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Hannah Kirk

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This paper investigates the relative role of religion in trust networks and proposes a model of the interaction between material payoffs and norm-dependent utility, permitting cooperative equilibria. Four influences on decision-making - believing in religion, stereotyping, belonging to a group, and priming - are tested in the laboratory, using an adapted trust game. The experimental design builds on a classic trust game but reveals characteristics of Responders and Proposers in multiple rounds, better aligning with societal interactions where both parties condition actions and reactions on available information. Religious individuals are both more trusting and trusted; stereotyped trust is a rational strategy. A Cambridge University sample provides unique collegiate affiliation confirming that dense secular networks equally, but less intensely, promote trust.

Cooperation and Creed: An Experimental Study of Religious Affiliation in Strategic and Societal Interactions

Hannah Kirk[a,*]

[a] *Trinity College, University of Cambridge, Trinity Street, Cambridge, CB2 1TQ, UK*

Abstract

This paper investigates the relative role of religion in trust networks and proposes a model of the interaction between material payoffs and norm-dependent utility, permitting cooperative equilibria. Four influences on decision-making - believing in religion, stereotyping, belonging to a group, and priming - are tested in the laboratory, using an adapted trust game. The experimental design builds on a classic trust game but reveals characteristics of Responders and Proposers in multiple rounds, better aligning with societal interactions where both parties condition actions and reactions on available information. Religious individuals are both more trusting and trusted; stereotyped trust is a rational strategy. A Cambridge University sample provides unique collegiate affiliation confirming that dense secular networks equally, but less intensely, promote trust.

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Author Biography: **Hannah Kirk** is a graduate student and Yenching Scholar at Peking University, China. She graduated from Trinity College, University of Cambridge in 2018 with a Double First in Economics (B.A). Hannah's research concentrates on experimental and behavioural economics, along with the cultural determinants of decision-making.

1. Introduction

From hunter-gatherer societies bound by kinship, human beings have organised themselves into large societies characterised by anonymous but cooperative interactions. This paper investigates the role of religion in "norms and institutions that sustain fairness in ephemeral exchanges" (Henrich *et al.* 2010, p.1480). Religious creeds have long been used

*Corresponding author; *Email:* hannah@thekirks.co.uk; *Phone:* +86 13146435199;
Permenant address: 9 Chaucer Road, Cambridge, CB2 7EB

to instil pro-social and trusting behaviours, acting as a coordination device in heterogeneous populations of genetically unrelated individuals. In testament of its significance, the bible instructs *'Trust thy neighbour'* and the US dollar implores *'In God We Trust'*. The exploitation of a mutually-reinforcing belief system by both the religious and the secular acts as a behavioural heuristic to govern interactions between strangers. Common knowledge of religious doctrines creates a social network where mutual trust is lent (Putnam 1993), transcending the absence of kinship and permitting cooperation in societal interactions (Henrich *et al.* 2010). Religion makes cooperation a winning strategy. The aim of this paper is to test the effectiveness of religion and alternative group affiliations in generating cooperation. It utilises a model of the interaction between material payoffs and norm-dependent utility, where pressure to conform to group norms permits cooperative equilibria. Adherence to accepted moral creeds (*Believing*) vis-à-vis religious or secular group affiliation (*Belonging*) can apply this internal pressure. Expectations of a partner's characteristic gameplay (*Stereotyping*) and increased salience of religious thought (*Priming*) can influence behaviour externally. Understanding the social significance of religion requires such scrutiny between religious values and groups (Hoffman 2013).

This study's design departs from existing literature in a number of ways. In the laboratory experiment participants play a modified version of the Berg et al. (1995) trust game with repeated rounds revealing different information on partner type e.g. your partner is anonymous, your partner is religious or your partner has the same religious affiliation as you. This within-subject approach identifies the different responses of each individual to different partners. The design reveals the relative importance of believing, belonging and stereotyping devices for decisions made under uncertainty. The battery of treatment rounds better isolates: (1) positive and negative stereotyping conditioned on revealed information and (2) in-group versus out-group behaviours. This experimental design permits comment not only on how beliefs govern behaviour of religious individuals but also how expectations of stereotypical religious behaviour imbue trust. Additionally, unlike previous experiments, trustworthiness (the Responder's full strategy set) is conditioned by partner characteristics to capture pure prosociality unmarred by expected reciprocity. Results are evaluated with uni-dimensional and multi-dimensional models derived from independent factor analysis, mitigating bias from self-reported religiosity. The factor rotation and regression techniques require less restrictive assumptions than previous methods used in the literature. Finally, and crucially, religion is viewed as a coordination device but through a comparative lens to secular affiliation. The belonging channel is isolated using unique collegiate affiliation to mimic in-group effects of religion. Cambridge University comprises 31 autonomous colleges responsible for provision of accommodation, food, and pastoral care. The strength of intra-collegiate friendship is demonstrated succinctly in the network diagram presented in Figure 1. The cluster of tight-knit community networks align interests in a way other secular affiliation, namely political or environmental alliance, cannot. Uncoupling the role of religious networks from social networks in this way has not previously been attempted.

Four predictions arise based on existing literature and the proposed model. Firstly, a **believing hypothesis**, individuals with stronger religious beliefs always display more prosociality and trust towards partners. Secondly, a **stereotyping hypothesis**, individuals

use expectations of their partners' characteristics to determine trust. Thirdly, a **belonging hypothesis**, partners of the same norm-group display more mutual trust. Finally, a **priming hypothesis**, manipulating individuals for salience of religious thought increases prosociality.

The experimental results support the first three of these predictions. Religion is predictive of gameplay in a trust game - through own religious characteristics and stereotyping of these characteristics by others. Religious individuals are significantly more trusting with all partners, especially those from their own religion evidencing in-group favouritism. All individuals, secular and religious, are more trusting of religious over anonymous partners. Greater trust is a rational strategy given the trustworthiness of religious participants. Group belonging drives these results: partners of the same group display greater trust and other-regarding behaviour. Trust is consolidated when group affiliation is common knowledge. Individuals are more trustworthy towards in-group partners with higher return proportions. Religious and secular in-group effects strengthen trust networks; believing and belonging conjointly provide cooperative infrastructure between strangers. Priming produced insignificant results, perhaps due to the weakness of the instrument and decision-fatigue biases.

Compared to previous experimental research (Hoffman 2013), these findings confirm religion's function as a social identifier but additionally identify the significance of religiosity for individual behaviour. Religion promotes cooperation towards other specific adherents, conditioned on environment of interaction (Scobie 1975). Given this, the strength of this experiment rests on the informational revelation methodology to mimic the societal complexities of religion amongst other group affiliations but in a strategic laboratory game.

This paper proceeds as follows. Section 2 reviews the relevant literature, Section 3 outlines the model and theoretical considerations. Section 4 explains the experimental procedure. Section 5 describes the statistical methods applied. Section 6 and 7 present the key and robustness results. Section 8 offers a discussion of strengths and limitations. Section 9 concludes.

2. Literature Review

Iannaccone (1998) broadly defines religion as "any shared set of beliefs, activities and institutions premised upon faith in supernatural forces" (p.1431). To delineate the dimensions of religion is theoretically and empirically challenging. The coevolution of religious institutions with societies introduces problematic endogeneity. Advancing Weber's (1958) initial identification of desirable protestant qualities, cross-country studies (Barro and McCleary 2003; Putnam 1993; La Porta *et al.* 1997) suggest religion is conducive to economic growth but if culture is indeed 'sticky', as Rubin and Karaja (2017) propose, such studies do not evince causal effects. Religion is pervasive, but also heterogeneous. Existing literature displays considerable Judeo-Christian bias, and despite participation from nine major religions, this study suffers from similar over-representation of a few. To demonstrate religion's causal impact, only a "genuine experiment will suffice" (Freeman 1986, p.371). Experimentally testing religiosity and trust allows observation of behaviour whilst controlling confounding characteristics of participants.

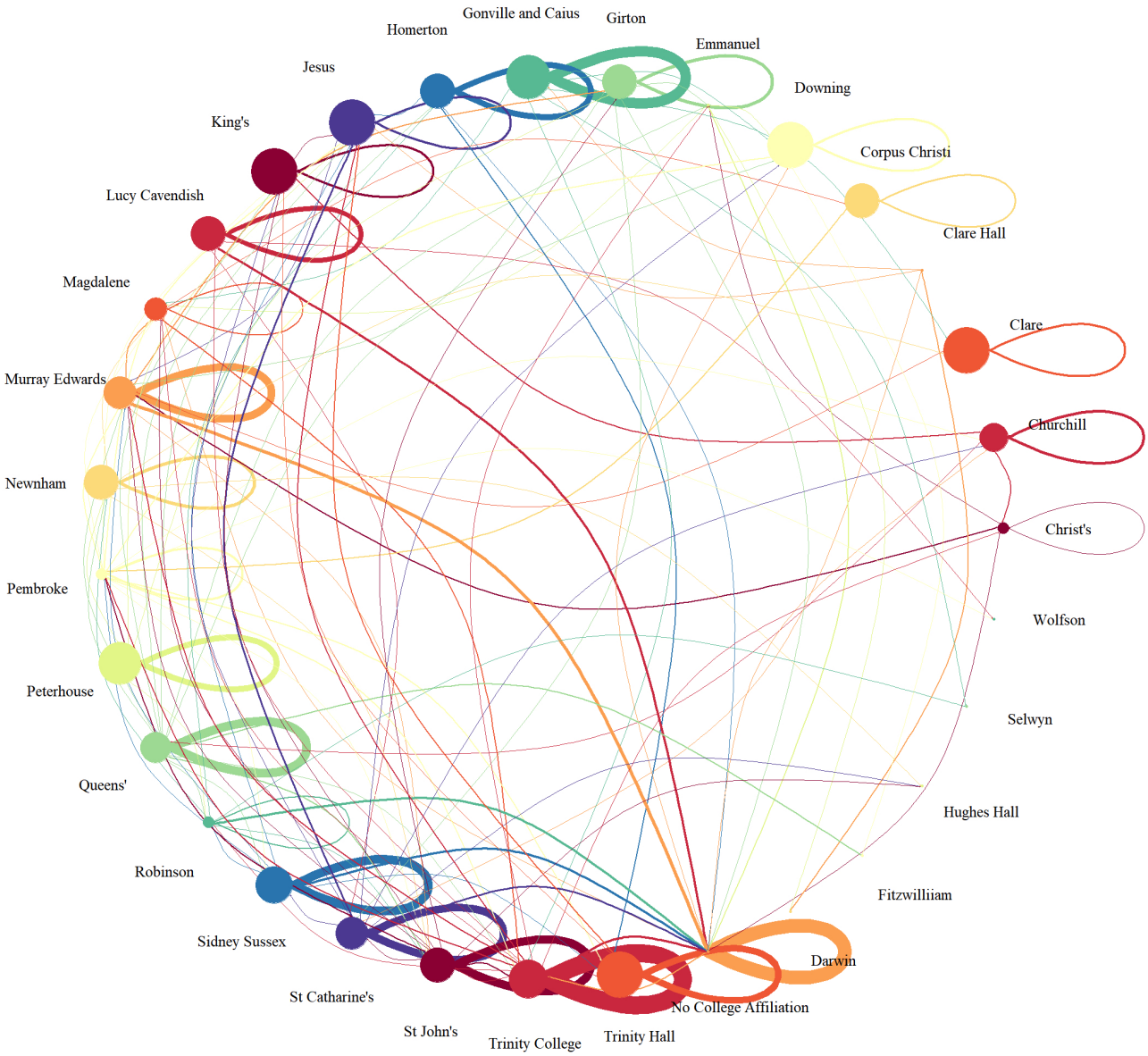

Figure 1: Network diagram of within and between collegiate friendships. Each node is a college. Node size scaled by proportion of total friends in college. Edges are friendships between individuals. Edge width gives number of individuals with that specific link. Links looping back to their origin represent intra-college friendships. *Colour for print*

Trust prevents opportunistic behaviour and promotes economic growth (Knack and Keefer 1997). Arrow (1972) argues "much of the economic backwardness in the world can be explained by a lack of mutual confidence" (p.357). This study uses a modified version of Berg, Dickhaut and McCabe's (1995) trust game, widely used to elicit interpersonal trust and trustworthiness, where a Proposer decides how much money to send to a Responder, who decides how much of the tripled amount received to return. In subgame perfect equilibrium, the Proposer imbues no trust with expectation of none returned. Contrastingly, placing full trust in a partner educes a Pareto-optimal solution, characterising a classic social dilemma.

Using trust games, Tan (2006) finds payment to anonymous partners is influenced positively by religious belief but negatively by religious participation, while Tan and Vogel (2008) show trust increases with trustee's religiosity. These studies benefit from multidimensional measures of religion advised by De Jong *et al.* (1976). In contrast, Anderson *et al.* (2010) find self-identified religious affiliation irrelevant to trusting behaviours. In a field experiment, Ruffle and Sosis (2003, 2006) examine religion's role promoting in-group cooperation. Jewish men belonging to the same kibbutz were more generous and trusting to their own, demonstrating religious participation reinforces beneficial collective favouritism.

Placing trust is risky. With uncertainty over partner type, beliefs are founded on stereotypical institutions which influence behaviour (Bowles and Gintis 2002, Balliet and Van Lange 2013). Religious doctrine instructs interpersonal trust to 'do unto others as you would have others do unto you', acting as 'cooperative infrastructure' (Binmore and Dasgupta 1986), governing beliefs into another's trustworthiness. Experimental studies show expectations of reciprocity determine trust (Rabin 1993, Fehr and Schmidt 2003). Beliefs about how beliefs affect behaviour (second order beliefs) are key to facilitating cooperation; players cooperate conditional on expected cooperation in return (Fischbacher *et al.* 2001). Orbell *et al.* (1992) shows religiosity is a marker of cooperation, so in absence of repeated actions and reputational concerns, it serves as a mechanism to Bayesian update expected strategies attributed to certain populations.

2.1. The Channels of Religion

Although religious behaviours are not rigidly dichotomous, religion has been broadly divided by *believing* and *belonging*. Belief orthodoxy, adherence to accepted creeds, induces moral other-regarding behaviours. The captivation of religious minds by the morally concerned supernatural ('Big Gods', Norenzayan 2013) promoted costly devout behaviours derived from moral instruction and divine reputation which reach beyond expectations of earthly reciprocity. Azzi and Ehrenberg (1975) propose individuals allocate time and money to secular and religious activities, maximising utility in this life and the afterlife. This 'belief only' approach is limited, ignoring a wide range of payoffs to religious activity beyond divine consideration.

Believing in religion is a concomitant channel to belonging to that religion. Iannaccone (1998) assigns religion as a 'club good', considering belonging from a rational choice perspective, costly rituals exclude free-riders from in-group benefits. In support of club models, Adam Smith (1776) analysed the clergy and congregation as corporations committed

to mutually-beneficial production. Indeed, Durkheim (1915) regarded religion as fundamentally collaborative. Many experimental studies suggest group belonging has a greater influence on behaviour than belief orthodoxy.

This dichotomous distinction is an unsatisfactory simplification and there remain gaps in the literature. Firstly, religion comprises beliefs but how they influence behaviour is unclear. To isolate the dominant mechanisms, this paper reveals different types of religious information. Secondly, while in-group and out-group behaviours are considered (Ruffle and Sosis 2006), little distinction is made between secular and religious group effects; under ambiguous definitions of religion, a bowling club is equivalent to a congregation (Iannaccone 1998). Darwin (1874) first argued secular institutions have scope to promote other-regarding behaviour over self-interest, while Becker and Dhingra (2001) argue "social networks, rather than beliefs" (p.329) enforce mutually-beneficial behaviours. Religions are simply particularly effective trust networks (Levy and Razin 2012). Freuhwirth *et al.* (2018) do begin to test the substitutability of "school clubs/sport participation or friendships for religiosity" (p.1) but the literature lacks comment on the interplay between religion and other networks more broadly. This study uses unique collegiate affiliation as a homophily cluster to better proxy non-religious but dense communities with their own belonging channels.

Rituals (e.g., daily prayer) inherently keep religion top of mind. Availability bias of religious thought has been experimentally tested by investigating how choices differ after religious identity is randomly made salient with an unscrambling sentence task. Shariff and Norenzayan (2007) and Liu *et al.* (2013) find primed subjects act more trustingly, but Choi and Fisher (2010) fail to replicate results with the same priming instrument. Differences in priming effect on both religious and secular individuals are also investigated in this paper.

This work complements previous work by investigating the operative channel by which religion affects behaviour but goes further addressing how beliefs about this mechanism affect one-shot interactions. Moreover, it extends existing literature on belonging, demonstrating strong secular group affiliation is weakly substitutable for religious affiliation. The key proposition is that ascription to the same shared values binds individuals together and religion is only one such coordination device.

3. Theory

In this section, norm-dependent utility is outlined and contrasted with the standard game theory solution of a trust game with, and without, certainty over partner characteristics.

3.1. Norm-Dependent Utility

A rich set of models exist to explain behaviour where agents regard their own and others' payoffs. Gagnon (2014) demonstrates religion can foster trust by introducing a threat of costly punishment, while Ng and Wang (2015) emphasise how a centralised institution changes dynamics of reciprocity between trustor and trustee. For one-shot interactions, Dasgupta's (2011) interpretation best applies where a disposition to obey social norms, defined as "shared understandings about actions that are obligatory, permitted, or forbidden"(Ostrom 2000, p.143), introduces a trade-off between self-interest and group conformity.

Cooperation is determined by internal and external expectations of group appropriate actions. Combining these ideas motivates the proposition that first-order beliefs (an intrinsic desire to play a certain strategy) and second-order beliefs (beliefs about type-contingent strategies) govern strategic behaviour. Following the model in Kimbrough *et al.* (2016), it is assumed behavioural influences of group affiliation are captured by a parameter measuring strength of individual norm-dependent preferences. The greater someone feels pressure to adhere, the further they deviate from the predicted self-interested strategies of traditional game theory.

3.2. Model

An extensive game allows for two sequential stages of the trust game and application of SPNE analysis. Let $N = \{1, ..., n\}$ be the set of players and a^T their actions. Define H as the finite set of histories where $h = (a^1, a^2, ..., a^T)$ of length T. Define Z as the set of terminal histories, and S the set of pure strategies.

The standard material payoff function $\pi_i : Z \to \mathbb{R}$ converts terminal histories Z to numeric values. As in Krupka and Weber (2013), there is a 'social appropriateness' of each action, where function g maps actions into a social appropriateness score, $g : A \to [-1, 1]$ where -1(/1) is 'very socially inappropriate(/appropriate)'. It is assumed group norms are common knowledge.

Define norm-dependent utility of player i:

$$U_i(z) = \pi_i(z) + \phi_i \sum_{i=1}^{T} g(a_i^t(z)) \tag{1}$$

Where ϕ_i is norm-pressure: how much selfishness is discounted for group norm adherence.

3.3. Trust Game

Proposer chooses to send $x \in [0, 6]$ to Responder and keeps remainder $(6-x)$. Responder receives $2x$ and chooses $y \in [0, 2x]$ to return to Proposer. Figure 2a presents the extensive form.

3.3.1. Standard Solution

Assuming linear utility and selfishness:

$$U_P(x, y) = (6 - x) + y \tag{2}$$

$$U_R(x, y) = 2x - y \tag{3}$$

Backward induction gives the SPNE. Responder chooses:

$$y^*(x) = \max_y U_R(x, y) \implies y^* = 0 \tag{4}$$

Responder returns nothing to maximise utility. Knowing this, Proposer sends nothing:

$$x^* = \max_{x \in [0,6]} [U_P(x, y) | y^* = 0] \implies x^* = 0 \tag{5}$$

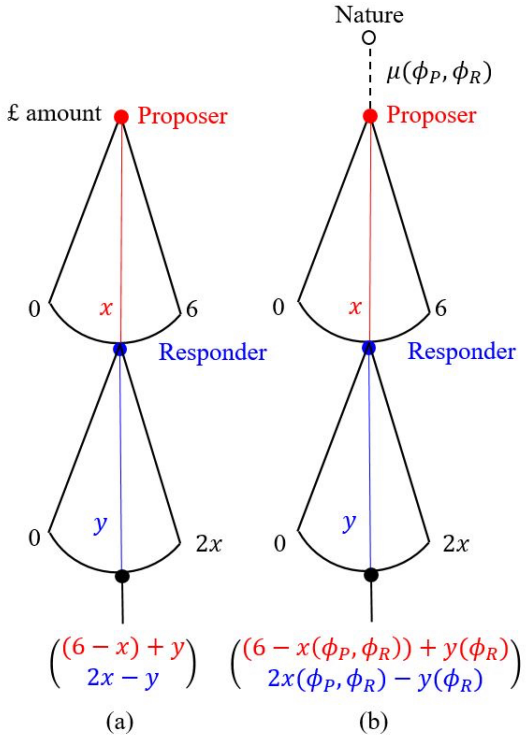

Figure 2: Extensive Form with certainty (panel a) and with uncertainty (panel b).

Equilibrium strategies yield zero-cooperation $\{S_P : x = 0; S_R : y = 0 \; \forall \; x \in [0, 6]\}$, with payoffs (6,0) to Proposer and Responder respectively. No trust is lent.

3.3.2. Norm-Dependent Solution

For Pareto-optimality, a social planner instructs Proposer to send everything $x = 6$ and Responder to return half ($y = 6$). To avoid loss of generality, assume Responder norm is a fraction $\omega_R \in [0, 1]$ such that $y = \omega_R x$; higher offers are met with higher returns. The upper bound represents the equitable solution where Responder returns $y = 6$, keeping the same amount for himself. Responder's norm is adjusted to preserve the [0,1] interval so highest disutility from deviant action is ϕ_R .
Norm-Utility of Proposer and Responder:

$$U_P(x, y, \phi_P) = (6 - x) + y - \phi_P g(6 - x) \tag{6}$$

$$U_R(x, y, \phi_R) = 2x - y - \phi_R g\left(\left|\frac{y - \omega_R x}{(2 - \omega_R)x}\right|\right) \tag{7}$$

Using backwards induction, Responder chooses:

$$y^*(x, \phi_R) = \max_{y \in [0, 2x]} 2x - y - \phi_R g\left(\left|\frac{y - \omega_R x}{(2 - \omega_R)x}\right|\right) \tag{8}$$

As $\phi_R \to 0$, $y^* \to 0$, i.e. as norm intensity dissipates, the amount returned decreases and selfishness dominates. As $\phi_R \to \infty$, $y^* \to \omega_R x$ i.e. the norm-appropriate return.

Proposer conditionally chooses:

$$x^*(\phi_P, \phi_R, y) = \max_{x \in [0,6]} (6 - x) + y^*(x, \phi_R) - \phi_P g(6 - x) \tag{9}$$

Higher ϕ_P and ϕ_R encourage Proposer to send everything ($x^* = 6$).

3.3.3. Uncertainty over ϕ_i

Adopting Harsanyi's (1967) transformation from an incomplete to imperfect information game, Nature plays first to decide type (Figure 2b). Responder's strategy is unchanged, the game ends with their decision. Information on ϕ_P is irrelevant besides conditioning when Responder is more trustworthy and norm-sensitive if their partner belongs to the same norm-group. In this case, responses to revealed Proposer characteristics is captured by higher ϕ_R or by different norm-appropriateness of certain actions.

Placing trust is a risky investment. Proposer's strategy must be sequentially rational given beliefs of Responder's norm-disposition $\mu(\phi_R)$ which are updated on available information (e.g., revealed Responder characteristics). Optimal x thus solves:

$$x^* = \max_{x \in [0,6]} (6 - x) - \phi_P g(6 - x) + \mathbb{E}[y^*(x, \phi_R) | \mu(\phi_R)] \tag{10}$$

Proposer's payoff can be increasing in x if ϕ_R is high, allowing higher expected y^*. There is minimal difference between Proposer types because the optimal amount sent depends on beliefs about ϕ_R; both secular and religious players condition trust on available information. Contrastingly, high ϕ_R Responders will always be more trustworthy, returning larger proportions than lower ϕ_R counterparts.

3.4. Theoretical Predictions

Drawing on the literature and model forms four predictions:

Prediction 1. ***Believing****: Individuals with stronger beliefs in divine reputation have more moral concern, displaying more trust and altruism in all behaviour. ϕ_P and ϕ_R are always higher and self-interest weaker as both Proposer and Responder.*

Prediction 2. ***Stereotyping****: Proposers use expectations of partners' ϕ_R to place trust. Information indicating Responder belongs to a population with higher ϕ_R endorses more trust even from secular Proposers with lower ϕ_P.*

Prediction 3. ***Belonging****: Proposers and Responders matched with in-group partners conform more closely to the group norm, with higher ϕ_P, ϕ_R and dominating g. A magnified effect arises when belonging to the same group is common knowledge. In expectation, religious and collegiate in-group effects are stronger than weaker secular commonalities of environmental or political views. Collegiate affiliation isolates a belonging pressure without the contaminating effect of believing.*

Prediction 4. ***Priming****: Proposers treated with salience of religious thought have higher* ϕ_P*. It is possible secular individuals are encouraged to mimic religious altruism but a greater effect is expected for primed religious individuals by bringing group pressures to front of mind.*

4. Experimental Method

This section outlines the experimental design features, explained in comparison and contrast to previous studies. The experiment was conducted at the Judge Business School Laboratory in December 2017 testing 80 subjects in nine computerised sessions, each 40 minutes.

4.1. Trust and Trustworthiness

All subjects play both Responder and Proposer in a modified version of Berg *et al.*'s (1995) trust game. Proposer (the "truster") decides how many pounds to send Responder (the "trustee"). For each pound sent, Responder receives two before deciding how many to return to Proposer. Appendix A presents experimental instructions. As Tan and Vogel (2008) advise, neutral language avoids framing effects ("Participant A" not "Proposer"; "pass" not "invest"). To preserve anonymity and participants' belief in live matches, e.g. someone in their college, the participants were told matching occurred across two experimental locations. No communication between participants, screened workstations and the experimenter vacating the room protected privacy of decision-making. While double-blind procedures are ideal (Hoffman *et al.* 1996), this was not feasible. Payments of a fixed and variable component were determined via a branching algorithm (coded in VBA). A random winning round was chosen for the Proposer who was then matched to the nearest neighbour Responder with the stated characteristic in the selected round. The recorded response strategy of this Responder in this round determined the variable payment.

4.1.1. Proposer Round

Proposers started with £6 in each of 13 rounds presented in a randomised sequence to prevent order dependence (round description presented in the Code Book, Appendix B). Each round reveals information on partner characteristics. In the first round 'an anonymous partner' tests baseline trust under complete uncertainty. In rounds 2-9 first-order information is revealed about the partner's affiliations. Religiosity is more comprehensively tested compared to existing literature by separating 'your partner has told us they are religious' from 'has the same religious affiliation'. Separation identifies favouritism versus discrimination found by Fershtman *et al.* (2005) between in-group or out-group partners. Secular group affiliation was tested through collegiate ties revealing 'your partner is at the same college'. Distractor rounds 'environmental friendliness' and 'political inclination' provided alternative secular affiliation and mitigated the Hawthorne bias from presupposition religion is the test subject. In rounds 10-12, second-order information is revealed: characteristics of Responder and what Responder knows about Proposer. For example, 'your partner is at the same college and knows you are also at this college' which is termed 'Matched College'. Lastly, the participant is told they're playing a machine which tests differences between

treatment of human partners who value cooperation and reciprocity versus an inanimate computer. Expected machine aversion requires fixing this last to avoid a low framing point biasing earlier rounds.

4.1.2. Responder Round

Responders provided a full strategy set (Selten 1967) of returns for each hypothetical amount given by Proposer, a method preferred to live feedback which confounds the relationship of religiosity and trust by introducing situational dependence or spite. There were five rounds of Proposer information: anonymous, religious, same college, environmentally friendly and politically inclined. Each round had six decisions; to avoid decision-fatigue biasing later rounds, distractors were last.

4.1.3. Discussion of Experimental Design

The experimental design builds on Tan and Vogel (2008) but explores the natural extension to reveal information not just about Responders but also Proposers. While previously untested, this aligns more closely with societal interactions where both parties condition responses on available information and stereotypes. The literature standard initial endowment is £10 which permits increased variation and incentive power. However, this experiment endowed Proposers with £6 which mitigates decision-fatigue by reducing the number of Responder decisions from 60 to 36 but still permits the egalitarian option of sending half the original endowment.

Considering further advantages, Proposers believe they are matched with partners who possess certain characteristics and are later informed about the set of common knowledge. The literature alludes to, but does not specifically test, use of shared characteristics as coordination devices. The illusion of being live-matched with partners is non-credible unless: (1) Responder decisions are pre-recorded and (2) preliminary information about participants' college, religiosity, environmental friendliness and political inclination is collected. Consequently, the experiment began with five short survey questions, following which Responder's strategy set was recorded. To further enhance credibility, an automatic-delay loading screen was programmed instructing participants to wait while matched by the computer.

4.2. Priming

The design employs a priming instrument developed by psychologists Srull and Wyer (1979) and borrowed by economists (Liu *et al.* 2013; Choi and Fisher 2012; Shariff and Norenzayan 2007). The task involved unscrambling sentences with the treatment including words of a religious nature [Tables 1-2]. Participants were given five lists of five words but must form sentences using only four. They then played a subset of Proposer rounds with some distractor questions dropped for time and fatigue considerations. The instrument offers implicit and subtle means to activate religious thinking, circumventing problems of forthright measures e.g. reading passages.

4.3. Risk Aversion

Risk aversion is common among high religiosity individuals (Hoffman and Miller 1995), analogous to Pascal's Wager that irreligion is strategically risky with little gain if God doesn't

	Words	Unscrambled Sentence
1	Meal Divine Was Fork The	The Meal Was Divine
2	Act The Sacred Wet Is	The Act Is Sacred
3	The Gasoline Are Blessed Peacemakers	Blessed Are The Peacemakers
4	Righteous His Dancer Soul Was	His Soul Was Righteous
5	Helpful We Trust God In	In God We Trust

Table 1: Treatment Sentences

	Words	Unscrambled Sentence
1	The Flew She Sunburnt Kite	She Flew The Kite
2	Quickly Arrived Vividly Food The	The Food Arrived Quickly
3	Happened Folk Smile It Because	Smile Because It Happened
4	Ate The Pies Website Men	The Men Ate Pies
5	Sick Became Mountain Cat The	The Cat Became Sick

Table 2: Control Sentences

exist but considerable disutility if He does. To elicit risk aversion, participants made nine binary choices in a Holt-Laury (2002) multiple price list. Their methodology is used to calculate a coefficient of relative risk aversion under iso-elastic utility:

$$U(x) = \frac{x^{1-\sigma}}{1-\sigma} \tag{11}$$

To avoid restricting preferences, a single switching point was not enforced. With hindsight, disallowing multiple switches could be beneficial since six individuals recorded this behaviour indicating they did not fully understand the task.

4.4. Survey

The order of questions was randomised, mitigating decision-fatigue bias. Phraseology of questions was inclusive of all major religions to avoid the Judeo-Christian tilt of existing literature. Standardised questions of religion and trust were taken from the World Values Survey. Demographic characteristics do explain some variation, despite providing limited explanation of religious behaviour. Gender, for example, has been shown to be a determinant of trust with greater female generosity (Buchan and Croson 1999). Appendix B presents the code book and summary statistics for all variables.

In total, just under half (46.4%) of participants affiliated with a religion but all participants were questioned on religious practices. Religiosity questions were split into believing and belonging. Belief considers personal dimensions, e.g. prayer frequency and belief in god or afterlife. Stereotyped characteristics are extracted by asking are religious individuals more trustworthy, 46% of participants agreed. Belonging considers service attendance,

participation in and financial contribution to religious organisations. Comparable secular belonging records participation in societies or sports teams, attendance at social events, meals in hall or services in college chapels.

5. Statistical Method

This section presents an overview of factor analysis and its application to two religiosity models.

5.1. Factor Analysis

The common factor model states an observed variable is caused by unobserved factors plus an error term (Anderson 1963). Factor analysis is preferred for constructing a measure of religiosity as a condensed statement of relationships between the complex set of survey variables. Each isolated component captures a necessary but insufficient component of religiosity. Factor analysis has the added benefits of reducing numerous explanatory variables, mitigating multicolinearity and avoiding 'desirability bias' (Hoffman 2013) from self-reported religiosity.

5.1.1. Uni-Dimensional Religiosity Model

All aspects have high positive loadings on the primary factor in the uni-dimensional model [Table 3] which is interpreted as *'General Religiosity'*. Personal prayer and religious service attendance load strongly on this measure. Estimated specific variances indicate individuals' religiosity score on each unique measure varies substantially beyond variation explained by the common factor[1]. A p-value of 0.000 offers confirmation to refit the model with two common factors.

5.1.2. Multi-Dimensional Religiosity Model

Using Screeplot analysis (Cattell 1966), two factors are retained in the multi-factor model. Factor rotation aims to achieve 'simple structure' (Thurstone 1947) which is more interpretable. Previous factor analysis on religiosity variables (Tan 2006; Tan and Vogel 2008) assumes factor orthogonality, implicit in the use of the Varimax rotation method. Orthogonality implies the extracted factors - belief, ritual, experience - are uncorrelated. This assumption is viewed as inappropriate and, as such, an oblique method is instead used which performs non-rigid rotation of the axes allowing for interrelated factors. The Promax algorithm was considered but Generalised Procrustes Analysis with a specified target matrix gave better 'simple structure'. Figure 3 overlays unrotated, rotated Varimax and Procrustes loadings. This orientation clarifies the superiority of Procrustes to literature-used Varimax. Using the standard cut-off of 0.35, Table 3 presents the two emergent factors, interpreted as *'Believing'* and *'Belonging'*.

[1]Specific variance of 1 indicates no common factor component, and 0 indicates variable entirely determined by common factor

	Variable	Uni-Factor Loading		Multi-Factor Loadings	
		GENERAL REL	Specific Var	BELONGING	BELIEVING
1	Pray	0.8815	0.2229	0.4946	0.4713
2	God Belief	0.8409	0.2929		0.9349
3	Afterlife Belief	0.7598	0.4227		0.5522
4	Holy Books	0.8511	0.2757	0.8207	
5	Attend	0.8735	0.2369	0.8033	
6	Funds	0.7172	0.4856	0.4163	0.3850
7	Religious Upbringing	0.6608	0.5633	0.3967	
8	Grandparent Religiosity	0.4663	0.7825	0.3993	
9	Religious Participation	0.8644	0.2527	0.9008	

Table 3: Interpreted Factor Loadings in Two Religiosity Models

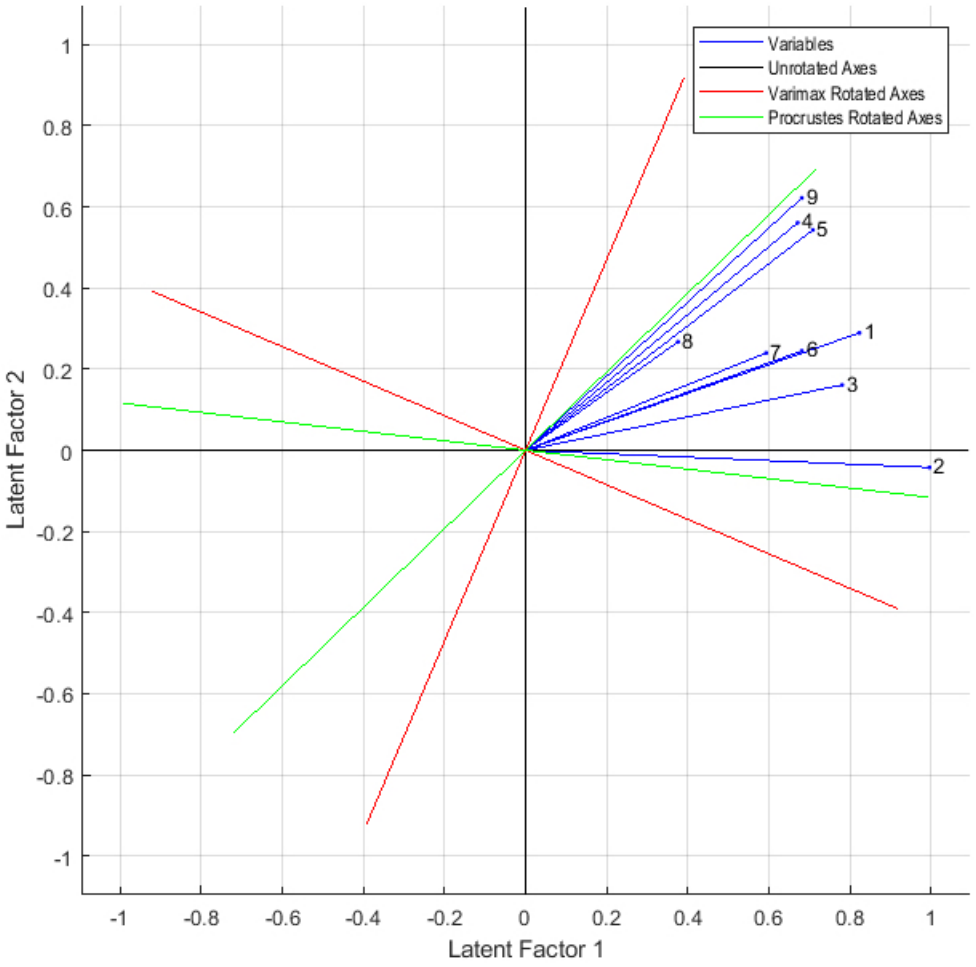

Figure 3: Overlay of Factor Analysis Methods. *Colour in print, but possible reproduction in greyscale*

5.2. Multivariate Analysis

Trust represented by the amount sent by Proposer (X_i) depends on: (1) own religiosity (Rel_i), (2) a vector of personal characteristics (Z_i') including sex and coefficient of risk aversion (CRRA), (3) round effects ($Round_i$) i.e. differential treatment of partners, and (4) interactions between own religiosity and round capturing in-group effects. There are unobserved individual fixed effects across rounds, and a round-variant idiosyncratic error. $Round_i$ is proposed as a function of expected reciprocity given available information $E[y_i|Round = R]$ and Proposer's norm and norm-pressure for that Responder type $[(\phi_P, g)|\phi_R]$.

$$X_i = \beta_0 + \beta_1 Rel_i + \gamma' Z_i' + \lambda' Round_i + \beta_2 (Round_i \times Rel_i) + \mu_i + \varepsilon_{iR} \tag{12}$$

A similar framework for trustworthiness defines Responder's return proportion (Y_i) but differs in two dimensions since the game ends subsequently: CRRA is not included as a control and $Round_i$ does not depend on expected reciprocity, only on altruism $[\phi_R, g]$. The strategy method removes situational dependence so amount received is not included as a regressor.

$$Y_i = \delta_0 + \delta_1 Rel_i + \omega' Z_i' + \psi' Round_i + \delta_2 (Round_i \times Rel_i) + \mu_i + \varepsilon_{iR} \tag{13}$$

Regression equation (12) is estimated using an ordered probit model assuming trust is a latent continuous variable underlying the ordinal discrete responses observed, regarded a more suitable assumption than literature standards of OLS or Tobit estimation. Fixed-effects estimation removes round-invariant individual heterogeneity and order effects but reduces variation since Rel_i is constant. By also adding individual and session-level random-effects, a multilevel mixed-effects specification best accounts for individual heterogeneity and non-independence from within-subject design (Moeltner *et al.* 2008).

Figure 4 shows return proportions are distributed somewhat unusually. An ordered probit requires fewer categories and despite use of OLS in the literature, such assumptions are considered inappropriate for the data at hand. Instead, the data is categorised into three levels of trustworthiness - low, medium and high - estimating (13) using a binary probit model. Groupings of trustworthiness, described as low-, medium- and high-types, are asymmetric in nature: a negative coefficient for low-type trustworthiness is not equal and opposite for high-type, owing to few return proportions being above two-thirds of amount received. In general, participants preserved some self-interest. Given how few participants were categorised as high trustworthiness, the results are not reported due to lack of the subset's sample size.

6. Results

Mixed and fixed-effect specifications controlling for individual heterogeneity give consistent estimates across variables but increase coefficient magnitude implying unobservables add a downward bias. The more appropriate mixed-effect coefficients are discussed hereafter but conclusions are robust to specification changes. The effectiveness of religiosity in conditioning individual trust, individual trustworthiness and two-way cooperation in trust

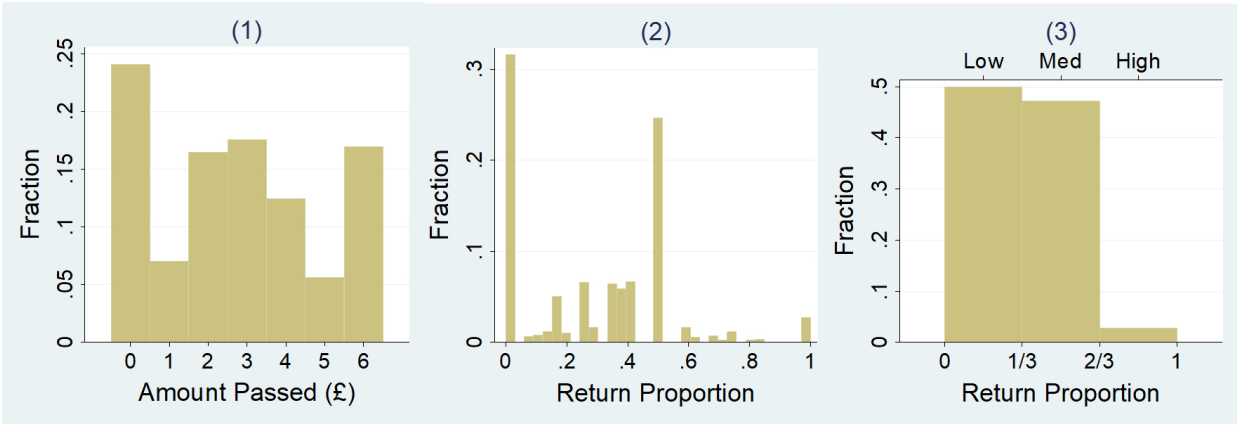

Figure 4: (1) Proposer Amount Sent (Trust), (2) Raw Responder Proportion Returned (Trustworthiness), (3) categories from (2). *Colour in print but possible reproduction in greyscale*

networks is first tested examining Uni-Dimensional Model results. However, religiosity itself contains both believing and belonging channels. Thus, for robustness and better identification of channel strength, Multi-Dimensional Model results are subsequently discussed.

6.1. Believing

Result 1. *Highly religious individuals are more trusting even with anonymous partners.*

Considering significant Proposer characteristics, high self-defined religiosity and general religiosity increase trust even with anonymous partners (giving over £0.90 more on average) confirming indiscriminate prosociality. Supporting Anderson *et al.* (2010), religious affiliation is not significant; it is strength of religiosity, not merely affinity to a religious group, which matters.

Table 4: Trust Ordered Probit with Proposer Religiosity

	Proposer Rel		
Pass Amount ∈ (£0, £6)	(1)	(2)	(3)
Rel Affil	0.334		
	(0.424)		
Self-Defined High Rel		0.931*	
		(0.452)	
High Gen Rel			0.912^{+}
			(0.508)
Controls	Y	Y	Y
Round Dummies	Y	Y	Y
N	1015	1015	1015
$^{+}$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$			
Robust standard errors in parentheses, clustered by ID. Standard coefficients reported. Multilevel mixed-effects estimation results reported. Random-effects also estimated and consistent (available upon request).Controls = {sex, crra}. Comparison group to High Gen Rel = weakly religious and non-religious individuals by factor score.			

Result 2. *Religious individuals are more trustworthy even with anonymous partners.*

Considering Responder own characteristics, highly religious individuals are 19.3% (at means) less likely to be categorised as low-type trustworthiness and more likely medium-type.

6.2. Stereotyping

Result 3. *Trust placed in partners depends on expected reciprocity which is conditioned on revealed characteristics. Positive qualities stereotypical of prosociality foster trust, while negative qualities restrict it.*

Considering significant partner characteristics, religious individuals are granted more trust, receiving £0.83 more on average compared to baseline anonymity. Environmentally friendly partners receive smaller positive bonuses. Conversely, individuals trusted politically inclined partners less, indicating negative stereotyping, and displayed machine aversion as expected offering a computer partner less than a human one. Result 3 indicates partner characteristics are used to condition trust beyond a consideration if this partner is in- or out-group. Stereotyping on available, albeit limited information, is a smart approach: given Result 2, if a Responder is religious, conditioning trust on increased expected reciprocity is a rational strategy because religious individuals are indeed more trustworthy.

6.3. Group Belonging

Result 4. *Religious individuals trust those belonging to religions more, especially when matching their own. Across all individuals, more trust is placed in same college partners. Belonging to the same network, either secular or religious, acts as a coordination device.*

Considering interactions between own religiosity and partner rounds, is trust of religious partners driven by religious participants? The Uni-Dimensional Model captures in-group favouritism with high general religiosity individuals sending more to religious partners (+£1.90 to baseline) but yet more to those from the same religion (+£2.02, 34% of total budget). Use of shared information coordinates trust, when both partners' religiosity is common knowledge £1.82 more is sent. Supporting the 'club good' (Iannaccone 1998) and favouritism-discrimination explanations (Ruffle and Sosis 2006), religious adherents cooperate most with in-group partners in a mutually-beneficial but exclusive network. Non-religious individuals cannot use 'same religious affiliation' to condition trust so the previously positive coefficient captured religious participants' behaviour. Crucially, the round coefficient on just 'religious partner' remains positive, confirming even secular individuals use religion to update expectations of reciprocity when risking trust in line with Result 3. Across all individuals, compared to a maximum budget of £6, there is an economically significant bonus to baseline given to same college (+£0.59) and same college same year (+£0.87). This increased trust is magnified (+£1.09) when the shared college is common knowledge. Sharing political ideology also engenders a positive but small bonus suggesting the denser the secular network, the stronger the effect in promoting trust.

Summarising Results and Predictions

Prediction 1 Believing	Higher religiosity individuals unconditionally display more trust and trustworthiness (Results 1, 2)
Prediction 2 Stereotyping	Expectations of a partners' characteristic gameplay conditions trust. Populations typecast for following altruistic norms are more trusted even by individuals outside this population (Result 3). Religious stereotypes are fulfilled by accordant trustworthiness so conditioning trust on partner characteristics is a rational response (Result 2)
Prediction 3 Belonging	Same group partners conform more with group norms and divorce actions further from self-interest. In-group effects from shared religion are unrivalled in strength by shared secular values but the dense network provided by collegiate affiliation has substantial scope to mimic in-group favouritism (Results 4, 5)
Prediction 4 Priming	No significant effect of priming. The instrument did not successfully imbue exogenous religious salience (Result 6) In reality, the cultural nature of religion renders it always endogenous.

Result 5. *Fewer individuals are low-type trustworthiness when playing against religious or same college partners. With no expectation of reciprocity in being trustworthy, behaviour towards same network individuals rests on group norm-adherence or pure prosociality in absence of investment motives.*

Low-type trustworthiness is less likely to be displayed with religious and collegiate partners (-3.4% and -4.4% at means, respectively) but more likely with politically inclined partners (+7.2%).

6.4. Priming

Result 6. *Priming salience of religious thought has no significant effect on trust.*

Even when disaggregating by individual religiosity or round, priming has no effect compared to the control group or to pre-prime behaviour, plausibly attributable to the subtle instrument or decision-fatigue. Choi and Fisher (2012) reach a similar null conclusion.

7. Robustness: Multi-Dimensional Results

For robustness, rounds are interacted with measures of religiosity across the factor models. For Proposer characteristics, the effects of belonging and believing broadly agree with the general factor model but coefficients are larger in magnitude. For Responder characteristics, the coefficient on the religious round remains significant but falls, indicating some of the previous effect was driven by religious individuals. This is confirmed since high general religiosity individuals are 25% less likely to be low-type trustworthiness with religious

partners than anonymous ones, a substantially larger coefficient in absolute terms and economically more significant compared to other individuals in the same round (3.2%). Beyond a robustness check, divorcing the two channels of religion provides a few notable results.

Stronger belonging and believing in religious individuals increases trust and trustworthiness in all but especially religious partners. The Multi-Dimensional Model shows high belonging and high believing[2] individuals are significantly more trusting under baseline anonymity, giving £1.14 and £0.98 more on average. High believers and belongers are more trustworthy than generally religious individuals. They are less likely to be categorised as low-type trustworthiness and more likely medium-type with all partners compared to baseline and compared to generally religious individuals. Across both channels, most trust is imbued and returned with the same and common knowledge religious partners, indicating in-group affiliation is still most powerful.

Notably, a strong sense of religious belonging also supports secular trust networks where general religiosity or high belief does not. High belonging individuals give significantly more when matched with same college and environmentally friendly partners when informed of the shared characteristic. High belongers are also more trustworthy being 19.8% more likely to display medium-type trustworthiness when playing against collegiate partners compared to the baseline round. This reveals a previously undocumented finding of belonging spillovers for religious individuals in strengthening their secular affiliations.

8. Discussion

This paper implements a carefully considered experimental design including monetary incentives, protection of anonymity and distraction from religion as the test subject, which all minimise incentives to distort laboratory decisions away from true preferences. Additionally, the design adds a new methodological contribution to the literature in testing the conditional responses of Responders' trustworthiness with revealed Proposer characteristics in the final stage. This involves no expected reciprocity so yields pure prosociality with more returned to both in- or out-group partners. Moreover, caution is applied in what assumptions can be made for the statistical techniques applied. *In lieu* of existing literature methods, this study uses oblique factor rotation and a more appropriate method of multilevel mixed-effects ordered probit estimation treating trust as a latent variable and accommodating for multiple sources of unobserved heterogeneity. Such care attempts to improve the internal validity of the study.

What cannot be guaranteed is external validity which hinges on two remaining issues. One limitation is that, as Henrich *et al.* (2010) criticise, the sample is drawn from a society of Western, Educated, Industrialised, Rich and Democratic or 'WEIRD' individuals whose behaviours are not necessarily extendable cross-culturally. Despite having a representative range of religions recruited from a large online pool, there was insufficient diversity in the sample for informative results about behavioural differences across religions. Utilisation of an online platform, such as Amazon MTurk, is a viable extension to this study, mitigating

[2]A 'high' score allocation is given based on top 25th percentile of factor scores.

sample size and specificity concerns. A second limitation is the consideration of unconnected individuals which as a result obscures the social contexts of religion (Cheadle and Schwadel 2012). Agents are more likely to conform to norms when embedded in dense familiar networks (Cornwall 1987) rather than with in-group but faceless partners in a laboratory. Consequently, an experimental setting with anonymous strangers will understate cooperative effects of individuals in the same religious network. Field experiments or empirical studies have more predictive power for religious behaviours in a transparent signalling environment (e.g. a congregation) described better by a repeated game incorporating dynamic reputational concerns.

Finally, does the trust game measure trust? Sequential nodes introduce strategic dependency of the first mover's decision. Payment conditioned on expected reciprocity is a trust investment, but a present when motivated by altruism or inequity-aversion. Experimental evidence linking higher payment to the possibility of repayment (Gneezy *et al.* 2000, Brülhart and Usunier 2010) does identify trust as the dominant determinant but the separation of trust, prosociality and altruism is never absolute. Despite these limitations, this experiment is a novel inquiry into how religion affects behaviour in dyadic one-shot interactions, corroborating the finding that religiosity does promote cooperation.

9. Conclusion

This paper comprehensively identifies mechanisms by which religion, as one group affiliation, affects strategic interactions. As suggested by panellists at the IEA Roundtable (2017), it incorporates broader conceptions of religion's believing versus belonging capacity in support of cooperative equilibria through formal adherence to creeds and to group norms. The fundamental result is that religion does promote trust networks through stereotypical beliefs reinforced by accordant strategies. Religious individuals are significantly more trusting and trustworthy across the board. On expectation of this stereotypical behaviour, religious partners are rewarded with greater interpersonal trust from all individuals - a Pareto-improving coordination. The Golden Rule, present in all major religions (Batson *et al.* 1993), enforces a law of reciprocity, even for secular individuals, to 'treat your partner as yourself'. Signalling intentions of trustworthiness by making costly yet credible commitment to religion ensures experimental gains and insures against defecting behaviour from other players. As hypothesised, religion makes cooperation collectively a winning strategy.

In contrast to Hoffman's (2013) reported lack of significant, robust effects, this study finds religion highly consequential for trust. Disaggregated rounds revealing the interacting contribution of one's own and partner religiosity underpin this positive result by virtue of methodology. A conclusion consistent with the literature is one of collective religious consequence; religious effects operate most strongly within the religious group. According to in-group favouritism versus out-group discrimination, over-revelation of generous behaviours leaves religious networks vulnerable to exploitation. Religiosity is a strong and pervasive predictor of gameplay between strangers, but is not unique in its provision of trust. These results add to the literature in demonstrating experimentally that secular group affiliation can provide the same benefits if the sense of belonging is sufficiently strong. Collegiate

affiliation is a substitutable coordination device but less dense networks formed on shared political or environmental views are insufficient common ground. These results confirm the supposition that secular group affiliation can equally but less intensely support other-regarding and trusting behaviours.

Whilst religion's effect on strategic interaction remains the primary focus of this paper, a final comment can be made on cooperation in diverse societies. Critically, more trust is imbued to those expected to return the favour. It is ascription to shared values which binds individuals together and religion is only one such coordination device. This paper demonstrates beliefs about stereotypical behaviour conditioned on revealed information are a key determinant of strategic interactions. In uncertain societal interactions, cooperation risks exploitation in the face of dominant self-interest. The ancient Roman formula *do ut des* ("I give that you might give") originally records reciprocity of exchange between human being and deity but suitably this expression of *homo-religicus* extends to *homo-economicus*. Even for those whose lives are not ruled by religion, the strategic rules which religion teaches its followers to play are a marker for cooperation, disseminating trust to society as a whole.

Dataset [dataset] Kirk, H., 2019. "Religion and Group Affiliation Data from Trust Game", Mendeley Data, V1, doi: 10.17632/4g64x8s27f.1

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Table 5: Trust Ordered Probit with Partner Rounds and Interactions of Proposer Religiosity. *Full version provided for reviewers but condensed version intended for publication*

	Rounds			**General Rel**		**Belonging**		**Believing**	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Pass Amount ∈ (£0, £6)	Pooled	ME	FE	Pooled	ME	Pooled	ME	Pooled	ME
High Gen Rel	0.427^{+}	0.912^{+}		0.533*	1.110*				
	(0.233)	(0.508)		(0.251)	(0.566)				
High Belong						0.569*	1.139*		
						(0.245)	(0.529)		
High Belief								0.468^{+}	0.975^{+}
Baseline Round: Anon								(0.253)	(0.562)
Env Friendly (2)	0.227**	0.434**	0.460**	0.302**	0.574***	0.284**	0.528**	0.291**	0.553**
	(0.0796)	(0.143)	(0.151)	(0.0966)	(0.171)	(0.0971)	(0.170)	(0.0956)	(0.169)
Rel (3)	0.435***	0.829***	0.878***	0.460***	0.866***	0.454***	0.844***	0.435***	0.816***
	(0.0933)	(0.149)	(0.158)	(0.119)	(0.200)	(0.119)	(0.199)	(0.119)	(0.200)
Same Coll (4)	0.297**	0.593***	0.629***	0.322*	0.649**	0.313*	0.629**	0.309*	0.602**
	(0.0971)	(0.166)	(0.175)	(0.126)	(0.222)	(0.127)	(0.220)	(0.126)	(0.220)
Same Rel (5)	0.204*	0.399*	0.424*	0.134	0.251	0.143	0.267	0.117	0.216
	(0.0851)	(0.159)	(0.168)	(0.0915)	(0.171)	(0.0921)	(0.170)	(0.0915)	(0.171)
Pol Inclined (6)	-0.155*	-0.304*	-0.321*	-0.120	-0.249	-0.136	-0.278	-0.144	-0.299^{+}
	(0.0768)	(0.138)	(0.146)	(0.0927)	(0.172)	(0.0933)	(0.170)	(0.0928)	(0.172)
Same Coll & Yr (7)	0.434***	0.871***	0.927***	0.478***	0.966***	0.480***	0.964***	0.472***	0.933***
	(0.110)	(0.180)	(0.191)	(0.142)	(0.241)	(0.143)	(0.240)	(0.141)	(0.238)
Rel & Same Coll (8)	0.451***	0.870***	0.925***	0.454**	0.874***	0.435**	0.836***	0.447**	0.843***
	(0.112)	(0.179)	(0.190)	(0.145)	(0.242)	(0.143)	(0.237)	(0.144)	(0.240)
Same Pol Ideology (9)	0.213*	0.404*	0.428*	0.313**	0.596**	0.284*	0.531**	0.298**	0.565**
	(0.0912)	(0.163)	(0.172)	(0.114)	(0.201)	(0.113)	(0.197)	(0.114)	(0.202)
Matched Env Friendly (10)	0.234*	0.444*	0.469*	0.295*	0.574**	0.265*	0.509*	0.297*	0.572*
	(0.0962)	(0.180)	(0.190)	(0.117)	(0.220)	(0.115)	(0.216)	(0.118)	(0.223)
Matched Rel (11)	0.0533	0.115	0.123	-0.0436	-0.0804	-0.0348	-0.0595	-0.0836	-0.167
	(0.0852)	(0.162)	(0.171)	(0.103)	(0.199)	(0.102)	(0.194)	(0.101)	(0.196)
Matched Coll (12)	0.544***	1.087***	1.156***	0.618***	1.239***	0.599***	1.196***	0.608***	1.198***
	(0.114)	(0.184)	(0.195)	(0.149)	(0.252)	(0.147)	(0.246)	(0.148)	(0.248)
Machine (13)	-0.391**	-0.694**	-0.732**	-0.296*	-0.525^{+}	-0.302*	-0.533^{+}	-0.328*	-0.595*
	(0.120)	(0.222)	(0.23)	(0.147)	(0.279)	(0.146)	(0.277)	(0.144)	(0.274)
(3) * High Gen Rel				0.444^{+}	1.036^{+}				
				(0.255)	(0.576)				
(5) * High Gen Rel				0.823**	1.769**				
				(0.273)	(0.595)				
(8) * High Gen Rel				0.522^{+}	1.156^{+}				
				(0.270)	(0.595)				
(11) * High Gen Rel				0.911***	1.900**				
				(0.251)	(0.567)				
(3) * High Belong						0.514*	1.127*		
						(0.247)	(0.547)		
(4) * High Belong						0.511*	1.032^{+}		
						(0.258)	(0.552)		
(5) * High Belong						0.829**	1.713**		
						(0.269)	(0.571)		
(8) * High Belong						0.641*	1.318*		
						(0.276)	(0.579)		
(10) * High Belong						0.462^{+}	0.903^{+}		
						(0.269)	(0.548)		
(11) * High Belong						0.916***	1.840***		
						(0.245)	(0.549)		
(3) * High Belief								0.478^{+}	1.112^{+}
								(0.254)	(0.579)
(5) * High Belief								0.823**	1.774**
								(0.274)	(0.601)
(8) * High Belief								0.513^{+}	1.174^{+}
								(0.276)	(0.609)
(11) * High Belief								1.001***	2.110***
								(0.245)	(0.564)
Controls	Y	Y	N	Y	Y	Y	Y	Y	Y
N	1015	1015	1015	1015	1015	1015	1015	1015	1015

$^{+}$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Robust standard errors in parentheses, clustered by ID. Standard coefficients reported. Pooled and multilevel mixed-effects (ME) estimation results reported. All models run with full set of interactions but only significant coefficients displayed. Controls = {sex, crra}.

Table 6: Trustworthiness Binary Probit with Partner Rounds and Interactions of Responder Religiosity. *Full version provided for reviewers but condensed version intended for publication*

	Rounds		**General Rel**		**Belonging**		**Believing**	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Pr(Return Proportion)	Low	Med	Low	Med	Low	Med	Low	Med
High Gen Rel	-0.193*	0.172**	-0.209*	0.147*				
	(0.0791)	(0.0639)	(0.0865)	(0.0747)				
High Belong					-0.261**	0.203**		
					(0.0825)	(0.0718)		
High Belief							-0.259**	0.200**
							(0.0817)	(0.0702)
Male	0.164*	-0.190**	0.165*	-0.191**	0.177*	-0.202**	0.164*	-0.191**
	(0.0727)	(0.0675)	(0.0729)	(0.0676)	(0.0719)	(0.0672)	(0.0723)	(0.0674)
Baseline Round: Anon								
Rel (2)	-0.0341*	0.0219	-0.0315*	0.0152	-0.0432*	0.0269	-0.0430*	0.0272
	(0.0164)	(0.0189)	(0.0133)	(0.0193)	(0.0191)	(0.0239)	(0.0190)	(0.0240)
Coll (3)	-0.0438+	-0.0240	-0.0634*	-0.0288	-0.0612*	-0.0321	-0.0661*	-0.0106
	(0.0228)	(0.0288)	(0.0288)	(0.0371)	(0.0289)	(0.0376)	(0.0271)	(0.0355)
Env Friendly (4)	0.000672	-0.0267	-0.0171	-0.0303	-0.0144	-0.0337	-0.0253	-0.0226
	(0.0188)	(0.0233)	(0.0180)	(0.0260)	(0.0180)	(0.0262)	(0.0198)	(0.0279)
Pol Inclined (5)	0.0723**	-0.0703**	0.0857**	-0.0923**	0.0743*	-0.0801**	0.0718*	-0.0777*
	(0.0252)	(0.0265)	(0.0315)	(0.0316)	(0.0300)	(0.0298)	(0.0310)	(0.0310)
High Gen Rel * (2)			-0.218**	0.170*				
			(0.0809)	(0.0678)				
High Gen Rel * (3)			-0.137	0.164*				
			(0.0885)	(0.0742)				
High Gen Rel * (4)			-0.147+	0.160*				
			(0.0873)	(0.0742)				
High Gen Rel * (5)			-0.254**	0.220**				
			(0.0817)	(0.0715)				
High Belong * (2)					-0.229**	0.187**		
					(0.0806)	(0.0705)		
High Belong * (3)					-0.199*	0.230**		
					(0.0852)	(0.0728)		
High Belong * (4)					-0.208*	0.225**		
					(0.0845)	(0.0728)		
High Belong * (5)					-0.262***	0.232***		
					(0.0796)	(0.0691)		
High Belief * (2)							-0.228**	0.182**
							(0.0805)	(0.0692)
High Belief * (3)							-0.178*	0.155*
							(0.0855)	(0.0745)
High Belief * (4)							-0.168*	0.185**
							(0.0828)	(0.0695)
High Belief * (5)							-0.252**	0.221**
							(0.0804)	(0.0696)
N	2400	2400	2400	2400	2400	2400	2400	2400

$^{+}$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Robust standard errors in parentheses clustered by ID.
Marginal effects dy/dx reported at means. Multilevel mixed-effects estimation results reported.

Appendix A. Experimental Instructions

These experimental instructions were adapted from Tan and Vogel (2008) and printed for all participants.

EXPERIMENTAL INSTRUCTIONS

You are participating in an experiment on decision-making. Please read these instructions before you begin. Once you feel you understand the instructions please start the computer task. You will be asked to complete an understanding test of the task. If there are any problems, please ask the experimenter.

Please note that communication with other participants is not allowed in this experiment.

This experiment is taking place at two locations in the university who have received the same instructions and computer task as you. You can be matched with partners across locations.

There are four sections to this experiment:

- Section 1: You will play games with a partner. This section has two stages: Stage 1, Stage 2. Each stage will contain a number of choices.
- Section 2: You will complete a cognitive task then play a game with a partner. This section contains a number of choices.
- Section 3: You will play a game alone. This section has one stage.
- Section 4: You will complete some survey questions.

SECTION 1 INSTRUCTIONS

In each round, you have to make decisions about how much money to pass to a partner. The amount you earn depends on the decision/s you and/or your partner make in that round.

In each task, there are two participants, participant A (A) and participant B (B). A starts with £6, and B with £0. In this experiment, you will play the roles of both A and B.

In some rounds, you will receive information about your partner. This information, however, will not be about your partner's choices, only their characteristics.

As A, you must decide how many pounds to pass– none, some, or all – to B. Each pound that you pass to B will be doubled.

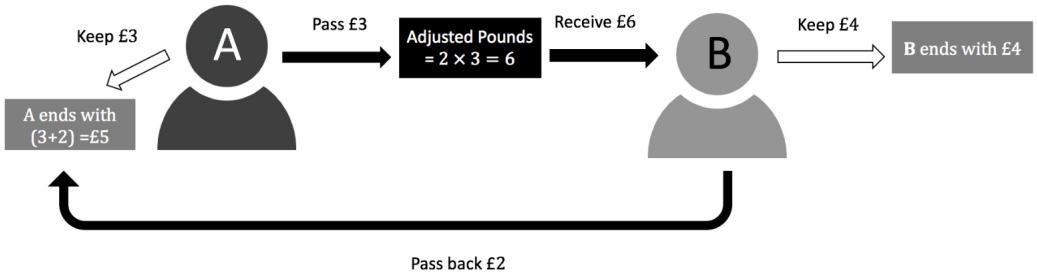
As B, you have to decide, based on number of pounds A might pass to you, how many pounds – none, some, or all – to pass back to A.

A's final number of pounds depends on the number on pounds A keeps plus the number of pounds B returns to you.

B's final pounds depend on the pounds A passes to B multiplied by 2, plus the number of pounds of B keeps after passing – none, some or all – back to A.

Read the following example to check you understand. Suppose A passes £3 to B and keeps the remaining £3. B receives (3x2 =) £6. From these £6, B returns £2 and keeps remaining £4.

Pounds at end of task	
A	£3 + £2 = £5
B	£4



Decisions as Participant B and Participant A

You will first play the role of B in Stage 1, and will play the role of A second in Stage 2. In each round, the computer will match you with a new partner. In some rounds you will be given some information. Each piece of information is relevant to your NEW partners and is not giving additional information on one partner.

As B, you decide a strategy on how many pounds to pass to A for each possible number of pounds A might pass to you. In some rounds, A may be provided with a piece of information about you, for example your IQ level. Additionally, in some rounds, you will be given information about the characteristics of your A partner. For example, "your partner was born in the same country as you."

As A, you decide how many pounds to pass to B out of your initial £6. In some rounds, you will be given information about B. The computer will match you with an A player who corresponds to the information that is provided in that round. For example, if you are told "B has an IQ of 150", the computer will pair you with any B player with an IQ of 150.

Payments

You are guaranteed a fixed show-up fee of £4. Your final payment will be based on one randomly chosen A decision and the decision of the corresponding B player you were paired with. For example, suppose in round 2 of your A decisions, you keep £4 and get returned £2. The computer will randomly determine this 'selected round'. You will not know this until the end of the experiment when you collect your payments.

For example, if round 2 of you A decisions is chosen as the 'selected round', you will receive £6 in variable payment to add to your £4 show-up fee, creating a total take-home payment of £10.

SECTION 2 INSTRUCTIONS

You will be provided with a list to words to unscramble into a sentence as quickly as you can.

In this task, you will receive 5 sets of 5 words. For each of set of words, **please form a sentence or phrase using ONLY 4 TERMS.**

Example:

Words	**Unscrambled Sentence**
Disciplined Man Flower The Was	The Man Was Disciplined
Eggs The Police Contains Recipe	The Recipe Contains Eggs

You will then be asked to play as A once more and the computer will match you with B players.

SECTION 3 INSTRUCTIONS

You will be provided with the above options and asked to select the preferred payoff options between Option A and Option B.

To understand the options available to you, take the first row in the table and consider a 10-sided dice.

Table 2
MPL method.

Option A	Option B	Option A	Option B
1/10 of $2, 9/10 of $1.60	1/10 of $3.85, 9/10 of $0.10	☐	☐
2/10 of $2, 8/10 of $1.60	2/10 of $3.85, 8/10 of $0.10	☐	☐
3/10 of $2, 7/10 of $1.60	3/10 of $3.85, 7/10 of $0.10	☐	☐
4/10 of $2, 6/10 of $1.60	4/10 of $3.85, 6/10 of $0.10	☐	☐
5/10 of $2, 5/10 of $1.60	5/10 of $3.85, 5/10 of $0.10	☐	☐
6/10 of $2, 4/10 of $1.60	6/10 of $3.85, 4/10 of $0.10	☐	☐
7/10 of $2, 3/10 of $1.60	7/10 of $3.85, 3/10 of $0.10	☐	☐
8/10 of $2, 2/10 of $1.60	8/10 of $3.85, 2/10 of $0.10	☐	☐
9/10 of $2, 1/10 of $1.60	9/10 of $3.85, 1/10 of $0.10	☐	☐
10/10 of $2, 0/10 of $1.60	10/10 of $3.85, 0/10 of $0.10	☐	☐

From Holt and Laury (2002).

Under Option A, you will receive: £2 if a 1 is rolled, and £1.60 if any number between 2 and 10 is rolled

Under Option B, you will receive: - £3.85 if a 1 is rolled, and £0.10 if any number between 2 and 10 is rolled.

Please go through each row deciding which option is preferred on computer task provided.

SECTION 4 INSTRUCTIONS

Please complete the provided survey question.

END OF INSTRUCTIONS

Please feel free to raise your hand for help if you feel the need, now or anytime during the experiment, for clarification. Many thanks for your participation, and good luck!