational fools: Implications of the affect heuristic for behavioral economics. *The Journal of Socio-Economics*, 31: 329-342.

Slovic, P., Finucane, M., Peters, E., & MacGregor, D. 2004. Risk as analysis and risk as feelings: Some thoughts about affect, reason, risk, and rationality. *Risk Analysis*, 24: 311-322.

Smith, V. 1982. Microeconomic Systems as an Experimental Science. *American Economic Review*, 72: 923-955.

Soyer, E., & Hogarth, R. 2011. The size and distribution of donations: Effects of number of recipients. *Judgment and Decision Making*, 6: 616-628.

Stieger, S., & Reips, U. 2016. A limitation of the Cognitive Reflection Test: familiarity. *PeerJ*, 4: e2395.

Stillman, T., Baumeister, R., Vohs, K., Lambert, N., Fincham, F., & Brewer, L. 2010. Personal philosophy and personnel achievement: Belief in free will predicts better job performance. *Social Psychological and Personality Science*, 1: 43-50.

Straub, P., & Murnighan, J. 1995. An experimental investigation of ultimatum games: Information, fairness, expectations, and lowest acceptable offers. *Journal of Economic Behavior & Organization*, 27: 345-364.

Stüber, R. 2019. The benefit of the doubt: Willful ignorance and altruistic punishment. *Experimental Economics*, 23: 848-972.

Sun, J., Harris, K., & Vazire, S. 2020. Is well-being associated with the quantity and quality of social interactions?. *Journal of Personality and Social Psychology*, 119: 1478-1496.

Sutter, M. 2005. Are four heads better than two? An experimental beauty-contest game with teams of different size. *Economics letters*, 88: 41-46.

Tan, H., & Forgas, J. 2010. When happiness makes us selfish, but sadness makes us fair: Affective influences on interpersonal strategies in the dictator game. *Journal of Experimental Social Psychology*, 46: 571-576.

Thaler, R. 1988. Anomalies: The winner's curse. *Journal of Economic Perspectives*, 2: 191-202.

The Economist. (2006, December 19). Free to choose? Modern neuroscience is eroding the idea of free will, Retrieved from https://www.economist.com/leaders/2006/12/19/free-to-choose.

The World Bank (2018a, March 2021). Poverty headcount ratio at $1.90 a day (2011 PPP) (% population), Retrived from https://data.worldbank.org/indicator/SI.POV.DDAY.

The World Bank (2018b, March 2021). Poverty headcount ratio at $3.20 a day (2011 PPP) (% population), Retrived from https://data.worldbank.org/indicator/SI.POV.LMIC.

The World Bank (2018c, March 2021). Poverty headcount ratio at $5.50 a day (2011 PPP) (% population), Retrived from https://data.worldbank.org/indicator/SI.POV.UMIC.

The World Bank (2019a, March 2021). Population, female (% of total population), Retrieved from https://data.worldbank.org/indicator/SP.POP.TOTL.FE.ZS.

The World Bank (2019b, March 2021). Urban population (% of total population), Retrieved from https://data.worldbank.org/indicator/SP.URB.TOTL.IN.ZS.

The World Factbook (2020, March 2021). Guide to Country Profiles – Median age. Retrieved from https://www.cia.gov/the-world-factbook/field/median-age.

Thomson, K., & Oppenheimer, D. 2016. Investigating an alternate form of the cognitive reflection test. *Judgment and Decision Making*, 11: 99-113.

Thunström, L., Cherry, T., McEvoy, D., & Shogren, J. 2016. Endogenous context in a dictator game. *Journal of Behavioral and Experimental Economics*, 65: 117-120.

Toplak, M., West, R., & Stanovich, K. 2011. The Cognitive Reflection Test as a predictor of performance on heuristics-and-biases tasks. *Memory & Cognition*, 39: 1275-1289.

Toplak, M., West, R., & Stanovich, K. 2014. Assessing miserly information processing: An expansion of the Cognitive Reflection Test. *Thinking & Reasoning*, 20: 147-168.

Trivers, R. 1971. The evolution of reciprocal altruism. *The Quarterly Review of Biology*, 46: 35-57.

Tsakumis, G., Curatola, A., & Porcano, T. 2007. The relation between national cultural dimensions and tax evasion. *Journal of International Accounting, Auditing and Taxation*, 16: 131-147.

Van den Bergh, B., & Dewitte, S. 2006. Digit ratio (2D: 4D) moderates the impact of sexual cues on men's decisions in ultimatum games. *Proceedings of the Royal Society B: Biological Sciences*, 273: 2091-2095.

Van Inwagen, P. 1975. The incompatibility of free will and determinism. *Philosophical Studies*, 27: 185-199.

Van Vugt, M., Roberts, G., & Hardy, C. 2007. Competitive altruism: A theory of reputation-based cooperation in groups. In R. Dunbar, & L. Barrett (Eds.), *Oxford Handbook of Evolutionary Psychology*. Oxford, UK: Oxford University Press, 531-540.

Veenhoven, R., & Vergunst, F. 2014. The Easterlin illusion: economic growth does go with greater happiness. *International Journal of Happiness and Development*, 1: 311-343.

Viscusi, W., & Chesson, H. 1999. Hopes and fears: the conflicting effects of risk ambiguity. *Theory and Decision*, 47: 157-184.

Vohs, K., & Schooler, J. 2008. The value of believing in free will: Encouraging a belief in determinism increases cheating. *Psychological Science*, 19: 49-54.

Wang, L., Malhotra, D., & Murnighan, J. 2011. Economics education and greed. *Academy of Management Learning & Education*, 10: 643-660.

Weber, R. 2003. 'Learning 'with no feedback in a competitive guessing game. *Games and Economic Behavior*, 44: 134-144.

Welsh, M., Burns, N., & Delfabbro, P. 2013**. The Cognitive Reflection Test: How Much More than Numerical Ability?** in Proceedings of the 35th Annual Conference of the Cognitive Science Society, ed. N. Miyake, D. Peebles, and R. Cooper, Austin, TX: Cognitive Science Society, 1587-1597.

Wilson, E. 1975. Some central problems of sociobiology. *Social Science Information*, 14: 5-18.

Winking, J., & Mizer, N. 2013. Natural-field dictator game shows no altruistic giving. *Evolution and Human Behavior*, 34: 288-293.

World Health Organization, 2019. International day of the midwife: 5 things you should know. accessed 26 January 2021, https://news.un.org/en/story/2019/05/1037921.

Wu, Y., Leliveld, M. & Zhou, X. 2011. Social distance modulates recipient's fairness consideration in the dictator game: An ERP study. *Biological Psychology*, 88: 253-262.

Zhang, D., Highhouse, S., & Rada, T. 2016. Explaining sex differences on the Cognitive Reflection Test. *Personality and Individual Differences*, 101: 425-427.

Zhao, X., Niu, R., & Castillo, I. 2010. Selecting distribution channel strategies for non-profit organizations. *European Journal of Marketing*, 44: 972-996.

Appendix

Appendix A.1: Summary of the variables: expected effect on altruism

Variable	Effect on altruism
Age	Positive
Female	Positive
Age	Positive
Anonymity (urban)	Negative
Deservingness (PoC)	Negative
Poverty	Positive
Happiness	Positive
GDP *per capita*	Positive
Freedom to Make Life Choices	Positive
Social Support	Positive
Health life expectancy	Positive
Perception of corruption (deservingness)	Negative
Power Distance	Unclear
Individualism	Negative
Masculinity	Negative
Ambiguity Aversion	Negative
Long-term Orientation	Positive
Indulgence	Positive

Appendix A.2a: KW test for the variable poverty1 between within quantiles

PPP	Q4	Q3	Q2
Q3	$X^2=0.072$ p=0.0788	-	-
Q2	$X^2=2.572$ p=0.109	$X^2=1.869$ p=0.172	-
Q1	$X^2=15.931^{***}$ p=0.000	$X^2=11.242^{***}$ p=0.001	$X^2=3.957^{**}$ p=0.047

Appendix A.2b: KW test for the variable poverty2 between within quantiles

PP	Q4	Q3	Q2
Q3	$X^2=0.031$ p=0.859	-	-
Q2	$X^2=1.872$ p=0.171	$X^2=1.915$ p=0.166	-
Q1	$X^2=10.876^{***}$ P=0.001	$X^2=11.695^{***}$ p=0.001	$X^2=3.712^{*}$ p=0.054

Appendix A.2c: KW test for the variable poverty3 between within quantiles

P	Q4	Q3	Q2
Q3	X^2=0.095 p=0.758	-	-
Q2	X^2=2.267 p=0.132	X^2=1.751 p=0.186	-
Q1	X^2=10.351*** p=0.001	X^2=11.339*** p=0.001	X^2=4.287** p=0.038

Appendix A.3a: KW test for the variable GDP within quantiles

GDP	Q4	Q3	Q2
Q3	X^2=0.262 p=0.609	-	-
Q2	X^2=1.815 p=0.178	X^2=3.313* p=0.069	-
Q1	X^2=12.853*** p=0.000	X^2=14.580*** p=0.000	X^2=7.004*** p=0.008

Appendix A.3b: KW test for the variable FMC within quantiles

FMC	Q4	Q3	Q2
Q3	X^2=1.186 p=0.276	-	-
Q2	X^2=1.890 p=0.169	X^2=0.240 p=0.624	-
Q1	X^2=18.233*** p=0.000	X^2=9.069*** p=0.003	X^2=9.400*** p=0.002

Appendix A.3c: KW test for the variable SS within quantiles

SS	Q4	Q3	Q2
Q3	X^2=0.569 p=0.451	-	-
Q2	X^2=2.610 p=0.106	X^2=1.528 p=0.217	-
Q1	X^2=14.038*** p=0.000	X^2=10.337*** p=0.001	X^2=4.840** p=0.028

Appendix A.3d: KW test for the variable HLE within quantiles

HLE	Q4	Q3	Q2
Q3	X^2=0.236 p=0.627	-	-
Q2	X^2=1.635 p=0.201	X^2=2.797* p=0.094	-
Q1	X^2=8.707*** p=0.005	X^2=11.372*** p=0.001	X^2=3.269** p=0.071

Appendix A.3e: KW test for the variable PoC within quantiles

PC	Q4	Q3	Q2
Q3	X^2=0.599 p=0.439	-	-
Q2	X^2=0.245 p=0.621	X^2=0.055 p=0.814	-
Q1	X^2=8.027*** p=0.005	X^2=6.053** p=0.014	X^2=4.991** p=0.026

Appendix A.3f: KW test for the variable happiness within quantiles

Happiness	Q4	Q3	Q2
Q3	X^2=1.620 p=0.203	-	-
Q2	X^2=3.291* p=0.070	X^2=1.112 p=0.292	-
Q1	X^2=15.690*** p=0.000	X^2=10.590*** p=0.001	X^2=6.399** p=0.011

Appendix A.4a: KW test for the variable female within quantiles

female	Q4	Q3	Q2
Q3	X^2=1.293 p=0.256	-	-
Q2	X^2=1.674 p=0.196	X^2=0.216 p=0.643	-
Q1	X^2=4.956 p=0.026	X^2=0.664 p=0.415	X^2=0.573 p=0.449

Appendix A.4b: KW test for the variable age within quantiles

age	Q4	Q3	Q2
Q3	X^2=0.205 p=0.651	-	-
Q2	X^2=0.874 p=0.350	X^2=1.414 p=0.234	-
Q1	X^2=7.034*** p=0.008	X^2=8.412*** p=0.004	X^2=1.431 p=0.232

Appendix A.4c: KW test for the variable urban within quantiles

urban	Q4	Q3	Q2
Q3	X^2=0.112 p=0.738	-	-
Q2	X^2=0.012 p=0.912	X^2=0.127 p=0.722	-
Q1	X^2=0.052 p=0.819	X^2=1.188 p=0.665	X^2=0.000 p=0.983

Appendix A.5a: Linear regression of happiness – first-stage model

Variable	Coefficients	Standard Error	P > |z|
GDP	0.000***	0.000	0.007
FMC	1.700**	0.445	0.000
SS	2.973***	0.765	0.000
HLE	0.038***	0.012	0.003
Generosity	0.266	0.382	0.487
PoC	-0.239	0.417	0.567
Constant	-0.871	0.728	0.233
R-squared	0.768		
Prob > F	0.000		
Number of observations	128		

Notes: The symbols ***, **, * denote that the coefficient is statistically different from zero at 1%, 5% and 10% respectively.

Appendix A.5b: Results of the linear regression of happiness by maximum likelihood

Variable	Coefficients	Standard Error	P > |z|
GDP	0.000***	0.000	0.000
FMC	1.872***	0.412	0.000
SS	2.832***	0.732	0.000
HLE	0.036***	0.012	0.002
Constant	-0.952	0.643	0.141
R-squared	0.755		
Prob > F	0.000		
Number of observations	128		

Notes: The symbols ***, **, * denote that the coefficient is statistically different from zero at 1%, 5% and 10% respectively

Appendix A.5c: Results of the final linear regression model of altruism with endogenous regressors

Variable	Coefficients	Standard Error	P > |z|
Female	-3.037**	1.025	0.003
Urban	-0.186**	0.086	0.030
PoC	-0.148*	0.079	0.063
Happiness	0.084***	0.016	0.000
Constant	1.532**	0.512	0.003
R-squared	0.332		
Prob > chi2	0.000		
Number of observations	128		

Notes: The symbols ***, **, * denote that the coefficient is statistically different from zero at 1%, 5% and 10% respectively.

Appendix A.6: Descriptive statistic of Hofstede's six cultural dimensions

Variable	N	Mean	SD	Min.	Max.
Power_distance	96	64.635	21.012	11	100
Individualism	96	38.677	22.121	6	91
Masculinity	96	47.156	18.549	5	100
Uncertainty	96	68.396	20.774	13	100
Long-term	84	45.512	22.288	4	88
Indulgence	80	46.038	22.051	13	100

Source: Hofstede et al. (2010)

Appendix A.7a: KW test for the variable power_distance by quartiles of generosity

power_distance	Q4	Q3	Q2
Q3	$X^2=3.130$* p=0.077	-	-
Q2	$X^2=1.854$ p=0.173	$X^2=0.103$ p=0.7481	-
Q1	$X^2=10.601$*** p=0.001	$X^2=14.777$*** p=0.000	$X^2=10.601$*** p=0.001

Appendix A.7b: KW test for the variable individualism by quartiles of generosity

individualism	Q4	Q3	Q2
Q3	$X^2=0.499$ p=0.480	-	-
Q2	$X^2=0.026$ p=0.872	$X^2=0.330$ p=0.566	-
Q1	$X^2=9.015$*** p=0.003	$X^2=9.195$*** p=0.002	$X^2=7.122$*** p=0.008

Appendix A.7c: KW test for the variable uncertainty by quartiles of generosity

uncertainty	Q4	Q3	Q2
Q3	$X^2=0.653$ p=0.419	-	-
Q2	$X^2=0.386$ p=0.534	$X^2=0.097$ p=0.756	-
Q1	$X^2=12.620$*** p=0.000	$X^2=8.075$*** p=0.005	$X^2=11.803$*** p=0.001

Appendix A.7d: KW test for the variable indulgence by quartiles of generosity

indulgence	Q4	Q3	Q2
Q3	X^2=0.579 p=0.447	-	-
Q2	X^2=0.180 p=0.671	X^2=0.174 p=0.677	-
Q1	X^2=4.660** p=0.031	X^2=14.288*** p=0.000	X^2=11.386*** p=0.001

Appendix A.7e: KW test for the variable masculinity by quartiles of generosity

masculinity	Q4	Q3	Q2
Q3	X^2=1.720 p=0.190	-	-
Q2	X^2=1.897 p=0.168	X^2=0.006 p=0.938	-
Q1	X^2=0.499 p=0.480	X^2=0.152 p=0.696	X^2=0.172 p=0.678

Appendix A.7f: KW test for the variable long-term by quartiles of generosity

long-term	Q4	Q3	Q2
Q3	X^2=0.751 p=0.386	-	-
Q2	X^2=2.103* p=0.147	X^2=0.539 p=0.463	-
Q1	X^2=0.871 p=0.351	X^2=0.046 p=0.830	X^2=0.701 p=0.401

Appendix A.8: Results of the final linear regression model of altruism with Hofstede's cultural dimensions

Variable	Coefficients	Standard Error	P > |z|
Happiness	0.090***	0.014	0.000
Female	-4.471***	1.215	0.000
Masculinity	-0.131*	0.069	0.056
Uncertainty	-0.273***	0.070	0.000
Long-term	0.126**	0.063	0.045
Constant	2.239***	0.611	0.000
R-squared	0.513		
Prob > chi2	0.000		
Number of observations	84		

Notes: The symbols ***, **, * denote that the coefficient is statistically different from zero at 1%, 5% and 10% respectively

Appendix B.1: Initial task – reorganize a group of words (Portuguese version)

Neutral	PFW	NFW
Control	Pro Free-Will	Against Free-Will
[da face] [de 71%] [Os oceanos] [cobrem cerca] [da terra.]	[que tomo.] [a existência] [arbítrio através] [de livre] [Eu demostro] [das decisões]	[arbítrio é] [uma ilusão.] [dos cientistas] [o livre] [A maioria] [reconhece que]
[pilhas alcalinas] [pilha normal.] [duram mais] [Normalmente, as] [que uma]	[máximo responsável] [sou o] [que escolho.] [Sei que] [pelas decisões]	[livre arbítrio.] [vindo a] [A neurociência] [não há] [moderna tem] [mostrar que]
[após 1970.] [de bolso] [As calculadoras] [tornaram populares] [apenas se]	[ambientais que] [condicionam o] [para ultrapassar] [Tenho capacidades] [meu comportamento.] [os factores]	[universo, assim] [As leis] [como o] [comportamento humano.] [da física] [explicam o]

Appendix B.2: Dictator game (Portuguese version)

Imagine-se numa situação em que a alguns estudantes da sua universidade são atribuídos 10 Euros – e que este seria o seu caso. Desses 10 Euros poderá ficar com a totalidade, dar uma parte ou mesmo tudo a uma outra pessoa. Sobre essa pessoa sabe apenas que também estuda na mesma universidade e que não lhe foram atribuídos 10 Euros, ao contrário de si.

Como gostaria que fossem distribuídos os 10 Euros entre si e o outro indivíduo?

Para mim: _____

Para a outra pessoa: _____

Appendix B.3: Dictator game (English version)

Imagine yourself in a situation where to some students at your university 10 Euros are allocated - and this would be your case. Of these 10 Euros you can keep the whole, give a part or even everything to someone else. All you know about that person is that he/ she is also a student at the same university and that he/ she has not been allocated 10 Euros. How would you like the 10 Euros to be distributed between you and the other person?

For me: _____

For the other person: _____

Appendix B.4: FAD-Plus scale

Note: the FAD-Plus scale was translated by the authors into Portuguese

Indique perante as seguintes afirmações qual o seu grau de concordância com cada uma delas usando uma escala de 1 a 5 em que 1 significa fortemente em desacordo e 5 fortemente em acordo.

P1	Eu acredito que o futuro já está determinado pelo destino.	(FD)
P2	A composição biológica de cada indivíduo determina os seus talentos e personalidade.	(SD)
P3	Eventos aleatórios parecem ser a principal causa da história humana.	(UNP)
P4	As pessoas têm completo controlo sobre as decisões que tomam.	(FW)
P5	Por muito que tentes, não consegues mudar o destino.	(FD)
P6	Os psicólogos e os psiquiatras vão eventualmente descobrir como descodificar o comportamento humano.	(SD)
P7	Ninguém consegue prever o que se vai passar no mundo.	(UNP)
P8	As pessoas devem assumir total responsabilidade pelas más decisões que tomam.	(FW)
P9	O destino tem um plano para cada um de nós.	(FD)
P10	Os teus genes determinam o teu futuro.	(SD)
P11	A vida parece ser imprevisível - tal como atirar um dado ou uma moeda ao ar.	(UNP)
P12	As pessoas podem superar qualquer obstáculo se realmente quiserem.	(FW)
P13	O que for será - não há muito que se possa fazer sobre isso.	(FD)
P14	A ciência demonstrou como o ambiente passado criou a tua actual inteligência e personalidade.	(SD)
P15	As pessoas são imprevisíveis.	(UNP)
P16	Os criminosos são totalmente responsáveis pelas coisas más que fazem.	(FW)
P17	Quer as pessoas gostem ou não, algumas forças misteriosas parecem direccionar as suas vidas	(FD)
P18	Assim como acontece com todos os animais, também o comportamento humano segue sempre as leis da natureza.	(SD)
P19	A vida é difícil de prever pois é quase totalmente aleatória.	(UNP)
P20	A sorte desempenha um papel importante na vida das pessoas.	(UNP)
P21	As pessoas têm completo livre arbítrio.	(FW)
P22	O carácter dos pais determina o carácter dos filhos.	(SD)
P23	As pessoas são sempre culpadas pelo seu mau comportamento.	(FW)

P24	O ambiente enquanto criança determina o teu sucesso enquanto adulto.	(SD)
P25	O que acontece às pessoas é uma questão de sorte.	(UNP)
P26	A força de vontade pode sempre superar os desejos do corpo.	(FW)
P27	O futuro das pessoas não pode ser previsto.	(UNP)

Appendix B.5: FAD-Plus scale (English version – Paulhus and Carey, 2011)
Please indicate your level of agreement with each of the following statements on a scale
of 1 to 5, where 1 is strongly disagree and 5 is strongly agree.

Q1	I believe that the future has already been determined by fate.	(FD)
Q2	People's biological makeup determines their talents and personality.	(SD)
Q3	Chance events seem to be the major cause of human history.	(UNP)
Q4	People have complete control over the decisions they make.	(FW)
Q5	No matter how hard you try, you can't change your destiny.	(FD)
Q6	Psychologists and psychiatrists will eventually figure out all human behavior.	(SD)
Q7	No one can predict what will happen in this world.	(UNP)
Q8	People must take full responsibility for any bad choices they make.	(FW)
Q9	Fate already has a plan for everyone.	(FD)
Q10	Your genes determine your future.	(SD)
Q11	Life seems unpredictable—just like throwing dice or flipping a coin.	(UNP)
Q12	People can overcome any obstacles if they truly want to.	(FW)
Q13	Whatever will be, will be—there's not much you can do about it.	(FD)
Q14	Science has shown how your past environment created your current intelligence and personality.	(SD)
Q15	People are unpredictable.	(UNP)
Q16	Criminals are totally responsible for the bad things they do.	(FW)
Q17	Whether people like it or not, mysterious forces seem to move their lives.	(FD)
Q18	As with other animals, human behavior always follows the laws of nature.	(SD)
Q19	Life is hard to predict because it is almost totally random.	(UNP)
Q20	Luck plays a big role in people's lives.	(UNP)
Q21	People have complete free will.	(FW)
Q22	Parents' character will determine the character of their children.	(SD)
Q23	People are always at fault for their bad behavior.	(FW)
Q24	Childhood environment will determine your success as an adult.	(SD)
Q25	What happens to people is a matter of chance.	(UNP)

| Q26 | Strength of mind can always overcome. | (FW) |
| Q27 | People's futures cannot be predicted. | (UNP) |

Appendix B.6: Variables of the probit and tobit model

Variable	N	Mean	SD	Min.	Max.
Giving (dummy)	132	0.621	(0.487)	0	1
Giving	132	3.004	(2.555)	0	1
NFW	132	0.273	(0.447)	0	1
PFW	132	0.348	(0.478)	0	1
FW	132	3.333	(0.600)	1.857	4.714
Upper	132	0.311	(0.465)	0	1
SD	132	3.054	(0.522)	1.857	4.286
FD	132	2.542	(0.744)	1	4.200
UNP	132	3.236	(0.507)	2	4.750
Age	132	21.909	(4.176)	18	47
Financial_comfort	132	0.902	(0.299)	0	1
Left	132	0.591	(0.494)	0	1
H_religious	132	0.167	(0.374)	0	1
Donated_before	132	0.871	(0.336)	0	1

Appendix B.7: Probit regression of the probability of giving (marginal effects, p values between brackets)

Variable	Model - 1	Model – 2	Model - 3	Model - 4	Model - 5
NFW	-0.124	-0.097	-	-	-
	(0.234)	(0.332)			
PFW	-0.072	-0.100	-	-	-
	(0.465)	(0.308)			
FW	-	-	0.066	0.051	-
			(0.350)	(0.465)	
Upper	-	-	-	-	0.084
					(0.343)
SD	-	-	-	0.181**	-
				(0.015)	
FD	-	-	-	-0.055	-
				(0.359)	
UNP	-	-	-	-0.007	-
				(0.935)	
Age	-	-0.009	-0.009	-0.013	-0.009
		(0.342)	(0.327)	(0.156)	(0.333)
Female	-	0.026	0.021	0.058	0.015
		(0.770)	(0.817)	(0.518)	(0.868)
Financial_comfort	-	-0.284*	-0.290*	-0.270*	-0.277*
		(0.059)	(0.059)	0.067	(0.070)
Left	-	0.101	0.102	0.077	0.098
		(0.269)	(0.244)	(0.371)	(0.263)
H_religious	-	0.315***	0.304**	0.320***	0.315***
		(0.009)	(0.012)	(0.008)	(0.008)
Donated_before	-	-0.036	-0.061	-0.070	-0.061
		(0.774)	(0.628)	(0.559)	(0.628)
N	132	132	132	132	132
Prob > chi2	0.494	0.106	0.116	0.079	0.103
Pseudo R2	0.008	0.069	0.066	0.096	0.066

Notes: The symbols ***, **, * denote that the marginal effect is statistically different from zero at 1%, 5% and 10% level of statistical significance respectively; respectively; omitted category for treatments is *neutral* treatment; p values between parentheses.

Appendix B.8: Probit regression of the probability of giving 5 or above (marginal effects, p values between brackets)

Variable	Model – 1	Model – 2	Model – 3	Model – 4	Model – 5
NFW	-0.308***	-0.308***	-	-	-
	(0.001)	(0.001)			
PFW	-0.116	-0.133	-	-	-
	(0.231)	(0.169)			
FW	-	-	0.063	0.052	-
			(0.381)	(0.461)	
Upper	-	-	-	-	0.199**
					(0.024)
SD	-	-	-	0.211***	-
				(0.008)	
FD	-	-	-	-0.067	-
				(0.303)	
UNP	-	-	-	-0.039	-
				(0.660)	
Age	-	0.000	0.001	-0.005	-0.000
		(0.972)	(0.946)	(0.625)	(0.964)
Female	-	-0.003	-0.029	0.018	-0.049
		(0.970)	(0.762)	(0.185)	(0.599)
Financial_comfort	-	-0.181	-0.206	-0.189	-0.172
		(0.180)	(0.165)	(0.185)	(0.245)
Left	-	-0.000	0.028	0.006	0.040
		(0.998)	(0.766)	(0.949)	(0.661)
H_religious	-	0.145	0.154	0.174	0.172
		(0.235)	(0.204)	(0.152)	(0.141)
Donated_before	-	0.177	0.137	0.127	0.141
		(0.161)	(0.284)	(0.295)	(0.259)
N	132	132	132	132	132
Prob > chi2	0.017	0.073	0.511	0.268	0.152
Pseudo R2	0.046	0.079	0.036	0.071	0.057

Notes: The symbols ***, **, * denote that the marginal effect is statistically different from zero at 1%, 5% and 10% level of statistical significance respectively; omitted category for treatments is *neutral* treatment; p values between parentheses.

Appendix C.1: Questionnaire

You are invited to participate in a study focused on cognitive and strategic thinking and in economic decision-making.

Participation in the study is voluntary and you can withdraw at any time by closing the survey link.

The study is being carried out as a part of a doctoral thesis in economics at Iscte Business School.

This survey can make you earn some money or give it to a charity. The amount at stake will be determined by you and derives from the choice you make on an allocation decision question about how to split money between you and a charity (Group 1). The amount you can win varies from a minimum of zero (0) Euros to a maximum of fifty (50) Euros and the amount the charity can benefit from is the total in division minus the amount you chose for yourself.

For the previous allocation of money to take place you must answer, as correctly as possible, a question from Group II. This is a question aimed at understanding strategic thinking. However, even if you didn't get anywhere near the correct answer in this question, don't be discouraged, at the end of the survey there is another question (Group IV) in which you can also earn some money. However, in this case the amount you could win is independent of the division of money you chose earlier in Group I.

Therefore, we will have two winners, one who is closest to the correct answer in the Group II and another who will be determined by the answer in Group IV.

After you have answered all the questions, we will ask for some basic demographic information.

To access the money, you will only have to provide us with a valid e-mail address. We will make the payment by bank transfer to the PAYPAL account associated to the e-mail address provided. If you do not have an e-mail associated with a PAYPAL account we will contact you via e-mail and you can specify another payment method (shipping by post, MBWAY, etc ...).

After the end of the study all records of your e-mail address will be deleted and will not be used for any further purpose or provided to third entities. You can also participate in the survey without providing an e-mail address, but in that case, you will not be eligible for the prize.

The survey will take about 10 minutes to complete.

Everyone can participate, but only once [duplicate answers (identified with the same IP address) will result in both questions being excluded]. You may, if you wish, pass on the link to family members or friends.

By submitting the questionnaire, you consent to your answers to be treated statistically, anonymously and confidentially, only for the designated purpose of this study.

If you wish, you can know the final results at the time of the oral defence of the PhD thesis named "Essays on Behavioural Economics" or when it is available in the ISCTE-IUL repository.

Would you like to proceed?

○ Yes

○ No

This is the question that will determine the amount you can receive or give to a charity.

Therefore, we ask you to distribute 50 Euros between you and a charity (Portuguese Red Cross).

It is the main mission of this charity (Portuguese Red Cross) to provide humanitarian and social assistance, especially to the most vulnerable people, preventing and repairing suffering and contributing to the defence of life, health and human dignity.

(Link: www.cruzvermelha.pt)

From those 50 Euros you can keep the totality, give a part or even everything to that charity.

How would you like to split the money between you and the Red Cross?

Please indicate below how much you would like to keep. The difference between what you choose to keep for yourself and the total divided will go to the Red Cross.

○ I want to keep 0 Euros of the 50 Euros in the allocation decision-process

○ I want to keep 5 Euros of the 50 Euros in the allocation decision-process

○ I want to keep 10 Euros of the 50 Euros in the allocation decision-process

○ I want to keep 15 Euros of the 50 Euros in the allocation decision-process

○ I want to keep 20 Euros of the 50 Euros in the allocation decision-process

○ I want to keep 25 Euros of the 50 Euros in the allocation decision-process

○ I want to keep 30 Euros of the 50 Euros in the allocation decision-process

○ I want to keep 35 Euros of the 50 Euros in the allocation decision-process

○ I want to keep 40 Euros of the 50 Euros in the allocation decision-process

○ I want to keep 45 Euros of the 50 Euros in the allocation decision-process

○ I want to keep 50 Euros of the 50 Euros in the allocation decision-process

Recently, have you had contact with any other survey in which a question similar to the previous one was present?

○ I do not know

○ No

○ Yes

In this game we ask you to choose a number between zero (0) and one hundred (100). The winner will be the one who chooses the number closest to 2/3 of the average of the numbers chosen by all the participants.

The winner will receive the amount determined by their answer regarding the allocation decision-process between themselves and the charity (question 1). The charity will also receive the amount corresponding to their choice.

If there is more than one participant who is equally close to the winning number, then the winner of the next four questions (questions 3, 4, 5 and 6) will be the winner.

If the tie still remains, a random draw will determine who will get the allocation of money chosen in question 1.

____

The task you now have in hands is to answer the next four questions correctly.

These questions are intended to break the tie (to decide a single winner) between those who are closest to the correct answer in the previous question (2) and in the question 18.

If João can drink one barrel of water in 6 days, and Maria can drink one barrel of water in 12 days, how long would it take them to drink one barrel of water together?

Guilherme received both the 15th highest and the 15th lowest mark in the class. How many students are in the class?

A man buys a donkey for $60, sells it for $70, buys it back for $80, and sells it finally for $90. How much has he made?

Simão decided to invest $8,000 in the stock market one day early in 2008. Six months after he invested, on July 17, the stocks he had purchased were down 50%. Fortunately for Simon, from July 17 to October 17, the stocks he had purchased went up 75%. At this point, Simon has: a. broken even in the stock market, b. is ahead of where he began, c. has lost money.

From the previous four questions, please indicate whether you have had contact with any of them before?

○ I do not know

○ No

○ Yes, with some

○ Yes, with all

From those four questions how many do you think you got correct?

- ⚪ 0
- ⚪ 1
- ⚪ 2
- ⚪ 3
- ⚪ 4

From those four questions, on average indicate how many questions do you think the other participants got correct?

- ⚪ 0
- ⚪ 1
- ⚪ 2
- ⚪ 3
- ⚪ 4

This is the other question with which you can also win some money.

In this game we ask you again to choose a number between zero (0) and one hundred (100). The winner will be the one who chooses the highest number that has been least chosen by all participants. The winner will receive the chosen number in euros.

In this question, if there is not a single winner, among the participants who are closest to winning, the one who got the highest number of correct answers in the questions of group II will receive the amount determined in this question.

As a last resort, if the tie still remains, a random draw will determine the winner from among those who are equally close to winning and who have obtained the same number of correct answers to questions 3, 4, 5 and 6 (group II).

____

Age

____

Gender

○ Male

○ Female

In which faculty are you enrolled?

○ ISCTE-IUL

○ Another

○ N/A

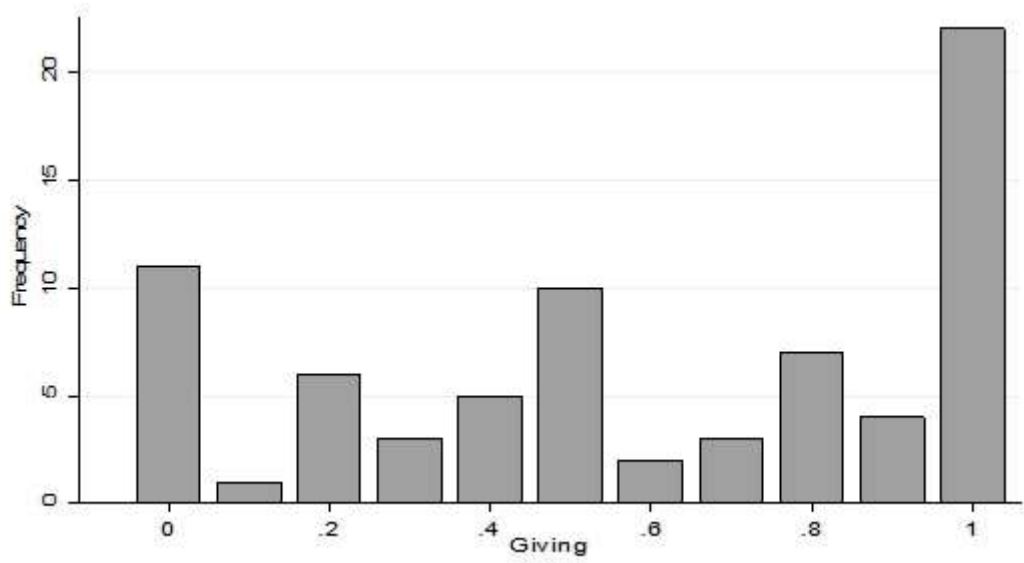What is the academic degree in which you are enrolled?

○ Bachelor

○ MBA

○ Master's course

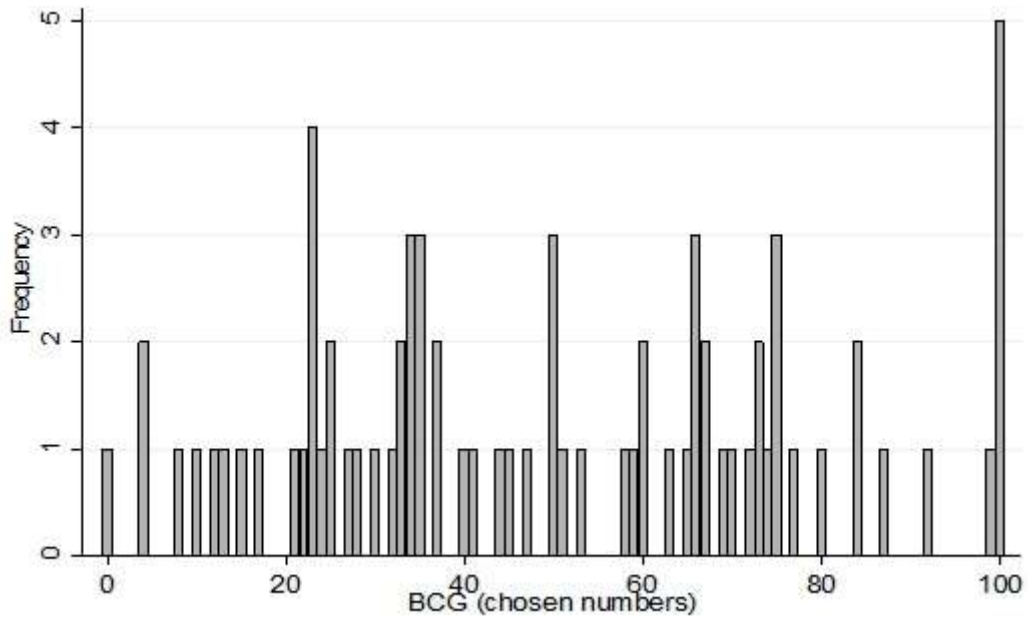○ PhD

Please indicate your academic course.

____

Please now indicate on a scale of 0 (zero) to 10 (ten), where zero (0) means "very difficult" and 10 (ten) "very comfortable", in general how you rate your financial well-being?

○	○	○	○	○	○	○	○	○	○	○
0	1	2	3	4	5	6	7	8	9	10

Appendix C.2: Histogram of giving (as a share of €10)

Appendix C.3: Histogram of BCG

Appendix C.4: Participant's level-k of thinking

Level_k	N	Percentage
Level_0	23	31.081
Level_1	19	25.676
Level_2	16	21.621
Level_3	8	10.811
Level_4	3	4.054
Level_5 (and above)	5	6.757

Appendix C.5: Histogram of BCG_PM
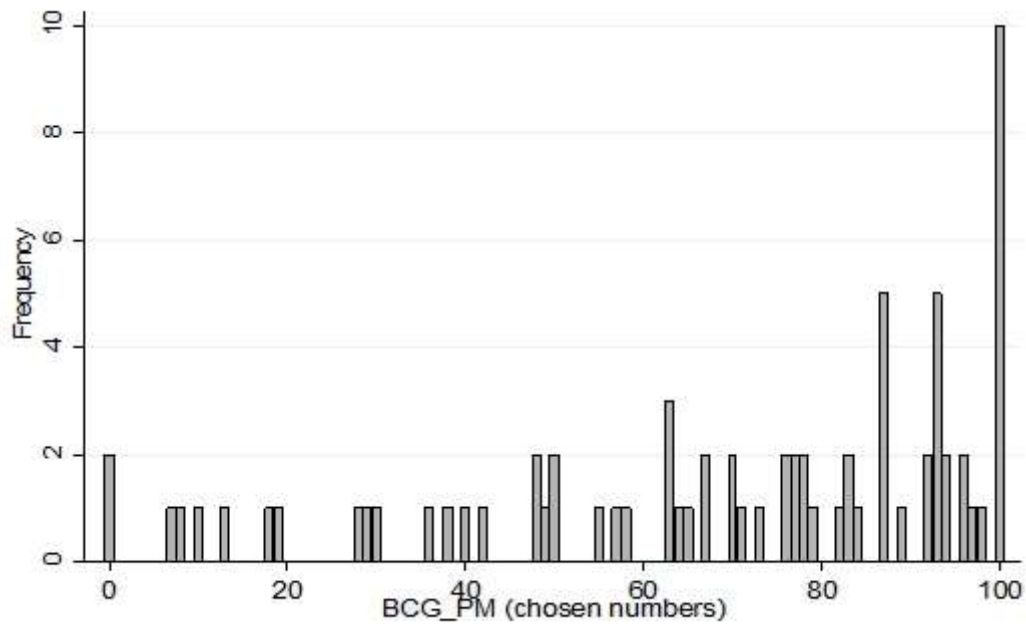
Appendix C.6: CRT results by generosity and strategic abilities

Crt_total	N	Giving	BCG	Winner_distance	Winner _distance (BCG_PM)
0	11	0.527	50.091	29.224	44.545
1	15	0.613	63.600	34.225	30.200
2	15	0.673	45.067	26.855	36.000
3	13	0.692	55.769	25.413	24.846
4	20	0.480	38.850	15.114	22.500

Appendix D.1: Questionnaire (1C, English Version)

Please complete the following questionnaire, which should take an average of about 5 minutes to complete. The questionnaire is part of a study on behavioural economics for the PhD in economics at ISCTE - University Institute of Lisbon. Answer by the order of presentation of the questions and without consulting other individuals. By completing the questionnaire, you consent that the answers you gave will be treated in statistical terms anonymously and confidentially. Thank you for your cooperation.

Imagine yourself in a situation in which for some students at your university are given 10 Euros - this would be your case. Of those 10 Euros you can keep the whole, give a part or even everything to a charity, in this case to the Portuguese Red Cross.

[It is the main mission of this institution (Red Cross) to provide humanitarian and social assistance, especially to the most vulnerable, preventing and repairing suffering and contributing to the support of life, health and human dignity]

How would you like to distribute the 10 Euros?

Myself ____

Cruz Vermelha Portuguesa ____

Please tell us how difficult was to answer the last question?

○ Very easy

○ Easy

○ Moderated

○ Difficult

○ Very difficult

How sure are you that the answer you gave in the penultimate question was precisely the one you would have done?

○ Very unconfident

○ Unconfident

○ Reasonable confidant

○ Confident

○ Very confident

Sex

○ Male

○ Female

Age

____

In what college are you currently registered? (N/A if it is not the case)

○ ISCTE-IUL

○ Another

○ N/A

What academic degree are you currently enrolled?

○ Bachelor

○ MBA

○ Master's course

○ PhD

What course it is?

____

Nationality

○ Portuguese

○ Other

From the following four sentences choose the one that best fits your financial well-being.

"With the current income available to me..."

○ "… I live with many difficulties."

○ "… I live with some difficulties."

○ "… I live reasonably well."

○ "… I live comfortably."

Do you usually vote?

○ I haven't had a chance to vote yet.

○ I never vote

○ I rarely vote

○ I vote often

○ Whenever there are elections I vote

In political terms people usually talk about "left" and "right". How do you position yourself within this scale.

○	○	○	○	○	○	○	○	○	○
1	2	3	4	5	6	7	8	9	10

How often do you donate goods or money to charities?

○ I have never donated before

○ Rarely

○ Regularly

○ Whenever I can

How do you classify yourself in relation to religion?

○ Agnostic

○ Atheistic

○ Buddhist

○ Catholic

○ Hindu

○ Jewish

○ Muslim

○ Orthodox

○ Protestant

○ Another religion

○ No response

Do you consider yourself to be a religious person?

| Lower | ○ | ○ | ○ | ○ | ○ | ○ | ○ | Higher |
| religiosity | 1 | 2 | 3 | 4 | 5 | 6 | 7 | religiosity |

Appendix D.2: Questionnaire (6C, English Version)

Please complete the following questionnaire, which should take an average of about 5 minutes to complete. The questionnaire is part of a study on behavioural economics for the PhD in economics at ISCTE - University Institute of Lisbon. Answer by the order of presentation of the questions and without consulting other individuals. By completing the questionnaire, you consent that the answers you gave will be treated in statistical terms anonymously and confidentially. Thank you for your cooperation.

Imagine yourself in a situation in which for some students at your university are given 10 Euros - this would be your case. Of those 10 Euros you could keep the whole, give a part or even everything to a set of six charities. You can distribute the 10 Euros between you and the six charities as you wish, you can share the money with only one, with more than one, with none, etc.

How would you like to distribute the 10 Euros?

Myself	____
Associação Portuguesa dos Bombeiros Voluntários	____
Banco Alimentar Conta a Fome	____
Cruz Vermelha Portuguesa	____
Liga Portuguesa Contra o Cancro	____
União Zoófila – Defender, proteger e tratar animais domésticos em risco	____
UNICEF – Fundo das Nações Unidas para a Infância	____

On the previous question do you consider that the number of charities available for donation was...

○ Very short

○ Short

○ Enough

○ Excessive

○ Very excessive

Please tell us how difficult was to answer the last question?

○ Very easy

○ Easy

○ Moderated

○ Difficult

○ Very difficult

How sure are you that the answer you gave in the penultimate question was precisely the one you would have done?

○ Very unconfident

○ Unconfident

○ Reasonably confident

○ Confident

○ Very confident

Appendix D.3: Questionnaire (24C, English Version)

Please complete the following questionnaire, which should take an average of about 5 minutes to complete. The questionnaire is part of a study on behavioural economics for the PhD in economics at ISCTE - University Institute of Lisbon. Answer by the order of presentation of the questions and without consulting other individuals. By completing the questionnaire, you consent that the answers you gave will be treated in statistical terms anonymously and confidentially. Thank you for your cooperation.

Imagine yourself in a situation in which for some students at your university are given 10 Euros - this would be your case. Of those 10 Euros you could keep the whole, give a part or even everything to a set of twenty-four charities. You can distribute the 10 Euros between you and the six charities as you wish, you can share the money with only one, with more than one, with none, etc. How would you like to distribute the 10 Euros?

Myself ____

Abraço – Associação de apoio a pessoas com VIH/SIDA ____

Acreditar – Associação de Pais e Amigos das Crianças com Cancro ____

Aldeias de Crianças SOS – Apoio a crianças sem cuidados parentais ____

AMI – Assistência Médica Internacional ____

Amnistia Internacional Portugal – Em defesa dos direitos humanos ____

Associação Ajuda de Berço – Assistência a bebés e crianças desprotegidas ____

Associação Ajuda de Mãe – Promover o bem-estar físico, emocional e social das grávidas e mães ____

Associação Nacional dos Cuidadores Informais ____

Banco Alimentar Contra a Fome ____

Cáritas Portuguesa ____

Cruz Vermelha Portuguesa ____

GAIA – Grupo de Acção e Intervenção Ambiental ____

ILGA – Intervenção Lésbica, Gay, Bissexual, Trans e Intersexo ____

Liga Portuguesa Contra o Cancro ____

Make-a-Wish Portugal – Realização de desejos a crianças/jovens que sofrem de doenças graves ____

Médicos do Mundo ____

Operação Nariz Vermelho – Associação de Apoio à Criança ____

PAR – Plataforma de Apoio aos Refugiados ____

QUERCUS – Associação Nacional de Conservação da Natureza ____

Raríssimas – Associação Nacional de Conservação da Natureza ____

SOS Animal – Grupo de Socorro Animal de Portugal ____

União Zoófila – Defender, proteger e tratar animais domésticos em risco ____

On the previous question do you consider that the number of charities available for donation was...

○ Very short

○ Short

○ Enough

○ Excessive

○ Very excessive

Please tell how difficult was to answer the last question?

○ Very easy

○ Easy

○ Moderated

○ Difficult

○ Very difficult

How sure are you that the answer you gave in the penultimate question was precisely the one you would have done?

○ Very unconfident

○ Unconfident

○ Reasonable confidant

○ Confident

○ Very confident

Appendix D.4: Probit model (marginal effects)

A probit model that captures the probability of donating estimated by maximum likelihood (ML) with robust standard errors.

Variable	1a	1b	1c
6C	0.060	0.052	0.060
	(0.051)	(0.049)	(0.045)
24C	0.034	0.000	0.008
	(0.048)	(0.047)	(0.043)
Difficulty	-	0.060	0.066
		(0.027)	(0.027)
Certainty	-	-0.022	-0.011
		(0.025)	(0.022)
Female	-	-	0.057
			(0.036)
Age	-	-	0.003
			(0.004)
Left	-	-	-0.022
			(0.034)
Financial_comfort	-	-	0.019
			(0.071)
Donated_before	-	-	0.089
			(0.040)
N	177	177	177
Prob > chi2	0.467	0.012	0.002
Pseudo R2	0.016	0.128	0.219

Notes: The symbols ***, **, * denote that the coefficient is statistically different from zero at 1%, 5% and 10% levels of statistical significance respectively: p values between parentheses.