

# The Boundaries of Trust: Cross-Religious and Cross-Ethnic Field Experiments in Mauritius

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## Abstract

Several prominent evolutionary theories contend that religion was critical to the emergence of large-scale societies and encourages cooperation in contemporary complex groups. These theories argue that religious systems provide a reliable mechanism for finding trustworthy anonymous individuals under conditions of risk. In support, studies find that people displaying cues of religious identity are more likely to be trusted by anonymous coreligionists. However, recent research has found that displays of religious commitment can increase trust across religious divides. These findings are puzzling from the perspective that religion emerges to regulate coalitions. To date, these issues have not been investigated outside of American undergraduate samples nor have studies considered how religious identities interact with other essential group-membership signals, such as ancestry, to affect intergroup trust. Here, we address these issues and compare religious identity, ancestry, and trust among and between Christians and Hindus living in Mauritius. Ninety-seven participants rated the trustworthiness of faces, and in a modified trust game distributed money among these faces, which varied according to religious and ethnic identity. In contrast to previous research, we find that markers of religious identity increase monetary investments only among in-group members and not across religious divides. Moreover, out-group religious markers on faces of in-group ancestry decrease reported trustworthiness. These findings run counter to recent studies collected in the United States and suggest that local socioecologies influence the relationships between religion and trust. We conclude with suggestions for future research and a discussion of the challenges of conducting field experiments with remote populations.

## Keywords

cooperation, ancestry, Mauritius, religion, trust

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Cooperation is an essential component of human life, and identifying the cultural features that support or inhibit cooperation is one of the most fundamental questions facing social science (Hill, Barton, & Hurtado, 2009). Building upon a long history of general social theory, evolutionary researchers have recently looked to religion as a critical contributor to the high levels of cooperation that are characteristic of human societies (Purzycki, Kiper, Shaver, Finkel, & Sosis, 2015; Shaver, Purzycki, Sosis, 2016).

The majority of contemporary evolutionary theories of religion assume that religious systems promote within-group trust and cooperation, both in small-scale societies and in complex social settings where interacting coreligionists are often anonymous (Norenzayan & Shariff, 2008; Purzycki et al., 2016).

Moreover, religion's positive influence on sociality is thought to have contributed to the emergence of large-scale societies over the course of the past 12,000 years and to be critical to the

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stability of complex social organization in most contemporary societies (Norenzayan et al., 2016).

While a considerable body of work has documented the positive association between religious belief and within-group trust and cooperation among anonymous coreligionists (e.g., Lang et al. 2016; Power, 2017; Purzycki & Arakchaa, 2013; Tan & Vogel, 2008; Xygalatas et al., 2013), research has yet to critically examine the dynamics of trust and religious beliefs, behaviors, and institutions across various religious systems and ethnicities representative of the intense social fragmentation that are characteristic of all large-scale societies (Hall, Cohen, Meyer, Varley, & Brewer, 2015; McCullough, Swartwout, Shaver, Carter, & Sosis, 2016; Turchin, 2013). Understanding the ways in which religious systems exacerbate or mitigate social divisions is critical to a more accurate understanding of religion's role in the emergence and stability of large-scale cooperation that breaks parochial boundaries. The dynamics of religion, trust, and cooperation are also important to understanding the cultural traits of the peaceful multiethnic and multireligious societies of today.

Here, we begin by describing the obstacles to large-scale cooperation, particularly one-shot interactions between anonymous agents who are unlikely to have opportunities to reciprocate in the future and therefore cannot be based on the presumption of a future ongoing relationship. Subsequently, we summarize theories which argue that religion provides solutions to these barriers. We describe the results of studies that test hypotheses derived from these theories, noting current gaps in our understanding—namely, whether or not, and under what conditions, religious identity can be expected to motivate trust across social boundaries. We then fill in these gaps with experimental data drawn from Mauritius which examine trust within and between Christians, Hindus, Afro-Mauritians, and Indo-Mauritians.

### The Cooperative Affordances of Religions

In small-scale societies, human cooperative interactions usually take place in the context of delineated social groupings (Hill et al., 2009; Nowak & Highfield, 2011). Group resources, such as those acquired through cooperative hunting or territorial defense, provide net benefits that often exceed those acquired individually (Pulliam & Caraco, 1984; Ridley, 1996; Tiger, 1969). Individual members of groups are often better off when everyone contributes to collective resources. However, there are several obstacles to achieving successful cooperation (Cronk & Leech, 2012). Critically, because individuals face incentives to cheat the group or to extract resources without commensurate investment, successful cooperation is difficult to achieve and can deteriorate rapidly (Frank, 1988, 2001; Schelling, 1980, 2001)

In the face-to-face social environments that characterize most of human history, unrelated individuals can avoid exploitation (a) by biasing cooperation toward individuals with whom cooperation has been successful in the past (Trivers, 1971), (b) by favoring cooperation with those who hold reputations as

reliable cooperators (Alexander, 1987; Nowak & Sigmund, 1998, 2005; Panchanathan & Boyd, 2003, 2004), and/or (c) if threats of punishment against defectors are credible (Fehr & Fischbacher, 2003). However, large-scale social settings exacerbate problems of exploitation, where social histories, reputation, and/or punishment mechanisms are unavailable and/or unreliable (Boyd & Richerson, 1988). Cooperation in large and anonymous contexts, where reliable information is difficult to acquire, and the risks of exploitation are high, therefore requires additional mechanisms to encourage trust between potential cooperators (Frank, 1988; Johnson, 2005; Schelling, 1980).

There is an emerging consensus among evolutionary scholars that religion increases cooperative affordances between anonymous coreligionists and therefore may have been critical to the emergence of large-scale cooperation (e.g., Irons, 2001; Johnson, 2016; Norenzayan, 2013; Watts et al., 2015). While this conjecture is generally agreed upon (Shaver, Purzycki, Sosis, 2016), at least two outstanding questions persist. First, the psychological mechanisms that motivate trust and cooperation between anonymous coreligionists remain obscure; and second, it is unknown whether these mechanisms also encourage cooperation between anonymous individuals with different religious and/or ethnic identities. We here describe and investigate one possible mechanism—a *coalitional recognition hypothesis*—which stresses the importance of markers of religious identity for providing religious individuals with a reliable mechanism to select anonymous coreligionists from out-group members (Bulbulia, 2004; Irons, 2001; Purzycki et al., 2016; Sosis, 2006). That is, by signaling commitment to monitoring and punishing supernatural agents that foster cooperation, religious individuals can reliably assort and enter into trust-based interactions even in otherwise anonymous settings.

Specifically, the coalitional recognition hypothesis contends that across most settings, the reliable communication of group affiliation is expected to increase trust and cooperative affordances among otherwise anonymous community members (Irons, 2001; Sosis, 2005). The communication of religious group membership can occur through several modalities, but particularly important to most religious traditions are displays of ritual behavior, the public observance of religious norms and taboos, and/or the adornment of religious badges (Sosis, 2006). Religious badges are those observable physical manifestations of religious group membership that clearly advertise a person's affiliation to a specific religious group. Religious badges range widely across religious traditions and vary in their permanence (e.g., from clothing to scarring), but some familiar examples include the hijab worn by some Muslim women, the yarmulke worn by Jewish men, crosses worn by Christians, or tilak (a white ash mark on the forehead; see below) worn by Hindus.

Speculation based on anecdotal evidence suggests that under certain conditions, trust might also be extended to any individual who signals commitment to a moralizing deity, even those deities who are associated with religious out-groups (Norenzayan, 2013, p. 65; Sosis, 2005). That is, an *inferred supernatural monitoring hypothesis* posits that indications of

belief in *any* omniscient supernatural entity who punishes uncooperative behaviors can be used as a cue that an anonymous person can be trusted. In other words, since religious people believe that they will be punished if they fail to cooperate, one can reliably assume that they are trustworthy.

The coalitional recognition hypothesis and the inferred supernatural monitoring hypothesis overlap to the extent that both are based on the premises that (a) the communication of shared supernatural belief leads to cooperative affordances, (b) the members of religious groups trust anonymous coreligionists, and (c) those more committed to the group are more likely to be more trusting of anonymous coreligionists. Indeed, studies consistently find that religious people are more cooperative with one another than secular individuals, even under anonymous conditions (e.g., Sosis & Ruffle, 2003), and recent cross-cultural research finds that belief in omniscient and punishing gods is associated with increased cooperative tendencies toward anonymous and distant coreligionists (Bulbulia & Mahoney, 2008; Purzycki et al., 2016). There also appears to be a positive relationship between a person's overall commitment to their religion (i.e., a person's religiosity) and the amount of trust allocated to anonymous coreligionists (Paciotti et al., 2011). The coalitional recognition hypothesis and the inferred supernatural monitoring hypothesis also overlap in that both see signals indicating shared belief as inducing the highest levels of trust.

The coalitional recognition hypothesis and the inferred supernatural monitoring hypothesis make competing predictions, however, with respect to trust allocated to the anonymous members of religious *out*-groups. The coalitional recognition hypothesis argues that indications of religious identity increase trust and motivate cooperation primarily among in-group members. By contrast, the inferred supernatural monitoring hypothesis posits that both in- and out-group members find as trustworthy those individuals who believe they are being watched by supernatural entities who punish uncooperative behavior.

In support of the inferred supernatural monitoring hypothesis, several studies find that individuals perceived as religious are trusted more than secular individuals, regardless of whether or not the rater is a coreligionist (Bailey & Doriot, 1985; Bailey & Garrou, 1983; Bailey & Young, 1986; Galen, Smith, Knapp, & Wyngarden, 2011; Gervais, Shariff, & Norenzayan, 2011; Orbell, Goldman, Mulford, & Dawes, 1992; Paciotti et al., 2011; Purzycki & Arakchaa, 2013; Tan & Vogel, 2008). Moreover, recent work suggests that the communication of religious commitment can even increase trust across religious group boundaries. For example, individuals adorning Christian religious badges (Christian crosses or Catholic Ash Wednesday ashes) were rated as more trustworthy than individuals not adorning these badges by both Christian and non-Christian American undergraduates (McCullough et al., 2016). Similarly, Hall and colleagues (2015) found that among Christian Americans, ratings of trust in both Christians and Muslims increased the more the targets of each religion were depicted as committed to those religions. The authors of both of these

studies speculated that these effects may not be universal and implied the need for research with more diverse populations.

Here, we test the coalitional recognition hypothesis and then examine these results against the inferred supernatural monitoring hypothesis in the non-Western and diverse population of Mauritius. Moreover, we posit that there are at least three reasons why people may not universally grant higher levels of trust to those communicating any supernatural beliefs. Instead, it is likely that the relationships between religious identity and trust will vary due to (a) the rigidity of social boundaries which are to some degree orthogonal to religion (such as ancestry), (b) socioecological conditions, and (c) the way that trust is assessed.

### *Cross-Cultural Variation in Religion and Trust and Previous Measurement Issues*

All large-scale societies, and major contemporary religions, are internally heterogeneous in several respects, and these heterogeneities are often impediments to cooperation. For example, experimental studies consistently find that people trust those of different ancestries less than members of their own ancestry (e.g., Buchan & Croson, 2004; Fershtman & Gneezy, 2001). While some studies have found that religious badges increase trust regardless of shared religious membership, it is unknown whether the positive effects of religion on trust can offset the divisiveness of ethnic differences.

Indeed, there are reasons to suspect that out-group religious markers on faces of in-group ancestry will not be found as more trustworthy, as the inferred supernatural monitoring hypothesis predicts. The *black sheep effect* refers to findings that in-group members who deviate from group norms (e.g., clothing, habits, behaviors) are judged more harshly than out-group members (with likable in-group members judged more positively; Marques & Yzerbyt, 1988; Marques, Yzerbyt, & Levins, 1988). In the context of the communication of religious identity, a black sheep effect may be the result of an inference that people who indicate shared religious membership, but who violate other normative expectations (such as might be the case of an atypical ancestry for that religion), are potential free riders and are more likely to threaten group cooperative resources.

Moreover, findings that religions increase trust across parochial boundaries run counter to cultural evolutionary theories which posit that religions play a crucial role in intergroup competition (Norenzayan et al., 2016) and encourage in-group cooperation during intergroup conflict over resources and/or values (Atran & Ginges, 2012; Choi & Bowles, 2007). Indeed, previous studies indicate that religious affiliation predicts derogation of religious out-groups (Blogowska & Saroglou, 2011; Bushman, Ridge, Das, Key, & Busath, 2007) and participation in collective religious activities predict support for suicide attacks during religious conflicts (Ginges, Hansen, & Norenzayan, 2009). How can we align this evidence with studies reporting cooperative behaviors toward religious out-groups?

A possible reason for these contradictory findings may stem from the fact that the majority of previous research supporting the inferred supernatural monitoring hypothesis was conducted among Western populations that exhibit unusually high rates of baseline trust (Johnson & Mislin, 2011) and are otherwise psychologically peculiar (Henrich, Heine, & Norenzayan, 2010; Sears, 1986). In other words, previous findings that religious people are judged as more trustworthy regardless of shared group membership may not be generalizable beyond Western populations, as these populations are unique in the allocation of trust. However, if in non-Western settings indications of supernatural belief are found to transcend parochial boundaries, then such findings would lend support to the inferred supernatural monitoring hypothesis and suggest these effects may be universal.

There are reasons to expect that inferred supernatural monitoring hypothesis may not universally hold. Specifically, we expect regional path dependencies of conflict and peace to influence judgments of the trustworthiness between religious groups (Shaver, Troughton, Sibley, & Bulbulia, 2016); that is, we expect socioecological variance in the degree of trust granted to out-group members. In areas of high levels of historical conflict over resources, for example, commitment to one religion can be expected to reduce trust toward the members of other religions (e.g., Ginges, Hansen, & Norenzayan, 2009). Conversely, in environments relatively free of conflict, such as the Western societies where the majority of previous research has been conducted, religious badges can be expected to increase generalized trust both within and across divides (Hall et al., 2015; McCullough et al., 2016; but see Ginges, Sheikh, Atran, & Argo, 2016). Moreover, recent research found that while atheists are universally distrusted, such biases are lower in Western societies (Gervais et al., 2017). However, if religious identity (relative to no indication of religiosity) is ineffective at motivating trust across group lines in non-Western settings, then such a finding would suggest that there is something unique to the local ecology that is influencing the way that people respond to signals of religious membership.

Finally, there is a difference between a general perception of the trustworthiness of anonymous others, as assessed by survey measures, and the high levels of trust required for successful economic cooperation in anonymous settings (Bonnefon, Hopfensitz, & De Neys, 2017). Indeed, there is evidence that the neuropsychological mechanisms involved in attitudinal ratings of interpersonal relationships (as assessed in surveys) may be distinct from those motivating economic exchange between individuals (Lang, Bahna, Shaver, Reddish, & Xygalatas, 2017), and some studies have found differences between attitudinal ratings and behavioral measures of trust (e.g., Johansson-Stenman, Mahmud, & Martinsson, 2009). Specifically, trust in economic settings involves a risk that initial trust of cooperation is returned (Theilmann & Hilbig, 2017), while attitudinal measures of trust are devoid of such risk.

Although previous studies have used both attitudinal and economic-based measures of trust in the same design (e.g.,

McCullough et al., 2016), they are typically both conceptualized as assessing the same underlying construct of trust. We see these measures as assessing different kinds or at least degrees of trust and expect that they might not always yield the same results across all contexts.

Here, we test for the cooperative affordances and impediments of religious markers by investigating attitudinal trust and risky economic investment within and across religious and ethnic lines in Mauritius, a country of considerable diversity, high levels of religious pluralism, and a complicated history of ethno-religious relations.

### *Ethnographic Setting: Mauritius*

Mauritius is a small island nation located in the Indian Ocean, 450 miles east of Madagascar. Its 1.3 million inhabitants comprise an ethnic and religious diversity that provides an ideal setting to investigate how religion and ancestry affect between- and within-group trust (Xygalatas et al., 2016). Mauritius has no indigenous population, as all of its current inhabitants came through immigration, whether voluntary or forced, from the 18th century onward. People of African and Malagasy descent, whose ancestors were brought to Mauritius to work as slaves on sugarcane plantations, and members of the Indian Diaspora, whose ancestors arrived in Mauritius as indentured laborers in the 19th century, make up the two largest ethnic populations (Eriksen, 2002). In addition to Indo- and Afro-Mauritians, there are smaller populations of Chinese and European (mostly French) ancestry.

Mauritius is a religiously plural society with freedom of religion granted under the constitution. Mauritius accommodates a variety of belief systems and has national holidays set aside every year for each of the Christian, Hindu, Islamic, and Chinese traditions. While data on ancestry are not collected by the national census, the government does track religious group identification. The majority of Mauritians are Hindus (49%), with Christians (32%) and Muslims (17%) making up the second and third largest religious groups, respectively (Statistics Mauritius, 2012). Religion and ancestry are heavily overlapping and often conflated in Mauritius. Afro- and Franco-Mauritians are overwhelmingly Christian while those of Indian descent are overwhelmingly Hindu. As a result, people of Indian descent are often referred to as Hindus, and those of African descent are known as Creoles but are most frequently referred to as Chrétiens (Christians).

Mauritius is often considered as an example of a successful multicultural country (Eriksen, 2002); yet, the country is not free of social inequality. In general, Creoles are relatively marginalized and have lesser economic and political standing, while members of the Hindu population enjoy much higher socioeconomic status (Eriksen, 2004). Hindus are more likely to be agriculturalists or work in public service, while Creoles are more likely to work in manual labor. These disparities may be attributed to a variety of historical and sociopolitical factors. Since most Mauritian Creoles are descendants of slaves, they do not have access to accumulated inherited wealth, which is

known to define socioeconomic status as well as occupation for many generations (Barone & Mocetti, 2016). Additionally, Afro-Mauritians are a minority, and as Mauritians traditionally vote along ethno-religious lines, they often do not have enough voting power to promote their interests. Since independence in 1968, the position of prime minister has always been held by a member of the Hindu majority (the only exception was a Franco-Mauritian who served for 2 years without being elected after his Hindu ally resigned).

Moreover, although ethnic violence is rare (though not absent) in Mauritius, racial stereotypes and distrust are abundant across groups (Eriksen, 1998). Indeed, prior to the third stage of data collection described below, many Hindus refused to sit in chairs where Creoles had been seated. On the official, but superficial ethnic and religious harmony of Mauritius, the anthropologist Thomas Hylland Eriksen (2004) stated,

The official multiculturalism of the country is a foil concealing systematic discrimination against particular ethnic groups [Creoles]: they are granted equal symbolic significance, cultural rights, and formal equality, but are discriminated against in informal, nearly invisible, but no less efficient ways. (pp. 92, 93)

We utilize this context of both multiculturalism and social inequality/ethnic distrust to examine the dynamics of religious signaling within and across ethnic, social, and religious boundaries. We here generate and evaluate two basic hypotheses. First, religious badges encourage risky economic investment in anonymous coreligionists from the same ethnic group (Hypothesis 1). That is, in comparison with shared ethnic group members without badges, those with religious badges will be trusted more. This is consistent with the coalitional recognition hypothesis, which predicts that in-group members expressing their commitment to moralizing gods are found trustworthy. However, the coalitional recognition hypothesis also predicts that (Hypothesis 2a) people from different ethnic groups who adorn in-group religious badges are trusted less than individuals of the same ethnic group with in-group religious badges (owing to a black sheep effect) and that (Hypothesis 2b) people from different ethnic groups adorning out-group religious badges are trusted less than individuals who share a rater's ancestry. Note that the inferred supernatural monitoring hypothesis makes opposing predictions for Hypotheses 2a and 2b and suggests that people adorning religious badges will be trusted more regardless of shared religion or ancestry. To examine these hypotheses, we assess attitudinal and behavioral trust and vary a Christian religious badge (a cross) and a Hindu religious badge (a tilak) across individuals of both Afro-Mauritian and Indo-Mauritian descent. To allay uncertainty from previous studies regarding whether attitudinal ratings of trust are mirrored by risky economic decisions, we used both measures in our study, hypothesizing that religious badges would encourage higher trustworthiness ratings regardless of shared ethnic/religious identity, but that only shared religious/ethnic identity

would encourage risky economic investments in anonymous coreligionists.

## Data and Methods

### Photo Collection

Data collection was carried out in three stages, with each stage at a different location in Mauritius. We first took photographs of 24 individuals in La Gaulette, a village located in the Southern portion of the island, with a population of 2,315 at the most recent census in 2011 (Mauritius, 2012). We recruited 12 Afro-Mauritian and 12 Indo-Mauritian males between the ages of 25 and 35. We asked each man to wear the same white shirt and stand against a white wall while we took two photographs. Each man was photographed with and without a necklace band and gave permission to use their images. We used only male targets to control for differences in the trustworthiness ratings of faces attributable to sex (Scharlemann, Eckel, Kacelnik, & Wilson, 2001).

Photographs were digitally modified in Adobe Photoshop to standardize appearance. First, noticeable light reflections (from sunlight) were masked so that skin color was equalized on all parts of the face. Additionally, each face was standardized so that the head-to-canvas ratio was similar across all images.

### Photo Selection

In order to select images for experimentation, we went to a new location, where people were not able to identify these individuals. Specifically, we asked both Afro- and Indo-Mauritian informants from the West-Central town of Quatre Bornes (population = 77,505) to rate these faces for their trustworthiness, attractiveness, and dominance/submission. Based on these ratings, we eliminated faces with high or low values on attractiveness and submissiveness/dominance, as both of these dimensions are known to influence perceptions of trustworthiness (e.g., Stewart et al., 2012; Willis & Todorov, 2006).

Faces (without the necklaces) were presented to participants on laptop computers with software we designed using the Adobe Flash Version 8 software bundle. We administered all instructions in the local Creole language. Fifteen participants rated only the Afro-Mauritian faces and 15 other participants rated only the Indo-Mauritian faces. Participants were shown each face, one at a time, in randomized order, and asked to rate each face on attractiveness, submissiveness/dominance, and trust. To assess participants' perceptions of each face's trustworthiness, we modified 12 items from the Propensity to Trust Scale (Glaeser, Laibson, Scheinkman, & Soutter, 2000; McCullough et al., 2016). Rather than self-ratings (as in the Propensity to Trust Scale), participants rated the trustworthiness of each target (e.g., "[I] listen to my conscience" was changed to "This person listens to his conscience"). Participants evaluated each face by choosing a point along an Unnumbered Sliding Scale from "strongly disagree" to "strongly agree" for each of the 12 items. The software recorded participant responses to a continuous 100-point Visual-Analog

Scale, where 0 equaled *strongly disagree* and 100 equaled *strongly agree*. These 12 trustworthiness questions evinced high reliability ( $\alpha = .92$ ). This scale has previously been found to correlate with trusting behavior as measured in the trust game described below (McCullough et al., 2016).

Similarly, participants rated each face on an Unnumbered Continuous Scale by clicking their mouse anywhere along a line that ranged from *very unattractive* (0), to *neither attractive nor unattractive* (50), to *very attractive* (100), and from *very submissive* (0), to *neither submissive nor dominant* (50), to *very dominant* (100). From this screening exercise we selected 10 faces, 5 Afro-Mauritian and 5 Indo-Mauritian, each with a mean submissiveness/dominance, attractiveness, and trust ratings between 50 and 60.

### Participants

To assess the effects of religious badges on perceptions of trustworthiness among in-group and out-group members, we moved to a third location, thus again ensuring that participants would be naive to the identities of the men in the photographs. Specifically, we conducted an experiment in Pointe aux Piments, a village on the North-West coast of the island with a population of 9,079 (Statistics Mauritius, 2012). We collected data from 53 males and 47 females, modal age 18 and 24 (60% of our sample). We excluded two participants whose religious affiliation did not match religions used in our study (one Muslim and one not affiliated) and one participant who did not operate the computer program correctly. We grouped participants based on their self-reported religious affiliation only (i.e., dichotomizing the sample into Christians and Hindus). Warrant for dichotomizing the sample according to religion comes from the recognition that although ancestry and religion are not always coupled in Mauritius (there was one Afro-Mauritian Muslim and one Indo-Mauritian who did not affiliate to any religion in our sample), the majority of individuals of a specific religious tradition are of the same ancestry. If a person is Christian, for example, most of their fellow religious in-group members will be of African descent. Moreover, since ancestry is sometimes mixed in Mauritius, we presume that religious affiliation is a more salient coalition signal for unmatched participants (i.e., those individuals who are not Indo-Mauritian Hindus or Afro-Mauritian Christians). Our final sample comprised 97 participants, of which 47 indicated that they were Christian and 50 indicated that they were Hindu.

However, as noted above, not all participants reported ancestry that traditionally matches the two religious affiliations used in this study. While we recruited participants equally from Indo- and Afro-Mauritian communities, of the 97 participants in our sample, 15 people reported mixed ancestry, 3 Sino-Mauritian ancestry, 3 Franco-Mauritian, and 1 participant reported “other” ancestry. In the main text, we treat religious affiliation as more salient and use the full sample of 97 participants (possibly neglecting some nuanced effects of mixed ethnicities); however, we present an alternative analysis in the supplement, removing data from those who did not self-

**Table 1.** Participant Counts and Descriptive Statistics.

Religious Affiliation (n)		Ancestry (n)		Sex (n)	
Christian	47	Afro-Mauritian	41	Males	51
Hindu	50	Indo-Mauritian	34	Females	46
		Other	22		
Sum	97	Sum	97	Sum	97
Age (Six Categories by 10 Years)		Religiosity (1–5)		Ritual Frequency (0–5)	
Mode	18–24	Mean	2.85	Mean	2.29
SD		SD	0.95	SD	1.46

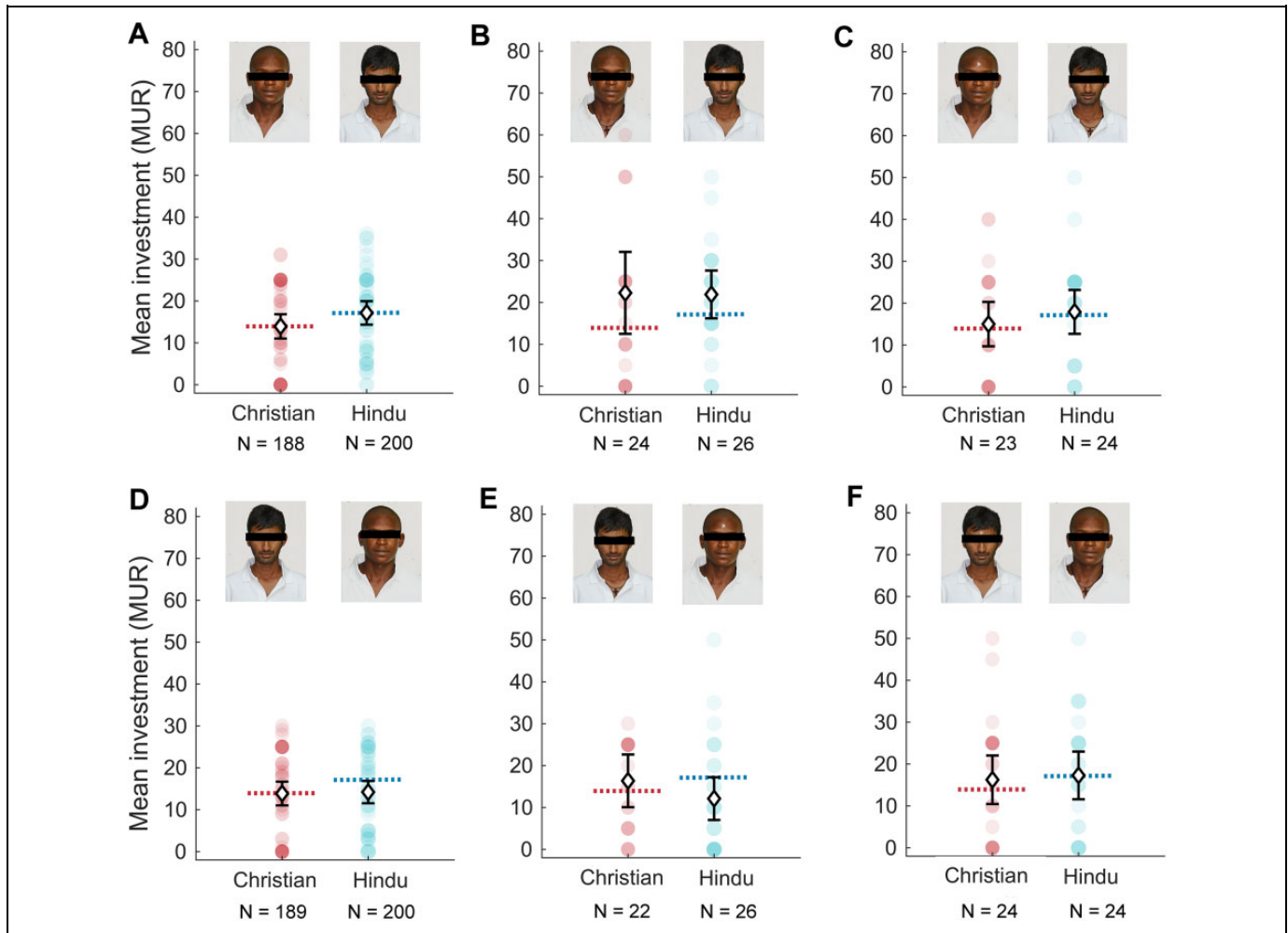
Note. Analyses in the main text are based on participants' religious affiliation. In the Supplemental Material, we show analyses only for participants with self-declared Afro- and Indo-Mauritian ancestry, excluding other and mixed ancestry.

identify as belonging to the African-Mauritian or Indo-Mauritian ethnic groups, and the religion with which they are most typically associated (i.e., Afro-Mauritian Christians and Indo-Mauritian Hindus). There were no practically important differences between the results from this reduced sample and the results presented in the main text. See Table 1 for an overview of participant counts and descriptive statistics.

### Experiment

We ran experiments in a large square tent set up in a public park for the purposes of data collection. To test multiple participants at the same time, the tent was separated into quadrants, each with its own doorway. We placed a table, chair, and laptop in each quadrant. Local assistants randomly sampled from Indo-Mauritian and Afro-Mauritian ethnic communities, told them that they were taking part in a study on economic decision-making, and obtained informed consent. The experiment was conducted in the local language and run by local assistants who were Indo-Mauritian, but from a different location on the island and unknown to participants. Waiting participants were corralled outside of the experimental tent to prevent collusion from participants who had already completed the experiment. To limit disclosure of study design, we collected all data within 3 days.

The experiment employed an elaborated version of the software used in the screening task. Participants were first screened for their ability to use a computer and asked to operate a computer mouse to mark the current time on a scale in front of a research assistant. If a participant passed this test, the she or he was shown 10 faces: 5 Afro-Mauritian and 5 Indo-Mauritian faces selected from the screening procedure described above. To control for contrast effects, we randomly assigned participants to one of the four conditions. In all four conditions, 2 of the 10 faces wore a religious badge. For the Christian badge, we added a simple black wooden cross to the necklace band. For the Hindu religious badge, we used a white tilak taken from a photograph of a man attending a Hindu temple in Quatres Bournes. Tilak vary, and differences in color and the orientation of markings indicate sectarian membership. However, white tilak do not demarcate the wearer as



**Figure 1.** Mean investments with 95% confidence interval and face illustrations. Each plot illustrates a type of face into which Christian and Hindu participants were, respectively, investing. The numbers below x-axis illustrate how many times each type of face was viewed. Horizontal lines are mean investments for in-group faces with no religious badge (this served as a reference category in our regression models; red is Christian participants, blue is Hindu). (A) Investments in in-group faces with no religious badge. (B) Investments in in-group faces with an in-group religious badge. (C) Investments in in-group faces with an out-group religious badge. (D) Investments in out-group faces with no religious badge. (E) Investments in out-group faces with an in-group religious badge. (F) Investments in out-group faces with an out-group religious badge. Note that the manipulated religious badges are a white ash mark (tilak) on a forehead or a wooden cross on a necklace. Participants' eyes are covered to protect their anonymity.

belonging to a sect and can be worn by any Hindu. In general, tilak communicate a person's religious commitment and involvement in the Hindu community. Thus, both badges we used indicated general religious affiliation (Christian or Hindu) without any indication of sectarian membership (e.g., Catholic or Marathi). We digitally added either a tilak or a cross with Adobe Photoshop (see Figure 1 for illustration).

Each participant viewed faces, two of which were modified to include a religious badge. Crosses were added to the images in which men were wearing the necklace in the initial photographs. One third of participants viewed only stimuli with tilak, one third viewed stimuli with only a cross, and one third viewed a face with a tilak and a face with a cross. Each face was judged 100 times: 80 times without any treatment, 10 times with a cross, and 10 times with a tilak.

Our design of 10 faces with two receiving the religious badge treatment is based on the design of previous research (McCullough et al., 2016). Here, we split the 10 faces by ancestry to achieve balance (i.e., 5 Afro-Mauritians and 5 Indo-Mauritians) and varied religious badges equally in their three possible combinations (i.e., cross/cross, cross/tilak, tilak/tilak). All participants viewed two faces with religious badges, but these badges and the faces to which they were connected varied between subjects. As in the original study, two faces received the treatment to make the manipulation less obvious and less subject to experimenter demand effects.

After completing the comprehension task, informants were shown each of the 10 faces in random order, one at a time, and were asked to answer the six trust questions that evinced the highest reliability in the screening task. Ratings were assessed



on an analog scale ranging from 0 to 100. Questions used to assess targets' trustworthiness were: "This person finishes what he starts," "This person respects others," "This person returns extra money when the cashier makes a mistake," "This person is always completely fair to others," "This person follows the rules," and "This person listens to his conscience." Data collected for the experiment reveal that these questions exhibited adequate reliability ( $\alpha = .79$ ).

After rating each face, participants played a modified form of the trust investment game, designed to measure trust and trustworthiness (Berg, Dickhaut, & McCabe, 1995). In the standard trust game, participants are anonymously paired and randomly assigned to the role of either trustor (Player A) or trustee (Player B). Both participants start with equal endowments; however, Player B's endowment never enters game play. In the initial decision-making task, Player A sends any amount of her endowment to Player B. If Player A sends none of her endowment, the game ends. If, however, Player A sends some or all of her endowment, this amount is tripled and then sent to Player B. In the second stage of the experiment, Player B decides how much, if any, of her received amount to send back to Player A. The amount Player A sends to Player B assesses trust since this amount represents a risk that the trustee will return less money than was sent (Camerer, 2003).

All of our participants were assigned to the role of Player A (trustor). They were told that they controlled 250 Mauritian rupees (about 1 day's wage for unskilled labor; US\$7.58) and that they could allocate none, some, or all of their money across 10 men located in La Gaulette (the southern town where the photographs were taken). Participants were told that their decisions would be transmitted electronically and anonymously over the computer to the 10 men in La Gaulette who would then respond with how much, if any, of the "transferred" money to return to the participant.

In order to make sure that participants understood the trust game, after completing the attitudinal ratings of the faces, the software stopped and asked participants to alert the local assistant who had left the "room." The assistant then reentered the room and explained the trust game to the participants. The participants were not allowed to proceed to the game until they had passed a comprehension task and the assistant had left the room. All participants completed the comprehension task.

In the economic decision-making task, faces were presented in a two-row  $\times$  five-column array, in the same order as they were presented in the initial rating task, positioned from the top-left corner, with a "bank" on the right of the array that indicated the 250 rupee initial endowment. Participants could allocate money in 5-rupee increments to each player by clicking on the arrows beneath their face. When a participant did so, it decreased her starting endowment as shown in her bank (see Figure S1 in Supplemental Material). In these experiments, and unlike the traditional trust game, there was no Player B. We decided to determine payouts based only on participant's decisions, adding the amount kept to half of the amount sent after tripling. For example, if a person trusted all of her endowment (250), she would have received a payout of

375 rupees ( $[250 \times 3]/2$ ). After making decisions in the economic game, participants completed questionnaires that asked about age, sex, ethnicity, marital status, education, religious affiliation, degree of religiosity, and frequency of ritual behavior. At the end of the study, each participant received the payout based on the above specified algorithm.

This study design is based upon McCullough, Swartwout, Shaver, Carter, and Sosis (2016), but adapted to the local context, and adjusted to vary the stimuli according to ancestry. In the original McCullough study, the researchers included a control condition of a necklace band to examine whether any additional stimuli added to a face increased trust (it did not). Based on these results, we did not include a control condition due to the small population size of our study area, and the lack of an appropriate control for prayer ashes (there are no locally relevant secular forehead markings).

All portions of this study were approved by the ethical committee of the Czech Association for the Study of Religions, Masaryk University, and written informed consent was obtained from all subjects.

### Data Analysis

All data were analyzed in R (R Core Team, 2016). Participants were split based on their reported religious affiliation (i.e., Christian or Hindu) in order to assign correct labels to each target face (e.g., an Afro-Mauritian face with a cross would be a face of in-group ancestry with an in-group religious badge for Christian participants, but an out-group face with an out-group badge for Hindu participants; see Figure S1 in Supplemental Material). The basic model, for both trust ratings and decisions in the trust game, included only the effects of a religious badge (Hindu tilak or a Christian cross) with faces of in-group ancestry without a badge as a reference category (the intercept). In the next step, we added religious affiliation (a binary variable Christian/Hindu), age centered on its mean, and sex, and in the third step, we held constant self-reported religiosity and frequency of ritual behavior. This approach allowed us to examine general trends in the effects of religious badges, regardless of participants' religious affiliation (e.g., the effect of an in-group face with an in-group badge compared to an in-group face without a badge). While it would be fruitful to explore a Badge  $\times$  Religious Affiliation interaction, comparing differential badge effects on investment between Christian and Hindu participants, our sample size is not large enough for such a comparison. Our basic model has 83% power to detect a medium size effect (Cohen's  $f^2 = .15$ ) at  $\alpha = .05$ . However, to explore a Badge  $\times$  Religious Affiliation, we would have needed to double the sample size (which is difficult in remote field settings, see Discussion section). We display the raw means for each religious affiliation and ancestry/badge type in Figure 1 together with the number that each type of ancestry-badge combination was viewed. Note that each participant saw 8 of the 10 faces without a badge, hence the inflated numbers for no-badge faces.

As a general approach, we used either linear mixed models (on trust ratings) or generalized linear mixed models (on trust



**Table 2.** Estimates and Odds Ratio With 95% Confidence Interval for Self-Reported Trustworthiness and Investment Decision in the Trust Game.

Variables	Model		
	Trustworthiness ( $\beta$ Estimates)	Binomial Invest (Odds Ratios)	Positive Invest ( $\beta$ Estimates)
Outface no badge	−1.05 [−3.26, 1.15]	0.58* [0.36, 0.92]	−0.58 [−2.00, 0.84]
Outface out-badge	2.01 [−2.79, 6.82]	1.21 [0.45, 3.23]	−0.86 [−3.77, 2.05]
Inface in-badge	3.84 [−0.88, 8.55]	3.96* [1.29, 12.17]	2.88* [0.07, 5.68]
Inface out-badge	−4.92* [−9.77, −0.06]	1.54 [0.56, 4.24]	0.15 [−2.84, 3.14]
Outface in-badge	−3.57 [−8.38, 1.23]	1.16 [0.41, 3.28]	−0.56 [−3.71, 2.59]
Affiliation	−0.76 [−6.36, 4.84]	3.15 [0.63, 15.73]	−2.66 [−7.79, 2.47]
Age	0.3 [−2.58, 3.19]	0.89 [0.40, 1.96]	−0.54 [−3.31, 2.23]
Female	−1.08 [−6.77, 4.61]	3.23 [0.62, 16.74]	−4.87** [−9.89, 0.15]
Religiosity	−0.17 [−3.20, 2.86]	0.92 [0.40, 2.13]	0.55 [−2.68, 3.77]
Ritual	0.97 [−1.02, 2.96]	0.84 [0.48, 1.50]	1.09 [−0.90, 3.07]
Intercept	58.49*** [44.90, 72.09]	2.56 [0.06, 114.12]	25.55*** [21.22, 29.89]
Observations	970	970	970

Note. We present  $\beta$  estimates with 95% confidence intervals and odds ratios (exponentiated logistic coefficients). Intercept is in-group face with no badge. Affiliation = Catholic versus Hindu; female = male versus female.

\* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$ .

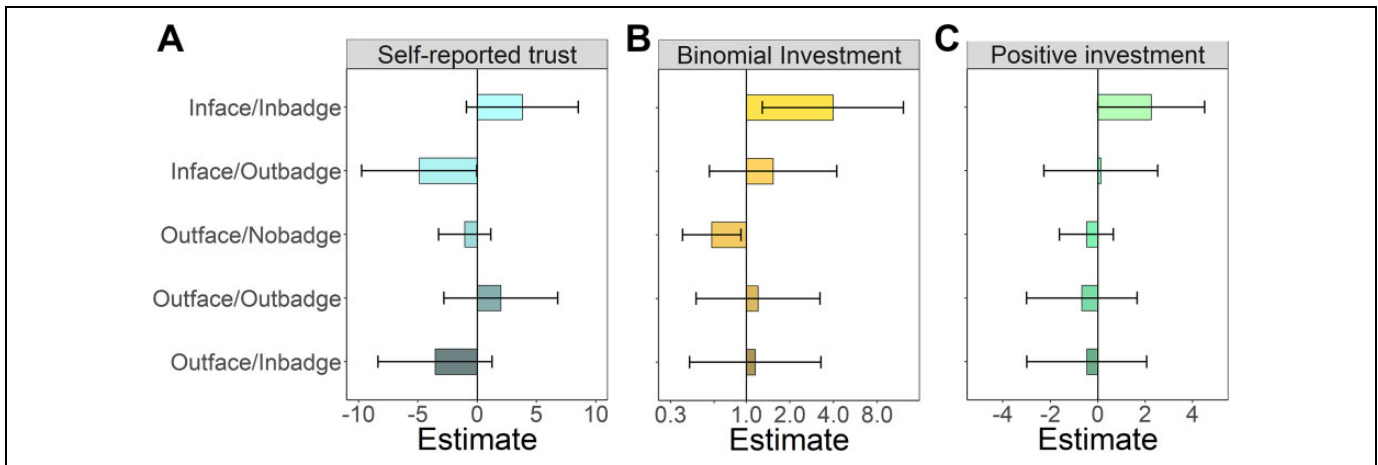
game behavior) with participant ID as a varying intercept to account for the fact that each participant made 10 decisions (i.e., these 10 decisions were nested within each participant). This step accounts for the fact that the 10 investment decisions were not independent of each other. Trust ratings were modeled using the lme function in the nlme package (Pinheiro, Bates, DebRoy, Sarkar, & Team, 2014). Because the investment data were counts bounded at 0, we built generalized linear mixed models to model the effects of religious badges on multiple investments in the trust game. Specifically, we employed a hurdle model that fit a binomial distribution on the binary decision to invest or not, and a truncated negative binomial distribution to the positive (nonzero) part of the investment data (Martin et al. 2005; Mullahy, 1986). The hurdle model revealed the best fit to the data when compared with zero-inflated poisson and negative binomial distributions (as assessed by Akaike's information criteria). Hurdle models were run with the *glmmadmb* command (glmmADMB package; Fournier et al., 2012; Skaug, Fournier, Nielsen, Magnusson, & Bolker, 2013) by specifying the "binomial" and "truncnbino1" distributions, respectively. Binomial coefficients were exponentiated and are reported as odds ratios. All plots were created using MATLAB (MathWorks Inc., 2013) or ggplot2 (Wickham, 2009).

## Results

### *Are Individuals Adorning Religious Badges Rated as More Trustworthy on Survey Measures Than Individuals Not Adorning Religious Badges, Regardless of the Shared Group Membership of the Raters?*

On a scale from 0 to 100, faces of in-group ancestry with an in-group religious badge were rated as slightly more

trustworthy compared to in-group faces with no badge (estimated difference = 3.84); however, the 95% confidence interval (CI) showed that this effect was not precisely estimated [−0.88, 8.55]. Faces of in-group ancestry with an out-group religious badge were *distrusted* compared to in-group faces with no badge ( $\beta = -4.92$ ; 95% CI [−9.77, −0.06]). In other words, on a face of shared ancestry, an in-group religious badge had variable effects (with most of the probability mass on the positive side), while an out-group badge decreased trust. The out-group ancestry trustworthiness ratings did not show any reliable patterns. Faces of out-group ancestry without a badge were rated, on average, as slightly less trustworthy compared to faces of in-group ancestry without a badge, but there was substantial uncertainty around this effect ( $\beta = -1.05$ ; 95% CI [−3.26, 1.15]). Similarly, faces of out-group ancestry with an out-group religious badge were rated slightly more positively, but again, with substantial uncertainty ( $\beta = 1.99$ ; 95% CI [−2.81, 6.79]). Faces of out-group ancestry with an in-group religious badge were rated more negatively ( $\beta = -3.55$ ; 95% CI [−8.36, 1.25]) compared to in-group faces with no badge. For this effect, while the 95% CI include both positive and negative values, the effect size and variability is comparable to the in-group ancestry/in-group badge ratings. In general, findings indicate that religious badges varied in the effects on attitudinal measures of trust. Although most of the probability mass was above 0 for the in-group ancestry/in-group badge effect, this effect was small and variable. Moreover, out-group religious badges increased *distrust* when adorned by people of in-group ancestry, and we also observed a small and variable negative effect of the trustworthiness of individuals of out-group ancestry with an in-group badge (see Table 2 and Figure 2), both indicative of a *black sheep effect*. Detailed modeling steps are described in Table S1 in Supplemental Material.



**Figure 2.** Estimates of badge effects with 95% confidence intervals. (A) Model of trustworthiness ratings. (B) Model of binary decisions to invest in a face. Note the coefficients are odds ratios and the x-axis was log transformed. (C) Model of nonzero investments in faces.

### Do Religious Badges (Relative to No Badge) Encourage Risky Economic Investment Regardless of the Shared Group Membership of the Raters?

Are Individuals Adorning Religious Badges Rated as More Trustworthy on Survey Measures Than Individuals Not Adorning Religious Badges, Regardless of the Shared Group Membership of the Raters?

The raw data displayed in Figure 1 suggest that compared to in-group faces with no badge, in-group faces with an in-group badge were trusted with more money across the entire sample. To investigate this matter more rigorously, we regressed the investment data on our ancestry/badge variable, collapsing results across participants' religious affiliations to gain more statistical power.

First, using a logistic regression model with varying intercepts by participant's ID, we found that the odds of investing in an in-group face with an in-group badge were 3.96 higher (95% CI [1.29, 12.17]) compared to an in-group face with no badge; that is, photos of in-group ancestry adorning an in-group religious badge had a nearly 4 times greater chance of receiving an investment (compared to in-group faces with no badge), supporting the *coalitional recognition hypothesis*. The estimates for all badge types are displayed in Table 2 and Figure 2. Second, we modeled the positive amount sent using the truncated negative binomial regression with a participant's ID as a varying intercept. This analysis showed that having an in-group badge on an in-group face was associated with getting roughly 3 more Mauritian rupee of the 250 (95% CI [0.07, 5.68]). In other words, when participants decided to invest, they invested, on average, higher amounts to in-group faces with an in-group badge. The somewhat small absolute increase is a result of the fact that participants in general chose to invest in multiple faces evenly, spreading risk ( $M_{\text{investment}} = 15.34$ ,  $SD = 14.17$ , maximum allocation recorded = 100; see Figure 1); hence, an increase of three rupees for in-group faces with in-group badge indicates a detectable deviation from the baseline tendency in

roughly equal allocations across multiple faces. However, we did not observe similar effects for in-group faces adorning out-group badges—while the coefficients were positive, these effects were small and variable (contrary to the *inferred monitoring hypothesis*; see Table 2).

Regarding investments in faces of out-group ancestry, we observed only a negative effect of an out-group face without a badge. Compared to an in-group face without a badge, the out-group face without a badge had a 37% lower probability of receiving money. This finding points to a baseline preference to invest in faces of shared ancestry (independent of religious badges). Interestingly, though not significantly different from the in-group face with no badge, all out-group faces with a religious badge (i.e., both in-group and out-group) had a positive probability of receiving an investment, suggesting that even an out-group badge might, to some extent, mitigate the baseline distrust among faces of out-group ancestry. However, we would need a larger sample to evaluate this conjecture (see Table 2, Figure 2, and Discussion section). See Supplemental Material for detailed analytical steps of the models.

### Discussion

The majority of contemporary evolutionary theories of religion hold that various features of religious systems support—at the very least—in-group cooperation. Often, these theories suggest that religious communities also encourage parochial altruism because religious beliefs communicate the rejection, at least implicit, of the beliefs and rituals of competing groups (religious or otherwise; Sosis, 2003). Recent research on the role of religious belief in intergroup relationships has found mixed evidence. For example, some studies found that displaying religious identity increases trust across group boundaries (e.g., Hall et al., 2015; McCullough et al., 2016) and even increases willingness to sacrifice oneself for an out-group member (Ginges et al., 2016). However, other studies suggest parochial altruism might better capture religions'

effects on out-group relationships (Blogowska & Saroglou, 2011; Bushman et al., 2007). Nevertheless, the former results are surprising, given the intense group boundary generating features of religion and the tendency for humans to respond parochially to group classifications, even those which are fleeting and superficial.

Here, we investigated two hypotheses related to the effect of religious signaling on cooperation among otherwise anonymous individuals. The *coalitional recognition hypothesis* assumes that religious individuals use markers of shared religious group membership to assess religious commitment among coreligionists and to distinguish between in-group members and others. The *inferred supernatural monitoring hypothesis*, on the other hand, contends that because religious people believe in omniscient supernatural entities who punish individuals who violate cooperative norms, raters perceive as trustworthy individuals signaling commitment to any punitive supernatural deity. Unlike previous studies conducted in the United States, which found that religious people are trusted regardless of shared group membership, we find the effect of markers of religious identity on trust are contingent upon shared religious group membership and expected ancestry. We suspect that the differences in findings between ours and previous research are because intergroup trust varies systematically across cultures and religious traditions (Shaver, Troughton, 2016). For example, the features of some religious systems may better ameliorate the divisive nature of ethnicity, and cross-religious trust is less likely in areas with histories of religious tensions.

Specifically, our findings indicate that as assessed by attitudinal and economic measures, Mauritians use religious badges to allocate trust in the service of coalition regulation—Mauritians prefer to trust fellow religious in-group members and to allocate less trust to people who indicate an out-group religious identity. Put differently, we find no reliable evidence that markers of religious identity increase trust across religious lines in Mauritius, compared to baseline trust behavior toward in-group members without a religious badge. We do find that faces of out-group ancestry with no badges receive fewer economic investments than out-group faces with a religious badge, but these increases did not differ from baseline levels of trust allocated to in-group faces. These results offer a preliminary conclusion that religious badges might mitigate some of the ethnic-based out-group hostility. However, out-group badges do not increase trust beyond baseline in terms of economic investments. In general, our findings provide greater support for the *coalition recognition hypothesis*.

Moreover, we found that, in terms of attitudinal ratings, individuals who were of in-group ancestry but who wore an out-group religious badge, and individuals who were of out-group ancestry who wore an in-group religious badge were *distrusted*. These findings suggest that religious markers have divergent effects on trust depending on the ancestry of the target and the rater. These findings are similar to the *black sheep effect* and suggest that people are suspicious of those individuals who appear to indicate membership in a group but

violate other expectations typically associated with group members. Individuals in our sample did not infer that these individuals were trustworthy, even though they were depicted as believing in supernatural entities.

Taken together, our findings suggest that research which has found religion to increase trust across religious group boundaries may be partially attributable to the ambient Christian cultural history of the Euro-American societies where these studies were conducted, and/or to the Christian identification of both raters and targets, or the unusual nature of American undergraduates (Sears, 1986). Christianity has a cultural history of proselytization across ancestries, unlike Hinduism. Rather than being indicative of religion, in other words, previous findings may only be generalizable to majority Western Christian populations. Alternatively, the differences between previous studies and the results reported here may be due to cross-cultural differences in the number of secular individuals in each country. In contexts where rates of unbelief are high, such as most Western societies, religious markers could perhaps function as markers of belonging to a “religious” in-group vis-à-vis a secular “out-group” (Hall et al., 2015); however, recent research finds little evidence of a religious in-group in New Zealand, a society with high rates of unbelief (Shaver, Troughton, et al., 2016), and the religious congruence fallacy (that religious people are more prosocial) appears inversely related to rates of atheism (Gervais et al., 2017).

Above, we suggested that researchers ought to distinguish between the measurement of general attitudes regarding the trustworthiness of the target (i.e., participants feel that the target will return their money) and the level of trust toward the target (i.e., willingness to extend trust in the form of such money). We suspect that when asked about the trustworthiness of a target—for instance, when asked if a person listens to her conscience—people infer that indications of religious involvement signal general trustworthiness as the *inferred supernatural monitoring hypothesis* predicts. Numerous studies suggest that people perceive religious individuals as more trustworthy regardless of shared group membership (Bailey & Doriot, 1985; Bailey & Garrou, 1983; Bailey & Young, 1986; Galen et al. 2011; Gervais et al., 2011; Orbell et al., 1992; Paciotti et al., 2011; Tan & Vogel, 2008). The trustworthiness as assessed by survey questions may be somewhat different, or perhaps be insufficient, to motivate risky economic cooperation. Indeed, the latter has more relevance for understanding the conditions under which religion leads to the promotion of large-scale cooperation.

We here assessed both attitudinal trust as based on survey ratings and risky trust as assessed by the trust game. In general, we find that the two measures do not differ. We found a positive effect of both attitudinal and economic investment in faces of in-group ancestry with in-group religious markers, but all other effects were variable. Although some of the coefficients trended in different directions for the two trust measures across the different conditions, they cross 0, and thus we hesitate to speculate further without additional data collection. Nonetheless, when selecting methodologies, we encourage that future

researchers consider the possibility that trust is multidimensional and/or that different measures may capture different levels of trust.

## Conclusion and Future Directions

The historical move from small-scale, face-to-face social living to large and anonymous societies is one of the major transitions in human evolutionary history (Richerson & Boyd, 1998). There is an emerging consensus among evolutionary scholars that religion facilitated this transition, in part by providing coreligionists with reliable mechanisms for the communication of cooperative intentions. Across the world, during what is known as the Axial Age (c.a. 800 to 200 BCE), religion helped large groups of unrelated and ethnolinguistically diverse individuals to find one another and to cooperate (Turchin, 2013).

Yet, while religion can create bridges, it typically does so by building walls. Understanding how religion unites and divides is not only critical for understanding the history of human ultrasociality but is also important to understanding the conditions that encourage or inhibit social integration in the highly diverse and largely anonymous societies of today. While some previous work has suggested that the communication of religious commitments can increase trust across social boundaries, we here found that religious markers are primarily used in the service of in-group cooperation and the regulation of social coalitions. We suspect that these divergent findings are the result of cross-cultural variation in conflict, differences in the proselytizing tendencies of religious traditions, and/or minority/majority intergroup dynamics.

We note that our conclusions are limited by several factors. First, while our sample size was sufficient to detect the differences between an in-group face with no badge and in-group face with a badge, it did not allow us to explore how these effects might differ between the two religious traditions sampled. Furthermore, while our manipulation (Hindu tilaks and Christian crosses) can be understood as signaling commitment to specific religious groups, a Hindu tilak is more directly associated with recent ritual participation (the ash mark is only temporary) and thus may be a more effective symbol when compared to a Christian cross. Indeed, it may be challenging to find badges across religious groups that have similar signaling functions, yet such badges would constitute a more rigorous test of the present hypotheses. Likewise, adding a different religious group with the same ancestry (e.g., Indo-Mauritian Muslims) could provide further insights into the complex relationships between religious affiliation and ancestry.

Another important limitation concerns the effect sizes detected in the current study. We chose to ask our participants to invest in 10 faces; however, as noted in the text, participants generally spread their allocations evenly across multiple faces, making any differences difficult to detect. Decreasing the number of faces (e.g., to four) could significantly increase the observed effect sizes. Alternatively, a within-subjects design (with every ethnic/religious combination) would increase effect sizes, but at the sacrifice of ecological validity

(individuals would be variously depicted as belonging to multiple religions). It might instead be fruitful to vary signal strength by including badges signaling participation in more extreme and demanding rituals, such as the Thaipooam Kavadi in Mauritius (Xygalatas et al., 2018). While many have rightfully suggested that more data ought to be collected among non-WEIRD (Barone & Mocetti) samples, data collection procedures from these samples come at high material and temporal costs. Such data are both expensive to collect and are often limited to single studies and these communities are often small; indeed, we would have had difficulty finding additional participants from our small study community.

Finally, to the extent possible, future work ought to systematically examine cross-religious trust in settings that vary in conflicts over resources, religious traditions, and the relative size and social dominance of religious groups. Such work has the potential to discover the social features that stabilize diverse, yet peaceful, societies.


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## Supplemental Material

Supplemental material is available for this article online.

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