The Effects of Religious Beliefs and Political Ideology under different Environments on Cooperation in the Public Good Game.
The Effect of framing on self-reported Political Ideology

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The views stated in this thesis are those of the author and not necessarily those of the supervisor, second assessor, Erasmus School of Economics or Erasmus University Rotterdam

Author: Lenoir, William
547821 | ERASMUS UNIVERSITEIT ROTTERDAM | ERASMUS SCHOOL OF ECONOMICS
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Supervisor: Hainguerlot, Marine
Second reader: Van Hulsen, Merel

Abstract

Cooperation always improved human lives as it facilitates the achievement of complex projects or the raising of a child. It is a component of every religion and part of the political debate, regarding the redistribution of wealth and public spending. Yet, literature is contradictory regarding the effects of political ideologies and religiousness of individuals on cooperation. However, a vast body of academics agree that to the framing of situation or contexts, can affect cooperation. Thus, this experimental research intended to discover whether the framing of a one-shot public good game could mediate the effects of political ideologies and religiousness on contribution. 146 participants were randomly assigned to a scarce or abundant setting. The main hypothesis was that left-wing and religious individuals would contribute more than right-wing and non-religious individuals in the game with the abundant frame, but not in the game with the scarce frame. The result did not find that religious individuals contribute more than non-religious ones in neither of the settings. Interestingly, religious intendance is negatively correlated with contribution among religious individuals in the abundant environment. Furthermore, belonging towards the left of the political ideology scale is positively correlated with contribution in the scarce environment only, whereas it was expected to occur in the abundant setting. Surprisingly, the framing of the hypothetical environment in which participants had to perform the game appears to have affected their self-reported political ideologies, as the distribution of political ideologies is significantly shifted towards the right in the scarce setting, compared to the abundant setting.

Table of Contents

Introduction

Cooperation is an omnipresent phenomenon in nature, human cooperation transcends that of other species concerning the variety of cooperative activities (Melis and Semmann, 2010). If cooperation enabled us to build bridges, skyscrapers and send rockets in space, cooperation also creates economic benefits. On the international level, overfishing in the international waters has reduced biodiversity and led to a scarification of fishes resulting in the unprofitability of the sector. In 2014, global high sea fishing profits amounted 1.4 billion US Dollars, with total subsidies of 4.2 billion US dollars (Gibbens, 2018). Protecting key areas could increase biodiversity and more fishes would be available in fishing areas, making the sector more profitable. The UN goal 14.4 commits to protect at least 10 percent of coastal and marine areas by 2020 (United Nations, 2020). The European Commission website has an extensive list of companies from the same industries, which have been fined for forming cartels and cooperating on increasing their prices jointly instead of competing with each other, which increased their profit at the expense of the consumers. However, consumers can also reduce the price or increase the quality of the products they buy through cooperation by getting involved into group purchases or consumer cooperatives.

Given the importance of cooperation, academics have focused on the determinants that might enhance it on the individual level as well as on the environment level. On the individual level, it was implied in previous literature and qualitive research that religious tend to exhibit more trust, cooperation and pro-social behavior (Mcbride and Richardson, 2012; Warner, Kilinc, Hale and Cohen, 2011; Lenfesty and Morgan, 2019). The basic values of compassion, solidarity and respect for one another are common to all religions (United Nations, 2006). Thus, religious individuals following such values should exhibit cooperation. Left-wing and liberal ideologies promote equality and social changes, while right-wing and conservatism promote hierarchy and conventionalism (Claessens, Fischer, Chaudhuri, Sibley and Atkinson, 2020). Individuals voting for more equalitarian policies, which come with higher taxes and redistribution of their own income, is a sign of higher cooperation than voting for policies associated with less taxes and government spending. Hence, one could expect left-wing individuals to exhibit more cooperation

in economic games. Interestingly, a growing body of research is finding contradictory results about whether religion or political ideology have significant effects on contribution (Anderson, Mellor and Milyo, 2004, 2010; Grünhage and Reuter, 2020; Brañas-Garza, Espín and Neuman, 2014). These researchers have not conducted qualitative researches but experiments and quantitative researches using public good games, dictator games and trust games as proxy for cooperation. If there is no clear consensus for whether these individual-level characteristics influences cooperation, the fact that different environments have different impacts on cooperation has not been contradicted. The variety of cultures, traditions and social norms show that people adapt and learn from their environment. The human does not only adapt to its external environment such as the climate, but also to his social and contextual environment. The Milgram experiment revealed how humans could undertake extremely unethical actions under a specific environment, alone with a figure of authority (Milgram, 1963). Rather interestingly, researchers often found significant differences in contributions by framing the environment in which their participants have to play differently or by adding different rules to the game (Bernold, Gsottbauer, Ackermann and Murphy, 2014; Prediger, Vollan and Herrmann, 2014). By making participants play a one-shot public good game either in an environment framed as scarce or framed as abundant, this paper intends to assert whether individual-level characteristics such as being religious or belonging to a certain political ideology would have an effect on cooperation only in one environment. The hypothesis of this research is that playing in the environment framed as abundant, compared to playing in the environment framed as scarce, mediates the individual-levels characteristics effects of religion and political ideology on contribution.

Firstly, this research paper reviews the literature on cooperation. Second, the research proposal and the hypothesis will be stated. Third, the game as well as the survey that were adopted are described and will be followed by the methodology that will be used to analyze the results of the survey. Then, the results will be explained before the discussion part, which compares the results to the literature and the hypothesis. After, the implication and relevance of the research will be discussed. Finally, the limitations of the experiment and extrapolation will close this thesis.

Literature Review

The literature review first exposes the debate and contradictory findings on the effects of religiousness and political ideologies on cooperation. Then, the effects of the different environments in which individuals have grown, as well as the effects of different situations and framings individuals face on cooperation are reviewed.

The effect of religiousness on cooperation

"Jesus took bread, and blessed it, and brake it, and gave it to the disciples, and said, Take, eat; this is my body." (King James Bible, 1769/2017, Matthew 26:26). This verse highlights the notion of sharing that is omnipresent in the Bible. The basic values of compassion, solidarity and respect for one another are common to all religions (United Nations, 2006). Therefore, religious individuals following the teachings of their religion should exhibit solidarity and cooperation in a public good game.

Regarding whether religion might foster cooperation, Warner, Kilinc, Hale and Cohen (2011) argue that their sample composed of Christians and Muslims exhibit pro-social utility maximization and that mainstream religions play a role in producing public good as their institutions promote generosity. Yet, their sample was solely composed of Christians and Muslims, which does not enable comparisons to non-religious individuals. Brañas-Garza, Espín and Neuman (2014) gathered a substantial sample of 766 participants in Spain in order to make them play the dictator game, the ultimatum game and a trust game with performance-based monetary incentives. The dictator game consists of only one round in which participants have to decide what portion of the pie they will attribute to themselves and to their partner, the ultimatum game is a two round version of the dictator game giving the choice to the second mover to accept the deal or to reject it, in which case both players receive nothing. In the trust game, the first mover has to give the whole pot or nothing. The second mover would receive four times the amount of the pot and decide whether to give back close to half of it or to keep it all. They found that non-religious individuals made decisions closer to the selfish best response in the dictator game and the ultimatum game, compared to religious individuals, but not in the trust game (Brañas-Garza et al., 2014). Among

Catholics, religious intensity measured as church participation was positively correlated to an altruist behavior (Brañas-Garza et al., 2014). Xu, Liu, and Liang (2018) found in their lab experiment that Christians exhibited a higher rate of trust and a lower rate of deception than non-Christians, especially for the strong believers. Nonetheless, when also making their 144 subjects play the public good game and the trust game for money, Anderson, Mellor and Milyo (2010) did not find a correlation between religious affiliation and contribution. Their results join the finding of Brañas-Garza et al. (2014) regarding the correlation between religious attendance and contribution in the public good game among their religious participants (Anderson et al., 2010). However, the individuals in the highest of the three religious attendance categories contributed significantly less as first mover in the bilateral trust game (Anderson et al., 2010).

The effect political ideology on cooperation

Extensive literature discerns the differences and similarities of the left-wing and right-wing political ideologies (Bobbio, 1996; McClosky and Chong, 1985). The distinction between the left and the right first emerged in politics during the French revolution in 1789 (Bienfait and van Beek, 2014). Liberalism, on the left, promotes equality, social change and system reform, while conservatism on the right, defends hierarchy, conventionalism and tradition (Claessens et al., 2020). One could therefore expect someone voting for left-wing policies associated with higher taxes and wealth redistribution to exhibit more cooperation than a right-wing voter. Interestingly, the following literature comparing left-wing and right-wing individuals regarding their levels of cooperation and trust in economic games is rather conflicting.

Balliet, Tybur, Wu, Antonellis and Lange (2016) found that Democrats were more concerned about the outcome of their partners than their Republicans counterparts in the public good game, but this was only significant for the sample tested after the 2012 US elections and not in the sample tested before the elections. Their samples respectively contain 362 and 366 participants which received a show up fee. However, their experience did not include performance-based monetary incentives. Hence, this does not satisfy the second sufficient condition of Smith (1982) for a microeconomics experiment, salience. Salience guarantees participants a performance-based reward (Smith, 1982). While the experiment of Anderson, Mellor and Milyo (2004) that satisfies

salience found that neither political affiliation nor political ideology of their participants had a significant effect on contribution in the public good game. Yet, they have claimed to have some evidence that Liberals were more trusting and trustworthy in the bilateral trust game (Anderson et al., 2004).

In-group favoritism, out-group derogation

Religions bring forward values such as respect, peace and cooperation. However, McBride and Richardson (2012) observe the duality of religion. While sadly, they have been the root of several violent and non-violent conflicts, religions also brought peace and cooperation within religious communities (McBride & Richardson, 2012). Researchers have discovered similar patterns at the individual level, Johnson, Rowatt and laBouff (2012) gathered measures of religiosity, spirituality, attitudes towards in-group values such as Christianity and heterosexuality and out-group values corresponding to other religions, atheism and homosexuality from their 144 participants. Their results have shown significant in-group favoritism and out-group derogation (Johnson et al., 2012). The same applies for political ideology, as Balliet et al. (2016), which were investigating differences in cooperation among Democrats and Republicans, also found more in-group cooperation relative to the out-group among both Republicans and Democrats.

Environment level effects on cooperation

The studies on the effect of religion and political ideology on cooperation above is conflicting. However, it has been observed that individuals with the same religion but coming from a different background can treat others differently. Johnson et al. (2012) examined in-group favoritism towards members of the same religion and out-group derogation. Investigating whether this effect could be weakened if people already had multicultural experience, Tadmor, Hong, Chao, Wiruchnipawan and Wang (2012) conducted six studies using from 69 to 89 participants. They discovered that exposure to multicultural experiences led to a reduction in stereotype endorsement, symbolic racism and discriminatory hiring decisions. They argue that the benefits of

multiculturalism arise regardless of the targeted group, such as homosexual or African American (Tadmor et al., 2012). Nonetheless, not only the environment individuals grew in can affect their behavior, but also the environment they are currently in. The theory of framing of Tversky and Kahneman (1981) highlights this phenomenon. When asked about choosing between one certain and an uncertain treatment to a coming disease, individuals prefer the uncertain treatment when expressed in terms of deaths and the certain treatment when expressed in terms of lives saved (Tversky and Kahneman, 1981). This is derived from the economic theory that individuals are risk seeking for losses and risk averse for gains.

Framing has shown its effect on cooperation in the experiment of Bernold et al. (2014), which framed the public good game as “Community Game”, “ Wall Street Game”, “Environment Game" and “Game” and observed significant effects of the framing of the name of the game on the aggregate cooperation and on the weight of preference and beliefs on cooperation. Their sample included 178 participants that were incentivized via performance-based monetary reward. Religious priming, using words connected to religious concepts, has also shown positive effects on prosocial behaviors (Ahmed and Hammarstedt, 2011; Shariff, Willard, Andersen, and Norenzayan, 2016). By priming religious words in their treatment group before completing the dictator game and the public good game, Ahmed and Hammarstedt (2011) discovered a significant increase of contribution in both games in their treatment group, regardless of whether individuals were religious or not. However, Shariff et al. (2016) reviewed results across 93 studies and 11653 participants and observed multiple effects of religious priming on prosocial behavior, but they claimed that religious priming does not reliably affect non-religious individuals. Thus, framing is able to increment prosocial behavior of individuals depending on their religious beliefs. Kim, Putterman and Zhang (2019) found a significant effect of perceived trustworthiness of the description of the session on the contribution of 120 subjects incentivized with performance-based monetary rewards, with higher perceived levels of trustworthiness leading to higher contributions in the trust game. By conducting one-shot public good games with performance-based monetary incentives on their 132 participants, Kocher, Martinsson, Matzat and Wollbrant (2015) discovered a significant correlation between beliefs about others and trust about others on their contributions, this clarifies why environments perceived as more trustworthy exhibit a higher aggregate cooperation.

Scarcity is also known to impact decision-making. Huijsmans, Ma, Rettore, Civae, Stallen and Sanfey (2019) induced scarcity or abundance mindset through consumer tasks and found that scarcity affected goal-oriented decision-making in unrelated consumer tasks as well as stress levels. Construal levels refer to the psychological distance of an object or a situation in the mind of an individual (Trope and Liberman, 2010). The further an object is from direct and concrete experience, the more abstract it is in the mind of an individual, the higher the level of construct of that object (Trope and Liberman, 2010). The research conducted by Wang, You and Yang (2018) discovered that individuals with low childhood socioeconomic status process information to a lower construal level. Maldonado and Moreno Sánchez (2009) ran an experiment by performing economic games with 230 local fishermen, who were incentivized via performance based monetary reward. Their results showed that when facing scarcity of a given resource, their subjects over-extracted the given resource, which led to lower profits, whereas their subjects deviated from the individualistic behavior when facing abundance (Maldonado and Moreno Sánchez, 2009). Prediger, Vollan and Herrmann (2014) also linked resource scarcity to antisocial behavior by conducting a joy-of-destruction game among farmers coming from either a constantly scarce area or an abundant one. In the face of the Covid-19 pandemic, supermarkets worldwide have been emptied by individuals hoarding supply as they were fearing future scarcity. Such patterns can find explanations in the work of Gino, Mickeal and Roberto (2016), who go further and argue that individuals process the information that is given to them in such a way that they can act egoistically while feeling moral.

Research Question

The aim of this research is to find out whether the framing of the hypothetical environment of a public-good game mediates the effects of political ideologies and religiousness on cooperation. The main hypothesis of this thesis research is that political ideologies and religiousness of the individuals that were exposed to the abundant environment frame, compared to the scarce frame, significantly affect contribution. However, religiousness and political ideologies are not expected to influence contribution when individuals played in the scarce setting.

Hypothesis: religion and political ideologies have an effect on cooperation in the abundant environment but not in the scarce environment.

Individuals should perceive the scarce environment as not trustful, framing has shown its effect on cooperation with the experiment of Bernold et al. (2014), which framed the public good game as "Community Game", " Wall Street Game", "Enviroment Game" and "Game" and found significant effects of the framing of the name of the game on the aggregate cooperation and on the weight of preference and beliefs on cooperation. The experiment of Maldonado and Moreno Sánchez (2009) demonstrated that, when facing scarcity of a given resource, their subjects over-extracted the given resource, which led to lower profits. Thus, higher aggregate contribution is expected in the abundant setting, compared to the scarce environment. The study of Gino, Mickeal and Roberto (2016) suggests that individuals adapt to the situation and process the information in their own advantage. Thus, the results of Anderson, Mellor and Milyo (2004, 2010), who found that neither political ideology nor religiousness affects contributions are more likely to apply in the scarce environment. Furthermore, the goal of framing the settings as scarce versus abundant is to create a scarcity mindset such as in Huijsmans et al. (2019) versus an abundant mindset in order to influence the construal level of the game in the mind of participants. The implication of this experiment is that it will be easier for religious and left-wing individuals facing the scarce environment to process information regarding to which extend a selfish action can be justified, compared to religious and left-wing individuals of the abundant setting.

Methods

Public good game

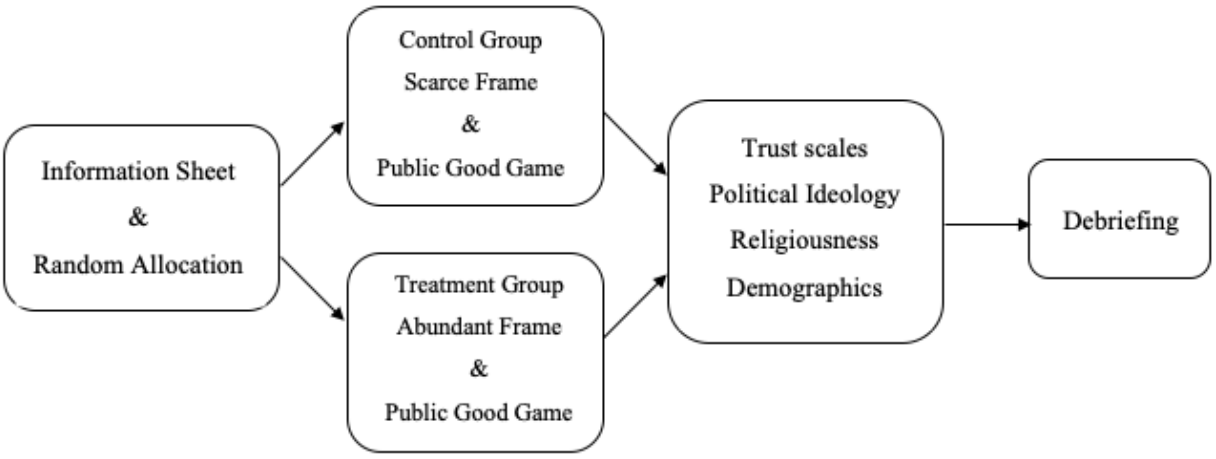
In order to conduct an investigation on cooperation, the public good game appears to be the most adequate. The literature above makes extended use of it. The game represents a trade-off between individual profit and group profit. This economic game can relate to real-life dilemmas, from taking care of a community garden to emitting pollution. In a repeated public good game, the dominant strategy is to free ride, but cooperating may increase the total outcome of an individual,

if other players do so too. In a one-shot public game, the dominant strategy is to free ride regardless of how the other participants are going to play. Although free riding is what rational individuals are expected to do, most experiments find a significant part of their participants contributing to the public good, which led to the theory of fairness and altruism of Fehr and Schmidt (2006)

Experimental design

This research has been conducted through an online experiment. In order to determine whether the framing of a hypothetical environment has mediating effects on cooperation through political ideologies or religiousness, participants must play in two different environments, one framed as scarce and one framed as abundant. Therefore, the experiment design consists of a between-subjects experiment where participants are elicited to the control or treatment group via the randomized control treatment tool of Qualtrics. The diagram on table 1 depicts the design of the experiment. Between-subjects experiments refer to experiments in which participants are only exposed to one condition. This design has been chosen over a within-subject experiment for the reason that subjects ignore the existence of the opposite environment.

Table 1. Experimental Design



The main dependent variable is contribution. Trust will be reviewed as both a dependent and an explanatory variable. The main explanatory variables are political ideologies, religious, religiosity, attendance frequency, "prayers frequency" in both environments and the binary variable abundant. Finally, the control variables are age, gender, origin, education, income.

The subjects have been randomly elicited in the control or treatment group via the randomized control treatment tool of Qualtrics. A randomization check is performed in the material section in order to be sure that no selection bias would influence the results.

Procedure

The detailed information sheet, experimental procedure and debriefing are placed in the appendix.

Participants were contacted through social media. The information sheet thanks them for participating, explains that one of them will be randomly drawn to win up to ten euros given his outcome in the public good game and assures that their data will remain confidential.

As for the experimental procedure, the difference between the control and the treatment group lies in the description of the environment the subjects hypothetically have to play in. Participants from Environment 1 are being told that they are at their place in twenty years from now and that their environment has become drought, resources are extremely scarce and future harvests are uncertain. Participants in the treatment group from Environment 2 are also being told that they are at their place twenty years in the future, but their environment is fertile, resources are abundant and future harvests will be good. In the first block, the environment is described and participants have to determine their contribution in a one-shot public good game. They are given a budget of twenty tokens, consequently what they give in the common pot will be doubled, then divided among the six neighbors. Thus, the outcome function of participant I is as follows:

$$\pi i(a1,\ldots,a6) = 20 - ai + (1/6) \cdot 2 \cdot (a1 + a2 + a3+a4+a5+ai)$$

Where πi stands for the outcome of participant i, ai for his contribution and a1 to a5 consist of the contributions of the other neighbors. The outcome function has been explained in a simpler fashion using "outcome" for πi, "tokens kept" for 20 - ai and "tokens in the common pot" for (a1 + … + ai).

Given the theory of framing, the lexical field of Environment 1 contains words such as scarce, rare and uncertain and the semantic of Environment 2 contains abundant, fertile and good. Framing has been proven effective in previous studies (Bernold et al., 2014). Nonetheless, it must be regarded with due diligence, if individuals sub-consciously associate scarcity with a foreign country or another culture and the abundant environment with a better version of their environment, group belonging duality addressed in the literature review might affect the results as participants could imagine being in a foreign third world country, in which they would constitute outsiders. Therefore, participants are asked to imagine that they are at their place, but in twenty years from now. The rules of the one-shot public good game do not differ in their framing. In the second block, participants will be asked to choose on a scale from zero to ten how much they trust their given environment, in order to assert whether framing had the intended effect. The third part aims to capture the religiousness and political ideologies of the subjects. The participants assessed their political ideology on a 11-points left-right scale proposed by Kroh (2007). As suggested by Biliet (2001), the subjects are asked whether they follow a religion and which one, to which intensity, the frequency at which they attend religious services apart from special events and how frequently they pray. Finally, the fourth part gathers their demographics.

Participant recruitment & incentive

The experiment has been sent to the participants through social media in both French and English. The participants were randomly assigned to the scarce or the abundant environment via the randomized control trial of Qualtrics. Teams of six subjects from the same environment were randomly drawn and one participant was randomly chosen to receive a monetary reward up to ten euros, depending on his outcome in the one-shot public game.

Sample

The subjects of the experiment were contacted through social media. The participants belong to the social network of the researcher, they were friends from high school in Belgium, internationals who studied in Maastricht and Rotterdam, some of their parents and colleagues from the parents of the researcher. Only participants above eighteen were eligible for this research, no other factor determined eligibility.

The frequency table is displayed in table 2, while table 3 illustrates the descriptive statistics for each of the environments. 196 people answered the survey. However, the dataset contains 146 participants due to some incomplete answers. 89 men and 57 women completed it with a mean age of 28,6, a standard deviation of 12,63 and ranging from 18 to 63 years old. Regarding the origin of the participants, 125 have European roots, 13 descent from Africa, 5 from Asia and 3 participants are either European/African or European/Asian. 44 participants are religious, this includes 26 Catholics.

Table 2. Frequencies

Origin	Freq (Percent)	Income	Freq (Percent)	Education	Freq (Percent)	Religion	Freq (Percent)	Political	Freq (Percent)
Europe	125 (85.62)	$30K>	44 (30.14)	High-School	25 (17.12)	Catholicism	26 (59.09)	Far-Left	10 (6.85)
Africa	13 (8.9)	$30K-$50K	35 (23.97)	Bachelor	77 (52.74)	Islam	2 (4.55)	Left	45 (30.82)
Asia	5 (3.42)	$50K-$100K	47 (32.19)	Master	43 (29.45)	Judaism	2 (4.55)	Center	27 (18.49)
Mix	3 (2.05)	$100K<	20 (13.7)	PhD	1 (0.68)	Protestantism	3 (6.82)	Right	61 (41.78)
						Orthodox	1 (2.27)	Far-Right	3 (2.05)
						Buddhism	3 (6.82)		
						Hinduism	1 (2.27)		
						Other	6 (13.64)		
Total	146 (100)	Total	146 (100)	Total	146 (100)	Total	44 (100)	Total	146 (100)

Materials

Dependent variable

The dependent variable is the contribution in the one-shot public good game ranging from zero to twenty tokens. In the scarce environment, contributions average 9.74 tokens and standard deviation is 5.85, while contributions from the abundant environment averages 10.6 with a standard deviation of 6.34. Contributions range from 0 to 20 in both environments.

Main explanatory variables

The main explanatory variables are the binary variable "religious" and the categorical variable "political ideology". Both variables are examined in the scarce and the abundant environment.
In addition, the effect of religious intensity, attendance and frequencies of praying are also assessed. Political ideology is measured on a 11-points left-right scale as used in the European Social Survey. Kroh (2007) compared the predictions of 101, 11 and 11- points left-right scales to a German ballot and found that the 11-points left-right scale gave the data of highest quality. In order to compare political ideologies, the variable "politicalid" has been transformed into the variable "political", which groups the eleven points in five categories from 0 to 4. The first category groups the far-left view with the people choosing between -5 and -4. The second category groups the participants with a left view from -3 to -1 and the third category groups the people, who locate their political ideology at the center. The fourth and the fifth categories are the opposite of the first and second ones and group the right view and the far-right view. Interestingly, the location of the average political ideology category in the scarce environment depicted on table 3 is 2.29. Whereas its counterpart from the abundant environment is at -0,513. A randomization test will be performed to determine whether political ideologies significantly differ in both environments. The fact that participants were randomly drawn in one or the other environment should solve for selection bias (Stoop, 2020). Therefore, a significant difference of political ideology between both environments would not enable to compare the effect of political ideology on contribution between the scarce and the abundant environment in a single test. Furthermore, it would put into question the validity of the self-reported political ideology on a left-right scale, one of the two main

explanatory variables of this experiment, as its location might be influenced by the framing of the environment.

The second main explanatory variable, "Religious" is a binary variable and religion is a categorical variable. 44 participants are religious, of which 26 are Catholics and 34 are monotheists. No other denomination than Catholics represent more than seven percent of the religious sample. Religious intensity is captured by the variable "Religiosity" scaling from zero to ten. The dataset only contains moderate religious individuals as "religiosity" ranges from zero to seven with a mean of 4.43 and a standard deviation of 2.23. The frequency of prayers and attendance are the same categorical variables as in Billiet (2001) and range from 0 to 7. Frequency of attendance averages 1.38 per religious individual with a standard deviation of 1.45 and a range between 0 and 5. Regarding prayers frequencies, the average is 2.34 per religious participant, the standard deviation is 2.25 and it. Ranges between 0 and 6.

Table 3. Summary Statistics

VARIABLES	(1) N	(2) Mean	(3) SD	(4) Min	(5) Max
Contribution	146	10.18	6.096	0	20
Contribution Scarce	71	9.746	6.349	0	20
Contribution Abundant	75	10.60	5.859	0	20
Contribution Rel.	44	10.36	5.882	0	20
Contribution Non-Rel.	102	10.10	6.212	0	20
Trust Environment	146	5.781	2.377	0	10
Trust Env. Scarce	71	5.014	2.339	0	10
Trust Env. Abundant	75	6.507	2.189	0	10
Trust Participants	146	5.308	2.515	0	10
Trust Part. Scarce	71	4.746	2.523	0	10
Trust Part. Abundant	75	5.840	2.405	0	10
Political Scale	146	0.0274	2.094	-5	5
Political Category	146	2.014	1.044	0	4
Political Cat. Scarce	71	2.296	0.977	0	4
Political Cat. Abundant	75	1.747	1.041	0	3
Religious	146	0.301	0.460	0	1
Religiosity	44	4.432	2.235	0	7
Prayers Freq.	44	2.340	2.251	0	6
Attendance Freq.	44	1.386	1.450	0	5
gender	146	0.390	0.490	0	1
age	146	28.65	12.64	18	63

Explanatory variables

The variables trust in the environment and trust in the other participants range from 0 to 10 and serve to determine whether the framing of the environments affected the trust of the participants in their hypothetical environment and in the other participants. In the scarce environment, the average location of trust in the environment and trust in the other participants are respectively at 5,04 and 4,74, their standard deviations are 2.33 and 2.52 and they both range from 0 to 10. Concerning the abundant environment, the average trust in the environment and in the other participants are respectively 6,5 and 5,84 with standard deviations of 2.19 and 2.4. They also both range from 0 to ten.

Regarding income, 30 percent live in a household earning less than €30K per year, 23 percent live in a household earning between €30K and €50K, 32 percent are in the category making between €50K and €100K. The participants from households making more than €100K per year consist of 13.7 percent of the dataset.

Analysis

First, the randomization check asserts that the participants characteristics were randomly divided among both environments. Second, the effect of the framing of the environments will be assessed by comparing the variables "Trust in the environment" and "Trust in others" from the scarce environment to their counterparts in the abundant environment under Model 2. Third, Model 3 analyzes the effect of the framing of the environments on the contributions of the respective environments. Then, the effects that political ideologies have on contribution in both settings will be compared in Models 4a and 4b, while the effects of religiousness and its attributes on contribution are compared in Model 5, 6, 7a and 7b. Finally, the determinants of contribution will be estimated in both environments in Model 9a and 9b.

Randomization check – Model 1a & 1b

The participants have been drafted in one or the other environment through the randomized control treatment tool of Qualtrics in order to avoid selection bias. Selection bias occurs when covariates, the characteristics of the participants in an experiment, are not evenly balanced between the control and the treatment group. Unbalanced participants characteristics between the control and the treatment group invalidates the results of the treatment as the reported effect might have been influenced by cofounding variables. Hence, tests must determine whether the participants were randomly distributed regarding their characteristics affecting the variable of interest. Therefore, the test must investigate the explanatory variables that should not be affected by framing in both environments. These variables are age, income, political ideology, origin, religiousness, religiosity and the frequencies of religious attendance and prayers.

As these variables must be compared in the scarce and the abundant environment, a two-sample test must be performed. Parametric tests require independence, normality, equal variance and interval measurements (Stoop, 2020). Parametric tests are particularly precise on large samples with interval data. Due to the limited size of this sample and the presence of nominal data such as origin, gender and religion and ordinal data such as political ideologies, household income, education, religiosity, prayers frequency and attendance frequency, a non-parametric test must be performed. Non-parametric tests also have a feature that make them more relevant to conduct randomization check, they detect whether two samples come from the same environment (Stoop, 2020). Contrary to parametric tests that compare a sample to a theorical benchmark, non-parametric tests compare the distribution of two samples to each other (Stoop, 2020). Given that origin, gender, religiousness and religion are a nominal binary and categorical variables, the Fisher exact test has been selected and is displayed along the Chi^2 Pearson test (Stoop, 2020). The null and alternative hypothesis of the Fisher exact test regarding origin are:

H_0: Origin is evenly distributed among the two environments

H_1: The distribution of origin differs across the two environments

The Mann-Whitney U test has been chosen to compare the distribution of the ordinal variables age, education, income, political ideology, religiosity, prayers frequency and attendance frequency

among the scarce and the abundant environments. The null and alternative hypothesizes of the Mann-Whitney U test are the following:

$$H_0: \mu_{Abundant} = \mu_{Scarce} \text{ and } H_1: \mu_{Abundant} \neq \mu_{Scarce}$$

Where μ is the mean rank of a variable in one environment.

Along with the Mann-Whitney U tests, permutation tests are conducted jointly. Such a test permutes participants into the control (scarce) and the treatment (abundant) groups randomly ten thousand times and run the same Mann-Whitney U test it is joined to. Then, it counts the amount of times that the absolute value of the z-scores of the randomly permuted Mann-Whitney U tests are larger or equal than the z-score of the original Mann-Whitney test in order to analyze the proportion of randomly permuted tests that are more significant than the original one. Significant results in the randomization check implies that the treatment and control groups were not randomly drawn from the same population. The null and alternative hypothesizes as well as the significance of the test are given by:

$$H0: X \sim (Abundant) = X \sim (Scarce) \text{ and } H1: X \sim (Abundant) \neq X \sim (Scarce)$$

$$p<0.05, p=C/n$$

Where $X \sim$ is the distribution of variable X, n is 10000, the amount of times the randomly permuted tests are ran, and where C is the amount of times a randomly permuted test yields an absolute z-score higher or equal than the original Mann-Whitney U test.

The effect of framing on trust – Model 2

Comparing variables from two distinct environments requires a two-sample test. Parametric tests require independence, normality, equal variance and variable being measured in interval scales (Stoop, 2020). The independence assumption is met when comparing trust from one environment to another as trust will not influence the environment. The variances of the variable screened on table 3 are similar in both environments and they are measured in interval scale. However, the

distribution of trust is following an almost normal distribution skewed at the beginning of the scale for “Trust in others” and the end for “Trust in the environment”. Thus, trust must be compared using a non-parametric test, which only requires independence and ordinal data (Stoop, 2020). The Mann-Whitney U test is used to determine, whether two independent samples come from the same population, is appropriate to compare trust between the scarce and the abundant environment as it compares two samples to each other and not to a theoretical benchmark (Stoop, 2020). The test will be used to compare “Trust in others” and “Trust in the environment” between the two environments. The null and alternative hypothesis of the Mann-Whitney U test are the following:

$$H_0: \mu_{Abundant} = \mu_{Scarce} \text{ and } H_1: \mu_{Abundant} \neq \mu_{Scarce}$$

Where μ is the mean rank of the variable of interest, trust, in one or the other environment.

The effect of framing on contributions – Model 3

In order to determine if framing affected contributions, a two-sample test must be used again. Due to the fact that contributions are skewed towards 0 and 20, which violates the normality assumption, a non-parametric test is best suited (Stoop, 2020). Therefore, the Mann-Whitney U test will be used as well. Its null and alternative hypotheses are the same as above, it is testing whether two samples come from the same population with regards to contributions.

$$H_0: \mu_{Abundant} = \mu_{Scarce} \text{ and } H_1: \mu_{Abundant} \neq \mu_{Scarce}$$

Comparing the effects of political ideologies under both environments - Model 4a & 4b

Models 4a and 4b test the main hypothesis of this experiment regarding whether framing mediates the effect of political ideologies on contribution. As political ideologies are separated in different nominal categories, a non-parametric test must be used (Stoop, 2020). Due to the left-right nature of the political ideology scale, the purpose of the Jonckheere-Terpstra test is to detect whether being located more and more towards the right end of the political scale affects contribution and

trust in each environment. The null and alternative hypotheses of the Jonckheere test are the following:

$$H_0: \theta_1 = \theta_2 = ... = \theta_k \ \& \ H_1: \theta_1 \leq \theta_2 \leq ... \leq \theta_k$$

Where θ_1 is the median of the variable of interest among the first group, such as contribution among far-left, whereas θ_k is the median of the variable of interest in the last group, contribution among far-righters in this case. The Jonckheere test is used to detect whether k samples come from the same population or if their distribution differs in an orderly manner. It is therefore appropriate to compare trust and contribution over the five categories of the political ideology variable in each environment, as the further on the right end of the scale an individual placed his political ideology, the less he is expected to contribute. Furthermore, the fact that these groups are relatively small and do not follow normal distributions requires non-parametric tests to be more precise. Therefore, the Jonckeere test is used four times. Model 4a contains two tests comparing the distribution of contributions of the different categories of political ideology in the scarce and in the abundant environment. Moreover, Model 4b consists of two tests comparing the distribution of trust in others among the political ideology categories in each environment.

Comparing the effects of religiousness on cooperation under both environments – Model 5, 6, 7a & 7b

Model 5 test the main hypothesis of this experiment regarding whether framing mediates the effect of religiousness on contribution. As religiousness is a binary variable, measuring the effects of being religious or non-religious on contribution and trust in others must be conducted via a two-sample test. The Mann-Whitney U test is selected again to analyze whether religious and non-religious participants come from the same population in terms of contribution and trust in others in each environment. The null and alternative hypothesis are the given by:

$$H_0: \mu_{Religious} = \mu_{Non\text{-}religious} \text{ and } H_1: \mu_{Religious} \neq \mu_{Non\text{-}religious}$$

In order to detect whether belonging to different religious denomination has an effect on contribution, a k-test must be performed. Due to the limited size of religious individuals in the dataset consisting of 44 participants and 22 in both environments, a non-parametric test will be used. The Kruskal-Wallis test is best suited as it tests whether k different samples come from the same population, in term of contribution in this case (Stoop, 2020). One Kruska-Wallis determines whether a religion yields a significant difference in contribution compared to the other religions in the scarce environment, while the other detects differences in the abundant environment. The null hypothesis is the following:

$$H_0: \theta_1 = \theta_2 = ... = \theta_k, H_1: \theta_i \neq \theta_j \text{ for some groups i and j}$$

Where θi is the median contribution of group i, Judaism for instance.

The manner in which religiosity, attendance frequency and prayers frequency influences contribution must also be assessed. Attendance frequency and prayers frequency are ordinal variables and the distribution of religiosity is highly skewed to the right. Thus, a non-parametric test must be performed. The Jonckheere test has been chosen again given the ordinal nature of its alternative hypothesis. It allows to test whether higher religiosity, higher attendance frequency and higher prayers frequency lead to higher contributions. The Jonckheere tests will analyze the effect of religiosity, attendance and prayers frequency on contribution in both environments and will thus be used eight times. The null and alternative hypothesis of the Jonckheere test are the following:

$$H_0: \theta_1 = \theta_2 = ... = \theta_k \ \& \ H_1: \theta_1 \leq \theta_2 \leq ... \leq \theta_k$$

Where θ_1 is the median of the interest variable in the first group, such as contribution in the category with the lowest level of attendance and θ_k is the median the variable of interest in the last category, contribution in the group yielding the highest attendance frequency for instance.

Trust on contribution – Model 8

In order to detect whether trust in other is correlated with contribution, such as in the experiment of Kocher et al. (2015), Model 6 contains two Jonckheere tests. One test is performed in the scarce environment, while the other one is conducted in the scarce setting. In both tests, contribution is the dependent variable in both tests and trust in other is the explanatory variable. Using a non-parametric test is convenient due to the sample size and the fact that trust and contributions are squeezed towards the extremities. Furthermore, the Jonckheere test allows to detect whether the dependent variable differs in an orderly manner along the categories of the independent variable. In this case, higher levels of trust are expected to lead to higher levels of contribution, such as in Kocher et al. (2015).

The determinants of contribution – Model 9a

The aim of this experiment is to analyze the effects of political ideology and religiousness, together with religion, religion intensity, attendance and prayers on cooperation in both environments. A single OLS regression was supposed to be performed using interaction terms between the abundant environment and the main explanatory variables. However, the analysis is divided into two distinct OLS regressions, as the randomization check displayed on table 5 found that the average location of political ideology is significantly different between the scarce and the abundant environments. This would raise independence concerns in a single OLS regression as the variable abundant and political ideology would be endogenous. The equation of the regression is given by:

$$Y_i = a + b_1 Pol_i + b_2 Religious_i + b_3 Religiosity_i + b_4 Pray_i + b_5 Attend_i + b_6 Edu_i + b_7 Inc_i + b_8 Origin_i + b_9 Gender_i + b_{10} Age_i$$

Where Y, the dependent variable, is contribution. Regarding independent variables, a is the constant, Pol_i is the political ideology category of individual i, Religious takes the value of one if i is religious, $Pray_i$ and $Attend_i$ are prayers and attendance frequency of i, Edu_i, Inc_i and $Origin_i$ are categorical variables for the education level, household income and origin of the participant i. Finally, $Gender_i$ takes the value of one if the participant is a female and Age_i corresponds to the

age of i. The hypothesis of the thesis being that belonging to a religious denomination or a left-wing political ideology only has a significant effect on contribution in the abundant environment, the hypothesis of the regression given by:

$$H_0: b_1=b_2=\ldots=b_{10}=0,\ H_1: \text{At least one b is non-zero}$$

In the scarce environment, none of the coefficients are expected to be significant. However, b_2 is expected to be positive and significant in the abundant environment for the reason that in the abundant environment, a religious participant, compared to a non-religious participant, is forecasted to contribute more in the public good game, ceteris paribus. While b_1 is expected to be negative and significant in the abundant environment, as someone belonging towards the right end of the political ideology scale compared to the left end of the scale is predicted to contribute less in the public good game, ceteris paribus.

Results

Randomization check

Model 1a containing the results of the Pearson Chi^2 test and the Fischer test are displayed on table 4, while Model 1b consisting of the Mann-Whitney U tests and their joint permutation tests are displayed on Table 5. On table 4, both the Chi2 test and the Fischer test failed to reject the null hypothesis that the distribution of origins from the participants are significantly different between the scarce and the abundant environment. The same applies for the distribution of gender, religiousness and of the different religion from the dataset. The fact that the Fischer and Chi^2 tests failed to reject the null hypothesis that participants from the opposite environments came from different population with regards to origin, gender, religiousness and religion, suggests that participants have been randomly drafted in both environments concerning these variables.

Table 4. Randomization check – Model 1a

	Pearson Chi² (χ^2) p = Prob > |z|	Fisher Exact $p = c/n$	Obs	
Origin	5.1649 0.160	0.143	146	Statistical Value p-value
Gender	1.5936 0.207	0.237	146	Statistical Value p-value
Religious	0.0473 0.828	0.858	146	Statistical Value p-value
Religion	7.4872 0.380	0.445	44	Statistical Value p-value
	***p<0.01, **p<0.05, *p<0.1			

On table 5, the first test failed to reject the null hypothesis that the distribution of age is the same in the scarce and in the abundant environments. Joint to the Mann-Whitney U test, the permutation test has a p-value of 0.8961, which means that out of the 10000 Mann-Whitney U tests performed by randomly permuting participants into the two environments, 8961 tests yield a z score higher or equal in absolute value than the z score of the original Mann-Whitney U test. This result further supports that participants were randomly drawn into the control and the treatment group. Concerning the second and third tests, both the Mann-Whitney U tests along with their permutation tests likewise failed to reject the null hypothesis that the distribution of neither education nor income is statistically different among both environments. Political ideology is the only variable that is significantly different between the scarce and the abundant environment. The Mann-Whitney U test and its paired permutation test rejected the null hypothesis at the one percent significance level. Thus, the distribution of political ideology is significantly different between the control and the treatment group, as it is shifted towards the right in the scarce environment compared to the abundant environment. With regards to the attributes of religiousness, the fifth, sixth and seventh Mann-Whitney U tests and their permutation tests additionally failed to reject the null hypothesis at the 10 percent significance level. Therefore, neither the distribution of

religiosity, nor of the frequencies of prayers and attendance to religious service are significantly different between the scarce and the abundant environment.

Table 5. Randomization check – Model 1b

	Mann-Whitney U Test (z) p = Prob > |z|	Permutation Test (T) $p = c/n$	Obs	
Age	-0.133 0.8943	-0.133 0.8961	146	Statistical Value p-value
Education	-0.555 0.5791	-0.555 0.5872	146	Statistical Value p-value
Income	0.116 0.9075	0.116 0.9178	146	Statistical Value p-value
Political	3.125 0.0018***	3.125 0.0021***	146	Statistical Value p-value
Religiosity	0.476 0.6342	0.476 0.6396	44	Statistical Value p-value
Attendance	1.101 0.2707	1.101 0.2778	44	Statistical Value p-value
Prayers	-0.743 0.4573	-0.743 0.4561	44	Statistical Value p-value
	***p<0.01, **p<0.05, *p<0.1 c = #{|T| >= |T(obs)|}, n=10000			

The effect of framing on trust

Model 2 is depicted on table 6, it contains two the Mann-Whitney U test analyzing the effect of the framing of the environment on trust in the environment and on trust in others. The first test rejected the null hypothesis that the samples from the scarce and the abundant environment come from the same population at the one percent significance level. The distribution of trust in the environment is significantly lower in the scarce than in the abundant environment, ceteris paribus. Hence, framing affected the trust of the participants in their environment as expected. The second

Mann-Whitney U test likewise rejected the null hypothesis that both samples were drawn from the same population at the one percent significance level. Participants located their trust in their co-participants higher in the abundant environment, compared to the scarce environment, ceteris paribus. Here, the framing of the environment affected the reported trust in the other participants. The fact that participants from the scarce environment not only exhibited less trust in the environment they had to play in, but also towards their co-participants as well, shows that framing had its intended effect on trust.

Table 6. Framing on trust – Model 2

	Mann-Whitney U Test (z) p = Prob > |z|	Obs	
Trust env.	-3.934 0.0001***	146	Statistical Value p-value
Trust part.	-2.71 0.0067***	146	Statistical Value p-value
	***p<0.01, **p<0.05, *p<0.1		

The effect of framing on contributions

If the framing of the environment affected trust in others and in the environment, this is however not the case for contributions. The Mann-Whitney U test from Model 3 depicted on table 7, failed to reject the null hypothesis that the scarce and the abundant sample come from the same population in terms of contribution at the ten percent significance level. Even tough average contributions are higher in the abundant environment, the difference is not significant.

Table 7. Framing on contributions – Model 3

	Mann-Whitney U Test (z) p = Prob > |z|	Obs	
Contribution	-1.017 0.309	146	Statistical Value p-value
	***p<0.01, **p<0.05, *p<0.1		

Comparing political ideologies and religiousness

Table 8 displays the four Jonckheere tests exploring the effects of political ideologies on contributions and trust in both the treatment and the control group. Political ideology is the independent variable, with its five categories "far-left", "left", "center", "right" and "far-right" that represent the proxy for the 11-points-left-right scale, while contribution and trust are the dependent variables.

The first test investigates whether belonging to a political ideology towards the right of the left-right scale affects contributions in an orderly manner in the scarce environment. With a p-value for the descending alternative of 0.0782, the test rejected the null hypothesis at the ten percent significance level. In the scarce abundant, the more a participant locates his or her political ideology towards the right, the more he or she is likely to have contributed less to the public good game than participants from the left of the scale. However, this result is not significant at the five percent significance level. The second test from the abundant environment consequently examines whether there is a trend in contribution depending on the location of the political ideology of the participants. Its descending and ascending alternative p-value respectively being 0.2038 and 0.7962, the test failed to reject the null hypothesis that contribution varies across the political ideology scale at the ten percent significance level. In spite of the hypothesis of this paper which expected to find a significant trend in the abundant environment, yet not in the scarce one, no trend has been detected in the abundant environment, while a descending trend in contribution has been spotted in the scarce environment along the left-right political scale.

The third and fourth Jonckheere tests explore the relationship between political ideology and trust in others in both the control and treatment group. In the scarce environment, the descending and ascending p values of 0.1045 and 0.8955 fail to reject the null hypothesis that an ascending or descending trend of trust exists along the political scale. Nonetheless, this hypothesis was rejected at the ten percent significance level in the abundant environment. The descending p-value of the last Jonckheere test of Model 4 of 0.0510 indicates a negative trend in trust in others along the political scale from left to right. The more an individual from the abundant environment reports a right-wing ideology, the less he is likely to trust other participants. Yet, this relationship is not significant at the five percent significance level.

Table 8. Political ideology under different environments – Model 4

	Jonckheere Test (J*) p = Prob (Z > J*) p = Prob (Z < J*)	Obs	
Contrib. Scarce	-1.417* 0.0782 0.9218	146	Statistical Value p-value descending alternative p-value ascending alternative
Contrib. Abundant	-0.828 0.2038 0.7962	146	Statistical Value p-value descending alternative p-value ascending alternative
Trust part. Scarce	-1.256 0.1045 0.8955	146	Statistical Value p-value descending alternative p-value ascending alternative
Trust part. Abundant	-1.635* 0.0510 0.9490	146	Statistical Value p-value descending alternative p-value ascending alternative
	***p<0.01, **p<0.05, *p<0.1		

Religiousness on cooperation under framing

The following tests examine the impact of framing on the effects of the attributes of religiousness on cooperation. The first attribute is religiousness, the second is the religious affiliation and the last are religiosity, religious attendance and prayers frequencies.

The Mann-Whitney U tests inspecting the effects of religiousness on contribution in the scarce and abundant settings are displayed on table 9, while the Kruskal-Wallis tests examining differences in contributions given the religious affiliations of religious participants are laid out on table 10. Models 7a and 7b in tables 11 and 12 contain the Jonckheere tests explore whether higher levels of religiosity, attendance or prayers lead to higher levels of contribution in both the scarce and the abundant habitats. Model 7a compares these variables amongst religious individuals, while Model 7b compares them among both religious and non-religious individuals.

Below, the negativity of the two z-scores indicates that contribution was higher on average among religious individuals under both frames. However, with two p-values of 0.8753 and 0.7734, both Mann-Whitney U tests failed to reject the null hypothesis far from the ten percent significance level. Thus, the hypothesis of this thesis that the correlation between religiousness and contribution becomes significant only when exposed to the abundant framing is rejected as well.

Table 9. Religiousness on contribution – Model 5

	Mann-Whitney U Test (z) p = Prob > |z|	Obs	
Contrib. Scarce	-0.157 0.8753	71	Statistical Value p-value
Contrib. Abundant	-0.288 0.7734	75	Statistical Value p-value
	***p<0.01, **p<0.05, *p<0.1		

The following table contains Model 6 and the Kruskal Wallis tests investigating differences in contribution between religious affiliation in the scarce and the abundant environment. With p-values of 0.3432 in the scarce setting and 0.2600 in the abundant one, both tests were rejected at the ten percent significance level. Hence, in both environments, no religion was found contributing more than the other ones.

Table 10. Religion affiliations on contribution – Model 6

	Kruskal-Wallis Test (χ^2) p = Prob > |z|	df	Obs	
Contrib. Scarce	6.764 0.3432	6	22	Statistical Value p-value
Contrib. Abundant	5.077 0.2600	4	22	Statistical Value p-value
	***p<0.01, **p<0.05, *p<0.1			

The table beneath explores whether between religious individuals, religiousness, attendance and prayers frequency affect contribution under both framing. Regarding the effect of religiosity on contribution, the null hypothesis has been rejected in both the scarce and abundant habitats at the ten percent significance level. Thus, higher levels of religiosity do not significantly lead to higher or lower contributions. However, about attendance, while the test failed to reject the null hypothesis at the ten percent significance level in the scarce environment, with a descending p-value of 0.0104, the test from the abundant framing rejects the null hypothesis at the five percent level. The framing of the gaming environment as abundant, compared to scarce, leads to attendance having a significant effect on contribution between religious individuals. Nonetheless, this effect is negative. Hence, when exposed to the abundant framing, the more participants attend religious ceremonies, the less they tend to contribute, compared to other religious individuals. Concerning the effect of the frequency of prayers on contribution, the null hypothesis was this time rejected in the scarce environment and not in the abundant one. With a descending p-value of 0.0523, a negative trend of contribution has been detected along the prayer frequency categories. The more a religious individual prays, the less he is expected to contribute compared to other religious individuals. However, the test did not reject the hypothesis at the five percent significance level. Yet, in the abundant setting, the test failed to reject the null hypothesis, with a descending p-values of 0.3724. Rather interestingly, higher levels of attendance lead to lower contributions in the abundant frame between religious individuals, while higher levels of prayer frequency tend to lead to lower levels of contributions in the scarce environment.

Table 11. Religious attributes on cooperation between religious individuals – Model 7a

Independent Variable	Dependent Variable	Jonckheere Test (J*) p = Prob (Z < J*) p = Prob (Z < J*)	Obs	
Religiosity	Contrib. Scarce	-0.094 0.4627 0.5373	22	Statistical Value p-value descending alternative p-value ascending alternative
	Contrib. Abundant	-0.205 0.5813 0.4187	22	Statistical Value p-value descending alternative p-value ascending alternative
Attendance	Contrib. Scarce	-1.229 0.1095 0.8905	22	Statistical Value p-value descending alternative p-value ascending alternative
	Contrib. Abundant	-2.311** 0.0104 0.9896	22	Statistical Value p-value descending alternative p-value ascending alternative
Prayers	Contrib. Scarce	-1.623* 0.0523 0.9477	22	Statistical Value p-value descending alternative p-value ascending alternative
	Contrib. Abundant	-0.326 0.3724 0.6276	22	Statistical Value p-value descending alternative p-value ascending alternative
		***p<0.01, **p<0.05, *p<0.1		

The following table contains the same tests as table 11, where the effect of religiosity, attendance and prayers on contribution were investigated in both settings. However, non-religious participants are also incorporated in the sample and assumed to be at the lowest level of each category. This time, every test failed to reject the null hypothesis at the ten percent levels. Hence, it is not possible to distinguish a trend in contributions along the religiosity, attendance and prayer categories when including non-religious individuals in the test sample.

Table 12. Religious attributes on cooperation among religious and non-religious participants – Model 7b

Independent Variable	Dependent Variable	Jonckheere Test (J*) p = Prob (Z < J*) p = Prob (Z < J*)	Obs	
Religiosity	Contrib. Scarce	0.209 0.5828 0.4172	71	Statistical Value p-value descending alternative p-value ascending alternative
	Contrib. Abundant	0.176 0.5697 0.4303	75	Statistical Value p-value descending alternative p-value ascending alternative
Attendance	Contrib. Scarce	-0.500 0.3086 0.6914	71	Statistical Value p-value descending alternative p-value ascending alternative
	Contrib. Abundant	-1.230 0.1093 0.8907	75	Statistical Value p-value descending alternative p-value ascending alternative
Prayers	Contrib. Scarce	-0.745 0.2280 0.7720	71	Statistical Value p-value descending alternative p-value ascending alternative
	Contrib. Abundant	-0.260 0.3974 0.6026	75	Statistical Value p-value descending alternative p-value ascending alternative
		***p<0.01, **p<0.05, *p<0.1		

Trust on contribution

Model 8 displayed in table 13 below contains two Jonckheere tests, each testing whether higher levels of trust in others are associated with higher contribution. Both the tests from the scarce and the abundant settings yield ascending p values of 0.000, rejecting the null hypothesis at the one percent level. A clear positive trend in contribution has been found along the categories of trust. The more an individual trusts the other participants, the more the individual will contribute to the public-good game compared to the other participants, ceteris paribus.

Table 13. trust on contribution – Model 8

	Jonckheere Test (J*) p = Prob (Z > J*) p = Prob (Z < J*)	Obs	
Contrib. Scarce	5.246*** 1.000 0.000	146	Statistical Value p-value descending alternative p-value ascending alternative
Contrib. Abundant	5.256*** 1.000 0.000	146	Statistical Value p-value descending alternative p-value ascending alternative
	***p<0.01, **p<0.05, *p<0.1		

OLS regressions

The results of the regressions of the determinants of contribution in both settings are displayed on table 14. Model 9a accounts for the scarce environment, while Model 9b for the abundant one. Regarding the hypothesis of this paper that framing mediates the impact of religiousness and political ideology on contribution, neither Model 9a nor Model 9b found any significant effect on contribution from one of the political ideology categories compared to the far-left base category as well as from religious participants compared to non-religious participants. In the group that was exposed to the scarce frame, the only variable yielding a significant effect is origin, where participants from mixed origins appear to have contributed significantly more. On average, a participant from mixed origins contribute 10.24 more tokens, compared to a European participant, ceteris paribus. This effect is significant at the one percent significance level. However, there was only one participant from mixed origins in the scarce environment. Thus, despite being significant, the causality between the variables cannot be assessed since the sample is too small. The British Journal of Pharmacology requires a minimum n of five independent individual per group, regardless of the power analysis (Curtis, Bond, Spina, Ahluwalia, Alexander, Giembycz, Gilchrist, Hoyer, Insel, Izzo, Lawrence, MacEwan, Moon, Wonnacott, Weston, and McGrath, 2015). Neither religiousness nor its attributes such as religiosity, attendance and prayers yield any significant effects. The same applies to political ideology, education categories, income categories, age and gender.

Nonetheless, framing the environment as abundant mediated the effect of a couple of variables on contributions. While the effect of political ideology religiousness, religiosity, prayers, age and gender are still non-significant, Model 9b found that attendance has a significant effect on contribution. With a coefficient of -3.04, the regression indicates that on average, a participant being in the attendance category above another attendance category, contributes 3.04 tokens less, compared to an individual in the attendance category below, ceteris paribus. This effect is significant at the five percent significant level. Furthermore, education, income, origin and the constant also became significant. The result of the regression indicates that on average, someone being in the second household income category, between €30k and €50K euros, contributes 5.52 less tokens, compared to an individual with a household income of less than €30K, ceteris paribus. This result is significant at the one percent significance level. This time, both the origin category Asian and the education category PhD rejected the null hypothesis that their coefficients were null at the ten percent significance level. However, they failed to reject the null at the five percent significance level, while they also suffer from the same lack of size, with sample sizes of 2 individuals for each variable only. The constant also became significant at the one percent significance level under the abundant frame.

Table 14. OLS regressions – Model 9a & 9b

VARIABLES	Scarce Model 9a	Abundant Model 9b
Left	2.857	0.636
	(6.650)	(3.716)
Right	2.429	-0.141
	(7.125)	(3.776)
Center	0.137	2.064
	(6.826)	(3.807)
Far-Right	7.244	
	(6.912)	
Religious	-7.037	-1.640
	(5.546)	(5.575)
Religiosity	0.286	0.677
	(0.523)	(0.841)
Attendance	0.277	-3.045**
	(0.756)	(1.456)
Prayers	-0.899	-0.423
	(0.681)	(0.611)
Bachelor	2.406	0.922
	(2.245)	(1.403)
Master	3.351	-1.362
	(2.135)	(1.825)
PhD		3.389*
		(1.847)
€ 30K-50K	0.0201	-5.521***
	(2.889)	(1.802)
€ 50K-100K	0.395	-0.00991
	(2.062)	(1.674)
€ > 100K	-0.859	1.463
	(2.801)	(3.487)
African	2.571	3.367
	(2.804)	(2.465)
Asian	-3.287	2.935*
	(2.818)	(1.667)
Mix	10.24***	0.749
	(2.594)	(3.653)
Gender	0.415	1.314
	(1.867)	(1.376)
Age	0.112	-0.0674
	(0.0924)	(0.0723)
Constant	8.960	14.86***
	(9.081)	(5.538)
Observations	71	75
R-squared	0.281	0.242

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Discussion

Due to the ongoing debate on the effects of belonging to a religion or a to political ideology on cooperation, the present experiment aimed at comparing the effects of religiousness and political ideology on contribution in the public good under two opposite framing, scarce and abundant. The hypothesis being that a difference in contribution due to religion or political ideology would only occur in the abundant environment. First, the results of the hypothesis are reviewed. Then, the effect of religiousness will be assessed, followed the issue of changing political ideology will be raised before discussing the effects of political ideology. Finally, the role that trust appears to have on contribution and self-reported political ideology will be debated, resorting to literature on the topic.

Hypothesis result

Contrarily to the hypothesis of this experiment, framing the environment participants played in as abundant compared to scarce did not trigger significant effects of neither religiousness nor political ideology on contribution in the one-shot public good game. Thus, the hypothesis of this experiment is rejected. However, some interesting findings arose. Concerning political ideology, the framing of the environment appears to have influenced the position of the self-reported political ideology of the participants, it being more towards the right in the scarce environment and towards the left in the scarce setting. A Jonckheere test actually identified a negative pattern of contribution from left to right along the political ideology scale, whereas this paper expected to witness this phenomenon in the abundant environment only. Touching upon religiousness, religious attendance has been found to have the opposite effects on contribution than what Anderson et al. (2010) and Brañas-Garza et al. (2014) discovered. These results are discussed in detail below.

Religiousness

Regarding religiousness, both the Mann-Whitney U test and the OLS regression failed to reject the hypothesis of similar contribution in the two environments. The main hypothesis of this survey, stating that religiousness would have an impact on contribution under the abundant framing only,

is thus rejected. This experiment found similar results as Anderson et al. (2010) with regards to the null effect of religiousness on contribution. None of the components of religiousness, such as religiosity, religious attendance and prayers frequency appear to enable to distinguish trends in contribution among religious and non-religious individuals under neither the abundant nor the scarce frame when performing non-parametric tests. On the other hand, the OLS regression found a negative correlation between attendance and contribution at the five percent significance level. When only comparing the attributes of religious individuals using Jonckheere tests, higher levels of religious attendance was also found to have significant negative effects on contribution in the abundant environment at the five percent significance level. Interestingly, these results claim the opposite of the findings Anderson et al. (2010) and Brañas-Garza et al. (2014), who discovered that higher religious attendance was associated with higher contribution among religious individuals in the public good game. The fact that none of the religious attributes were associated with higher contribution and that higher religious attendance was linked with lower cooperation in the abundant setting might be due to the fact that no individual belonging to the highest categories of religiosity, attendance and prayer took part in the experiment. Yet, Anderson et al. (2010) discovered that the category with highest religious attendance contributed significantly less as a first mover in the bilateral trust game.

Political ideology

Switching political ideology

With regards to political ideology, it appears that participants located theirs more towards the left when being in the abundant environment that they trusted significantly more, compared to the scarce setting that they trusted less and in which they located their political ideologies more towards the right. This phenomenon has not been found in any research yet. It raises concerns over the validity of the left-right political scale as a tool to compare political ideologies as framing can shift the location of the average political ideology. Bauer, Barberá, Ackermann and Venetz (2017) were already concerned about the validity of the self-placement of the left-right political scale and found that interpersonal comparability was impaired as the self-placement of their participants

depended on their education or whether they came from Western or Eastern Germany. Laméris, Jong-A-Pin and Garretsen (2018) and Everett (2013) designed scales and questions aiming at precisely determining the political ideology of the interviewee. Their questionnaires contained questions over public policies, economic and personal freedom as well as nationalism (Laméris et al. (2018); Everett (2013)). Yet rather interestingly, Price, Tewksbury and Powers (1997) found that by varying the framing of the opening and closing part of a story, while keeping the same main body throughout their treatments, the decisions the students made after reading a text about fictive public financing policies of their university significantly differed. Regarding the issue of climate change, Singh and Swanson (2017) observed that the way climate change is framed affected the beliefs of the participants of their experiment, particularly among Republicans. Hence, the framing of simple experiments can have an immediate effect on beliefs over public and current matters as well. Thus, by extrapolation, the more elaborated scales would also be affected by framing as well. Furthermore, by framing political issues in a general manner versus a specific manner on a sample of over 4000 participants, Jacoby (2000) found that the sample that was exposed to the specific issue frame was significantly more favorable to government spendings over a range of policies, compared to the sample exposed to the general issue frame. Jacoby (2000) claims that this is a reason why Republicans and Democrats frame issues differently.

The effects of political ideology on trust and cooperation

The Jonckeere tests from table 8. found that left-wing individuals tend to trust others more than their left-wing counterparts in the abundant environment only. This result is in accordance with the experiment of Anderson, Mellor and Milyo (2004) that found that Democrats were more trusting and trustworthy than Republicans in the bilateral trust game. Nonetheless, whereas Anderson, Mellor and Milyo (2004) observed no correlation between political ideology and contributions in the public good game, the Jonckheere test in the scarce environment found that left-wing individuals contributed significantly more than the right-wing participants. The main hypothesis of this experiment was that political ideology would have an effect in the abundant environment only, but it was in fact the opposite, with a significant effect in the scarce environment only. The scarce frame mediated a significant negative effect of political ideology on contribution,

the more a participant reported his political ideology towards the right. This finding is similar to the one of Balliet et al. (2016) from the literature review, which found that democrats contributed more than Republicans in the public good game when the experiment was conducted after the election. Interestingly, this relationship found significance in the environment that yields less trust in others and in which political ideology is shifted towards the right, compared to the abundant setting. If the Jonckheere test in the scarce environment found a significant effect, this is not the case of the OLS regressions. Neither Models 9a nor 9b discovered that belonging to any of the five political categories had a significant impact on contribution. These results join the findings Anderson, Mellor and Milyo (2004) who observed no correlation between political ideology and contribution in the public good game.

Trust

Trust appears to have a central role in this experiment. It is the main predictor of contribution in the public good game as the Jonckheere tests investigating the relationship between trust in other and contribution in the scarce and the abundant setting of Model 8 are significant at the one percent significance level. This result is consistent with the findings of Kocher et al. (2015), who observed that beliefs about others and trust were positively correlated to contribution. Furthermore, when being in an environment that they trusted more, the distribution of political ideologies shifted to the left of the political scale, compared to the scarce setting. Whereas consequent literature focuses on the effect that political ideology has on trust (McCright, Dentzman, Charters and Dietz, 2013; Balliet et al., 2016), no research has been conducted on whether trust can influence political ideology, which appears to have occurred in this experiment.

Limitations

The fact that the public game is about community might lead individuals to cooperate more than what they would in real life, as being generous is socially desirable. Arnold and Feldman (1981) and Furnham (1986) already found that individuals tend to lie about their beliefs toward a socially desirable outcome. The five political ideology categories “far-left”, “left”, “center”, “right” and “far-right” are proxies for the 11-point political ideology scale. Although this manipulation has

already been conducted by Arceneaux, Gravelle, Osmundsen, Petersen, Reifler and Scotto (2021), more elaborated manners of determining political ideologies can be used (Laméris et al., 2018). The Fisher test from the randomization check analyzing the randomization of origin, gender and religions across both environments is not joint to a permutation test. Although Kaiser (2007) details how to perform a Fisher permutation on Stata, it only works for interval variables, whereas origin, gender and religion are nominal variables. The dataset does not contain individuals, who estimated their religiosity over seven out of ten, the same applies for religious attendance frequency and prayers frequency. Thus, highly religious participants failed to be reached. This does not enable to test whether highly religious individuals do contribute more in the public good, as Anderson et al. (2010) and Brañas-Garza et al. (2014) discovered.

Further Research

Teyssier (2012) discovered that risk aversion was negatively correlated with contribution of first movers in the public good game. Thus, a risk preference measurement could be added in the next questionnaires, as risk preference could be an additional control variable. In order to further test the effect of political ideology on cooperation under different frames, it is possible to avoid the shift in the distribution of political ideologies induced from framing, by asking for the political ideology of participants before exposing them to framing. However, sensitive questions are usually placed at the end of the questionnaires for the participants not to make decisions according to their ideologies. Most interestingly, further research regarding the effect of framing on political ideology might focus on the possible changes in policy opinions from more elaborated scales or vote intention prior to elections.

Conclusion

The literature being contradictory regarding the effects of political ideology and religion on cooperation, the aim of this experiment was to detect whether framing the hypothetical environment in which participants had to perform a one-shot public good game as two radical opposites, scarce versus abundant, would mediate the effect of political ideology and religiousness on cooperation. The hypothesis of this paper that political ideology and religiousness would yield

significant effects on contributions in the abundant framing only has been rejected. Religiousness did not have any effect on cooperation under neither the scarce nor the abundant frame. Although all religions emphasize on the importance of cooperation, the participants of this experiment who considered themselves religious could not be differentiated with respect to contribution. Furthermore, higher religious attendance is associated with lower contribution in the abundant environment. However, highly religious individuals failed to be reached, as reports the limitation section. Interestingly, political ideology has a significant effect on contribution in the scarce setting, which is the opposite of what was expected. The results suggest that the more participants reported their political ideology towards the right of the political scale, the less they contributed to the public good game in the scarce setting. This is consistent with the expectation to see left-wing individuals exhibit more cooperation than their right-wing counterparts. The variable trust in other appears to be the best predictor for contribution, as it is highly and positively correlated in both environment The most surprising result of this experiment is that the distribution of political ideologies is significantly shifted towards the left of the political scale in the abundant environment, compared to the scarce setting which yielded significantly less trust in other participants. Different frames appear to affect the self-reported political ideology of individuals.

The implication of these findings suggests that political ideologies of individuals could be altered simply by framing and by expositions to certain words. The significance of political ideology in the scarce setting further suggests that though situations may better reveal the nature of individuals through their actions, as political ideology only had a significant effect on contribution in the scarce setting. These results are of scientific relevance as it brings an aspect of framing to the literature on the relevance of political ideology and religiousness regarding cooperation. They show that framing can mediate the effects of personal attributes on cooperation, but that it can also affect personal attributes such as political ideology. Finally, they open the door to further research on the role of trust and how framing could influence voting intentions.

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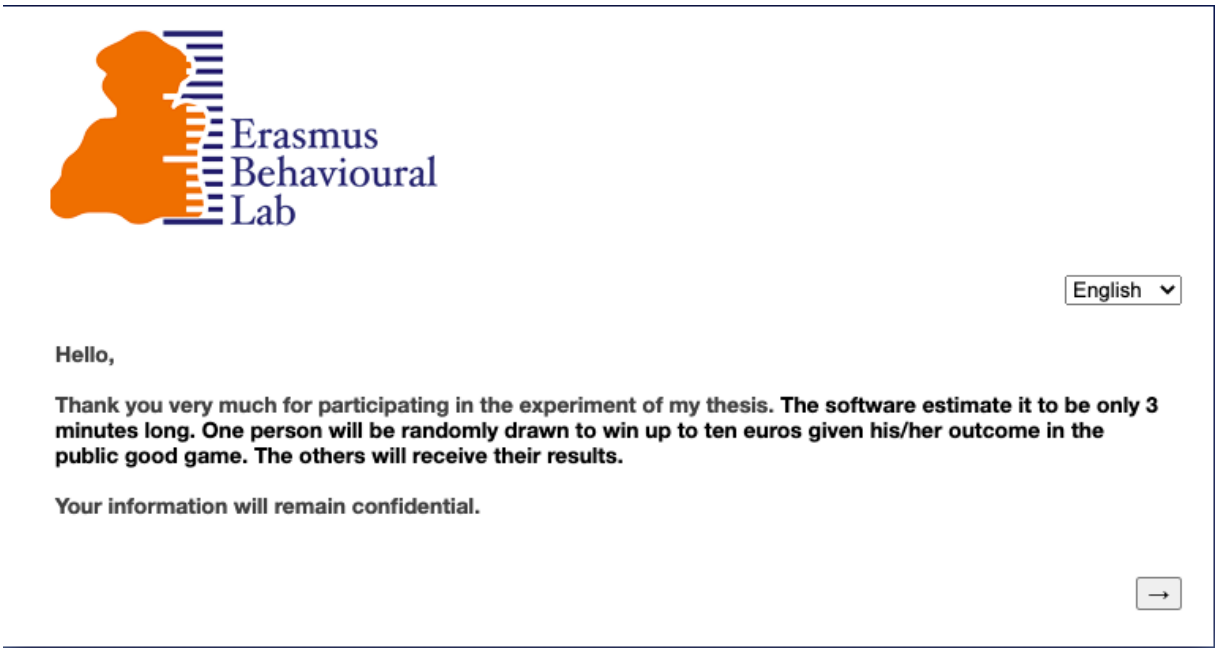
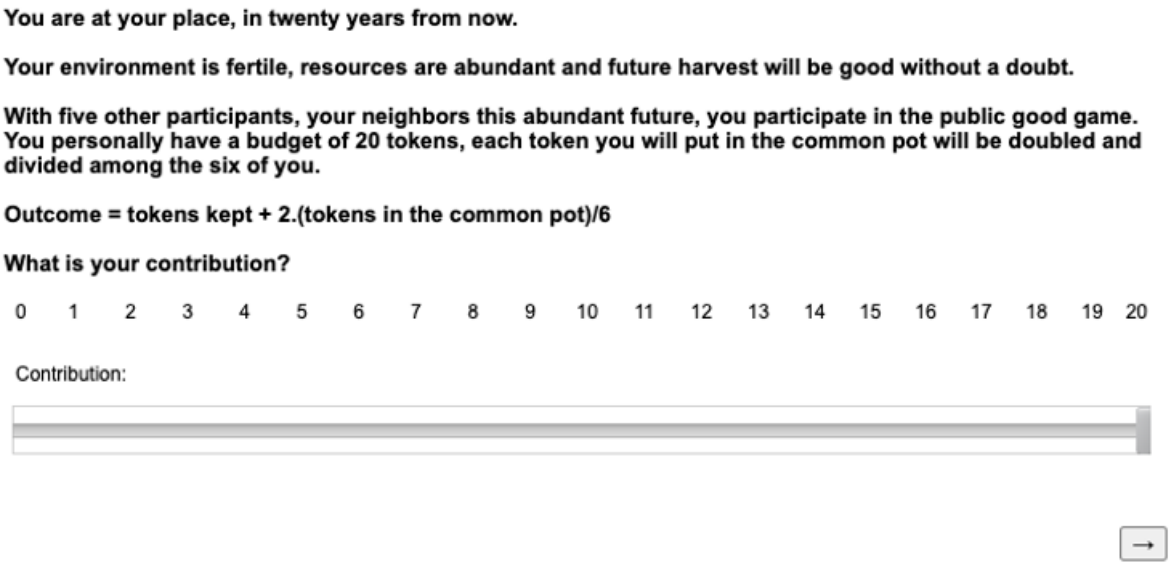
Appendix

Information sheet

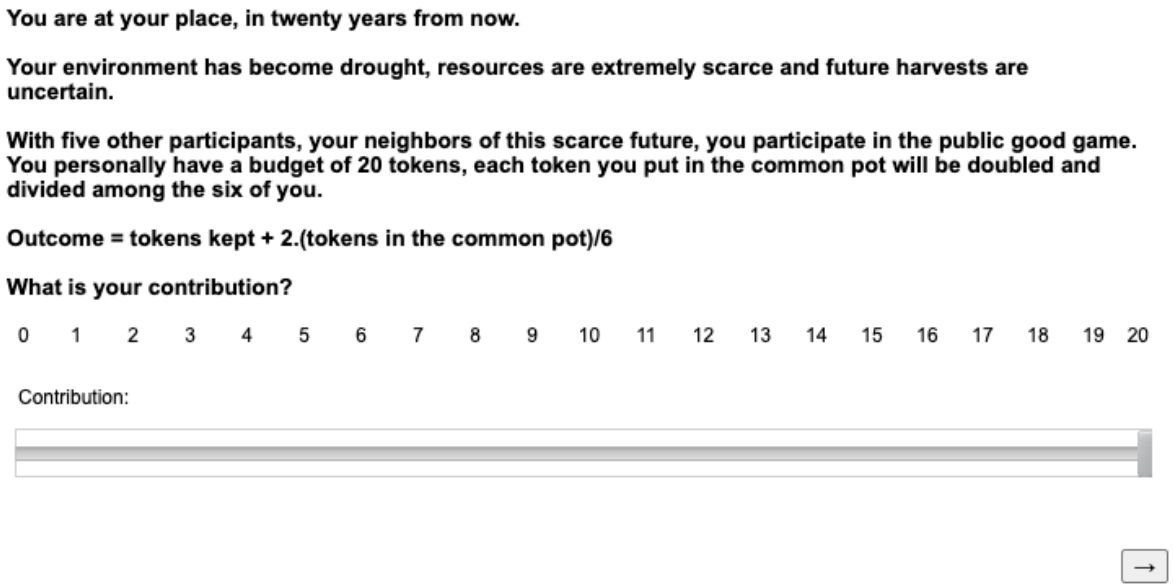


Experimental procedure

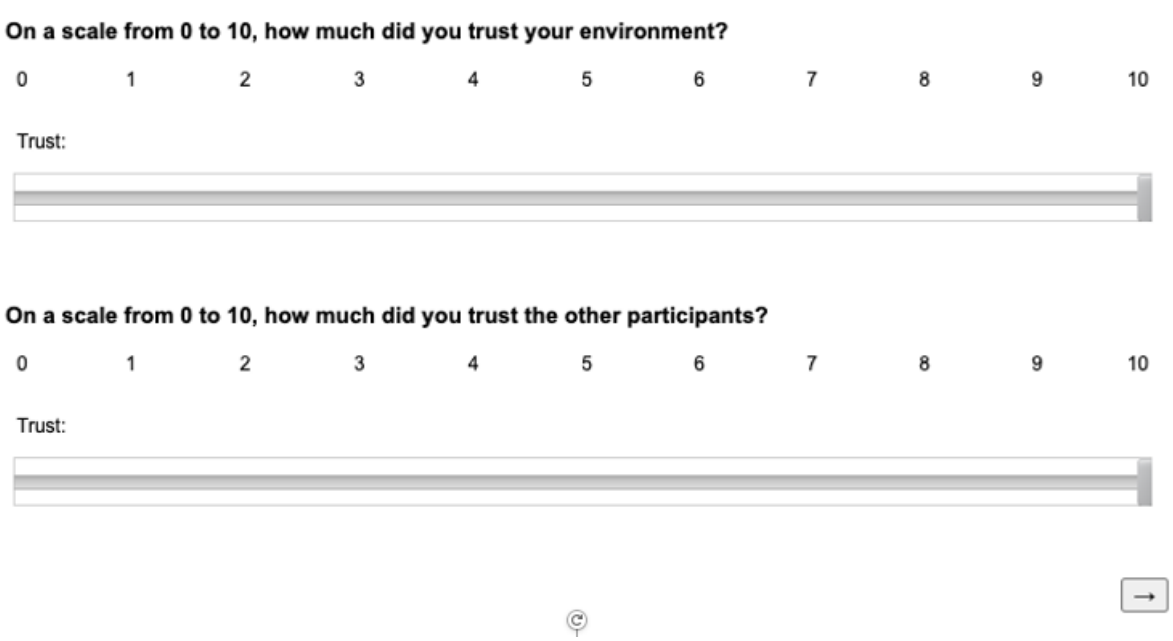
Abundant setting



Scarce setting



Personal measures



Where do you locate your political ideology?

Left Right

-5 -4 -3 -2 -1 0 1 2 3 4 5

Click to write Choice 1

Do you consider yourself as belonging to a religion or a philosophy?

- ◯ Yes
- ◯ No

→

What is your gender?

- ◯ Male
- ◯ Female
- ◯ Other

How old are you?

Which country do you live in?

- ◯ Belgium
- ◯ Netherlands
- ◯ Other

What is your origin?

- ◯ European
- ◯ African
- ◯ Asian
- ◯ Other

What level of education have you achieved?

- ◯ Primary school
- ◯ Secondary school
- ◯ Bachelor
- ◯ Master
- ◯ Phd

What do you estimate the yearly income of your household to be (net in €)?

- ◯ 0 - 30K
- ◯ 30K - 50K
- ◯ 50K - 100K
- ◯ More than 100K

→

Debriefing

In order for you to know your result and to communicate your IBAN in case you are the lucky winner, please let me your email. (If you want to)

- ◯ email:

Thank you!

→