



#### EMPIRICAL ARTICLE

# Who is generous and to whom? Generosity among Christians, Muslims, and atheists in the USA, Sweden, Egypt, and Lebanon

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#### Abstract

Are religious people more generous than non-religious people? If so, are they more generous in general or mainly to members of their religious ingroup (i.e., parochially generous)? Also, do levels of parochial generosity differ between Christians, Muslims, and atheists? This paper examined these questions by using a novel design of the *Dictator Game*, where participants in multiple rounds decided how much money to keep for themselves and give to three other players, of whom some information is revealed. Three studies (N = 1,719) with a Swedish sample, an American sample, and a sample from Egypt and Lebanon were conducted. We found that religious people were more generous compared to non-religious people when information about players' religious affiliation was available, but not when it was not available. The results suggest that if religious people are more generous, this mainly occurs when religious information is salient. We also found evidence of parochial generosity among Christians, Muslims, and atheists as all three groups gave more to their religious ingroup than to both of their outgroups. However, Muslims seemed to differ from Christians and atheists by giving more to their ingroup than the other two groups gave to their respective ingroups in the USA and possibly in Sweden.

#### 1. Introduction

When given an opportunity, many people are generous rather than self-interested. For example, despite being able to keep everything for oneself without any repercussions, several studies have found that a majority of participants give away a significant portion of their money in economic games (e.g., *Dictator Game*; List, 2007). Monetary generosity is one type of prosocial behavior (i.e., acting in ways aimed to protect or benefit other people's welfare; Gervais, 2014; Gervais et al., 2011, 2017). Many religions highlight the importance of acting prosocially and being generous. Therefore, it is not surprising that the field of psychology of religion has investigated if this emphasis on prosociality in religions can be confirmed in real life – in other words, if religious people are more prosocial than non-religious people (Ahmed and Salas, 2011; Billingsley et al., 2018; Eckel and Grossman, 2004; Everett et al., 2016; Isler et al., 2021). Notwithstanding the attention directed to it, there is no consensus regarding this matter. One major reason for the lack of consensus relates to whether

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religious prosociality is general or parochial (Everett et al., 2016; Isler et al., 2021; Tsang et al., 2021). General prosociality would imply an increased prosociality regardless of the group affiliation of the recipient. Parochial prosociality would instead indicate an increased prosociality toward religious ingroup members, but that this increased prosociality is not extended to outgroup members (i.e., an ingroup effect based on religious affiliation). In this paper, we also use the term overall generosity when we refer to generosity toward both ingroup and outgroup members in our studies.

During the past decade in the field of psychology of religion, much attention has been paid to the question about whether religious generosity is general or parochial – and whether there is a difference in generosity between religious and non-religious people to begin with. The results from studies on this are mixed. Among those who argue that religious generosity is parochial, Galen (2012) highlighted that studies that seemingly show that religious people are more generous often fail to take assumed group membership into account. He argued that this can explain the results of many studies on religious prosociality. In line with this, a review on who is more likely to give to charity pointed out several studies that show that religious people are not necessarily more generous than non-religious people toward secular organizations (Bekkers and Wiepking, 2011). This would indicate that religious people's increased generosity is mainly directed to recipients of the same religious ingroup.

Religious affiliation can make for a strong ingroup, which influences members to show a higher trust to their group members and increase their generosity within the group (Isler et al., 2021; Thunström et al., 2021; Tsang et al., 2021). This is why several theories predict that religious people are more prosocial toward their religious ingroup (Atran and Henrich, 2010; Sosis and Alcorta, 2003; Wilson, 2002). A common idea in some of those theories is that a function of religion is to create trust between the members of a society that share the same religious beliefs. For example, the different theories predict that religious people would be more generous to their ingroup, either as the result of believing in punitive gods that make people adhere to moral rules within the group (cultural evolution; Atran and Henrich, 2010; Norenzayan et al., 2016), or as the result of a costly signaling behavior (e.g., fasting, praying) to show ingroup members that one is trustworthy and thereby suitable to trade with (Sosis and Alcorta, 2003) or, lastly, that religiosity evolved with the function to create a community where ingroup members work toward the greater good of the group (Wilson, 2002). Thus, religious ingroup versus outgroup can be important to consider as a potential confounding factor in studies, since participants might assume that the receiver of their generosity either belongs to their ingroup or not.

At the same time, many studies indicate a general increased prosociality among religious people. In line with this, Saroglou (2012) argued against the conclusion from Galen (2012), pointing out several studies that have found a link between religiosity and prosociality. For example, Everett et al. (2016) investigated if self-affiliated Christians and atheists were more or less generous in economic games, either in general or to their ingroup. They found that Christians were more generous in general, with no significant difference in how much they gave to a Christian recipient and an atheist recipient, in line with arguments for general generosity. Further support comes from studies where participants have been primed with religious concepts, finding that these participants were slightly more prosocial (Billingsley et al., 2018; White et al., 2019). For example, Ahmed and Salas (2009) as well as Ahmed and Hammarstedt (2011) found that priming students with religious concepts and letting them play economic games resulted in participants being more generous than those who had not been primed. However, it should also be noted that some studies have not found a difference in prosociality altogether between self-affiliated religious and non-religious participants, when the recipients' religion was not mentioned and participants were not primed (Ahmed and Salas, 2009; Eckel and Grossman, 2004).

Other theoretical reasons support both general and parochial religious generosity. Religions have examples of ideas that could be interpreted as prescribing general prosociality, for example, Bible verses such as 'Show yourself in all respects to be a model of good works' (Tit. 2:7) or, from the Quran: 'Again, guard themselves from evil and do good. For Allah loveth those who do good' (Surah Al-Ma'idah 93). However, there are also religious examples where parochial prosociality is prescribed (e.g., the Judeo-Christian custom or law of giving tithes, or the third pillar in Islam of giving a portion of one's wealth, called *Zakat*).

An important reason for the lack of consensus is that most empirical studies do not directly compare whether prosociality differs in contexts where people know the recipient's religious affiliation and in contexts where this information is not available (Galen, 2012). Further, most studies do not investigate religious prosociality in contexts where a person can simultaneously act prosocial to someone of their religious ingroup and to people of their religious outgroups, with the possibility of also acting to benefit oneself. In current multi-religious societies, where Christians, atheists, Muslims, and people of other religions live together, we interact with both people of our religious ingroups and people of our religious outgroups. We have limited resources that we at any moment can choose to spend on ourselves, ingroup members, and/or outgroup members. Therefore, the lack of a methodological paradigm allowing comparisons of ingroup and outgroup generosity can be an important missing piece to understanding religious prosociality in practice. In this report, we employed such a paradigm to investigate whether religious people are more generous than non-religious, either generally or parochially, and whether there is a difference in generosity between people with different religious affiliations.

Economic games can be used to study prosociality as cooperative or generous behavior. These games, which originate from behavioral economics, attempt to model real-life social interaction by reducing the decision(s) made by the participant to the critical feature of the modeled situation. This is often done by giving participants a sum of money and asking them to decide if or how much they want to share with other players. This type of paradigm allows researchers to avoid some confounding factors, since just the relevant context can be given to participants (Thielmann et al., 2021). Different economic games investigate various aspects of prosociality, like generosity, trust, and cooperation. Relevant to this paper is the *Dictator Game*. The *Dictator Game* studies generosity by letting the participant allocate a sum of money between themselves and another player. Thus, the participant – the dictator – is the only one who makes a decision (List, 2007). Economic games can be varied, for example, by playing the game repeatedly with the same player, by changing who has the money at the start of the game, or by giving information about the other player (Thielmann et al., 2021). In this paper, we will make adaptations to the *Dictator Game* to better suit our research questions. In our adapted *Dictator Game*, participants will play multiple rounds and there will be several potential recipients in each round.

Lang et al. (2019), Pasek et al. (2023), and Preston and Ritter (2013) are three examples illustrating how economic games can be used to study various facets of religious prosociality. Lang et al. (2019) asked whether people who had stronger beliefs in moralizing gods, or had been primed to think about moralizing gods, were more impartial when allocating money to different people in a *Random Allocation Game* and *Dictator Game*. They investigated both generosity (amount allocated between self and another person) to local and distant religious ingroup members and outgroup members, and ingroup favoritism when participants couldn't keep money for themselves. They found that stronger beliefs in moralizing gods or being primed with thinking about moralizing gods was associated with giving more money to distant religious ingroup members both when the other recipient was the participants themselves and when it was a local religious ingroup member.

Pasek et al. (2023) used *Dictator Game* to investigate generosity to religious ingroup and outgroup members before and after participants had been primed to think about their god. They found that after being primed, participants were more generous both toward the ingroup and outgroup in most of the participant groups. Intergroup threat ratings and intergroup commonality ratings did not moderate the increased generosity toward outgroup members after thinking about God. They speculate that thinking about God could make targets' status as humans salient and decrease the salience of the religious category they belong to.

The findings in Pasek et al. (2023) are consistent with the results of Preston and Ritter (2013), who found that priming participants with thoughts of *God* made them more prosocial toward outgroup members, while priming them with thoughts of *religion* made them more prosocial toward ingroup members in a game of *Prisoner's Dilemma* as well as other prosocial decisions. They speculate that thoughts of God and religion activate different aspects of the sacred and lead to different prosocial behavior.

In conclusion, previous studies using economic games to study religious prosociality have found that different religious primes lead to different prosocial behavior to ingroup and outgroup members.

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There seems to be no uniform picture of religious people's prosocial behavior toward ingroup and outgroup members. Thus, to understand the role of religion in prosocial behavior, the different aspects of situations where people have an opportunity to be prosocial need to be investigated. In this paper, we investigate people's behavior when they have an opportunity to be generous to both ingroup and outgroup members, both when they know the religious affiliation of the potential recipients and when they do not.

#### 2. Overview of the studies

This paper includes three studies that investigated religious generosity in countries with three different (non-)religious contexts. First, we asked whether there was a difference in overall generosity between religious, agnostic, and atheist participants when they either knew or did not know the recipient's religious affiliation. Second, we investigated whether Christians, Muslims, and atheists were more generous to their religious ingroup than to their two religious outgroups, as well as whether such parochial generosity differed between the three groups. Specifically, we studied this by using an adapted *Dictator Game* in which participants allocated money between themselves and three other individuals, who differed in their religious affiliation (Christian, Muslim, atheist). This allowed us to investigate whether generosity is general or parochial among religious people and also whether Christians, Muslims, and atheists differ in how much they allocate to their ingroup versus outgroups.

The first study was conducted in a highly secular country in Europe – Sweden. However, we ended up with a rather small sample of Muslim participants, which made it difficult to compare the groups. In our second study, conducted in the USA (a more religious country than Sweden), we used the same research design, but with a larger sample and evenly sized groups of Christians, Muslims, atheists, and agnostics. Compared to the first study, this allowed us to better compare Christians, Muslims, and atheists in their generosity to their ingroup versus outgroups. The results from this study indicated that Muslim participants differed in their ingroup giving compared to Christians (and atheists), which was in line with the results from the first study. This left us wondering if this was due to Muslims being a minority group in both Sweden and the USA. Therefore, we conducted a third study in two Muslimmajority countries – Egypt and Lebanon. This third sample can be regarded as non-WEIRD, meaning participants are not from countries that are Western, Educated, Industrialized, Rich, and Democratic (Henrich et al., 2010). However, these turned out to be hard-to-reach populations, and we did not collect enough atheist participants to include them in analyses. Nevertheless, this third study allowed us to ask whether the two religious groups – Muslims and Christians – differed in their ingroup versus outgroup giving in a context where Muslims are in majority.

# 3. Aims and hypotheses

The aim of the studies was to investigate the role of religion in generosity. Specifically, we investigated whether religious generosity is general or parochial (i.e., directed to the ingroup) and whether the parochial giving differs between Christians, Muslims, and atheists. Our research questions, hypotheses, and studies were all preregistered and can be found at <a href="https://osf.io/2x6h8/">https://osf.io/2x6h8/</a>, as well as a data file.

One of our main questions was to investigate whether there is a difference between religious people, atheists, and agnostics (agnostics here refer to people who categorize themselves as *believing in higher powers but no organized religion*, as *agnostics* or report that they *have not yet decided* their religious affiliation) in how generous they are overall. This was investigated both when information about people's religious affiliation was available and when it was not (i.e., when they have some information other than religiosity about the people). This allowed us to investigate whether information about recipients' religious affiliation would change people's level of overall generosity compared to when they did not have this information, but had some other information about them (e.g., their hobby). Whenever 'religious group/affiliation' is mentioned in the paper, we include atheists and agnostics.

We had no specified hypothesis about whether there would be a difference in overall generosity between the groups when information about religious affiliation was not available. However, when information about religion was available, we hypothesized that there would be a difference between the groups. We hypothesized that religious people would be more generous than atheists. In study 1, we also hypothesized that religious people would be more generous than agnostics (see all preregistrations at <a href="https://osf.io/2x6h8/">https://osf.io/2x6h8/</a>).

Our second main question was to investigate whether people are more generous toward those who belong to the same religious group (i.e., parochial generosity). Specifically, we asked whether samples of Christians, Muslims, and atheists would be more generous to their respective religious ingroups compared to their religious outgroups. Agnostics and people of other religious affiliations were excluded from these analyses. We also investigated whether samples of Christians, Muslims, or atheists show more parochial generosity compared to the other groups. The latter question was only explicitly stated in the third preregistration but was investigated in all studies. Regarding the question of parochial generosity, we hypothesized that people would be more generous to their religious ingroup than to their religious outgroups. Regarding the second question, whether Christians, Muslims, or atheists would be more generous to their religious ingroup, we had no specified hypothesis.

We do not manipulate religious affiliation or religious thoughts in any way, since our aim is to study the behavior of the religious groups as they are. There are likely countless factors that differ between the groups, and our aim is not to isolate the effects of religiosity among all other factors. Rather we aim to investigate generosity among Christians, Muslims, and atheists.

# 4. Study 1: Sweden

#### 4.1. Method and materials

#### 4.1.1. Participants

A total of 574 participants completed the study and 398 of them were included in the final sample. Participants under 18 years of age (N = 35) or who did not consent (N = 9) were immediately excluded and could not complete the rest of the survey. We recruited participants via different social media platforms, such as Facebook groups, Reddit, and ads in religious magazines and on Facebook. We also contacted mosques, churches, and specific persons to ask them to complete the survey. We preregistered that we aimed to collect 100 participants from each of the following groups: Christians, Muslims, atheists, and agnostics. However, although we eventually translated the survey to Arabic, we were unable to recruit 100 Muslim participants. Therefore, we decided to stop the data collection when we had at least 100 participants from the remaining groups. Further, before running the analyses, we excluded participants who failed an attention check (N = 96), did not live in Sweden (e.g., had done the Arabic version and lived somewhere outside of Sweden; N = 67), stated negative numbers in the game (N=3); see description below), guessed the aim of the study (e.g., stated 'religion' or 'faith' in the aim guess; N = 26), or gave inconsistent answers on the two questions about their religious affiliation (N = 9). Thus, our final sample consisted of 398 participants (40.7% women, 58.0% men, 1.3% other; age: M = 31.3, SD = 9.9). Of these, 90 were Christians (22.6%), 28 were Muslims (7.0%), 106 were agnostics (26.7%), 145 were atheists (36.4%), 3 were Jewish (0.8%), 4 were Buddhist (1.0%), and 22 chose 'other' (5.5%) based on their answer on religious affiliation in the survey. Among the 106 agnostics, 27 chose the option 'believe in higher powers but no organized religion' (6.8%), 19 chose 'have not decided' (4.8%), 60 chose 'agnostic' (15.1%). Muslims had a religiosity score of .75 (SD =.20), Christians .50 (SD = .28), agnostics .14 (SD = .14), atheists .07 (SD = .08). See Table A1 in the Appendix for more demographic details.

# **4.1.2.** Design

The study had a within-subject, quasi-experimental design. It was conducted online by having participants follow a link that we sent out together with a short description of the study. All participants

played an adapted version of the *Dictator Game* in six rounds. In each round, participants decided how to hypothetically allocate a pot of 100 SEK (approximately 10 USD) between themselves and three other hypothetical players. They could not keep all the money for themselves, but needed to allocate some to at least one of the other players. One of these six rounds was the critical round presenting religious information about the other players. Our second critical round was about ideology, where participants allocated money between themselves and participants of different ideological convictions. This round and the religion round were randomized as the third or the sixth round.

#### 4.1.3. Procedure

After reading a short description of the study and consenting to partake in the study, participants were informed of their task in the *Dictator Game*. They then received two practice rounds to make sure they understood the task. After each practice round, they received feedback describing how they had chosen to allocate the pot of money between themselves and the other players. After the two practice rounds, participants then played and allocated money in six rounds. The only information about the other players given to participants in each round was how these players had replied to a question about their interests, opinions, or beliefs. In the religion round, participants were given information about which religious affiliation the other players had. In this round, one player had chosen 'Christian', another 'Muslim', and the third 'atheist'. The remaining rounds concerned hobbies (round 1), vacation preferences (round 2), favorite school subject (round 4), favorite movie genre (round 5), and ideological opinions (round 3 or 6, as it was randomized with the religion round).

After having allocated money in the six rounds, participants were asked to report which of the answers given by the other players in each round was closest to the answer they would have given to the question. They also rated how well they identified with their chosen answer in each round. Next, participants were asked to report, in their own words, what they believed the purpose of the study was. Following this, participants answered a number of questions regarding their religious beliefs and behaviors. After that, participants answered an attention check question, some ideological statements, rated how much they thought that people from the three religious groups (Christians, Muslims, and atheists) agreed with them about their vision for society, about moral opinions, and, finally, trust in finding common ground on these topics with a person from these religious groups. Participants then answered demographic questions and their trust in people in general. Finally, they were thanked for their participation in the study and asked to contact the researchers if they wanted more information about the study.

#### 4.1.4. Instructions

The *Dictator Game* was explained to participants with the following instructions. 'In this study, you will play a hypothetical game against three other players. You will be told the players' answers to a question which concerns their opinions or interests. In total, you will play six rounds. You will not play against the same people more than once. Thus, when one round is over, you will meet three new players in the next round. Your task in the game is to allocate a pot of 100 SEK between yourself and the players. You are not allowed to keep all money for yourself, but you choose how many of the other players you want to allocate money to, and how much the player or players will receive. The money you allocate is hypothetical, thus, you will not receive this money for real. Allocate the money based on how you think you would actually act if the game were for real. After the game, you will get to answer some questions about yourself. You will start with two test rounds, to help you understand how the game works.'

#### 4.1.5. Allocations and ingroup measures

#### 4.1.5.1. Dictator Game

Participants allocated a sum of 100 SEK (approximately 10 USD) between themselves and three potential recipients. In each round, they were told what the potential recipients had answered on a question. These were the questions in each of the six rounds (recipients' answers in parentheses): (1) What do you do in your spare time? (Football, Gym, Movies) (2) Which country would you prefer

to go to on vacation? (Japan, Uruguay, Malta) (3) Which ideology represents your opinions most accurately? (Socialism, Liberalism, Conservatism) (4) Which subject were you best at in elementary school? (Mathematics, Language, Handicraft) (5) Which movie genre do you prefer? (Science-fiction, Musical, Action) (6) What is your religious affiliation? (Christian, Muslim, Atheist). Participants had to allocate at least 1 SEK to one other recipient but could keep up to 99 SEK for themselves. While they were dividing the money, a text below showed how much money was left to allocate ('You have [amount] SEK left to allocate').

### 4.1.5.2. Ingroup and affinity

After the *Dictator Game*, participants chose which of the answers in each of the six rounds was closest to what they would have answered themselves. They chose from the same answers that the hypothetical recipients had given in the *Dictator Game*. This allowed us to calculate how much each participant had allocated to ingroup and outgroup members in each round. After each of the ingroup questions, participants also rated how strongly they identify with the chosen answer.

# 4.1.6. Religiosity and ideology measures

# 4.1.6.1. Belief in God(s)

Participants were asked to indicate how strongly they believed in God or gods on a scale from 0 to 100. They were told that if they were certain that God (or gods) does not exist, they should choose '0', and if they were certain that God (or gods) does exist, they should choose '100'.

### 4.1.6.2. Religious affiliation

Participants were asked to indicate their religious affiliation or equivalent. They had 11 options to choose between: Christian, Hindu, Buddhist, Muslim, Jewish, Sikh, believe in higher powers but no organized religion, have not decided, agnostic, atheist, and other (in that order). If they chose 'other', they were asked to write their answer.

#### 4.1.6.3. Central role

Participants answered the question 'How great of a role does religion play for your lifestyle and everyday decisions?' They indicated their answer on a Likert scale ranging from 0 (None at all) to 10 (Very great).

#### 4.1.6.4. Religious activities with others

Participants answered the question 'How often do you engage in religious activities with others, e.g. Sunday service, Friday prayer?' They indicated their answer on a Likert scale ranging from 1 (Daily) to 7 (Never). We report reversed scores for this variable so that higher number indicate more frequent religious activities.

#### 4.1.6.5. Religious activities without others

Participants answered the question 'How often do you engage in religious activities without others, e.g. pray alone or read holy scripture?' They indicated their answer on a Likert scale ranging from 1 (Daily) to 7 (Never). We report reversed scores for this variable so that higher numbers indicate more frequent religious activities.

#### 4.1.6.6. Sacrifices

Participants were asked about their sacrifices deriving from their faith. They answered the question 'How great sacrifices do you make due to your religion?' with the subsequent text: 'To clarify: a sacrifice is a choice to abstain from something which could otherwise benefit you as a person presently or to actively do something which does not benefit you presently (e.g. to sacrifice time, energy or money). Examples of sacrifices: to pray for people or things other than yourself, to donate money for religious reasons, to help in the congregation, abstain from eating certain types of food or say no to

activities for religious reasons.' Participants indicated their answer on a Likert scale ranging from 1 (None at all) to 7 (Very great).

# 4.1.6.7. Religiosity

The items belief in God(s), central role, religious activities with others, religious activities without others, and sacrifices were normalized and combined into a single index with a value between 0 and 1.

### 4.1.6.8. Ideology ratings and ranking

After the religious measures and an attention check, participants answered two ideological measures. First, participants were asked to state how much they sympathized with three different ideological statements on a Likert scale from 1 (Do not agree at all) to 10 (Agree completely). The three statements were: 'It is important that there are not large gaps in society.' 'It is important that the freedom of individuals is respected by the government.' And 'It is important that society does not change too rapidly.' Second, participants were asked to rank each of these three statements based on how important they considered them to be, from 1 (most important) to 3 (least important).

#### 4.1.6.9. Perceived compatibility

For each of the three religious target groups (Christians, Muslims, atheists), participants answered two questions regarding perceived compatibility with people from these groups. The first question was 'To what extent do you think that [atheists/Christians/Muslims] agree with your vision of society?' Participants indicated their answer on a Likert scale ranging from 1 (None at all) to 10 (Completely). The second question was: 'If you and an [atheist/Christian/Muslim] each separately would answer questions about what is morally right and wrong, how often do you think that you would give the same answer?' Participants indicated their answer on a Likert scale ranging from 1 (Never) to 10 (Always). Together with a question about dialogue optimism (described below), these questions for each group were presented in a randomized order (i.e., the order of religious groups was randomized).

# 4.1.6.10. Dialogue optimism

For each of the three religious groups, participants answered a question about their belief in dialogue with a person from that group. They read: 'Imagine that you have a conversation with an [atheist/Christian/Muslim] about the things you disagree on regarding society and morality. How large proportion of the things you disagreed on from the beginning do you think you would agree on when you both feel that the conversation is completed?' and indicated their answer with a slider from 0 to 100.

# 4.1.7. Demographic measures

### 4.1.7.1. Age, gender, and country

Participants stated their age, gender, and which country they lived in. Only participants who stated that they lived in Sweden were included in analyses.

#### 4.1.7.2. Language skills

Participants who chose to fill in the survey in Arabic were also asked about how well they understood Swedish. They chose between these options: (1) not at all, (2) easier words and phrases, (3) understand texts and speech with easy language, (4) understand most everyday texts and speech, (5) understand even advanced texts and speech, (6) speak fluent Swedish and understand most of it, and (7) Swedish is my mother tongue.

# 4.1.7.3. Education

Participants were asked about their highest level of completed education. They chose between these options: (1) some high school, (2) completed high school or equivalent, (3) some university/college,

(4) bachelor's degree or equivalent, (5) master's degree or equivalent, (6) some doctoral studies, (7) PhD or equivalent.

#### 4.1.7.4. Income

Participants indicated their income after taxes by choosing from six options.

### 4.1.7.5. Church of Sweden membership

Participants were asked about whether they had exited the Church of Sweden. Citizens born in Sweden automatically became members of the Church of Sweden until year 1996, which is why most adults who are not members have actively exited the church. These were the options participants chose from: (1) Yes, (2) No, I am a member of the Church of Sweden, (3) I have never been a member of the Church of Sweden, and (4) I do not know.

# 4.1.7.6. Trust in people in general

Participants rated their trust in people in general on a scale from 1 (No trust at all) to 10 (Very great trust).

#### 4.2. Results

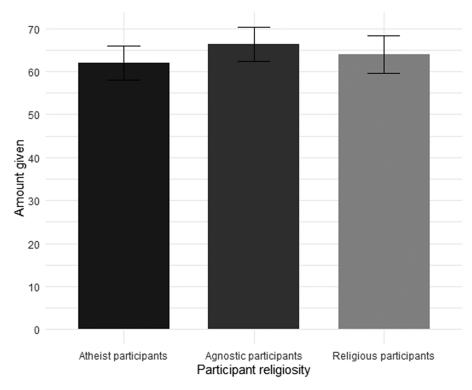
#### 4.2.1. Planned analyses

This section will be separated into two parts, answering the two main aims of this paper. First, we report possible differences in generosity between religious people, atheists, and agnostics – both when participants did not know and when they knew about recipients' religious affiliation. Second, the results of whether people were more prosocial to their ingroup are reported – both in general and whether there was a difference between Christians, Muslims, and atheists. In accordance with *Judgment and Decision Making* standards, we report one-tailed *p*-values for the tests of our directed hypotheses. When nothing else is specified, two-tailed *p*-values are reported.

#### 4.2.1.1. Is there a difference in prosociality between religious people, atheists, and agnostics?

**4.2.1.1.1.** When religious information was not available. First, we tested whether there was a difference in generosity between religious people, atheists, and agnostics when they did not know of the recipients' religious affiliation. For this, we conducted a between-subject ANOVA where the dependent variable was the mean donated amount in the non-religion rounds (i.e., the rounds where religious information was not included, e.g., favorite school subject and vacation preferences). Our independent variable was the comparison of three groups: religious people (all religious groups were gathered into one group), atheists, and agnostics (all non-decided categories were gathered to the agnostics group). There was no significant difference between religious people (M = 63.98, SD = 25.20), agnostics (M = 66.33, SD = 21.11), and atheists (M = 62.03, SD = 24.68) in how much they gave away when religious information about recipients was not available, F(2, 381) = 1.02, p = .360. Figure 1 shows the mean amount given by atheists, agnostics, and religious people in the five rounds when information about religious affiliation of recipients was not available.

4.2.1.1.2. When religious information was available. Second, we tested whether there was a difference in generosity between religious people, atheists, and agnostics when they did know the recipients' religious affiliations. Again, we conducted a between-subject ANOVA where the dependent variable was the donated amount in the religion round (i.e., the round where religious information about recipients was available). Our independent variable was again the three groups (comparing religious people, atheists, and agnostics). There was a significant difference between the groups in how generous they were overall, F(2, 381) = 4.40, p = .013,  $\eta_p^2 = .023$ . A Bonferroni post hoc test revealed that religious people gave significantly more money



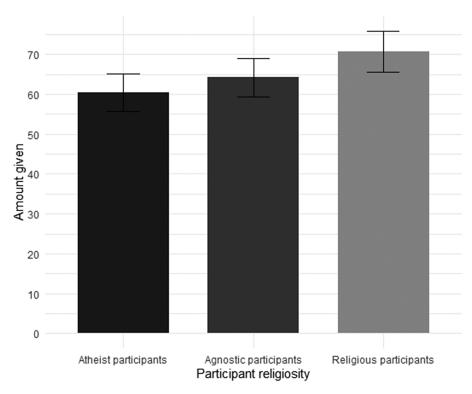
**Figure 1.** Mean amount given in the five rounds without religious information about recipients for study 1, as a function of religiosity of the participants in the Dictator Game. Participants were able to give at most 100 SEK to the targets and had to give at least 1 SEK to one of the targets.

(M = 70.63, SD = 29.38) than atheists (M = 60.50, SD = 29.08), one-tailed p = .005) in the religion round, but not significantly more than agnostics (M = 64.19, SD = 25.78), one-tailed p = .119). Agnostics and atheists did not significantly differ in how much they gave (p = .902). Figure 2 shows the mean amount given by atheists, agnostics, and religious people in the religion round, when the religious affiliation of recipients was displayed.

#### 4.2.1.2. Are people more generous to members of their own ingroup?

Our second aim was to investigate whether participants were more prosocial toward their religious ingroup than their religious outgroups and whether there was a difference in this between Muslims, Christians, and atheists.

4.2.1.2.1. Were people more prosocial toward their religious ingroup than their religious outgroups?. To answer this question, we conducted a repeated-measures ANOVA. The dependent variables were the amount given to the religious ingroup in the religion round (e.g., amount given to the Christian recipient by a Christian participant) and the amount given to the religious outgroup that was given the highest amount in the same round (e.g., amount given to the atheist recipient by a Christian participant if the Muslim was given a lower amount by the participant than the atheist). The independent variable was religious affiliation of the participants. Only Christians (N = 90), Muslims (N = 28), and atheists (N = 145) were included in these analyses. In line with parochial generosity and our hypothesis, participants gave significantly more to their religious ingroup (M = 38.31, SD = 30.16) than to the religious outgroup that was given the largest amount (M = 15.06, SD = 14.14), F(1, 260) = 82.41, P(1, 260) = 82.41, P(1, 260) = 82.41. Bonferroni post hoc tests found that participants in all religious groups gave



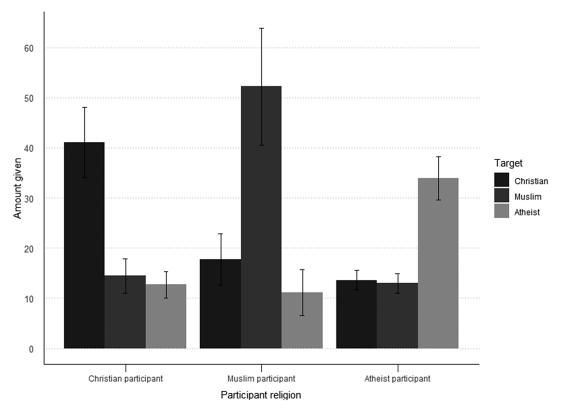
**Figure 2.** Mean amount given in the religion round for study 1, as a function of religiosity of the participants in the Dictator Game. Participants were able to give at most 100 SEK to the targets and had to give at least 1 SEK to one of the targets.

significantly more to their ingroup than to the outgroup that received the highest amount (Christian: ingroup M = 41.07, SD = 34.18; outgroup M = 16.42, SD = 16.77; one-tailed p < .001; Muslim: ingroup M = 52.21, SD = 31.47; outgroup M = 17.75, SD = 13.79, one-tailed p < .001; atheist: ingroup M = 33.90, SD = 26.18; outgroup M = 13.69, SD = 12.24, one-tailed p < .001).

4.2.1.2.2. Were Muslims, Christians, or atheists more prosocial toward their religious ingroup? There was no interaction between religious affiliation and amount to ingroup and outgroup, F(2, 260) = 1.67, p = .191. A difference score variable was used for this one-way ANOVA. This means that the amount given to one's ingroup minus both of one's outgroups did not significantly differ between Muslims (ingroup: M = 52.21, SD = 31.47; outgroup: M = 28.86, SD = 23.22), Christians (ingroup: M = 40.48, SD = 33.57; outgroup: M = 27.13, SD = 25.38), or atheists (ingroup: M = 33.90, SD = 26.18; outgroup: M = 26.60, SD = 23.71). Figure 3 shows the amount given from each religious group to each recipient in the religion round.

#### 4.2.2. Exploratory analyses

In this section, the results of the ideology round are presented similarly to the results of the religion round above. We first ask whether participants who chose socialism, liberalism, or conservatism as their ingroup were more generous than other groups in the five rounds where ideology of recipients was not revealed. Next, we ask whether the participant ideological groups differed in generosity in the ideology round when they knew the ideology of recipients. We then ask whether participants in general or any of the participant ideological groups are more generous to their ideological ingroup than to the



**Figure 3.** Amount given in the religion round for study 1, as a function of religious affiliation of the participant and recipient in Dictator Game. Participants were able to give at most 100 SEK to the targets and had to give at least 1 SEK to one of the targets.

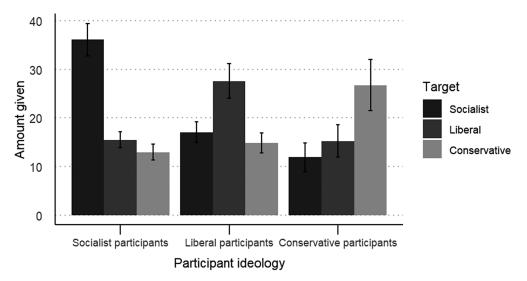
two ideological outgroups. After that, the results of the remaining four rounds and finally an analysis comparing the religion round to all other rounds are presented.

# 4.2.2.1. Are socialists, liberals, or conservatives more generous when information about ideological beliefs is not available?

A between-subjects ANOVA with amount given in the five rounds where ideology was not mentioned as a dependent variable were used to investigate whether any of the three included ideological groups was more generous. The independent variable was the ideological ingroup (based on the question about which answer to the question in the ideology round one agreed the most with, where the options were socialist, liberal, and conservative). This analysis also revealed a significant difference between groups, F(2, 404) = 5.408, p = .005, and a Bonferroni post hoc test found that conservatives gave less money than socialists (p = .003). No other differences between groups were significant. The results were similar when using agreement with ideological statements as the independent variable, with the exception that conservative participants gave significantly less than both socialists and liberals.

# 4.2.2.2. Are socialists, liberals, or conservatives more generous when information about ideological beliefs is available?

A between-subjects ANOVA with amount given in the ideology round as a dependent variable was used to investigate whether any of the three included ideological groups was more generous. The independent variable was the ideological ingroup (based on the question about which answer to the question in the ideology round one agreed the most with, where the options were socialist, liberal, and



**Figure 4.** Amount given in the ideology round for study 1, as a function of ideology of the participant and recipient in Dictator Game. Participants were able to give at most 100 SEK to the targets and had to give at least 1 SEK to one of the targets.

conservative). This analysis also revealed a significant difference between groups, F(2, 404) = 3.943, p = .020, and a Bonferroni post hoc test found that conservatives gave less money than socialists (p = .023). No other differences between groups were significant. The results were similar when using agreement with ideological statements as the independent variable, with the exception that conservative participants gave significantly less than both socialists and liberals.

# 4.2.2.3. Are people more generous toward their ideological ingroup than toward their ideological outgroups?

A repeated-measures ANOVA was conducted to test whether people were more or less generous toward their ideological ingroup than toward ideological outgroups. Amount given to the chosen ideological ingroup (e.g., amount given to the liberal by liberals) and amount given to the ideological outgroup that was given the highest amount (e.g., amount given to the socialist by a liberal participant if the participant gave less to the conservative than to the socialist) were used as dependent variables, while ideological ingroup was used as an independent variable, to investigate possible interactions. A significant main effect was found, meaning that participants overall gave significantly more to their ideological ingroup than to the outgroup that received the most money, F(1, 404) = 72.800, p < .001,  $\eta_p^2 = .153$ . Bonferroni post hoc tests found that participants in all ideology groups gave significantly more to their ingroup than to the outgroup that received the highest amount (socialism: ingroup M = 36.10, SD = 24.65; outgroup M = 16.46, SD = 12.15, p < .001; liberalism: ingroup M = 27.58, SD = 20.57; outgroup M = 18.96, SD = 11.86, p < .001; conservatism: ingroup M = 26.75, SD = 22.17; outgroup M = 16.38, SD = 14.00, p = .002). An ANOVA using a difference score of ingroup allocations minus outgroup allocations showed a significant difference F(2, 404) = 5.075, p = .007,  $\eta_p^2 = .025$ . Bonferroni post hoc tests showed that socialists gave more to their ideological ingroup compared to outgroups than liberals (p = .006), but no other groups differed significantly. Figure 4 shows the amount given by each participant group to each target.

#### 4.2.2.4. Allocations in the remaining four rounds

Repeated-measures ANOVAs were used to investigate the allocations in the remaining four rounds. These analyses were done in the same way as the religion round and the ideology round above. In the vacation round (p < .001), hobby round (p < .001), movie genre round (p < .001), and favorite

school subject round (p < .001), repeated-measures ANOVAs found that participants overall allocated significantly more money to their ingroup than to the outgroup that they gave the largest amount of money. Bonferroni post hoc tests found that most participant groups (based on the chosen ingroup) within these four rounds gave significantly more money to their ingroup than to the outgroup that received the most money. The exceptions were those who chose football in the hobby round, who gave only 4.7 SEK more to their ingroup (p = .150), those in the vacation round who chose USA, who gave only 3.3 SEK more to their ingroup (p = .929), and those who chose Malta, who gave only 2.6 SEK more to their ingroup (p = .326), as well as those in the school subject round who chose Swedish, who gave only 2.0 SEK more to their ingroup (p = .274). These differences were not significant.

# 4.2.2.5. Comparisons between rounds

We conducted a series of paired-samples t-tests where difference scores of ingroup minus outgroup allocations of each round were used and each round was compared to the religion round. These showed that participants gave significantly more to their ingroup members compared to outgroup members in the religion round than in the hobby round, vacation round, school subject round, and movie genre round (all p < .001). In the religion round, the overall difference score was 2.3 SEK higher than in the ideology round, which was not a significant difference (p = .314). The results were similar when only including participants who had rated their affinity with all of their ingroups to at least 5 on a scale from 0 to 10.

# 4.3. Discussion study 1

In the first study testing this methodological paradigm with an adapted *Dictator Game* with multiple rounds consisting of different potential recipients, we find that religious people gave more money than atheists (but not agnostics) in the religion round, but no differences between the groups in the rounds where religion was not mentioned. Further, participants gave more money to their religious ingroups than to their religious outgroups. Last, we did not find any significant difference between atheists, Christians, or Muslims in how much they gave to their ingroup members. However, looking at the means, Muslims seemed to have given more to their ingroup compared to how much the other two groups gave (about 12-20 SEK more), but as the number of Muslim participants were relatively few (N = 28), we might have lacked power to detect a difference. Therefore, we decided to test the same study but with a bigger and more unified sample. We also decided to test it in a more religious country in comparison to secular Sweden.

#### 5. Study 2: USA

# 5.1. Method and materials

#### 5.1.1. Participants

A total of 801 participants completed the study, which was conducted on Prolific, and 713 of them were included in the final sample. In line with our preregistration, we collected 200 participants from each of the following religious groups: Christians, Muslims, atheists, and agnostics. However, we excluded participants who guessed the aim (e.g., stated 'religion', 'faith' in the aim guess, N = 14), failed the attention check (N = 67), or gave inconsistent answers to the two questions about their religious affiliation (N = 8). Therefore, our final sample consisted of 713 participants (45.0% women, 53.6% men, 1.4% other; age: M = 30.82, SD = 9.99). Of these, 169 were Christians (23.7%), 151 Muslims (21.2%), 182 agnostics (25.5%), 203 atheists (28.2%), and 8 chose 'other' (1.1%), based on their answer to religious affiliation in the survey. Among the 182 agnostics, 23 chose the option 'believe in higher powers but no organized religion' (3.2%), 5 chose 'have not decided' (0.7%), 154 chose 'agnostics' (21.6%). The religiosity score for Muslims was .72 (SD = .19), for Christians .60

(SD = .22), for agnostics .11 (SD = .11), and for atheists .03 (SD = .03). See Table A2 in the Appendix for more demographic details.

#### 5.1.2. Design

The design of the study was identical to that of study 1. The survey was translated from Swedish to English.

#### 5.1.3. Procedure and measures

The procedure was identical to that in study 1, except for three small changes. First, in each round where participants were allocated a pot of 100 SEK, they could also read what this amount would translate to in USD (i.e., 10 USD). Second, a few of the targets in the *Dictator Game* were changed. In the ideology round, socialism was replaced with libertarianism. In the school subject round, handicraft was replaced with physical education. In the vacation round, USA was replaced with Uruguay. These changes were made to better suit an American context. Third, the measure of whether participants were part of the Swedish state church was replaced with a question on whether participants still belonged to the religion that they had grown up in (see below). Last in the survey, participants also answered whether they thought their answers had been influenced by one or several factors (e.g., presidential election, Covid pandemic).

### 5.1.4. Religious upbringing

Participants answered a question about which, if any, religion they primarily grew up in. They chose from these options: (1) I grew up without any religion. (2) I grew up in the same religion that I belong to today. And (3) I grew up in another religion than the one I belong to today.

#### 5.1.5. Factors that could affect answers

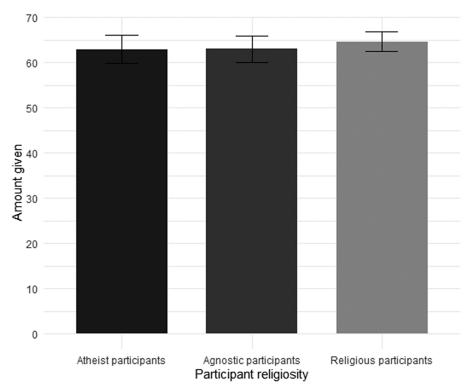
Participants could mark the following options if they deemed that they had affected their answers in the study: (1) Climate change, (2) Covid-19 pandemic, (3) Upcoming presidential election, (4) Economic downturn, and (5) None of the above. They could mark several options if more than one applied.

#### 5.2. Results

#### 5.2.1. Planned analyses

As in study 1, this section will be divided into two parts, answering the two aims.

- 5.2.1.1. Is there a difference in prosociality between religious people, atheists, and agnostics?
- **5.2.1.1.1.** When religious information was not available. As in study 1, we first tested whether there was a difference in prosociality between religious people, atheists, and agnostics when they did not know of the recipients' religious affiliation. For this, we conducted a between-subjects ANOVA with mean donated amount in the non-religion rounds as the dependent variable and the three groups (religious people, agnostics, atheists) as the independent variable. The result shows that there was no significant difference between religious people (M = 64.59, SD = 19.84), agnostics (M = 63.01, SD = 20.31), and atheists (M = 62.91, SD = 22.69) in how generous they were when religious information about recipients was not available, F(2, 703) = 0.54, p = .581. Figure 5 shows the mean amount given by atheists, agnostics, and religious people in the five rounds when information about religious affiliation of recipients was not available.
- 5.2.1.1.2. When religious information was available. We thereafter tested whether there was a difference in prosociality between religious people, atheists, and agnostics when they did know the recipients' religious affiliation. For this, we conducted a between-subjects ANOVA with donated amount in the religion round as our dependent variable and the three groups (religious people, agnostics, atheists) as the independent variable. As in study 1, there was a significant difference between the groups in how generous they were overall, F(2, 703) = 8.38, p < .001,  $\eta_p^2 = .023$ .



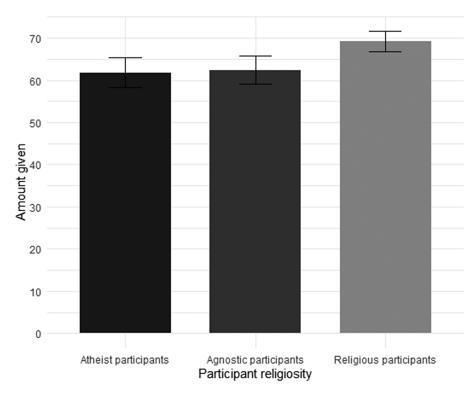
**Figure 5.** Mean amount given in the five rounds without religious information about recipients for study 2, as a function of religiosity of the participants in the Dictator Game. Participants were able to give at most 100 SEK to the targets and had to give at least 1 SEK to one of the targets.

A Bonferroni post hoc test revealed that religious people donated significantly more money (M = 69.21, SD = 21.44) than atheists (M = 61.78, SD = 25.44, one-tailed p < .001) and agnostics (M = 62.40, SD = 23.18, one-tailed p = .003). Agnostics and atheists did not significantly differ in how much they donated (p = .100). Figure 6 shows the mean amount given by atheists, agnostics, and religious people in the religion round, when the religious affiliation of recipients was displayed.

#### 5.2.1.2. Are people more generous to members of their own ingroup?

We thereafter tested whether participants were more prosocial toward their religious ingroup than their religious outgroups and whether there was a difference in this between Muslims, Christians, and atheists. To answer these questions, we conducted repeated-measures ANOVAs, the first with amount given to one's religious ingroup (e.g., amount given to the Christian recipient by a Christian participant) and amount given to the religious outgroup that was given the highest sum (e.g., amount given to the Muslim recipient by a Christian participant if the atheist was given a smaller amount than the Muslim) as the dependent variables, whereas religious affiliation was the independent variable (comparing Christians, Muslims, and atheists). The second ANOVA used a difference score of amount given to the ingroup members and sum of amount given to the outgroup members as the dependent variable. Only Christians (N = 169), Muslims (N = 151), and atheists (N = 203) who chose the same ingroup as their religious affiliation were included in these analyses.

5.2.1.2.1. Were people more prosocial toward their religious ingroups than their religious outgroups?. In line with parochial generosity and our hypothesis, participants gave significantly more to their religious ingroup (M = 36.13, SD = 23.38) than to the religious outgroup that received the highest amount (M = 17.13, SD = 12.10), F(1, 520) = 217.65, p < .001,  $\eta_p^2 = .295$ . Bonferroni post



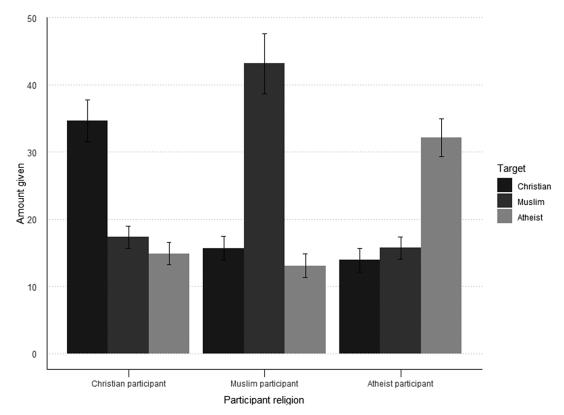
**Figure 6.** Mean amount given in the religion round for study 2, as a function of religiosity of the participants in the Dictator Game. Participants were able to give at most 100 SEK to the targets and had to give at least 1 SEK to one of the targets.

hoc tests found that participants in all religious groups gave significantly more to their ingroup than to the outgroup that received the highest amount (Christian: ingroup M = 34.62, SD = 20.54; outgroup M = 18.33, SD = 11.18, one-tailed p < .001; Muslim: ingroup M = 43.17, SD = 27.98; outgroup M = 16.45, SD = 11.44, one-tailed p < .001; atheist: ingroup M = 32.16, SD = 20.61; outgroup M = 16.63, SD = 13.24, one-tailed p < .001).

5.2.1.2.2. Were Muslims, Christians, or atheists more prosocial toward their religious ingroup? There was a significant interaction with religious affiliation, F(2, 520) = 5.38, p = .005,  $\eta_p^2 = .12$ . As in study 1, a difference score variable was used for this analysis. This means that the amount given to one's ingroups minus amount given to one's outgroups significantly differed between the three groups. Pairwise comparisons showed that Muslims had a significantly larger difference between amount given to ingroups and outgroups (ingroup: M = 43.17, SD = 27.98; outgroup: M = 28.70, SD = 20.42), than both Christians (ingroup: M = 34.62, SD = 20.54; outgroup: M = 32.17, SD = 19.99; p = .014), and atheists (ingroup: M = 32.16, SD = 20.61; outgroup: M = 29.63, SD = 22.96; p = .010). Figure 7 shows the amount given from each religious group to each recipient in the religion round.

# 5.2.2. Exploratory analyses

The results of the ideology round are presented below, with the same structure as the religion round above. As in study 1, we first ask whether participants who chose socialism, liberalism, or conservatism as their ingroup were more generous than other groups in the five rounds where the ideology of recipients was not revealed. Next, we ask whether the participant ideological groups differed in generosity in the ideology round when they knew the ideology of recipients. We then ask whether



**Figure 7.** Amount given in the religion round for study 2, as a function of religious affiliation of the participant and recipient in Dictator Game. Participants were able to give at most 100 SEK to the targets and had to give at least 1 SEK to one of the targets.

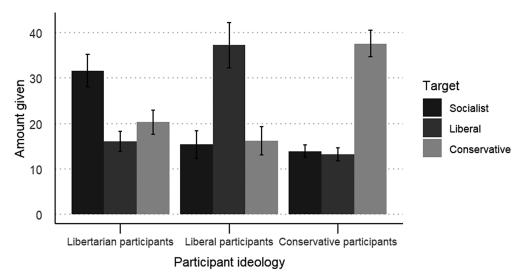
participants in general or any of the participant ideological groups are more generous to their ideological ingroup than to the two ideological outgroups. Next, the results of the four remaining rounds are presented.

# 5.2.2.1. Are liberals, libertarians, or conservatives more generous when information about ideological beliefs is not available?

A between-subjects ANOVA with amount given in the five rounds where ideology was not mentioned as a dependent variable was used to investigate whether any of the three included ideological groups was more generous. The independent variable was the ideological ingroup (based on the question about which answer to the question in the ideology round one agreed the most with, where the options were liberal, libertarian, and conservative). We found no significant difference between groups, F(2,718) = 1.913, p = .148. The result was similar when using agreement with ideological statements as the independent variable in the same analysis.

# 5.2.2.2. Are liberals, libertarians, or conservatives more generous when information about ideological beliefs is available?

A between-subjects ANOVA with amount given in the ideology round as a dependent variable was used to investigate whether any of the three included ideological groups was more generous. The independent variable was the ideological ingroup (based on the question about which answer to the



**Figure 8.** Amount given in the ideology round for study 2, as a function of ideology of the participant and recipient in Dictator Game. Participants were able to give at most 100 SEK to the targets and had to give at least 1 SEK to one of the targets.

question in the ideology round one agreed the most with, where the options were liberal, libertarian, and conservative). This analysis also showed no significant difference between groups, F(2, 718) = 2.190, p = .113. The results were similar when using agreement with ideological statements as the independent variable.

# 5.2.2.3. Are people more generous toward their ideological ingroup than toward their ideological outgroups?

A repeated-measures ANOVA was conducted to test whether people were more or less generous toward their ideological ingroup than toward the ideological outgroup that received the largest amount of money. Amount given to the chosen ideological ingroup (e.g., amount given to the liberal by liberals) and amount given to the ideological outgroup that received the most (e.g., amount given to the libertarian by a liberal participant if the participant gave more to the libertarian than to the conservative) were used as dependent variables, while ideological ingroup was used as an independent variable, to investigate possible interactions. A main effect of allocation difference was found, F(1,718) = 79.379, p < .001,  $\eta_p^2 = .100$ . Bonferroni post hoc tests found that participants who chose liberalism as their ingroup gave significantly more to their ingroup (M = 33.23, SD = 20.05) than to one of their outgroups that they gave the highest amount (M = 16.74, SD = 12.42, p < .001). Participants who chose conservatism also gave significantly more to their ingroup (M = 28.77, SD = 17.62) than to the outgroup that they were the most generous to (M = 19.49, SD = 11.03, p < .001). Participants who chose libertarianism as their ingroup gave a mean of 4.05 SEK more to their ingroup (M = 23.33, SD = 12.48) than to the outgroup that received the highest amount (M = 19.27, SD = 10.91), which was not a significant difference (p = .089). A one-way ANOVA using a difference score of ingroup minus outgroup allocations found that the participant ideology groups differed significantly, F(2, 718) = 14.105, p < .001,  $\eta_p^2 = .038$ . Bonferroni post hoc tests showed that liberals gave more to their ideological ingroup members compared to the two outgroup members than both libertarians (p < .001) and conservatives (p = .001). Figure 8 shows the amount given by each ideological group to each recipient.

# 5.2.2.4. Allocations in the remaining four rounds

As in study 1, repeated-measures ANOVAs found that in the vacation round (p < .001), hobby round (p < .001), movie genre round (p < .001), and favorite school subject round (p < .001), participants overall allocated significantly more money to their ingroup than to the outgroup that they gave the largest amount of money. Bonferroni post hoc tests found that most participant groups (based on chosen ingroup) within these four rounds gave significantly more money to their ingroup than to the outgroup that received the most money. The only exception was those in the vacation round who chose Malta, who gave only 3.4 SEK more to their ingroup (p = .062).

#### 5.2.2.5. Comparisons between rounds

We conducted a series of paired-samples t-tests where difference scores of ingroup minus outgroup allocations of each round were used and each round was compared to the religion round. These showed that participants gave significantly more to their ingroup members compared to outgroup members in the religion round than in the hobby round, vacation round, school subject round, and movie genre round (all p < .001). In the religion round, the overall difference score was 0.8 SEK lower than in the ideology round, which was not a significant difference (p = .581). The results were similar when only including participants who had rated their affinity with all of their ingroups to at least 5 on a scale from 0 to 10.

# 5.3. Discussion study 2

As in study 1, religious people gave more money than atheists in the religion round, but no differences between the groups were found in the five rounds where religion was not mentioned. Participants gave more money to their religious ingroup than they gave to both of their religious outgroups. This study also found that Muslims gave more money to the Muslim player than Christians gave to the Christian player, or atheists gave to the atheist player. Christians and atheists did not differ in how much they gave their ingroups, and none of the groups differed in how much they gave their outgroups.

To further investigate the differences between Muslims' generosity and the generosity of the other groups, we decided to conduct a study with participants from two Muslim majority countries: Lebanon and Egypt. While we cannot determine the mechanisms causing Muslims' behavior in the game, the study in Lebanon and Egypt allowed us to investigate whether the generosity of Muslims to their ingroup would be present in countries where they belong to the majority religion of the country.

# 6. Study 3: Egypt and Lebanon

#### 6.1. Method and materials

# 6.1.1. Participants

Collecting participants from Muslim-majority countries was more difficult than we had expected. We tried to collect participants from Mturk first and thereafter from social media (Reddit). However, neither of these methods turned out to be feasible. Therefore, we eventually contacted Qualtrics Panel to collect participants. We decided to collect participants from Egypt and Lebanon, since these are Muslim-majority countries with fairly large groups of Christian citizens as well.

A total of 650 participants completed the study through Qualtrics Panel and 608 of them were included in the final sample. The total sample consisted of 475 participants from Egypt and 175 from Lebanon. This was in line with our request to Qualtrics Panel (i.e., 450 participants from Egypt and 150 from Lebanon). Participants who guessed the aim of the study (N = 36) or gave inconsistent answers to the two questions about their religious affiliation (N = 6) were excluded. Thus, our final sample consisted of 608 participants (52.8% women, 47.0% men, 0.2% other; age: M = 31.90, SD = 9.70). Of these, 72 were Christians (11.8%), 522 Muslims (85.0%), 8 agnostics (1.3%), 5 atheists (0.8%), and 4 chose 'other' (0.7%) in their answer to religious affiliation in the survey. Among the Muslims,

446 were Sunni (72.6%), 32 Shia (5.2%), and 44 chose 'other' (7.2%). Among the eight agnostics, three chose the option 'believe in higher powers but no organized religion' (0.5%), two chose 'have not decided' (0.3%), and three chose 'agnostic' (0.5%). The religiosity score for Muslims was .87 (SD = .14), for Christians .76 (SD = .17), for agnostics .42 (SD = .31), and for atheists .10 (SD = .08). See Table A3 in the Appendix for more demographic details.

#### 6.1.2. Design

The design of the study was identical to that of study 1 and study 2. The survey was translated to English and Arabic, meaning participants could choose which language they wanted to use when answering the study. 93.6% of participants chose to do the survey in Arabic and 6.4% in English. This might suggest it is beneficial to translate surveys in hard-to-reach populations.

#### 6.1.3. Procedure and measures

The procedure was identical to that in study 2, except for three small changes. First, in each round where participants were allocated a pot of 100 SEK, they could also read what this amount would be in Egyptian or Lebanese pounds (instead of USD as in study 2). Second, participants who chose 'Muslim' as their religious affiliation were also asked to indicate whether they were Sunni, Shia, or other kind of Muslim. The last question that was included in study 2, about whether there were factors that had influenced participants' responses, was omitted from this study.

#### 6.2. Results

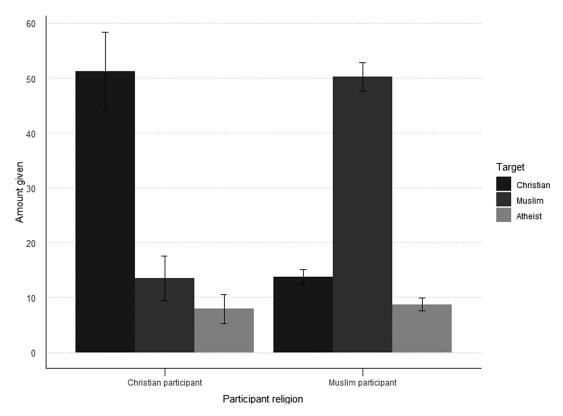
#### 6.2.1. Planned analyses

Because the number of atheists (N = 5) and agnostics (N = 8) were so few in this study, we could not perform the analyses for the first research question, where religious people were compared to atheists and agnostics in their overall generosity. This also meant that for question 2, we could only compare Christians and Muslims in their in- and outgroup giving. Nevertheless, this allowed us to see whether the results from study 2 – that Muslim participants were significantly more generous to their ingroup – would hold in these two Muslim-majority countries. We could also investigate whether there was evidence of parochial generosity, as in study 1 and study 2. To answer the first question, we conducted a repeated-measures ANOVA with donated amounts to the ingroup and to the outgroup that received the highest amount as dependent variables and the two religious groups (Muslims and Christians) as the independent variable. The second question was analyzed using a difference score variable of amount given to the ingroup minus amount given to the outgroups as dependent variable. Only Christians (N = 72) and Muslims (N = 519) who chose the same ingroup as their religious affiliation were included in analyses.

# 6.2.1.1. Are people more generous to members of their own ingroup?

6.2.1.1.1. Were people more prosocial toward their religious ingroup than their religious outgroup?. In line with parochial generosity and our hypothesis, Christian and Muslim participants gave significantly more to their religious ingroup (M = 50.41, SD = 30.31) than to the religious outgroup that was given the highest amount (M = 15.71, SD = 17.30), F(1, 589) = 172.51, p < .001,  $\eta_p^2 = .227$ . Bonferroni post hoc tests found that participants in both religious groups gave significantly more to their ingroup than to the outgroup that received the highest amount (Christian: ingroup M = 51.26, SD = 30.98; outgroup M = 14.65, SD = 17.93, one-tailed p < .001; Muslim: ingroup M = 50.29, SD = 30.24; outgroup M = 15.85, SD = 17.22, one-tailed p < .001).

6.2.1.1.2. Were Muslims or Christians more prosocial toward their religious ingroup?. There was no difference between Christians and Muslims, F(1, 589) = 0.11, p = .741. A difference score variable was used for this analysis. This means that the amount given to one's ingroup minus amount given to one's outgroups did not significantly differ between Muslims (ingroup: M = 50.29,



**Figure 9.** Amount given in the religion round for study 3, as a function of religious affiliation of the participant (only including Christians and Muslims) and recipient in Dictator Game. Participants were able to give at most 100 SEK to the targets and had to give at least 1 SEK to one of the targets.

SD = 30.24; outgroup: M = 22.50, SD = 23.03) and Christians (ingroup: M = 51.26, SD = 30.98; outgroup: M = 21.44, SD = 23.94). Figure 9 shows the amount given from each religious group to each recipient in the religion round.

# 6.2.2. Exploratory analyses

Below the results of the ideology round are presented in the same way as the religion round above. As in the previous studies, we first ask whether participants who chose socialism, liberalism, or conservatism as their ingroup were more generous than other groups in the five rounds where ideology of recipients was not revealed. Next we ask whether the participant ideological groups differed in generosity in the ideology round when they knew the ideology of recipients. We then ask whether participants in general or any of the participant ideological groups are more generous to their ideological ingroup than to the two ideological outgroups. Lastly the results of the four remaining rounds are presented.

# 6.2.2.1. Are socialists, liberals, or conservatives more generous when information about ideological beliefs is not available?

A between-subjects ANOVA with amount given in the five rounds where ideology was not mentioned as a dependent variable was used to investigate whether any of the three included ideological groups was more generous. The independent variable was the ideological ingroup (based on the question about which answer to the question in the ideology round one agreed the most with, where the options were socialist, liberal, and conservative). This analysis did not find significant differences between

groups, F(2, 611) = 2.911, p = .055. Similarly, when using agreement with ideological statements as the independent variable in the same analysis, no significant difference between groups was found.

# 6.2.2.2. Are socialists, liberals, or conservatives more generous when information about ideological beliefs is available?

A between-subjects ANOVA with amount given in the ideology round as a dependent variable was used to investigate whether any of the three included ideological groups was more generous. The independent variable was the ideological ingroup (based on the question about which answer to the question in the ideology round one agreed the most with, where the options were socialist, liberal, and conservative). This analysis found no significant difference between groups, F(2, 611) = 1.430, p = .240. The results were similar when using agreement with ideological statements as the independent variable.

# 6.2.2.3. Are people more generous toward their ideological ingroup than toward their ideological outgroup?

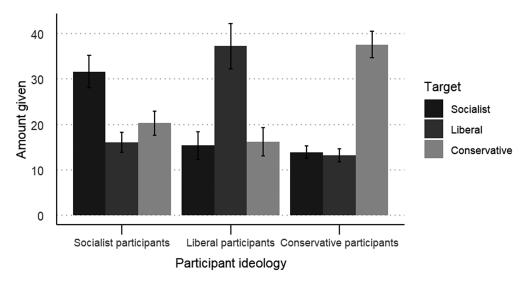
A repeated-measures ANOVA was conducted to test whether people were more or less generous toward their ideological ingroup than toward the ideological outgroup. Amount given to the chosen ideological ingroup (e.g., amount given to the liberal by liberals) and amount given to one of the ideological outgroups that was given the highest amount of money (e.g., amount given to the socialist by a conservative participant if the socialist was given more money than the liberal by the participant) were used as dependent variables, while ideological ingroup was used as an independent variable. There was a main effect of allocation difference between the ingroup and outgroup amount in the ideology round,  $F(1, 611) = 84.185, p < .001, \eta_p^2 = .121$ . Bonferroni post hoc tests found that participants who chose conservatism, liberalism, and socialism as their ingroup all gave significantly more to their ingroup than to the outgroup that was given the most money (conservatism: ingroup M = 37.64, SD = 27.37; outgroup M = 16.79, SD = 15.21, p < .001; liberalism: ingroup M = 37.28, SD = 28.71; outgroup M = 21.46, SD = 21.59; socialism: ingroup M = 31.66, SD = 21.29; outgroup M = 23.56, SD = 16.26). A one-way ANOVA using a difference score of ingroup minus outgroup allocations found that the participant ideology groups differed significantly, F(2, 611) = 6.564, p = .002,  $\eta_p^2 = .021$ . Bonferroni post hoc tests showed that conservative participants gave more to their ingroup compared to their outgroups than socialists (p < .001). No other groups differed significantly. Figure 10 shows the amount given by each ideological group to each target in the ideology round.

#### 6.2.2.4. Allocations in the remaining four rounds

In the vacation round (p < .001), hobby round (p < .001), movie genre round (p < .001), and favorite school subject round (p < .001), repeated-measures ANOVAs found that participants overall allocated significantly more money to their ingroup than to the outgroup that they gave the largest amount of money. Bonferroni post hoc tests found that most participant groups (based on the chosen ingroup) within these four rounds gave significantly more money to their ingroup than to the outgroup that received the most money. The exceptions were those in the vacation round who chose Uruguay, who gave only 0.7 SEK more to their ingroup (p = .859), and those in the movie genre round who chose musical, who gave only 1.7 SEK more to their ingroup (p = .859).

### 6.2.2.5. Comparisons between rounds

As in studies 1 and 2, we conducted a series of paired-samples t-tests where difference scores of ingroup minus outgroup allocations of each round were used and each round was compared to the religion round. These showed that participants gave significantly more to their ingroup members compared to outgroup members in the religion round than in the ideology round, hobby round, vacation round, school subject round, and movie genre round (all p < .001). The results were similar when only including participants who had rated their affinity with all of their ingroups to at least 5 on a scale from 0 to 10.



**Figure 10.** Amount given in the ideology round for study 3, as a function of ideology of the participant and recipient in Dictator Game. Participants were able to give at most 100 SEK to the targets and had to give at least 1 SEK to one of the targets.

### 6.3. Discussion study 3

As in study 1 and study 2, participants gave more money to their religious ingroup than to both of their religious outgroups. Muslims and Christians did not differ in their generosity toward their ingroup or outgroup. Both groups gave on average half of the total sum to their ingroup. Due to the low number of atheists and agnostics in the sample, these groups were not included in the analyses.

#### 7. General discussion

The aim of this paper was to investigate the role of religious affiliation in generosity. More specifically, we asked whether there was a difference in generosity between religious and non-religious participants either when they knew or did not know the recipient's religious affiliation. The aim was also to investigate whether religious generosity is parochial or general and whether parochial giving differs between Christians, Muslims, and atheists. Our novel design of an adapted Dictator Game with multiple rounds and multiple recipients allowed us to investigate the generous behavior of religious and nonreligious people in more detail than many previous studies. Also, we have examined these questions in three vastly different samples – Sweden, the USA, and Lebanon and Egypt – where the latter should be regarded as a non-WEIRD and hard-to-reach population. Since multiple religious groups live alongside each other in many societies, the decision to split one's resources between oneself and people with several other religious affiliations is one that people are frequently faced with. Such decisions would not necessarily lead to similar allocations as when the decision is only between oneself and one other group (as in many previous studies on this topic). In summary, our studies found that religious people were more generous overall than non-religious people when they knew recipients' religious affiliation, but there was no difference between the groups when this information was not available. Furthermore, we found that Christians and Muslims in all studies as well as atheists in the first two studies allocated more to the ingroup recipients than to the outgroup recipients in the religion round. This supports parochial generosity among Christians, Muslims, and atheists. However, we found partial evidence indicating that Muslim participants gave more to their ingroup compared to Christians and atheists.

Related to our first aim, we found a difference in overall generosity between religious and non-religious participants depending on what information about recipients was available. Specifically,

religious people were more generous overall than atheists (studies 1 and 2) and agnostics (study 2) in the round where they were informed of the religious affiliations of the potential recipients. However, no significant differences in overall generosity between the groups were found in the other rounds where religious information was not provided. Thus, these results partly confirm the concerns raised by Galen (2012), who pointed out that it is important to take group affiliation into account when investigating religious people's prosociality.

Our results suggest that participants seemed to have taken group membership into account when this was explicit and then acted more generously. This could indicate that the mentioning of religion acted as a prime that led religious participants to increase their giving, as in priming studies (e.g., Ahmed and Hammarstedt, 2011; Preston and Ritter, 2013). Alternatively, it might indicate that religious participants are parochially generous in this context. If so, they give more to their religious ingroup, but not more to ingroups (or outgroups) generally. Due to the design of our study, where participants in multiple rounds saw information about potential recipients and were asked to allocate money between them with that sole information to guide them, group identity in general and (in the religion round) religious group identity in particular were likely made more salient than thoughts of God or other aspect of religiosity. Thus, the difference between ingroup and outgroup giving might have been larger in our study than it would have been if we had made a moralizing god salient, as Lang et al. (2019), Pasek et al. (2023), and Preston and Ritter (2013) did in some of their rounds. In either case, this result indicates that there is no general religious generosity when religious people allocate money between themselves and other people and information about recipients' religion is not salient. This is in line with Ahmed and Salas (2009) and Eckel and Grossman (2004), who found no religious prosociality in the absence of religious primes and information on recipients' religious affiliation.

Our results contrast with those of Everett et al. (2016), who had similar aims – to examine whether generosity is general or parochial - and a somewhat similar design. There self-affiliated Christians and atheists played either an adapted version of the *Dictator Game* (the money given was first doubled) or the Trust Game (an economic game that measures generosity and trust) with a player that either identified as a Christian or an atheist. They found that Christians in the Dictator Game gave more than atheists in general, without parochiality, and also that more religious Christians gave more in the Trust Game. However, this paper had no non-religion rounds to compare with, meaning that the general generosity they found was only shown when participants knew the recipient's religious affiliation. Our design allowed us to compare generosity both when participants knew and did not know the religious affiliation of recipients, which showed that although there was a higher generosity among religious people in the religion round, it was not higher in the non-religion rounds. Also, we found that Christians, Muslims, and atheists all gave more to their religious ingroup members than to their outgroup members. However, it should be noted that Everett et al. (2016) found that Christians who thought more of religious matters were the ones who drove the effect of general generosity – a measure that we did not include. We had one measure of how central religion was in the lives of participants as well as two measures of engagement in religious activities, which are the closest approximation of the measures in Everett et al. (2016). When combining data from all three studies, we found that all three measures correlated positively with the amount given to the ingroup in the religion round for both Christians and Muslims. However, the religiosity measures that correlated significantly with the amount given to outgroups in the religion round were negative correlations, meaning that those who were more religious gave less to their religious outgroups (see Supplementary materials). Thus, while our measures differ from those included in their studies, results of our analyses are not in line with the results of Everett et al. (2016).

Related to our second aim, we found evidence of parochial generosity in all religious groups and all three samples. Participants gave significantly more money to their religious ingroup than to the religious outgroup. When we compared the religion round to the other rounds, we found that participants overall gave more to their ingroups compared to their outgroups except for the ideology round, which did not differ significantly from the religion round in studies 1 and 2. This indicates that the religious group identity evokes a particularly strong ingroup effect, even among atheists. These results are in line with

several theories saying that a function of religion is to create trust between the members of a society that share the same religious beliefs and thereby predict that religious people would be more generous to their ingroup (although the reasons differ between the theories, e.g., because of moral rules within the group or costly signaling behavior). However, our results indicate that not only religious people but also atheists are more generous to their ingroup.

Also related to the second aim, we found some evidence that parochial generosity differed among the religious groups. Specifically, Muslims were more generous toward their ingroup than Christians and atheists in the religion round. The difference was not significant in study 1, where only 28 Muslims were included, but highly significant in study 2, which had a larger sample. Although there was no difference in study 3 when only comparing Christians and Muslims, the amount given by Muslim participants to Muslim recipients was comparable to or higher than those in studies 1 and 2. Thus, the higher parochial generosity among Muslims does not seem to be limited to countries where Muslims are a minority. The studies presented here cannot determine why Muslims give more, but there are several possibilities. One possibility is that the Islamic system of beliefs and norms might be especially efficient at fostering parochial generosity, at least in this context. For example, the third pillar in Islam states that Muslims should give a share of their wealth to the less fortunate, and some claim that this portion should primarily go to fellow Muslims (Basri and Khali, 2014). Another possibility would be that the cultures of Lebanon and Egypt, which might be similar to some of the cultures that Muslim immigrants in Sweden and the USA originate from, promote parochial generosity. The ideal of treating everyone, regardless of group membership, equally is a norm in the USA and Sweden, but possibly not as evident in Lebanon and Egypt. This cultural explanation would also account for why Christians in study 3 acted similar to the Muslims, described here next.

We found that Christians' and Muslims' generosity differed between the study conducted in the USA and the one in Egypt and Lebanon. Both groups were more generous to their ingroup and less generous to their outgroups in study 3 compared to study 2. Of the 100 SEK that participants were allocated in the religion round, Christians in study 3 gave a higher amount (ca. 16 SEK more) to their ingroup and a lower amount (ca. 10 SEK less) to their outgroups compared to Christians in study 2. This apparent difference was also seen among Muslims. Muslims gave more (ca. 7 SEK) to their ingroup and less (ca 6 SEK) to their outgroups in study 3 compared to Muslims in study 2. The difference between ingroup and outgroup amounts was higher for both Christians and Muslims in study 3, compared to study 2. This difference was also statistically significant (see the Appendix). Moreover, these groups gave higher average amounts of money overall in the study conducted in Lebanon and Egypt than in the study conducted in the USA. This result is in line with the cultural explanation mentioned in the previous paragraph. However, it might also be explained by the larger role religion plays in Egyptian and Lebanese societies compared to the USA (at least in relation to ethnic conflicts; Fox, 2004). The histories of these countries might also have affected the results. For example, Christians have been persecuted in Egypt and might thus feel a stronger sense of ingroup solidarity with each other (Savage, 2014).

Lastly, we want to highlight some thoughts related to the concept of parochial prosociality. The term *parochial* has negative connotations (e.g., narrow-minded is a synonym) and is sometimes viewed as a bias (e.g., Isler et al., 2021). Thus, there is sometimes an assumption that parochial prosociality is undesirable and that we should aim for all people to be equally prosocial to all groups of people. Whether this assumption should be regarded as correct or not is not within the scope or legitimacy of this paper. Nevertheless, we want to highlight that it is possible to look at parochial generosity from at least two angles. One can either see it as an achievement of religions in creating a will to be more generous within the religious group, a generosity that might otherwise not exist at all – or one can consider it an unfair practice that leaves those outside of the group without the benefits of those within. We leave it up to the readers to decide which view to adopt. Here we make no judgment about the morality of parochial prosociality, but rather have used it as synonymous with ingroup favoritism.

#### 7.1. Limitations

We did not recruit as many participants from each religious group as originally planned for studies 1 and 3. Nevertheless, many studies investigating religious prosociality have had smaller samples than what have been included here. Also, this paper includes a non-WEIRD sample, which is rare in this field of research.

The money and other players were hypothetical in these studies. Thus, we cannot know whether the results would have been the same in our studies if participants had made real decisions. However, Ben-Ner et al. (2008) compared hypothetical and real *Dictator Game* decisions and found that they were remarkably similar. Moreover, Ben-Ner et al. (2009) found that participants gave similar amounts to both ingroup and outgroup members in hypothetical *Dictator Games* compared to *Dictator Games* incentivized with real money. Thus, there is reason to believe that we would have received similar results if the participants allocated real money.

Participants in studies 2 and 3 were paid a small sum of money for their participation, whereas participants in study 1 were not compensated. This difference in recruitment might have affected our samples. For instance, more generous people, who are willing to participate in studies for free, might be found in the sample from study 1. However, participants in study 1 did not give more money on average (M = 63, across all rounds) than participants in studies 2 (M = 64, across all rounds) and 3 (M = 71, across all rounds). Therefore, this should not explain the results we found.

The absence of context is both a strength and a weakness. Since people seldom make decisions without context in reality, the ecological validity suffers due to this design, as it does in most studies using economic games. However, this design makes it possible to isolate the relevant decision without introducing unnecessary confounding factors (Thielmann et al., 2021).

#### 7.2. Future research

We employed a novel variation of the *Dictator Game*, where participants divided money between themselves and several other players. Future studies could build on this variation in different ways. For instance, a similar structure could be applied to the *Trust Game*, where participants could give money to several recipients and hope for money to be sent back to them. That would be a way of studying trust rather than generosity in a game where you could choose between trusting an ingroup member, an outgroup member, neither, or both.

Another way to build on the studies presented here would be to use a similar design but with real money and decisions, rather than hypothetical ones. Using larger sums of money would also be a way to test whether the results can be generalized further to decisions where participants can give away substantial sums of money. This could be done with a raffle, where the money is divided in accordance with the decision made by the winning participant.

We discovered that it is difficult to recruit Muslims in Sweden and atheists in Lebanon and Egypt. However, researchers with access to these populations could conduct studies to learn how they act in economic games with religious ingroup and outgroup members.

### 8. Conclusions

This paper used a novel adaptation of the *Dictator Game* in three vastly different samples, including one non-WEIRD sample (Sweden, the USA, and Egypt and Lebanon) to investigate whether religious generosity in this context was general or parochial and whether the parochial giving differed between Christians, Muslims, and atheists. We found that religious people were more generous overall than atheists (and possibly agnostics) when information about recipients' religious affiliation was available, but not more generous when this information was not present. Thus, our results suggest that if there is a higher overall generosity among religious people, it seems to be mainly in cases where religious information about recipients is present. We also found evidence of parochial generosity among Christians, Muslims, and atheists as all three groups gave more to their religious ingroups than to their

outgroups. However, Muslims seemed to differ from Christians and atheists by giving more to their ingroup than the other two groups gave to their ingroups in the USA and possibly Sweden.

Supplementary material. The supplementary material for this article can be found at http://doi.org/10.1017/jdm.2024.14.

Data availability statement. Materials, preregistrations, and data are available on Open Science Framework at https://osf.io/2x6h8/.

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**Author contribution.** N.H., H.M., G.A., and D.V. designed the research. N.H. and H.M. initiated the project, performed the research, analyzed data, and wrote the paper. All authors reviewed and commented on manuscript drafts.

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**Competing interest.** The authors declare none.

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# Appendix: Instructions and stimuli used in the studies

Below are the information and stimuli used in the studies, as seen by the participants.

The screenshots are mainly taken from study 2 since this study was conducted in English. However, for some of the screenshots, there are two versions provided (from study 2 and study 3). This is to show when there was some minor difference in the stimuli between the two studies (e.g., when 100 SEK was translated to USD as in study 2 or Egyptian pound/Lebanese pound as in study 3).

1. Initial information as seen by participants in study 2 (first screenshot) or study 3 (second screenshot), both provided with the English translation.

6%

In this study, you will play a hypothetical game against three other players. You will be told the players' answers to a question which concerns their opinions or interests. In total, you will play six rounds. You will not play against the same people more than once. Thus, when one round is over, you will meet three new players in the next round.

Your task in the game is to allocate a pot of 100 SEK (which is approximately 10 US dollars) between yourself and the players. You are not allowed to keep all money for yourself, but you choose how many of the other players you want to allocate money to, and how much the player or players will receive. The money you allocate is hypothetical, thus, you will not receive this money for real.

Allocate the money based on how you think you would actually act if the game were for real.

After the game, you will get to answer some guestions about yourself.

You will start with two test rounds, to help you understand how the game works.

Next

English ~

In this study, you will play a hypothetical game against three other players. You will be told the players' answers to a question which concerns their opinions or interests. In total, you will play six rounds. You will not play against the same people more than once. Thus, when one round is over, you will meet three new players in the next round.

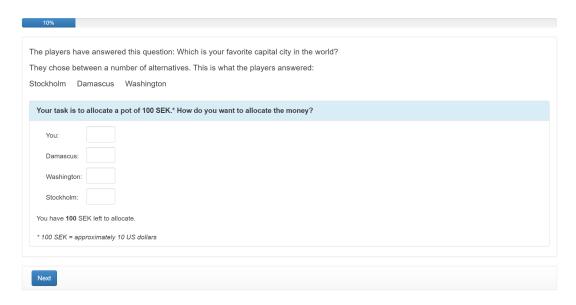
Your task in the game is to allocate a pot of 100 SEK (which is approximately 180 Egyptian pounds or 17,600 Lebanese pounds) between yourself and the players. You are not allowed to keep all money for yourself, but you choose how many of the other players you want to allocate money to, and how much the player or players will receive. The money you allocate is hypothetical, thus, you will not receive this money for real. Allocate the money based on how you think you would actually act if the game were for real.

After the game, you will get to answer some questions about yourself.

You will start with two test rounds, to help you understand how the game works.



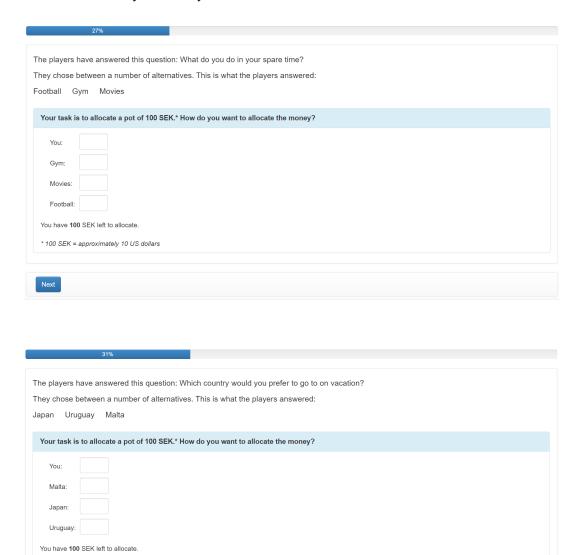
2. The two test rounds and the provided feedback as seen by participants in study 2. The feedback provided was tailored based on participants' responses in the test round.



| 10%  |
|--|
|  |
| You chose to give:   |
| 10 SEK to yourself,  |
| SEK to the person who chose Stockholm as their favorite capital city,  |
| 10 SEK to the person who chose Damascus and 80 SEK to the person who chose Washington.                                     |
| OUT TO the person who chose washington.  |
|  |
| Next   |
|  |
|  |
|  |
|  |
| 17%  |
|  |
| The players have answered this question: How many rooms are there in your home?  |
|  |
| They chose between a number of alternatives. This is what the players answered:  |
| 1 2 3  |
|  |
| Your task is to allocate a pot of 100 SEK.* How do you want to allocate the money?   |
|  |
| You:   |
| 3 rooms:   |
|  |
| 1 room:  |
| 2 rooms:   |
|  |
| You have 100 SEK left to allocate.   |
| * 100 SEK = approximately 10 US dollars  |
|  |
|  |
| Next   |
| <del>_</del>   |
|  |
|  |
|  |
| 17%  |
|  |
| You chose to give:   |
| 40 SEK to yourself,  |
| 10 SEK to the person who replied 1 to the question about number of rooms in their home,                                    |
| 15 SEK to the person who replied 2 and   |
| 35 SEK to the person who replied 3.  |
|  |
|  |
| Next   |
|  |
|  |
|  |
|  |
| 21%  |
|  |
| The test rounds are now finished. You will now play six new rounds. The game is played the same way as in the test rounds. |
|  |
|  |
| Next   |
| _  |
|  |

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3. The six rounds played in the game, as seen by participants in study 2. For the ideological question (third screenshot), the version from study 3 is also provided since the alternatives in study 2 differed from those in study 3 and study 1.



\* 100 SEK = approximately 10 US dollars

| The players have answered this question: Which ideology represents your opinions most accurately? They chose between a number of alternatives. This is what the players answered: Libertarianism Liberalism Conservatism  Your task is to allocate a pot of 100 SEK.* How do you want to allocate the money?  You: Libertarianism: Libertarianism: Conservatism:  You have 100 SEK left to allocate. * 100 SEK = approximately 10 US dollars or 10 Euro | 32%   |
|---|---|
| They chose between a number of alternatives. This is what the players answered:  Libertarianism Liberalism Conservatism  Your task is to allocate a pot of 100 SEK.* How do you want to allocate the money?  You:  Liberalism:  Libertarianism:  Conservatism:  You have 100 SEK left to allocate.  * 100 SEK = approximately 10 US dollars or 10 Euro  |   |
| Libertarianism Liberalism Conservatism  Your task is to allocate a pot of 100 SEK.* How do you want to allocate the money?  You:  Liberalism:  Libertarianism:  Conservatism:  You have 100 SEK left to allocate.  * 100 SEK = approximately 10 US dollars or 10 Euro   | The players have answered this question: Which ideology represents your opinions most accurately? |
| Libertarianism Liberalism Conservatism  Your task is to allocate a pot of 100 SEK.* How do you want to allocate the money?  You:  Liberalism:  Libertarianism:  Conservatism:  You have 100 SEK left to allocate.  * 100 SEK = approximately 10 US dollars or 10 Euro   | They chose between a number of alternatives. This is what the players answered:                   |
| You: Liberalism: Conservatism: You have 100 SEK left to allocate. * 100 SEK = approximately 10 US dollars or 10 Euro  |   |
| You: Liberalism: Libertarianism: Conservatism:  You have 100 SEK left to allocate. * 100 SEK = approximately 10 US dollars or 10 Euro   | Libertarianism Liberalism Conservatism  |
| Libertarianism:  Libertarianism:  Conservatism:  You have 100 SEK left to allocate.  * 100 SEK = approximately 10 US dollars or 10 Euro   | Your task is to allocate a pot of 100 SEK.* How do you want to allocate the money?                |
| Libertarianism:  Conservatism:  You have 100 SEK left to allocate.  * 100 SEK = approximately 10 US dollars or 10 Euro  | You:  |
| Conservatism:  You have 100 SEK left to allocate.  * 100 SEK = approximately 10 US dollars or 10 Euro   | Liberalism:   |
| Conservatism:  You have 100 SEK left to allocate.  * 100 SEK = approximately 10 US dollars or 10 Euro   |   |
| You have 100 SEK left to allocate.  * 100 SEK = approximately 10 US dollars or 10 Euro  | Libertananism:  |
| * 100 SEK = approximately 10 US dollars or 10 Euro  | Conservatism:   |
|   | You have 100 SEK left to allocate.  |
| Next  | * 100 SEK = approximately 10 US dollars or 10 Euro  |
| Next  |   |
| Next  | _   |
|   | Next  |
| <del>_</del>  |   |

The players have answered this question: Which ideology represents your opinions most accurately?

They chose between a number of alternatives.

This is what the players answered:

Socialism
Liberalism
Conservatism

Total

Socialism Liberalism Conservatism

Your task is to allocate a pot of 100 SEK.\*

How do you want to allocate the money?

You

\* Approximately 180 Egyptian pounds or 17,600 Lebanese pounds.

 $\rightarrow$ 

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|  | 37%  |                       |                       |          |  |
|--|--|-----------------------|-----------------------|----------|--|
| he players have s  | nswered this question: Whi   | ch subject were you k | past at in elementary | echool?  |  |
|  | n a number of alternatives.  |                       |                       | scrioor: |  |
| -  | guage Physical education   |                       | cis answered.         |          |  |
| attiettiatios Lai  | guage Friysical educatio   | "11                   |                       |          |  |
| Your task is to all  | ocate a pot of 100 SEK.* How   | do you want to alloca | te the money?         |          |  |
| You:   |  |                       |                       |          |  |
| Language:  |  |                       |                       |          |  |
|  |  |                       |                       |          |  |
| Physical education   | 1.   |                       |                       |          |  |
| Mathematics:   |  |                       |                       |          |  |
| You have 100 SEK I   | ft to allocate.  |                       |                       |          |  |
| * 100 SEK = approx   | mately 10 US dollars   |                       |                       |          |  |
|  |  |                       |                       |          |  |
| Next   |  |                       |                       |          |  |
| Next   | 41%  |                       |                       |          |  |
|  |  |                       |                       |          |  |
| he players have a  | nswered this question: Whi   |                       |                       |          |  |
| he players have a  | nswered this question: Whin  |                       |                       |          |  |
| he players have a  | nswered this question: Whi   |                       |                       |          |  |
| he players have a<br>hey chose betwee<br>cience-fiction N  | nswered this question: Whin  | This is what the play | ers answered:         |          |  |
| he players have a<br>hey chose betwee<br>cience-fiction N  | nswered this question: Whi<br>n a number of alternatives.<br>usical Action                       | This is what the play | ers answered:         |          |  |
| he players have a hey chose betwee clence-fiction N  | nswered this question: Whi<br>n a number of alternatives.<br>usical Action                       | This is what the play | ers answered:         |          |  |
| he players have a<br>hey chose betwee<br>cience-fiction N<br>Your task is to all<br>You:   | nswered this question: Whi<br>n a number of alternatives.<br>usical Action                       | This is what the play | ers answered:         |          |  |
| he players have a hey chose between cience-fiction in Your task is to all You:  Science-fiction:   | nswered this question: Whi<br>n a number of alternatives.<br>usical Action                       | This is what the play | ers answered:         |          |  |
| he players have a hey chose betwee cience-fiction M  Your task is to all  You:  Science-fiction:  Action:  | nswered this question: Whin a number of alternatives. usical Action  cate a pot of 100 SEK.* How | This is what the play | ers answered:         |          |  |
| he players have a hey chose betwee cience-fiction in the Your task is to all Your task | nswered this question: Whin a number of alternatives. usical Action  cate a pot of 100 SEK.* How | This is what the play | ers answered:         |          |  |

| 44%  |                   |
|--|-------------------|
|  |                   |
| The players have answered this question: What is your religious    | affiliation?      |
| They chose between a number of alternatives. This is what the p    | players answered: |
| Christian Muslim Atheist   |                   |
|  |                   |
| Your task is to allocate a pot of 100 SEK.* How do you want to all | locate the money? |
|  |                   |
| You:   |                   |
| Atheist:   |                   |
|  |                   |
| Christian:   |                   |
| Muslim:  |                   |
| V 1 400 05V1 01 11 1   |                   |
| You have 100 SEK left to allocate.                                 |                   |
| * 100 SEK = approximately 10 US dollars                            |                   |
|  |                   |
|  |                   |
| Next   |                   |
|  |                   |

#### Study 1

Below are some extra results from study 1. Table A1 gives an overview of the gender and age distribution among Christians, Muslims, atheists, agnostics, and others. It also provides descriptive information about how these religious groups answered some of the religious measures. Figure A1 shows the education levels of Christians, Muslims, atheists, agnostics, and others.

#### Study 2

Below are some extra results from study 2. Table A2 gives an overview of the gender and age distribution among Christians, Muslims, atheists, agnostics, and others. It also provides descriptive information about how these religious groups answered some of the religious measures. Figure A2 shows the education levels of Christians, Muslims, atheists, agnostics, and others.

# Study 3

Below are some extra results from study 3. Table A3 gives an overview of the gender and age distribution among Christians, Muslims, atheists, agnostics, and others. It also provides descriptive information about how these religious groups answered some of the religious measures. Figure A3 shows the education levels of Christians, Muslims, atheists, agnostics, and others.

# Differences in outcome between studies

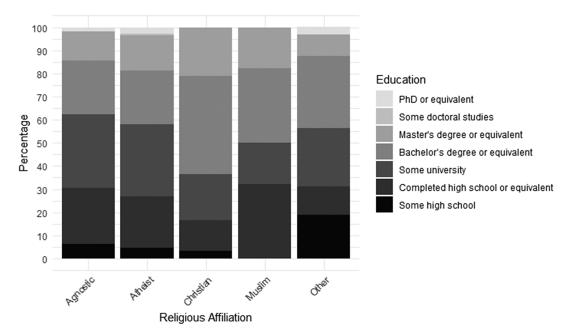
Christians in study 2 gave a mean of 34.62% to their ingroup and 32.17% to their outgroups, while Christians in study 3 gave 51.26% to their ingroup and 21.44% to their outgroups, on average. Using a difference score variable in a univariate ANOVA, where outgroup allocation was subtracted from ingroup allocation in the religion round, a significant difference between studies was found, F(2, 328) = 10.37, p < .001. Bonferroni post hoc tests found that the difference between Christians' ingroupoutgroup allocation in study 3 was significantly higher than in study 2 (p < .001). Muslims in study 2 gave 43.17% to their ingroup and 27.98% to their outgroups, while the Muslims in study 3 gave 50.29% to their ingroup and 22.50% to their outgroups in the religion round. Using a similar difference score for Muslims in the three studies, the outgroup-ingroup allocation was found to differ significantly, F(2, 695) = 4.51, p = .011. Bonferroni post hoc tests found that the outgroup-ingroup difference was higher

**Table A1.** Descriptive information about gender, age, and some of the religious measures for five religious groups based on participants' religious affiliation in study 1.

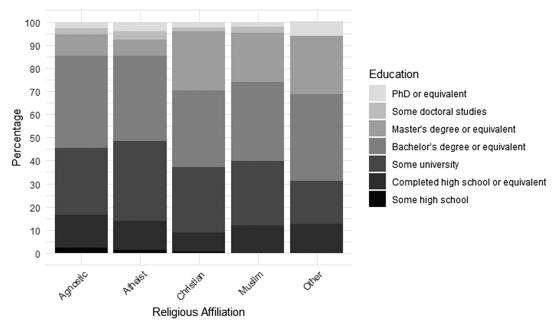
|                                     | Christian $(N = 90)$ | Muslim (N = 28) | Atheist $(N = 145)$ | Agnostic <sup>a</sup> $(N = 112)$ | Other <sup>b</sup> $(N=23)$ |
|-------------------------------------|----------------------|-----------------|---------------------|-----------------------------------|-----------------------------|
| Gender N (%)                        | Women: 42            | Women: 15       | Women: 47           | Women: 49                         | Women: 9                    |
| · /                                 | (46.7%)              | (53.6%)         | (32.4%)             | (43.8%)                           | (39.1%)                     |
|                                     | Men: 48              | Men: 13         | Men: 96             | Men: 63                           | Men: 11                     |
|                                     | (53.3%)              | (46.4%)         | (66.2%)             | (56.3%)                           | (47.8%)                     |
|                                     | Other: 0             | Other: 0        | Other: 2            | Other: 0                          | Other: 3                    |
|                                     | (0%)                 | (0%)            | (1.4%)              | (0%)                              | (13.0%)                     |
| Age                                 | 32.6                 | 31.3            | 29.5                | 31.6                              | 33.7                        |
| M(SD)                               | (9.7)                | (8.8)           | (8.6)               | (11.8)                            | (10.8)                      |
| Belief in God(s)                    | 75.06                | 93.6            | 3.36                | 20.7                              | 31.43                       |
| M(SD)                               | (31.91)              | (19.1)          | (9.69)              | (25.1)                            | (39.03)                     |
| Central role                        | 5.88                 | 8.71            | 1.43                | 2.15                              | 4.04                        |
| M(SD)                               | (3.34)               | (1.94)          | (2.66)              | (2.94)                            | (3.86)                      |
| Religious activities with others    | 3.21                 | 3.79            | 1.14                | 1.27                              | 1.41                        |
| M(SD)                               | (1.86)               | (2.32)          | (0.37)              | (0.55)                            | (1.10)                      |
| Religious activities without others | 4.13                 | 6.00            | 1.07                | 1.47                              | 2.41                        |
| M(SD)                               | (2.37)               | (1.79)          | (0.52)              | (1.23)                            | (2.11)                      |
| Sacrifices                          | 3.36                 | 5.82            | 1.19                | 1.52                              | 2.52                        |
| M (SD)                              | (2.07)               | (1.57)          | (0.86)              | (1.52)                            | (2.06)                      |

 $<sup>^{</sup>a}$ Three categories were included in Agnostics: those who for religious affiliation indicated that they 'believe in higher powers but no organized religion' (N = 27), 'have not decided' (N = 19), and 'agnostics' (N = 66).

 $<sup>^{</sup>b}$ Three categories were included in Other: those who for religious affiliation indicated that they were Buddhist (N = 4), Jewish (N = 3), and other (N = 16).



**Figure A1.** Composition of education level for agnostics, atheists, Christians, Muslims, and others in study 1.



*Figure A2.* Composition of education level for agnostics, atheists, Christians, Muslims, and others in study 2.

in study 3 than in study 2 (p = .008). There was no significant difference between studies when the same analysis was done for atheist participants, F(2, 351) = 0.52, p = .597.

# Analyses of data from all three studies

Table A4 displays correlations between religiosity measures and how much participants in studies 1-3 gave to ingroup and outgroup members in the religion round.

**Table A2.** Descriptive information about gender, age, and some of the religious measures for five religious groups based on participants' religious affiliation in study 2.

|                                     | Christian $(N = 169)$ | Muslim $(N = 151)$ | Atheist $(N = 203)$ | Agnostic <sup>a</sup> $(N = 182)$ | Other <sup>b</sup> $(N = 8)$ |
|-------------------------------------|-----------------------|--------------------|---------------------|-----------------------------------|------------------------------|
| Gender N (%)                        | Women: 75             | Women: 64          | Women: 99           | Women: 80                         | Women: 3                     |
|                                     | (44.4%)               | (42.4%)            | (48.8%)             | (44.0%)                           | (37.5%)                      |
|                                     | Men: 94               | Men: 87            | Men: 98             | Men: 98                           | Men: 5                       |
|                                     | (55.6%)               | (57.6%)            | (48.3%)             | (53.8%)                           | (62.5%)                      |
|                                     | Other: 0              | Other: 0           | Other: 6            | Other: 4                          | Other: 4                     |
|                                     | (0%)                  | (0%)               | (3.0%)              | (2.2%)                            | (0%)                         |
| Age                                 | 33.61                 | 29.01              | 30.87               | 29.87                             | 26.75                        |
| M(SD)                               | (10.48)               | (10.04)            | (10.25)             | (8.74)                            | (6.34)                       |
| Belief in God(s)                    | 86.64                 | 91.61              | 2.54                | 23.56                             | 34.75                        |
| M (SD)                              | (19.33)               | (15.49)            | (6.95)              | (26.56)                           | (39.97)                      |
| Central role                        | 7.14                  | 7.97               | 0.33                | 0.99                              | 2.13                         |
| M(SD)                               | (2.52)                | (2.19)             | (1.40)              | (1.68)                            | (2.70)                       |
| Religious activities with others    | 3.54                  | 4.57               | 1.09                | 1.29                              | 1.50                         |
| M(SD)                               | (1.87)                | (2.09)             | (0.34)              | (0.57)                            | (0.54)                       |
| Religious activities without others | 4.53                  | 5.64               | 1.03                | 1.36                              | 2.75                         |
| M(SD)                               | (2.06)                | (1.98)             | (0.25)              | (0.93)                            | (2.19)                       |
| Sacrifices                          | 4.34                  | 5.28               | 1.07                | 1.34                              | 2.00                         |
| M(SD)                               | (1.88)                | (1.62)             | (0.38)              | (0.78)                            | (1.20)                       |

<sup>&</sup>lt;sup>a</sup>Three categories were included in Agnostics: those who for religious affiliation indicated that they 'believe in higher powers but no organized religion' (N = 23), 'have not decided' (N = 5), and 'agnostics' (N = 154).

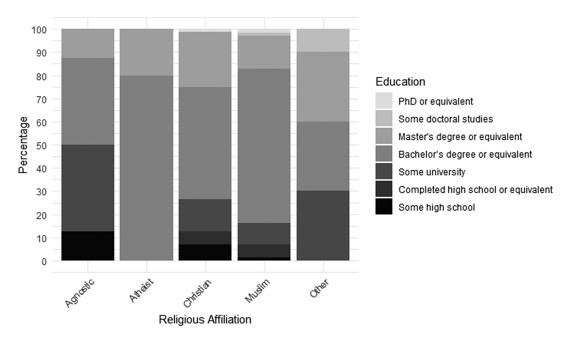
<sup>&</sup>lt;sup>b</sup>One category was included in Other: those who for religious affiliation indicated 'other' (N = 8).

**Table A3.** Descriptive information about gender, age, country, and some of the religious measures for five religious groups based on participants' religious affiliation in study 3.

|                                     | Christian ( <i>N</i> =72) | Muslim ( <i>N</i> =519) | Atheist (N=5) | Agnostic <sup>a</sup> (N=8) | Other <sup>b</sup> (N=4) |
|-------------------------------------|---------------------------|-------------------------|---------------|-----------------------------|--------------------------|
| Gender N (%)                        | Women: 42                 | Women: 268              | Women: 4      | Women: 5                    | Women: 2                 |
|                                     | (58.3%)                   | (51.6%)                 | (80.0%)       | (62.5%)                     | (50.0%)                  |
|                                     | Men: 30                   | Men: 250                | Men: 1        | Men: 3                      | Men: 2                   |
|                                     | (41.7%)                   | (48.2%)                 | (20.0%)       | (37.5%)                     | (50.0%)                  |
|                                     | Other: 0                  | Other: 1                | Other: 0      | Other:0                     | Other:0                  |
|                                     | (0%)                      | (0.2%)                  | (0%)          | (0%)                        | (0%)                     |
| Age                                 | 32.96                     | 31.88                   | 32.40         | 24.75                       | 33.0                     |
| M(SD)                               | (11.36)                   | (9.55)                  | (11.19)       | (5.97)                      | (6.33)                   |
| Country                             | Egypt: 17                 | Egypt: 428              | Egypt: 3      | Egypt: 2                    | Egypt: 3                 |
| N(%)                                | (23.6)                    | (82.5)                  | (60)          | (25)                        | (75)                     |
| . ,                                 | Lebanon: 55               | Lebanon: 91             | Lebanon: 2    | Lebanon: 6                  | Lebanon: 1               |
|                                     | (76.4)                    | (17.5)                  | (40)          | (75)                        | (25)                     |
| Belief in God(s)                    | 91.67                     | 97.72                   | 3.00          | 53.63                       | 82.25                    |
| M(SD)                               | (19.30)                   | (8.64)                  | (4.47)        | (50.48)                     | (24.09)                  |
| Central role                        | 8.28                      | 8.73                    | 3.80          | 4.50                        | 6.25                     |
| M(SD)                               | (1.96)                    | (1.83)                  | (4.76)        | (3.30)                      | (4.19)                   |
| Religious activities with others    | 4.14                      | 5.44                    | 1.20          | 2.25                        | 3.50                     |
| M(SD)                               | (1.75)                    | (2.01)                  | (0.45)        | (1.83)                      | (2.38)                   |
| Religious activities without others | 5.42                      | 6.07                    | 1.20          | 3.50                        | 3.00                     |
| M(SD)                               | (1.83)                    | (1.60)                  | (0.45)        | (2.73)                      | (1.83)                   |
| Sacrifices                          | 7.32                      | 8.15                    | 0.20          | 3.00                        | 5.00                     |
| M(SD)                               | (2.28)                    | (2.17)                  | (0.45)        | (2.56)                      | (3.56)                   |

<sup>&</sup>lt;sup>a</sup>Three categories were included in Agnostics: those who for religious affiliation indicated that they 'believe in higher powers but no organized religion' (N = 3), 'have not decided' (N = 2), and 'agnostics' (N = 3).

 $<sup>^{\</sup>mathrm{b}}$ One category was included in Other: those who for religious affiliation indicated 'other' (N=4).



*Figure A3.* Composition of education level for agnostics, atheists, Christians, Muslims, and others in study 3. Note that only 5 atheists, 8 agnostics and 4 people in the other category participated in study 3.

**Table A4.** Correlations between religiosity measures and amount given to religious ingroup and outgroups.

|                           | Christian ( <i>N</i> =331) | Muslim ( <i>N</i> =698) | Atheist ( $N=353$ )  |
|---------------------------|----------------------------|-------------------------|----------------------|
| Belief in God(s)          |                            |                         | _                    |
| Amount given to ingroup   | r = 0.230, p = <.001       | r = 0.158, p = <.001    | r = -0.012, p = .410 |
| Amount given to outgroups | r = -0.053, p = .167       | r = -0.142, p = <.001   | r = 0.076, p = .077  |
| Central role              |                            |                         |                      |
| Amount given to ingroup   | r = 0.266, p = <.001       | r = 0.159, p = <.001    | r = 0.019, p = .364  |
| Amount given to outgroups | r = -0.095, p = .039       | r = -0.139, p = <.001   | r = -0.043, p = .210 |
| With others               |                            |                         |                      |
| Amount given to ingroup   | r = 0.170, p = .001        | r = 0.113, p = .002     | r = -0.089, p = .047 |
| Amount given to outgroups | r = -0.119, p = .016       | r = -0.120, p < .001    | r = 0.085, p = .056  |
| Without others            |                            |                         |                      |
| Amount given to ingroup   | r = 0.202, p < .001        | r = 0.119, p = .001     | r = -0.009, p = .431 |
| Amount given to outgroups | r = -0.050, p = .183       | r = -0.142, p = <.001   | r = 0.118, p = .014  |
| Sacrifices                |                            |                         |                      |
| Amount given to ingroup   | r = 0.246, p = <.001       | r = 0.118, p = .001     | r = 0.007, p = .450  |
| Amount given to outgroups | r = -0.113, p = .020       | r = -0.130, p = <.001   | r = 0.092, p = .043  |
|                           |                            |                         | -                    |

Correlations between religiosity measures and amount given to religious ingroup and outgroups. For the Christian and Muslim participants, all religiosity measures correlated positively with amount given to the ingroup and some of them correlated negatively with amount given to outgroups. All studies are combined in this table, but similar results (not always significant, but in the same direction), were found when the same analyses were made for the studies separately. All *p*-values are one-tailed.

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