Gods, Games, and the Socioecological Landscape:
The Evolutionary Dynamics of Small-Scale Religious Traditions

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1. Introduction

From the serene mountaintop rituals of Inner Asia to the painful Sundance rites of the American Plains, traditional religious practices exhibit considerable variation around the world. What accounts for this variation? While generations of social scientists have observed important relationships between religion and social cohesion (Durkheim, 2001 [1912]; Malinowski, 1936; Rappaport, 1979), only recently have researchers actively pursued integrating the study of religion with the natural and social sciences, positing that religion plays a critical role in human relationships. If religion contributes to the kinds of cooperation that bolster societies, the kinds of cooperative challenges that people face should contribute to the content and form of religious expression (Bendixen et al., 2023a; Purzycki and Sosis, 2022). To what extent do religious systems conform to local challenges to cooperation? Are they effective in overcoming these challenges? How expansive is this cooperation? Is it limited to local communities or do traditional religions mediate relationships between groups? By rigorously studying some of the dazzling variety found in the world's religious traditions, this project seeks answers to these questions.

2. Theory and Hypotheses

At their heart, the applied human evolutionary sciences of cooperation and coordination account for why individuals would ever bother to invest in someone else at a cost to themselves and how such a strategy would ever proliferate in a population of selfish competitors (Cronk and Leech, 2012; McElreath and Boyd, 2007). Without sanctions, it is theoretically advantageous for individuals to be selfish in their interactions, but the world we see is full of cooperative acts. While animals primarily engage with cooperation between kin (Maynard Smith, 1964), people engage in considerable direct reciprocity between unrelated individuals (Axelrod, 1984; Trivers, 1971). Yet, we also show a wide range of social relationships built on neither kin nor direct, reciprocal interactions, particularly in cases of vast trade networks, state societies, and urban environments (Henrich et al., 2010; Turchin, 2013).

Our capacities for culture have contributed to our ability to survive in virtually all of the world's myriad environments (Henrich, 2016; Richerson and Boyd, 2005). The variation of human economies and cultural forms we see around the world is thus due in part to the pressures people have faced in the past. Importantly, individuals addressed these pressures *together* and thus developed a considerable interdependence on each other. Yet, this interdependence is constantly under threat both internally and externally. Candidate mechanisms mitigating these threats include cultural norms, institutions, beliefs, practices, and the psychological systems that underlie their functioning (Boyd and Richerson, 2009; Richerson and Henrich, 2012). Furthermore, formal theory shows that

cultural strategies can co-evolve with threats to the kinds of cooperation that hold societies together (Bednar and Page, 2007). Religion—beliefs in and practices devoted to spirits, gods, and other spiritual agents—may be one such flexible and adaptive cultural solution to problems that threaten relationships necessary for survival (Purzycki and Sosis, 2022).

Two important religious mechanisms that appear to bolster cooperation are supernatural punishment and ritual. The "supernatural punishment hypothesis" (Johnson, 2016, 2005; Norenzayan, 2013; Schloss and Murray, 2011) posits that the fear of costly supernatural repercussions against selfish behavior will proliferate in a context where the likelihood of getting caught and the cost of punishment outweighs the opportunities missed by being cooperative. Beliefs in gods' punishment harness our cooperative tendencies (H1-H2 in Core Hypotheses), especially when the perceived costs of selfishness outweigh the benefits of cooperating. To motivate behavior, then, individuals should believe that the costs of a god's punishment outweigh what could be gained by shirking religious obligations (H3). Building on this, some posit that the long-studied "moralistic traditions"—religions with gods that punish theft, greed, murder, and/or dishonesty (e.g., the Abrahamic traditions, Buddhism, Hinduism, etc.)—are especially effective in contexts with many anonymous individuals (Peoples and Marlowe, 2012). Such beliefs ostensibly galvanize evolved moral cognition, promoting cooperation beyond kith and kin (H4-H5), and thus may contribute to the scaling-up of societies (Norenzayan, 2013). Ritual behaviors devoted to the gods also function as important mechanisms for cooperation. Rituals bring people together, but their costs also communicate that participants are committed to deities, one's community, and their expected mores (Bulbulia, 2004; Rappaport, 1999; Soler, 2012; Sosis and Bressler, 2003). In other words, ritual costs convey that one has a cooperative disposition (H6).

While these mechanisms might strengthen cooperation, different societies face different threats; from foragers and horticulturalists to herders and urban merchants, the ways humans make a living alter their relationships in dramatic ways (Cronk et al., 2000). In other words, a society's economy shapes the contours of its cooperative landscape. Furthermore, around the world, the culturally-postulated targets of gods' and spirits' anger include behaviors beyond violations of morality (as defined above) and ritual; across ethnographic works, the kinds of things believed to inspire the anger of spirits also include violations of etiquette, food and sexual taboos, rules of resource management, and substance abuse (Purzycki and McNamara, 2016). Theory (Bendixen and Purzycki, 2023; Purzycki et al., 2022a) posits that underlying this diversity is an important constellation of features. Namely, around the world, the kinds of problems that religious traditions address include: a) conflicts of interest (i.e., they are game-theoretic in nature) with cooperative strategies that are b) individually costly, c) cognitively salient, and d) relatively easy to avoid doing and therefore e) not easy to enforce with secular means (H7). Recent cross-cultural ethnographic efforts (Bendixen et al., 2023a) suggest this is the case for relatively stable religious systems. If so, then we should also find that religiously prescribed behaviors and local beliefs in supernatural punishment should decrease self-interested behavior in these scenarios (H8).

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> **Core Hypotheses**
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> H1. Beliefs in supernatural punishment induce cooperation toward non-kin.
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> H2. Beliefs in supernatural monitoring induce cooperation toward non-kin.
>
> H3. The culturally postulated costs of supernatural punishment outweigh the benefits of selfishness.
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> H4. Beliefs in moralistic supernatural punishment induce cooperation beyond directly reciprocal relations.
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> H5. Cooperation between members of the so-called "moralistic traditions" will be greater and more expansive than those in the "local traditions".
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> H6. Ritual participation conveys commitment to one's community members.
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> H7. Beliefs in supernatural punishment will point to: a) conflicts of interest with cooperative strategies that are b) individually costly, c) cognitively salient, and d) relatively easy to avoid doing and therefore e) not easy to enforce with secular means.
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> H8. Religiously prescribed behaviors and local beliefs in supernatural punishment should decrease self-interested behavior in these local scenarios.
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> H9. The cooperative payoffs that religious expression provides positively feed back to maintain these traditions through cultural learning.
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> H10. Relatively new and taxing problems should be associated with infrequent appeals, beliefs, and corollary behaviors.

How, then, do individuals in traditional religions curb competitive selfishness? First, as discussed above, the perceived costs of angering spirits should outweigh the costs of secular punishment of the same infraction (H3). This motivates action. Second, religious systems must be about salient problems (H7); beliefs about what gods punish are not likely become commonplace unless the taxing threats already exist. Third, religious traditions will become more widespread by virtue of a host of social learning biases (Kendal et al., 2018) including the proclaimed positive benefits of engaging in religious traditions and by virtue of appeals to costly spiritual sanctions (see Fitouchi and Singh, 2022; Purzycki et al., 2022a) (H9). This process highlights how religious systems evolve; if successful traditions address threats to sociality, we should see religion acclimating to novel threats (H10). Indeed, recent examples include gods believed to be concerned with and support contemporary resistance to environmental degradation (Sponsel, 2014; White, 1967) and spirits' anger about alcohol abuse where alcohol-related mortality is severe (Purzycki, 2016; Purzycki and Holland, 2019).

3. Proposed Study

3.1. Goals and objectives

The primary goal of this project is to better understand the relationship between local social ecologies and religion in small-scale traditions. To shed light on the relationship between social ecology and traditional religions, we will organize and invest in coordinated, iterated, and longitudinal ethnographic and experimental field research conducted among relatively isolated cultural groups.

The demand for this kind of work already exists; many of the populations whose traditions we wish to learn more about and the wider scientific community hoping to better understand human uniqueness both express a desire for such efforts. As small-scale societies are increasingly engulfed by globalized economies, world religions, and exposed to corollary values that alter their culture and lifeways (Henrich et al., 2010; Nettle et al., 2000), carefully documenting cultural and religious systems is especially timely for both science and the communities whose traditions are rapidly changing.

We will recruit, train, and support the fieldwork of 8 early-career and/or indigenous researchers. We will also work *with* the communities we work in to better understand our theory and method; by eliciting feedback from the communities we work in and conveying the critical feedback we receive, we will be made aware of our own blindspots, biases, and relevance to those voices typically left out of the conversation. Furthermore, organizing such work will bring precise project design and cutting-edge data collection and analyses to bear on the question of why religious traditions remain cross-culturally ubiquitous and central to human societies past and present. Once finished, our publicly available data can be processed and incorporated into a variety of contemporary cross-cultural databases (e.g., Slingerland et al., 2020; Watts et al., 2015).

Over two field trips, we will carry out two main objectives together. Objective 1 entails collecting ethnographic and survey data alongside a behavioral experiment to assess the role of traditional religious beliefs on the scope of cooperation. Utilizing the data we collect during the first field season, Objective 2 assesses variation by designing site-specific methods to test the hypotheses that traditional beliefs and practices conform to and mitigate costly threats to cooperation that emerge from local lifeways.

3.2. Objective 1: Religion and the breadth of cooperation

One proposed mechanism to account for the kinds of wider-scale cooperation humans engage in is the kind of beliefs found among the so-called "moralistic traditions" (e.g., the globalized Abrahamic traditions, Buddhism, and Hinduism, see Lightner et al., 2022; Norenzayan et al., 2016). In "moralistic" traditions, individual beliefs about what gods know, punish, and reward include explicit codes that encourage self-restraint and cooperative support of other individuals (hence, "moral"; Curry et al., 2019; Purzycki et al., 2018b). In turn, this increased cooperation would both attract individuals to the payoffs they would reap in moralistically religious communities and facilitate the kind of cooperation required to dominate and outcompete other groups. This may partly explain the contemporary global spread of the "moralistic traditions". From this, we can ask: *are the "moralistic traditions" especially unique in harnessing cooperation beyond local boundaries or is general belief in supernatural punishment sufficient?*

Using economic game experiments across 15 diverse field sites, previous work showed that the more individuals claimed their moralistic gods knew and punished people, the more cooperative they were towards other co-religionists of the same moralistic traditions (Lang et al., 2019; Purzycki et al., 2016). However, because we primarily measured cooperation between members of dominant "moralistic" traditions (e.g., Christianity, Buddhism, and Hinduism) and not between members of "local" traditions (e.g., ancestor worshipers or totemic spirit cults), we could not assess the hypothesis that specifically "moralistic supernatural punishment" beliefs promote cooperation any differently than "local" traditions, where spiritual agent beliefs revolve around other behaviors (see Purzycki et al., 2022b).

Objective 1 will therefore address these hypotheses by assessing the breadth of cooperation between participants and recipients in "local" religions (H1-H4). Merging the data we collect with

that from previous work will allow us to rigorously test the hypothesis that cooperation is more likely between individuals in "moralistic" traditions than between those in traditions where gods are thought to be focused on other aspects of human behavior (H5). Section 4 details the methods we will use for Objective 1.

3.3. Objective 2: Variation in religion and kinds of cooperative dilemmas

While Objective 1 focuses on the general effects of supernatural punishment, Objective 2 focuses on variation in religious expression. Consider the following examples. In Australia, the aboriginal Martu burn fields in a controlled manner. This practice enriches the soil, thus sustaining the seed-producing plants upon which rodents feed. Monitor lizards feed on these rodents and the Martu hunt the lizards. Over the long term, this system ultimately increases the availability of resources for people and fuels cooperative food-sharing networks (Bird et al., 2013). The Martu justify this collaborative effort with appeals to spirits and suggest that stopping the practice would entail the end of the world. In Bali, temples are distributed along rivers. For ritual purposes, these temples store water upriver, thus providing nearby resident rice farmers with water for their paddies. This requires downstream farmers to wait until the water is released from holding tanks. While sitting in holding tanks, the nutrients of the water are replenished, and ritual networks coordinate the timed release of the water to downriver recipients. This ritually-timed distribution of water allows more farmers to grow more rice (Lansing, 2006). In the southern Siberian Republic of Tyva, ritual sites are located on the territorial borders of nomadic herders and exploitable natural resources (e.g., water from natural springs) on their territories. Outsiders are generally discouraged from entering others' territories as it represents a potential threatening incursion. Therefore, when passing through or in need of renewable resources on others' territories, one pays respects to local spirits. Participating in these rituals conveys trustworthiness and general cooperative sentiments (Purzycki and Arakchaa, 2013) and Tyvans believe that neglecting such practices can lead to disaster and death.

In these three cases, religious beliefs and practices revolve around coordination and cooperation problems that are readily modeled as specific dilemmas (Purzycki and Sosis, 2022; Purzycki et al., 2022a), each with experimental counterparts. Furthermore, local religious beliefs and practices promote the cooperative strategies involved in these dilemmas. Individuals could avoid the effort and risks of field burning (Martu), reap the benefits of over-exploiting water's nutrients (Bali), and try to violate territorial agreements and bring one's herds into neighbors' grazing land or extract resources on others' territories with impunity (Tyva Republic). Yet in each case, local religious systems minimize competitive, locally specified threats to cooperation (H8). What may explain variation across these examples, then, are the specific kinds of dilemmas that arise out of different economic conditions and modes of subsistence. These cases studies are exceptional; most work along these lines is anecdotal, at the group-level, and interpretations are rendered in a *post hoc* fashion. Furthermore, these studies were conducted in isolation. The proposed project will therefore collaboratively examine local traditions in context with data collected from individuals and assess how religious traditions serve specific ends.

4. Methods

Each Objective's methods regimes will follow from the class of research question it addresses. As it is a test of the cross-cultural effects of spiritual punishment on the breadth of cooperation, Objective 1 entails executing the same protocol in all field sites (Appendix A5). As Objective 2 focuses on the diverse uses of religious practices, methods will be necessarily varied and catered to particular

contexts. We will collect foundational ethnographic data in the first field season to feed into designs used during the second field season. For all projects, we will will elicit participant feedback and critical engagement with the methods and results.

4.1. Objective 1

The early part of Year 1 will be spent in preparation for the project, including recruitment, protocol finalization, ethics approval, preregistration, and training followed by a summer field trip (see Appendix A5 for materials). Researchers will go to the field and with the help of local assistants deploy an ethnographic-experimental protocol that collects group- and individual-level data using: a) a preliminary ethnographic survey; b) a demographics survey; c) a religiosity survey; and d) economic experimental games designed to measure cooperative fairness and generosity.

4.1.1. Demographic survey

The demographic survey captures standard individual data (e.g., age, sex, number of children, years of formal education, etc.), alongside measures of other theoretically relevant factors (e.g., food security, salient threats to cooperation, attitudes towards other groups, etc.; see Purzycki et al., 2018c; Purzycki and Lang, 2019). In order to ensure longitudinal research is feasible, we will administer the demographic survey among all participants.

4.1.2. Religious landscape interview

We will conduct a preliminary ethnographic survey ($n \approx 30$ in each site) to establish what gods and practices people know about in their respective communities. As we are targeting popular beliefs and practices (i.e., not just experts' or specialists' religious worldviews), such methods are maximally useful and avoid the pitfalls of relying too heavily on a few key informants and are easy to use across diverse groups (e.g., Bendixen et al., 2023a). Among other tasks (see Appendix A5), participants will:

- freely-list locally important gods/spirits;
- rank and rate those gods/spirits on various theoretically important features (e.g., if they punish, what they punish and reward, etc.);
- list and discuss what these gods/spirits care about;
- list and discuss religious practices and individual requirements;
- discuss especially important times and places for religious expression;
- list and rank the importance of those from whom they learn religious traditions; and
- list and rank the importance of pressing threats to one's wellbeing and community

These ethnographic methods generate discrete data, thus allowing us to examine beliefs and practices using both scales and relatively open-ended questions to be quantified using specialized software (Purzycki and Jamieson-Lane, 2016). Specifically, ethnographic free-list data collection (Quinlan, 2017; Purzycki, forthcoming) provides high-resolution data about beliefs, knowledge, and practices. Avoiding the trappings of monolithic views of culture, this method embraces individual-level variation and facilitates all manner of analyses at both individual and group levels.

Researchers will also conduct group-level surveys to examine key features of variation in religious behavior that address the cost, frequency, timing, and spatial significance of the behaviors list, as

well as details of who is allowed and/or expected to participate, consequences of not participating, and whether or not individuals from other communities participate. This way, we cover our bases of internal and external views of religious practices, but also ensure that researchers know which religious topics should be avoided should any arise. This data will feed into the designs of both Objectives.

4.1.3. Religiosity survey

The religiosity survey includes a battery of discrete questions for all experimental participants (with a minimum targeted $n \approx$ 40-80 in each site; see Appendix A1 for power analysis). Drawing from the ethnographic free-list data collected in the Religious Landscape Interview, we will solicit beliefs about gods attributed a) moral interests; b) knowledge breadth; c) punitive; and d) reward capabilities. For Objective 1, responses to these questions constitute our primary predictor of cooperative behavior (see below and Appendix A2 for causal model). For Objective 2, responses to these questions will inform us of the kinds of variation in religious belief and practice for designing locally-specified instruments. This survey also includes questions about individuals' devotional practices towards the gods. We will also ask a battery of questions that measure exposure to the "moralistic traditions"; to the extent that this confounds both cooperation and beliefs in "local" deities, we would need to hold this constant in our analytical models (Baimel et al., 2022; Purzycki et al., 2022d). Participants will also list the sources by which they have come to know their traditions. Early versions of these surveys were successfully executed in previous projects and we will refine them to ensure local relevance and feasibility.

4.1.4. Behavioral experiments

To measure cooperative behavior, we will use experimental economic games, a successful and useful paradigm in field research (Pisor et al., 2020). As part of Objective 1, participants will play religiously framed versions of the Dictator Game and the Random Allocation Game (Hruschka et al., 2014). These two games capture two different aspects of individual cooperation; the Dictator Game measures generosity and the Random Allocation Game measures rule-following fairness. Participants will play at least two counterbalanced versions of each game type, thus choosing to allocate money to themselves, anonymous local co-religionists of the same community, and/or geographically distant co-religionists who live in other communities.

   While all recipients are anonymous—and actually receive the allocations—the distant co-religionists are relatively isolated and unable to directly reciprocate. This recipient therefore represents targets of cooperation that has expanded beyond typical face-to-face interactions. Researchers will allocate money as appropriate; money in Self cups will go to players and researchers will randomly select individual local co-religionists and distant co-religionists to live up to the promises of the experiment and thus avoid deception.

   In the Dictator Game, participants simply allocate 10 coins into 2 cups however they wish. In the Random Allocation Game, participants play in private with 30 coins, two cups, and a fair die where three sides are one color and three sides are another color. In the experiment, participants allocate each coin to one of the two cups in the following manner. They first choose a cup to put a coin into and then roll the die. If one colored side comes up, players are supposed to put the coin into the cup they mentally picked. If the die comes up the other color, players are supposed to put the coin into the opposite cup from the one they chose. If people play by the rules and therefore allocate the coins impartially, the coins are distributed randomly and the mean number of coins in each cup should be around 15 (see Appendix A2 for more technical details). As cup selection

occurs in isolation, however, participants can overrule the die in favor of one of the cups without anyone observing their decision.

In both games, we can measure individuals' generosity and impartial rule-following by statistically modeling the likelihood of allocating a coin to a given cup and use the target beliefs as predictors of generosity and fairness (see Appendix A2 for causal model). Furthermore, given the theoretical prediction that "moralistic traditions" should outcompete "local traditions" because they explicitly appeal to gods' punishment of uncooperative, self-interested behavior, we will ensure that participants allocate money to co-religionists of the local, indigenous tradition. With this data, we can directly compare cooperation between individuals in the previous studies and individuals in the current project.

4.2. Objective 2

The ethnographic data and group-level measures collected in Year 1 will tell us what communities believe their gods punish and reward, the specific social dilemmas that communities face, and important sources of behavioral variation at each field site. Using this information, we will craft site-specific experiments and behavioral studies that assess whether religious beliefs and practice actually influence cooperation in locally salient social dilemmas. To facilitate design and successful execution, we will conduct another week-long workshop in Year 2. There, we will fine-tune site-specific studies that assess local relationships between religious expression and cooperative dilemmas. We will also consider the prospects of conducting similar studies in multiple sites for comparative purposes.

With site-specific, implementation-ready protocols designed in and immediately after the workshop, researchers will return to the field for the second time, and link individuals' data collected during Year 1 to new project data and repeated measures for follow-up experiments. Given the cross-cultural diversity of the field sites involved and the amount of risk involved in unanticipated variation, we have a flexible range of methods at the ready to use as appropriate. Further, each field researcher will employ multiple methods in order to robustly assess the target hypotheses and do so in a directly comparable, data-driven manner. The following field-based projects used methods that are among the more promising techniques we propose:

- **Behavioral measures in naturalistic settings**: We can measure individual variation in rituals (e.g., participation, costs, location, and timing) and examine how ritual investment corresponds to cooperative acts and their reception in the community. In Mauritius, for example, Xygalatas et al. (2013) measured individual variation in painful ritual practices, finding that those who engaged in more painful versions of the rite donated more money to charity. Others (Shaver and Sosis, 2014) examined variation in church and kava-drinking ritual attendance among Fijians, finding that these disparate traditions partition forms of within-group competition.

- **Social network data**: Ideal for smaller communities, this measures cooperative networks and their association with religious commitment. Participants list candidates for whom they interact with the most, thus allowing us to examine the strength of social ties. Using the data collected from the religiosity survey, we can assess the degree to which religious commitment bonds individuals together and corresponds to structures in the social network. Examples using this method have found that among Hadza foragers (Hill et al., 2014) and Hindus in a south Indian village (Power, 2017), ritual institutions can be a binding force within and between foraging groups and castes, respectively.

- **Behavioral ecological data**: When religious systems revolve around resource management, collecting ecological data such as measuring caloric returns from ritually mediated practices (Bird et al., 2013), toxin levels in tabooed foods (Henrich and Henrich, 2010); or tree cover and species diversity resulting from spiritually sanctioned forestry and foraging (Atran et al., 2002) will be necessary to collect. A considerable amount of discussion has revolved around whether or not supernatural sanctions actually prevent individuals from over-exploiting resources (Hames, 2007; Hartberg et al., 2016; Smith and Wishnie, 2000), but notably few studies examine the question with systematic means (cf. Zavaleta, 1999). Between-participant and community studies can examine whether individuals and communities relate to their environments in ways marked by religious beliefs and practices.

- **Between-participant vignette studies**: Vignette studies measuring the perceived trustworthiness and cooperative tendencies of hypothesized individuals can be useful measures of religion's role in cooperation, especially in cases where directly measuring naturalistic behavioral data is too difficult (e.g., if rituals are sporadic or we require participants to reason about the consequences of taboo violations that are rarely committed). For example, Purzycki and Arakchaa (2013) employed this technique in a between-participant study that compared the perceived trustworthiness of individuals who varied on ethnic identity, religious affiliation, and local herding rituals devoted to animistic spirits. They found that religiously pious individuals reliably conveyed generalized trustworthiness.

- **Culturally framed economic games**: Playing economic game experiments with a specific cultural framing can tells us if religious norms are indeed inducing cooperation. Some have compared allocations across generically described games (e.g., a simple Dictator Game without specific cultural identifiers) and games framed with locally specified names of cooperative institutions. For instance, Cronk (2007) found that the Maasai herders of Kenya played the "osotua game" in a more culturally nuanced logic that those who played the same experimental game without this framing (cf. Gerkey, 2013; Lightner et al., 2017). We can culturally frame experiments in ways that appeal to spirits and/or the behaviors involved in religious practice.

- **Localized experimental games**: As different threats to cooperation are defined by different payoff structures, companion experimental games exist for most theoretically defined social dilemmas. We can cater experimental design around the dilemmas that people face in real life, frame them explicitly in locally salient ways (see above), and examine how religious framing alters cooperative behavior.

- **Inverted experimental games**: Recent experiments (Purzycki et al., 2020) show that participants adjusted their models of what God cares in accordance with the outcome in a Trust Game. Here, Christian individuals played a Trust Game where participants could give money to a Christian recipient. This initial endowment was quadrupled, and the recipient could either return half or keep the entire amount. Thus, the players had to trust others to split the quadrupled amount. Players whose trust was betrayed by a co-religionist were more likely to claim that God is angered by greed and selfishness. Applying such a paradigm in the field would facilitate an assessment of the feedback between cooperation and religious commitment.

In summary, the project directly builds on prior work to assess critical hypotheses about the relationship between cooperation and religion. Its novelty is manifold as it a) draws upon prior, theoretically motivated predictions about the class of scenarios that religion traditions address, b) rigorously and empirically assesses how religion co-varies with local social and ecological context; c) examines religion's effectiveness in addressing problems associated with local contexts; and d) does so cross-culturally and e) collaboratively.

5. Project structure and recruitment

The core team will be the PI and to-be-hired postdoc who will organize and lead the project and workshops, maintain project communication, and ensure data are audited and cleared for open scientific use. Together, we will lead the omnibus, multi-site report analyses and write-ups. Our core advisory board consists of Drs. Lee Cronk, Eva Kundtová Klocová, Martin Lang, Anne Pisor, and Richard Sosis. This board will function as mentors during the week-long workshops conducted in Years 1 and 2, corresponding to each Objective. During the workshops, we will train the field researchers in methods, data entry, data analysis, and open science practices.

In the first year, we will recruit 8 researchers with interest in the scientific study of religion and cooperation, with a preference for indigenous, under-represented, and/or aspiring young researchers (see Appendix A3 for recruitment call). This field site size is ideal for project management and lends itself to making safer statistical inferences about omnibus cross-cultural patterns while ensuring cross-cultural diversity in sampling. The focus on indigenous researchers heeds recent calls for a more inclusive, engaged, and enlightened scientific culture (Broesch et al., 2020; Gewin, 2021). In this modest way, we will support researchers' fieldwork and dissertations, with direct, bi-directional lines of communication between the core team and stakeholders. We will also directly support researchers with the additional benefits of providing: a) the means to generate their own foundational data sets and projects that will serve their scientific careers and the communities in which they work, b) methods training; c) mentorship from experienced researchers, d) incentives for submitting data and reports in on time; and e) the kind of organized network of field researchers that can directly engage with the scientific field in an organized fashion.

6. Dissemination plan

The project is explicitly committed to open science practices. While ensuring the anonymity of individual participants, we are committed to a) pre-registering all studies; b) publicly providing all methods protocols, c) analyzed data, and d) analytical software; and d) ensuring all publications are a part of the public record. The PI has a long-standing record of providing project materials online (at `github.com/bgpurzycki` and `bgpurzycki.wordpress.com`) and has developed and maintained analytical software specifically catered to the kinds of data analysis for this project. This public resource (AnthroTools) has been used in over 50 empirical reports, books, and theses. In terms of our outputs, we plan to organize two open-access special issues for site-specific reports for each Objective (e.g., at *Religion, Brain and Behavior* and/or *Evolutionary Human Sciences*).

References

Atran, S., Medin, D., Ross, N., Lynch, E., Vapnarsky, V., Ek, E.U., Coley, J., Timura, C., Baran, M., 2002. Folkecology, Cultural Epidemiology, and the Spirit of the Commons: A Garden Experiment in the Maya Lowlands. Current Anthropology 43, 421–450. doi:doi: 10.1086/339528.

Axelrod, R., 1984. The Evolution of Cooperation. Basic Books, New York.

Baimel, A., Apicella, C., Atkinson, Q., Bolyanatz, A., Cohen, E., Handley, C., Henrich, J., Kundtová Klocová, E., Lang, M., Lesogorol, C., et al., 2022. Material insecurity predicts greater commitment to moralistic and less commitment to local deities: a cross-cultural investigation. Religion, Brain & Behavior 12, 4–17.

Bednar, J., Page, S., 2007. Can Game(s) Theory Explain Culture?: The Emergence of Cultural Behavior Within Multiple Games. Rationality and Society 19, 65–97. doi:doi: 10.1177/1043463107075108.

Bendixen, T., Apicella, C., Atkinson, Q., Cohen, E., Henrich, J., McNamara, R.A., Norenzayan, A., Willard, A.K., Xygalatas, D., Purzycki, B.G., 2023a. Appealing to the minds of gods: A novel cultural evolutionary account of religious appeals and an empirical assessment using ethnographic data from eight diverse societies. Religion, Brain and Behavior doi:doi: 10.31234/osf.io/tjn3e.

Bendixen, T., Lightner, A.D., Apicella, C., Atkinson, Q., Bolyanatz, A., Cohen, E., Handley, C., Henrich, J., Kundtov, E., Lesorogol, C., et al., 2023b. Gods are watching and so what? moralistic supernatural punishment across 15 cultures. Evolutionary Human Sciences , 1–30.

Bendixen, T., Purzycki, B.G., 2023. Accounting for cross-cultural variation in the minds of gods, in: Purzycki, B.G., Bendixen, T. (Eds.), The Minds of Gods: A Cross-Disciplinary Survey. Bloomsbury Publishing, pp. 149–158.

Bird, R.B., Tayor, N., Codding, B.F., Bird, D.W., 2013. Niche construction and dreaming logic: aboriginal patch mosaic burning and varanid lizards (varanus gouldii) in australia. Proceedings of the Royal Society B: Biological Sciences 280, 20132297.

Boyd, R., Richerson, P.J., 2009. Culture and the evolution of human cooperation. Philosophical Transactions of the Royal Society B: Biological Sciences 364, 3281–3288.

Broesch, T., Crittenden, A., Beheim, B., Blackwell, A., Bunce, J., Colleran, H., Hagel, K., Kline, M., McElreath, R., Nelson, R., Pisor, A., Prall, S., Pretelli, I., Purzycki, B., Quinn, E., Ross, C., Scelza, B., Starkweather, K., Stieglitz, J., Mulder, M., 2020. Navigating cross-cultural research: methodological and ethical considerations. Proceedings. Biological sciences 287, 20201245. doi:doi: 10.1098/rspb.2020.1245.

Bulbulia, J., 2004. Religious costs as adaptations that signal altruistic intention. Evolution and Cognition 10, 19–38.

Cinelli, C., Forney, A., Pearl, J., 2021. A crash course in good and bad controls. Available at SSRN 3689437 .

Cronk, L., 2007. The influence of cultural framing on play in the trust game: A maasai example. Evolution and Human Behavior 28, 352–358.

Cronk, L., Chagnon, N.A., Irons, W., 2000. Adaptation and human behavior: an anthropological perspective. Transaction Publishers.

Cronk, L., Leech, B.L., 2012. in: Meeting at Grand Central, Princeton University Press.

Curry, O., Whitehouse, H., Mullins, D., 2019. Is it good to cooperate? testing the theory of morality-as-cooperation in 60 societies. Current Anthropology 60.

Durkheim, E., 2001 [1912]. The elementary forms of religious life / Emile Durkheim; translated by Carol Cosman. Oxford world's classics, Oxford University Press, New York.

Fitouchi, L., Singh, M., 2022. Supernatural punishment beliefs as cognitively compelling tools of social control. Current Opinion in Psychology 44, 252–257. doi:doi: https://doi.org/10.1016/j.copsyc.2021.09.022.

Gerkey, D., 2013. Cooperation in context: Public goods games and post-soviet collectives in kamchatka, russia. Current Anthropology 54, 144–176.

Gewin, V., 2021. How to include indigenous researchers and their knowledge. Nature 589, 315–318.

Gómez, A., Brooks, M.L., Buhrmester, M.D., Vázquez, A., Jetten, J., Swann Jr, W.B., 2011. On the nature of identity fusion: insights into the construct and a new measure. Journal of personality and social psychology 100, 918.

Hames, R., 2007. The ecologically noble savage debate. Annu. Rev. Anthropol. 36, 177–190.

Hartberg, Y., Cox, M., Villamayor-Tomas, S., 2016. Supernatural monitoring and sanctioning in community-based resource management. Religion, Brain & Behavior 6, 95–111.

Henrich, J., 2016. The secret of our success: How culture is driving human evolution, domesticating our species, and making us smarter. princeton University press.

Henrich, J., Ensminger, J., McElreath, R., Barr, A., Barrett, C., Bolyanatz, A., Cardenas, J.C., Gurven, M., Gwako, E., Henrich, N., et al., 2010. Markets, religion, community size, and the evolution of fairness and punishment. science 327, 1480–1484.

Henrich, J., Henrich, N., 2010. The evolution of cultural adaptations: Fijian food taboos protect against dangerous marine toxins. Proceedings. Biological Sciences 277, 3715–3724. doi:doi: 10.1098/rspb.2010.1191.

Hill, K.R., Wood, B.M., Baggio, J., Hurtado, A.M., Boyd, R.T., 2014. Hunter-gatherer inter-band interaction rates: Implications for cumulative culture. PloS one 9.

Hruschka, D., Efferson, C., Jiang, T., Falletta-Cowden, A., Sigurdsson, S., McNamara, R., Sands, M., Munira, S., Slingerland, E., Henrich, J., 2014. Impartial institutions, pathogen stress and the expanding social network. Human Nature 25, 567–579.

Johnson, D.D.P., 2005. Gods punishment and public goods. Human Nature 16, 410–446.

Johnson, D.D.P., 2016. God is watching you: How the fear of god makes us human. Oxford University Press, USA.

Kendal, R.L., Boogert, N.J., Rendell, L., Laland, K.N., Webster, M., Jones, P.L., 2018. Social Learning Strategies: Bridge-Building between Fields. Trends in Cognitive Sciences 22, 651–665. URL: http://www.sciencedirect.com/science/article/pii/S1364661318300949, doi:doi: 10.1016/j.tics.2018.04.003.

Lang, M., Purzycki, B.G., Apicella, C.L., Atkinson, Q.D., Bolyanatz, A., Cohen, E., Handley, C., Kundtová Klocová, E., Lesorogol, C., Mathew, S., et al., 2019. Moralizing gods, impartiality and religious parochialism across 15 societies. Proceedings of the Royal Society B 286, 20190202.

Lansing, J.S., 2006. Perfect Order: Recognizing Complexity in Bali. Princeton University Press, Princeton. Google-Books-ID: 8bHtAQAAQBAJ.

Lightner, A.D., Barclay, P., Hagen, E.H., 2017. Radical framing effects in the ultimatum game: the impact of explicit culturally transmitted frames on economic decision-making. Royal Society Open Science 4, 170543. URL: https://royalsocietypublishing.org/doi/abs/10.1098/rsos.170543, doi:doi: 10.1098/rsos.170543.

Lightner, A.D., Bendixen, T., Purzycki, B.G., 2022. Moralistic supernatural punishment is probably not associated with social complexity. Evolution and Human Behavior .

Liu, F., Eugenio, E.C., 2018. A review and comparison of bayesian and likelihood-based inferences in beta regression and zero-or-one-inflated beta regression. Statistical Methods in Medical Research 27, 1024–1044. doi:doi: 10.1177/0962280216650699.

Malinowski, B., 1936. The Foundations of Faith and Morals. London: Oxford University Press UK.

Maynard Smith, J., 1964. Group selection and kin selection. Nature 201, 1145–1147.

McElreath, R., 2020. Statistical Rethinking: A Bayesian course with examples in R and Stan. Second ed., CRC Press.

McElreath, R., Boyd, R., 2007. Mathematical Models of Social Evolution: A Guide for the Perplexed. University of Chicago Press, Chicago ; London.

Nettle, D., Romaine, S., et al., 2000. Vanishing voices: The extinction of the world's languages. Oxford University Press on Demand.

Norenzayan, A., 2013. Big Gods: How Religion Transformed Cooperation and Conflict. Princeton University Press.

Norenzayan, A., Shariff, A.F., Gervais, W.M., Willard, A.K., McNamara, R.A., Slingerland, E., Henrich, J., 2016. The cultural evolution of prosocial religions. Behavioral and brain sciences 39.

Pearl, J., Glymour, M., Jewell, N.P., 2016. Causal inference in statistics: A primer. John Wiley & Sons.

Peoples, H.C., Marlowe, F.W., 2012. Subsistence and the evolution of religion. Human Nature 23, 253–269.

Pisor, A.C., Gervais, M.M., Purzycki, B.G., Ross, C.T., 2020. Preferences and constraints: the value of economic games for studying human behaviour. Royal Society open science 7, 192090.

Power, E.A., 2017. Social support networks and religiosity in rural South India. Nature Human Behaviour 1, 0057.

Purzycki, B.G., 2016. The evolution of gods' minds in the Tyva Republic. Current Anthropology 57, S88–S104. doi:doi: 10.1086/685729.

Purzycki, B.G., forthcoming. Ethnographic Free-List Data: Management and Analysis with Examples in R. SAGE.

Purzycki, B.G., Apicella, C., Atkinson, Q.D., Cohen, E., McNamara, R.A., Willard, A.K., Xygalatas, D., Norenzayan, A., Henrich, J., 2016. Moralistic gods, supernatural punishment and the expansion of human sociality. Nature 530, 327–330.

Purzycki, B.G., Arakchaa, T., 2013. Ritual Behavior and Trust in the Tyva Republic. Current Anthropology 54, 381–388. doi:doi: 10.1086/670526.

Purzycki, B.G., Bendixen, T., Lightner, A.D., Sosis, R., 2022a. Gods, games, and the socioecological landscape. Current Research in Ecological and Social Psychology 3, 100057.

Purzycki, B.G., Henrich, J., Apicella, C., Atkinson, Q.D., Baimel, A., Cohen, E., McNamara, R.A., Willard, A.K., Xygalatas, D., Norenzayan, A., 2018a. The evolution of religion and morality: a synthesis of ethnographic and experimental evidence from eight societies. Religion, Brain & Behavior 8, 101–132.

Purzycki, B.G., Holland, E.C., 2019. Buddha as a God: An Empirical Assessment. Method & Theory in the Study of Religion 31, 347–375. doi:doi: 10.1163/15700682-12341453.

Purzycki, B.G., Jamieson-Lane, A., 2016. Anthrotools: An R package for cross-cultural ethnographic data analysis. Cross-Cultural Research 51, 51–74.

Purzycki, B.G., Lang, M., 2019. Identity fusion, outgroup relations, and sacrifice: A cross-cultural test. Cognition 186, 1–6.

Purzycki, B.G., Lang, M., Henrich, J., Norenzayan, A., 2022b. The evolution of religion and morality project: reflections and looking ahead. Religion, Brain & Behavior 12, 190–211.

Purzycki, B.G., Lang, M., Henrich, J., Norenzayan, A., 2022c. The evolution of religion and morality: Reflections and looking ahead. Religion, Brain & Behavior 12, 190–211.

Purzycki, B.G., McNamara, R.A., 2016. An ecological theory of gods minds, in: De Cruz, H., Nichols, R. (Eds.), Cognitive Science of Religion and Its Philosophical Implications. Continuum, New York, pp. 143–167.

Purzycki, B.G., Pisor, A., Apicella, C., Atkinson, Q.D., Cohen, E., Henrich, J., McElreath, R., McNamara, R.A., Norenzayan, A., Willard, A.K., Xygalatas, D., 2018b. The cognitive and cultural foundations of moral behavior. Evolution and Human Behavior 39, 490–501.

Purzycki, B.G., Ross, C.T., Apicella, C., Atkinson, Q.D., Cohen, E., McNamara, R.A., Willard, A.K., Xygalatas, D., Norenzayan, A., Henrich, J., 2018c. Material security, life history, and moralistic religions: A cross-cultural examination. PloS one 13, e0193856.

Purzycki, B.G., Sosis, R., 2022. Religion Evolving: The Dynamics of Culture, Cognition and Ecology. Equinox.

Purzycki, B.G., Stagnaro, M.N., Sasaki, J., 2020. Breaches of trust change the content and structure of religious appeals. Journal for the Study of Religion, Nature and Culture 14, 71–94.

Purzycki, B.G., Willard, A.K., Klocová, E.K., Apicella, C., Atkinson, Q., Bolyanatz, A., Cohen, E., Handley, C., Henrich, J., Lang, M., Lesorogol, C., Mathew, S., McNamara, R.A., Moya, C., Norenzayan, A., Placek, C., Soler, M., Weigel, J., Xygalatas, D., Ross, C.T., 2022d. The Moralization Bias of Gods' Minds: A Cross-Cultural Test. Religion, Brain and Behavior 12, 38–60.

Quinlan, M.B., 2017. The freelisting method. Handbook of research methods in health social sciences. Singapore: Springer , 1–16.

Rappaport, R.A., 1979. Ecology, meaning, and religion. North Atlantic Books.

Rappaport, R.A., 1999. Ritual and Religion in the Making of Humanity. volume 110. Cambridge University Press.

Richerson, P., Henrich, J., 2012. Tribal Social Instincts and the Cultural Evolution of Institutions to Solve Collective Action Problems. Cliodynamics 3. doi:doi: 10.21237/C7clio3112453.

Richerson, P.J., Boyd, R., 2005. Not by genes alone: How culture transformed human evolution. University of Chicago Press Chicago.

Schloss, J.P., Murray, M.J., 2011. Evolutionary accounts of belief in supernatural punishment: a critical review. Religion, Brain & Behavior 1, 46–99.

Shaver, J.H., Sosis, R., 2014. How does male ritual behavior vary across the lifespan? Human Nature 25, 136–160.

Slingerland, E., Atkinson, Q.D., Ember, C.R., Sheehan, O., Muthukrishna, M., Bulbulia, J., Gray, R.D., 2020. Coding culture: challenges and recommendations for comparative cultural databases. Evolutionary Human Sciences 2.

Smith, E.A., Wishnie, M., 2000. Conservation and Subsistence in Small-Scale Societies. Annual Review of Anthropology 29, 493–524. doi:doi: 10.1146/annurev.anthro.29.1.493.

Soler, M., 2012. Costly signaling, ritual and cooperation: evidence from candomblé, an afro-brazilian religion. Evolution and Human Behavior 33, 346–356.

Sosis, R., Bressler, E.R., 2003. Cooperation and commune longevity: A test of the costly signaling theory of religion. Cross-Cultural Research 37, 211–239.

Sponsel, L.E., 2014. Spiritual ecology: Is it the ultimate solution for the environmental crisis? Choice 51, 1339–13448.

Trivers, R.L., 1971. The evolution of reciprocal altruism. The Quarterly review of biology 46, 35–57.

Turchin, P., 2013. How did large-scale complex societies evolve. Cultural evolution: Society, technology, language, and religion , 61–74.

Watts, J., Sheehan, O., Greenhill, S.J., Gomes-Ng, S., Atkinson, Q.D., Bulbulia, J., Gray, R.D., 2015. Pulotu: Database of Austronesian Supernatural Beliefs and Practices. PLOS ONE 10, e0136783. URL: `http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0136783`, doi:doi: 10.1371/journal.pone.0136783.

White, L., 1967. The Historical Roots of Our Ecologic Crisis. Science 155, 1203–1207. doi:doi: 10.1126/science.155.3767.1203.

Xygalatas, D., Mitkidis, P., Fischer, R., Reddish, P., Skewes, J., Geertz, A.W., Roepstorff, A., Bulbulia, J., 2013. Extreme rituals promote prosociality. Psychological Science 24, 1602–1605.

Zavaleta, E., 1999. The emergence of waterfowl conservation among yup'ik hunters in the yukon-kuskokwim delta, alaska. Human Ecology 27, 231–266.

A. Appendices

A1. Power analysis for Objective 1

The Random Allocation Game can detect biased coin allocations as deviations from truly random allocations which, at the population level should represent random draws from a binomial distribution with 50% probability of going into any given cup. It is therefore critical that we have a large enough sample of draws to reliably detect a truly biased distribution.

To address this, we will combine power analyses with our preregistration materials to inform the minimum sample size needed per field site. With 30 die rolls per participant and a true average allocation of about 54% to 55%—the biases found in the treatment conditions of Lang, et al. (2019)—we would require a minimum of about 40 participants per game to detect this effect with at least a 90% probability (i.e., the statistical power). If we conservatively predict small-to-moderate effects in any experimental treatment conditions of the Random Allocation Game (e.g., an average allocation of 53% to 54% in each field site), then we will require a minimum of 47 to 83 participants to achieve 90% power (Figure A1).

This demonstrates the sensitivity of the Random Allocation to population-level shifts from random allocations, and consequently, its ability to work well with practical and achievable sample sizes. Also, although the ethnographic data informing Objective 2 will motivate researchers to aim for larger sample sizes than the minimum sizes per site shown in Figure A1, including these power analyses with our preregistration will keep us accountable to identifying any limitations if a field site is unable to achieve the minimum sample sizes needed per field site.
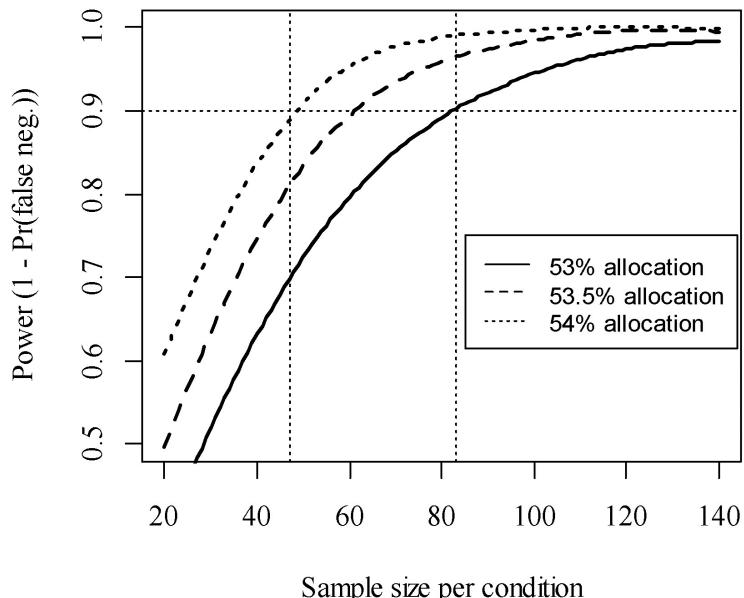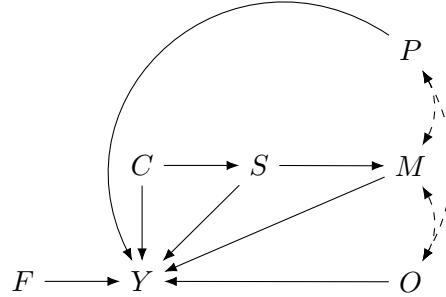
Figure A1. Power based on sample size per condition in each field site. Statistical power, shown on the *y*-axis, by sample size in the *Random Allocation Game*, shown on the *x*-axis. Average allocations in the treatment conditions are shown as line types, representing deviations from a distribution of random allocations with 50% probabilities in the experiment. Vertical dotted lines (*n* = 47 and *n* = 83) represent the minimum sample sizes needed to detect a true positive for a given average with a 90% probability, shown as the horizontal dotted line.

To guide statistical model-building and inference, we developed a foundational model of the causal structure of the data-generating process in the form of a *directed acyclic graph* (Pearl et al., 2016), applied previously in the precedent study (Bendixen et al., 2023b):

Here, Y denotes cooperation, M, P and O denote respectively the moral concern, punitive tendency, and knowledge breadth of a deity (between which we assume bidirectional causal relationships represented by dashed double-headed arrows), S denotes food (in)security, C denotes number of children, and F denotes a set of structural features of the game set-up (e.g., game order, game check, and game type). These assumed relationships derive from previous empirical studies and evidence syntheses (Lang et al., 2019; Purzycki et al., 2016, 2018a,b,c, 2022c). Our target relationship, or *estimand*, then, is the direct effect $M{\rightarrow}Y$, where M is measured using beliefs and practices and Y is operationalized as economic game play.

According to this causal model and assuming no relevant unobserved confounding, to block all back-door paths from M to Y, we need only adjust for P, O, and S. The path from C to M through S is blocked when we condition on S; conditioning on C is therefore not strictly necessary. However, including C can reduce variation in Y, thereby increasing the precision of the target relationship (see e.g., Cinelli et al., 2021, and references therein), and we therefore include both C and S in our conditioning set. For the same reason, we include the structural features of the game set-up, F. At least two additional variables could be included on these grounds, namely measures of emotional closeness to the local/distant co-religionist players (see Section 4.1.4) using pictorial "fusion" scales (Gómez et al., 2011). While previous research found small effects of these variables on impartial coin allocations, a concern was raised that rather than being measures of "fusion" *per se*, these instruments might measure prosocial tendencies in general (cf., Purzycki and Lang, 2019). Given ambiguities around validity, we refrain from considering these variables here.

The only colliders in this graph are the main predictor variables M, P and O, and the outcome variable, Y, and so, under this model, conditioning on covariates does not induce spurious associations in our estimand. Moreover, while we assume no systematic missingness pattern conditional on our covariates, our statistical models employ full Bayesian imputation of missing covariates (McElreath, 2020) in order not to discard data unnecessarily.

Our statistical models follow from this causal structure and the data generation process. More technically, the probability of allocating an individual coin, y_i, into any given cup is: $y_i \sim$ Binomial$(30, p_i)$. To assess the breadth of cooperation, we use coins allocated to the distant co-religionist as our target outcome. In the Dictator Game, we will use proportion of initial endowment given to the distant co-religionist and model this using a zero-one inflated beta distribution:

$y_i \sim \text{ZOIBeta}(\mu_i, \phi_i, \alpha_i, \gamma_i)$. Here, μ_i and ϕ_i represent the mean and breadth of the beta distribution, α_i is a parameter that estimates the probability that an observation is either 0% or 100%, and γ_i represents the conditional probability that an observation is 100%, given it is 0% or 100% (see Liu and Eugenio, 2018, for more technical details). Our statistical regression models follow accordingly. We will craft similar models that are catered to specific projects for Objective 2.

The Forms and Functions of Small-Scale Religious Traditions
Call for Field Researcher Applications
Deadline: February 28, 2024

The relationship between religion and society is an age-old object of fascination for social scientists. What explains the variation we see in the worlds small-scale religious traditions? Are such traditions responses to local threats to cooperation and other forms of sociality? Do traditional beliefs and practices bolster cooperation? Do indigenous religious traditions contribute to the sustained use of resources? Do rituals in these communities convey commitment to other community members? Do traditions change to accommodate and address new challenges? Until now, only a few exceptional case studies have systematically detailed how small-scale religious systems contribute to reducing self-interested motivations and encourage sustained, group-beneficial behaviors in locally relevant ways. This project will examine these questions in a coordinated manner.

As a collaborative, iterated, ethnographic and experimental venture conducted among relatively isolated populations, this project represents the first organized, quantitative study of traditional religious beliefs and practices, their correspondence to local threats to cooperation, and whether religious activities and beliefs promote cooperative responses to these threats. The project will contribute to explaining why one of humanitys most ancient and cherished institutions persists in so many different forms around the globe.

This is a call for aspiring and established social scientists interested in the scientific study of religion to participate in a collaborative ethnographic and experimental study of traditional or indigenous religions. Priority will be given to indigenous researchers, individuals from under-represented groups, and/or younger researchers who study/wish to study the religious traditions of small-scale societies. The project will take place over a three-year period and awards will include support for: a) two field trips; b) costs for experiments; c) local assistance; d) local investment; and e) two training and discussion workshops.

The general timeline is as follows:

April 2024: Workshop 1 (mandatory)
Summer 2024: Field Trip 1 (timing and length flexible)
Autumn 2024: Data Submission 1
April 2025: Workshop 2 (mandatory)
Summer 2025: Field Trip 2 (timing and length flexible)
Autumn 2025: Data Submission 2

Please send the following in one document with the subject line GGSL APPLICATION MATERI-ALS to bgpurzycki@gmail.com:

1. **CV**

2. **Letter of recommendation** from supervisor (if PhD or postdoc). Feel free to have supervisors send letters directly.

3. **A declaration** that you can live up to the project and its timeline. The workshops are mandatory, and we assume that two summers will be reserved for fieldwork.

4. **A budget** detailing costs per field trip including travel, accommodations, and local assistance. If possible, please also note local average daily wage.

5. In a **cover letter**, please address the following questions as honestly and succinctly as possible (lengths are only suggestions):

   A. **Field Site (half page)**. Please briefly describe your proposed field site and the religious system you wish to learn more about. How has/have proselytizing religions affected this community? What is your relationship and previous experience in the region? Do you need and have permission to work there? Are you a member of this community? Please discuss any ways the project might serve the community and any ways we might give back (financial or otherwise).

   B. **Objective 1 (1-2 paragraphs)**. Assess the feasibility of conducting the study in Purzycki et al. (2016) in your field site. Who would the distant co-religionists be? What currency would you use for participants?

   C. **Objective 2 (1 page)**. Which aspects of the religion do you propose to work on? Does this tradition appear to mediate social relationships? How so? Is there a particular social dilemma or problem that religious beliefs and practices appear to be addressing? If possible, situate the tradition you propose to study using Bendixen et al. (2023) and Purzycki et al. (2022). Think about questions such as: *What do spirits care about (e.g., punish, reward)? When do people appeal to the supernatural (e.g., illness, foraging, harvesting, traveling, etc.)? What do people do to appease spirits/the gods (e.g., ritual, offerings)?* If possible, consider whether these supernatural beliefs, appeals and rituals plausibly reflect or point towards game-theoretic dilemmas and challenges to coordination and cooperation. *If so, what kinds of dilemmas and challenges? How might we go about empirically testing whether these supernatural beliefs, appeals and rituals causally address rather than, say, simply rhetorically direct attention to these dilemmas and challenges?* If you have proposed methods already in mind, please feel free to pitch a study.

   D. **Skills (half page)**. Please briefly indicate/describe your existing and/or planned experience with social science, quantitative methods and data, and/or programming. Experience is not necessary for acceptance, but it is ideal.

   E. **About You and Why This Project**. Please let us know why you want to participate in this project and anything else you think we should know in considering your application.

To give you a better sense of the primary theoretical motivations of the project, please refer to the following:

Bendixen, T., Apicella, C., Atkinson, Q., Cohen, E., Henrich, J., McNamara, R. A., ... & Purzycki, B. G. (2023). Appealing to the minds of gods: Religious beliefs and appeals correspond to features of local social ecologies [target article, commentaries, and replies]. Religion, Brain and Behavior.

Purzycki, B. G., Bendixen, T., Lightner, A. D., & Sosis, R. (2022). Gods, games, and the socioecological landscape. Current Research in Ecological and Social Psychology, 3, 100057.

The following works provide a variety of ways to investigate the relationship between religion, relationships, and local ecology.

Atran, S., Medin, D., Ross, N., Lynch, E., Vapnarsky, V., Ek, E., ... & Baran, M. (2002). Folkecology, cultural epidemiology, and the spirit of the commons: A garden experiment in the Maya Lowlands, 19912001. Current Anthropology, 43(3), 421-450.

Lansing, J. Stephen, and John H. Miller. 2005. Cooperation, Games, and Ecological Feedback: Some Insights from Bali. Current Anthropology 46 (2): 32834.

Purzycki, B. G., & Arakchaa, T. (2013). Ritual behavior and trust in the Tyva Republic. Current Anthropology, 54(3), 381-388.

Purzycki, B. G., Apicella, C., Atkinson, Q. D., Cohen, E., McNamara, R. A., Willard, A. K., ... & Henrich, J. (2016). Moralistic gods, supernatural punishment and the expansion of human sociality. Nature, 530(7590), 327-330.

Singh, M., Kaptchuk, T. J., & Henrich, J. (2021). Small gods, rituals, and cooperation: The Mentawai water spirit Sikameinan. Evolution and Human Behavior, 42(1), 61-72.

Townsend, C., Aktipis, A., Balliet, D., & Cronk, L. (2020). Generosity among the Ik of Uganda. Evolutionary Human Sciences, 2, e23.

The Forms and Functions of Small-Scale Religious Traditions
Call for Postdoctoral Fellow Applications
Deadline: February 28, 2024

The School of Culture and Society at Aarhus University invites applications for a two-year postdoctoral fellowship in the study of religion. The position is full-time and is due to begin in the Spring of 2024 (start date is negotiable). The university is keen for its staff to reflect the diversity of society and thus welcomes applications from all qualified applicants regardless of their personal background.

Place of employment
The Department of the Study of Religion, Jens Chr. Skous Vej 3-7, 8000 Aarhus C, Denmark.

Research context
This position is funded by a Templeton Religion Trust grant awarded to the supervisor, Associate Professor Benjamin Purzycki, at the Department of the Study of Religion.

Research and postdoctoral project
In spite of the continued growth in evolutionary and cognitive sciences of religion, little scholarly attention has been directed towards accounting for variation in religious expression among researchers who embrace discrete, quantitative methods. The field also lacks the kind of detailed, individual-level data about traditional, small-scale religious beliefs and practices that ground debates. This postdoctoral position will therefore involve contributing to designing a set of empirical projects to be executed cross-culturally, with a particular focus on understanding whether religious beliefs and practices of small-scale traditions revolve around particular social dilemmas.

Tasks

- Study design and pre-registration
- Data pipeline, management, and analysis
- Report writing
- Theory development and evidence synthesis in the study of the evolution of religious systems
- Coordinating research assistants, field researchers, as well as junior and senior colleagues
- Prioritizing tasks and managing deadlines, workshops, etc. for the project as a whole

Qualifications, job requirements and preferences
Applicants must hold a PhD or equivalent qualifications in anthropology, economics, ecology, biology, or any related field that addresses problems in the role religion plays in individual and collective wellbeing. Applicants must also document:

- experience and training in quantitative research design and social scientific methods
- fluency in written and spoken English
- fluency in a programming language (e.g., R or Python)
- data analytic skills including multi-level modeling

- the ability to work collaboratively
- project management experience
- excellent and effective communication
- a willingness to contribute to a vibrant, enjoyable and friendly work environment

Assets but not requirements

- a focus on religion with preference for small-scale traditions
- appreciation for/familiarity with evolutionary game theory, human behavioral ecology, mathematical and agent-based modeling, and cultural evolutionary theory
- involvement in the cognitive and/or evolutionary sciences of religion
- Bayesian data analytical skills
- familiarity with methods in causal inference

Further details
Applications must be uploaded in English.

Please note that only publications that are actually submitted with the application will be assessed; a list of publications is not sufficient. Applications that are not accompanied by publications will not be assessed.

References or recommendations should not be included with the application. Applicants who are invited for interview may be asked to provide professional references.

For further information about the position, please contact Associate Professor Benjamin Grant Purzycki (bgpurzycki@cas.au.dk). For more information about the application, please contact HR supporter Marianne Birn (mbb@au.dk).

A5. Sample Protocol
NOTE: As noted throughout, this protocol includes materials that extend the experiments beyond the scope of the proposal (e.g., priming conditions, experimental extensions, etc.). This is in the event that field researchers have the necessary resources and inclination to do them.

Demographics [ALL PARTICIPANTS]

[**ID**] Participant ID_____Date_____Time_____

Note: Variable names are in brackets.

Note to RA: Data should be entered using the numbers provided (No = 0 and Yes = 1; or use the scale).

1. [**SEX**] **Sex**: Male/Female

2. [**AGE**] **Age**:

3. [**OCCUP**] **Occupation**:

4. [**FAMILY**] **Family Status**: 1) Single   2) Married   3) Engaged   4) Divorced   5) Widowed

5. [**LIVE**] **Where do you live (district, town, or region**)? (ask only if appropriate):_____

6. [**HOWLONG**] **How long have you lived here**? (ask only if appropriate and be sure to understand what "here" means as this may mean house, section of territory, etc.)

7. [**BIRTHPLACE**] **Where was your birthplace**?

8. [**GROWUP**] **Where did you grow up?**

9. [**CITYRS**] **For how many years total have you lived in a town/city**?:_____

10. [**CHILDREN**] **How many children have you given birth to/fathered**?:_____

11. [**FORMALED**] **Total years of formal education**? (ask only if appropriate):_____
_____

12. [**HOUSEHOLD**] **How many people are consistently living in your household**? (family that lives with you):_____

13. [**NATLANG**] How well do you speak **NATIVE LANGUAGE**? (ask only if appropriate) I don't speak **NATIVE LANGUAGE** (0)   Not well (1)   Well (2)   Good (3) Very Good (4)   Fluent (5)

14. [**MAT1**] Do you worry that in the next month your household will have a time when it is not able to buy or produce enough food to eat?   0) No   1) Yes

15. [**MAT1C**] How certain are you that you will be able to buy or produce enough food to eat in the next month [RA: use Insecurity Scale]?
    -2) Very uncertain   -1) A little uncertain   0) I don't know
    1) A little certain   2) Very certain

16. [**MAT2**] Do you worry that in the next six months your household will have a time when it is not able to buy or produce enough food to eat?   0) No   1) Yes

17. [**MAT2C**] How certain are you that you will be able to buy or produce enough food to eat in the next six months [RA: use Insecurity Scale]?
    -2) Very uncertain   -1) A little uncertain   0) I don't know
    1) A little certain   2) Very certain

18. [**MAT3**] Do you worry that in the next year your household will have a time when it is not able to buy or produce enough food to eat?   0) No   1) Yes

19. [**MAT3C**] How certain are you that you will be able to buy or produce enough food to eat in the next year [RA: use Insecurity Scale]?
    -2) Very uncertain   -1) A little uncertain   0) I don't know
    1) A little certain   2) Very certain

20. [**MAT4**] Do you worry that in the next five years your household will have a time when it is not able to buy or produce enough food to eat?   0) No   1) Yes

21. [**MAT4C**] How certain are you that you will be able to buy or produce enough food to eat in the next five years [RA: use Insecurity Scale]?
    -2) Very uncertain   -1) A little uncertain   0) I don't know
    1) A little certain   2) Very certain

22. [**GOOD**] Please list up to 5 behaviors that make someone a good/virtuous/moral person.

23. [**BAD**] Please list up to 5 behaviors that make a bad/immoral person.

24. [**REPER**] What are the consequences to people who do these [**BAD**] things?

25. *[**GENNET**] Please list the names of up to 5 of the most generous people here.

26. *[**GENNETR**] Please rank them from 1-5 in terms of how generous they are (1 is the most generous).

27. *[**RELNET**] Please list the names of up to 5 of the most religious people here.

28. *[**RELNETR**] Please rank them from 1-5 in terms of how religious they are (1 is the most religious).

*For especially isolated communities.

The Religious Landscape Interview (RLI) [PRELIMINARY SAMPLE]

This interview should be done with roughly 20 randomly selected adults from your target community, the same community from which you sampled for the experiments. This protocol should be done BEFORE the experiments, but **should not be done with the same people who did the experiments if you can help it**. In fact, if you are worried about over-stressing experiment participants, you can specifically avoid using them. The purpose of this interview is to generate the input, in terms of spiritual agents and rituals for the more detailed religiosity interview that will follow this one. That interview, called the Religiosity Interview, must be done with the experimental participants, but can be conducted at a later time.

***

The primary purpose of this interview is to systematically assess the locally important salient gods and spirits, as well as rituals. These are free-lists, which means the interview should pose the question, which may include some example (see below), and wait for the person to begin listing items (pauses are okay). Here's a simple procedure.

1. Ask the question and wait until there person says something.

2. Hopefully, they will list some items. If they do, let them go until they run out and pause.

3. Then ask, "is there anything else?" If they name more, write those down and wait for a pause at which point ask "is there anything else?". Keep doing that until they affirmatively indicate that there's nothing else, or until you have 5 items.

4. Once you have a list, ask the person to rank the items from most important to least important. Ranks can be written next to the items.

5. If the person is literate, the interviewer can show them the list. Otherwise, they should read the list from the bottom up. They should read the entire list, and ask the person which of those is the most important. Mark that down. Then read the list again omitting the top ranked item, etc.

Material to be translated (and back-translated) and read to participants is in green.

Opening and Consent

Thank you very much for meeting with me/us. I would you to ask you some questions about your life preferences, practices and beliefs. If you don't want to answer any of my questions, you can just ask to skip that question. You can also ask to finish the interview at any time. May I ask you some questions?

Questions

1. Gods and Spirits

(a) Please list all of the gods or spirits that you can think of that people believe in here? Write down list (max 5), following the above procedure.

(b) Could you rank these from the most important in your life to the least important? Which is the most important?

Now the RA should go through each being on the list in question 1 and ask (the name of god or spirit should be inserted in the blank):

(c) Is _____concerned about what people do or how they behave?
(d) Can_____see into people minds or know their thoughts and feelings?
(e) Does _____punish people who behave in ways that _____does not like?
(f) Does _____reward people who behave in ways that _____ likes?

RAs should record responses in the table presented on the next page. Use a "1" for "Yes" and a "0" for No. And, record any comments the person makes in addition to the yes or no response.

Name_____ID_____Date/Time_____

Location:_____Order #_____RA initials_____

#	God or spirit label	Rank 1.b	Question 1.c (1= yes; 0 = no)	Question 1.d (mindread)	Question 1.e (punish)	Question 1.f (reward)
1						
2						
3						
4						
5						

2. Communal Rituals

   a. Please list all of the important communal or ritual activities that people here participate in? For example, _____(insert of 2 to 3 examples of group rituals the fieldworker is familiar with). Note, if the language doesn't have a word for "ritual" stick with "important communal activities" and let the examples help convey the intuitive meaning.

   b. Could you rank these from the most important to the least important? Which is the most important?

   c. How often is _____performed? Insert the label for each activity. The RA can suggestions frequencies here. For example, it's fine to ask "Do you do this once per week or once per month?" and gradually triangulate in on the frequencies.

   d. Tell me about _____(insert activity/ritual)? Provide a brief description, focusing on any seemingly costly elements (displays), sensory pageantry, music and synchrony.

Name_____ID_____

#	2.a. Ritual label	Rank	2.c. Times per Day, week, month (include units!!)	2.d. Descriptions
1				
2				
3				
4				
5				

2. Communal Rituals Free-list

3. Private or Personal Rituals

   a. Please list all of the personal activities that you perform with the gods or spirits in mind? For example, _____[give locally relevant example, like prayer].

   b. After the list is complete, ask: Could you rank these from the most important to the least important? Which is the most important?

   c. How often is _____performed? Insert the label for each activity. The RA can suggestions frequencies here. For example, it's fine to ask "Do you do this once per week or once per month?" and gradually triangulate in on the frequencies.

   d. Tell me about _____(insert activity/ritual)? Provide a brief description, focusing on any seemingly costly elements (displays), sensory pageantry, music and synchrony.

Name_____ID_____

	3. Private or Personal Rituals Free-list			
#	3.a. Ritual label	Rank	3.c. Times per Day, week, month (include units!!)	3.d. Descriptions
1				
2				
3				
4				
5				

4.   Please tell me your thoughts on how it is that the world came to be.

5.   What happens to people when they die?

6.   Are there any sacred places here? Please tell me about them.

Now I'm going to ask you about important things that affect you and your community. Please list up to 5 things that affect you and your livelihood.

4. Threats to self and society				
#	4.a. Threat listed	Rank	4.c. Times per Day, week, month (include units!!)	4.d. Descriptions
1				
2				
3				
4				
5				

Experimental Activities [OBJECTIVE 1 STUDIES WITH EXTENSIONS]
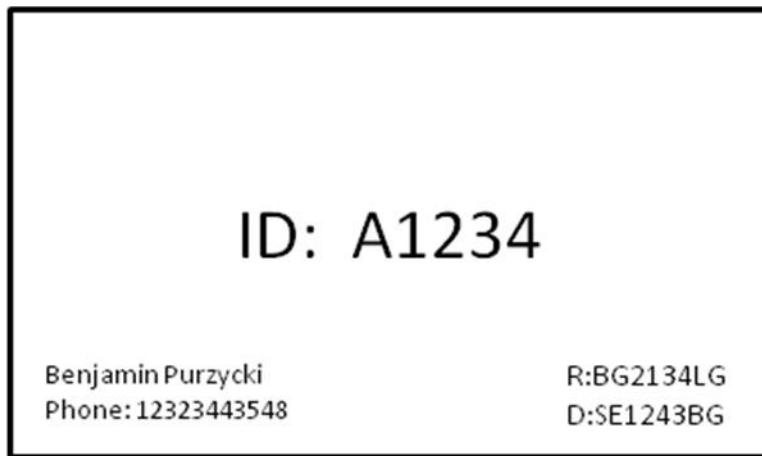
The games we'll be running are the Random Allocation Game (RAG) and a Dictator Game (DG).

The RAG tests whether or not people will bend rules to favor various recipients. People make anonymous decisions, roll a die, and have to put money into cups based on the outcome of the two. People often cheat in this activity (detectable by outcome), and in these activities, we will examine if beliefs minimize cheating. Each participant will enter the Activity Area and engage in 2 versions of the Random Allocation Game (RAG1 and RAG2) in counter-balanced order. Participants are randomly assigned to either RAG1 first, then RAG2, or vice versa. This is then followed by a set of DG's both with the same recipients (see below). The DG (see below) measures generosity.

IDs, Random Assignment, and Contacts

If you don't already have Participant IDs, perhaps use a deck of shuffled (shuffle 7 times) index or business cards with ID numbers, and order of activity assignment already written on them (see RAG spreadsheet). Shuffle them, and have participants pick one. This will be their ID. If you already have IDs established, then you can use the same procedure to assign activity order. Here's an example:

So, the "ID" is the ID number, the "R:BG2134LG" indicates the RAG (R:) treatment (MG = MORALISTIC GOD prime), 2134 indicates the RAG order, LG indicates the Local God questions first on the religiosity interview. So, the D: part would be the equivalent for the DG (with a **SE**cular prime, for example). There is some contact information in the corner. It's convenient, clean, and in cases where you have a literate sample with cell phones, it can serve as a contact card as well. When you collect participants' contact information, use a blank card, write down their contact info. (name, address, phone number) AND their ID number. **Keep this information secure**.

PRIME: If feasible, try to run a "primed" and "unprimed" treatment of the RAG procedure described here. Priming is discussed in greater detail below. A "location prime" is preferable if possible, but object primes may be used too (though they haven't worked clearly in the past).

Note: With individual players the researchers and assistants work through the examples and test questions with real coins on a flat surface with cups clearly marked. In RAG1, one cup is marked **DISTANT** (e.g., Catholic at St. Barnabas'; Buddhist in Ak Dovurak village) and one is marked **LCOAL** (e.g., Member of St. Mary's; Buddhist in Kyzyl) whereas RAG2 has two cups marked with **YOU** and **DISTANT** (See image below). We are using the "hit them over the head" approach here, because it's crucial that they perceive the "co-religionist" component, even if they don't care about it. We will conduct other experiments to assess how much this lack of subtlety matters. We deal with assigning the DISTANT in more detail below.

A. RAG1: LOCAL vs. DISTANT

Note: Again, with individual players, the researchers and assistants work through the examples and test questions with real coins/bills on a flat surface with cups clearly marked (coins are preferred). In RAG1, two cups are marked with "**DISTANT**", "A **LOCAL** person" whereas RAG2 has two cups marked with "**YOU**" and "A **DISTANT** person" (See illustrations below). Moreover, given that the participants will spend a lot of time, sometimes alone, with their cups, it is better that the cups have one-way entry slits in order to prevent reallocations of money after the activities have been played. Each of the examples presented below will be presented either as an example or used as a test question as required. If more test questions are needed, the researcher or assistant should begin again with the first set of examples, and mark on the data sheet how many more example sets were used. When setting up the activity rooms, make sure that the participant cannot see the labels for cups in future activities. Also, ensure that during the experiment, there is a wall or screen blocking the direct line of sight between participant and experimenter. **Anonymity is very important to maintain in the RAGs**.

If you're using location primes for this task: conduct half in a sacred place and conduct half in a secular place (grand total of 80 participants at minimum). There are 30 rolls in each task and two versions of the task (RAG1 and RAG2). So, 30 rolls x 2 versions should equal approximately a typical daily wage in your community. If the typical daily wage in your community is $10, each roll would approximate to 0.17 cents. We've rounded up to 20 cents using 20 cent coins for this example. If you do not have a location prime, simply do both activities where you can. Round up, instead of down, if possible (see the RAG excel file for easy calculation).

This activity is conducted anonymously. In the RAG, participants roll a die. The die should have three **black** and three **white** sides on them to give participants a 50-50 chance for rolling one of the two colors (plus, this makes it easier for participants). Try to make sure that the colors on the die do not correspond in some way to players' affiliations or their locations (e.g., don't use "black" if your DISTANT is in the "Black Hills" or some such) as this may confuse participants. Feel free to use different colors. Participants have two cups in front of them, the die, and 30 coins (and an object prime if using one). Participants are to think of a specific cup and roll the die. If the die lands with a **black** side facing up, participants *should* put one of the coins in the cup they secretly chose. If the die lands with a **white side** facing up, they are *supposed* to put one of coins into the other cup—(in this case the cup marked **DISANT**). The easiest way to think of this is that black → the cup I was thinking of, while white → the other cup. If people cheat, we will be able to detect this because of significant deviations from random allocations. See Materials for more details.

Of course, experience suggests that it's crucial to test the die to make sure it's "fair". Test your dice before using them. Roll it 100 times. You should be pretty close to 50/50, but test with a chi-square test to be sure.

Place these images on the cups you use. The images are in the PowerPoint file in the Materials Folder (Folder #4). Convert the text appropriately.

i. Script for Group in Introduction Area

Thank you all for taking the time to come today. Today's activities may take **up to 2 hours,** so if you think you will not be able to stay that long let us know now. Before we begin I want to make some general comments about what we are doing here today and explain the rules that we must follow. We will be doing some tasks with money. Whatever money you win in the activity will be yours to keep and take home. **[researcher's name]** will be supplying the money. But you should understand that this is not **[researcher's name]** own money. It is money given to **him/her** by the **[researcher's university]** to use for research. This research will eventually be part of a book; **[optional: it is not part of a development project]**. These activities are part of a scientific research project involving many researchers like **[researcher's name]** and people from many different societies around the world.

Before we proceed any further, let us stress something that is very important. Many of you were invited here without understanding very much about what we are planning to do today. If at any time you find that this is something that you do not wish to participate in for any reason, you are of course free to leave whether we have started the activity or not.

We are about to begin the activity. **Based on the numbers you picked**, you will be brought into the activity area. While you are waiting here, you cannot talk about the activity and you cannot talk to people who have already finished the activity while you are waiting.

ii. Script for Individuals in Activity Area

You have two cups in front of you: one belongs to **DISTANT** and one belongs to a random person from **your [LOCAL]**. You roll a die 30 times and each die roll will tell you how to assign one **20 cent** coin; each time you roll the die, you will put **20 cent**s in one of the two cups in front of you. After you finish today's activities, we will deliver this cup of money to a person randomly selected from **your** [LOCAL] and one randomly selected person from **DISTANT.** You will not be informed about who will receive the money and the persons who receive the money will not know about you.

You should follow these three steps to allocate each **20 cents** using the die:
>   Step 1: Please choose one of these two cups in your mind.
>   Step 2: Roll the die once.
>   Step 3: The die has 6 sides. If the die lands with a **black** side facing up, you will put one of the **20 cent** coins in the cup you chose in your mind in Step 1. If the die lands with a **white side** facing up, you will put one of the **20 cent coins** into the opposite cup that you chose.

Repeat these three steps for each of the **20 cent** coins until there is no more money left. Here are some examples for single rolls:

> For example, suppose that you chose the cup for the person from [**LOCAL**] in Step 1. Then you roll the die once. If the die lands with a **black** side up, you will place one of the **20 cent** coins in the cup for **LOCAL**. If the die lands with the **white** side up, you will place one of the **20 cent** coins in the cup for [**DISTANT**].

> Here is another example. Suppose that you chose the **DISTANT** cup in Step 1. Then you roll the die once. If the die lands with the **black** side up, you will place **20 cent**s into the **DISTANT** cup. If the die lands with the **white** side up, you will place **20 cent**s in the cup of the [**LOCAL**].

Now I am going to ask you some questions to see if you understand the activity:

iii. Test Questions
[RAs check the answers given to make sure they are correct; these are TEST Questions]

> 1P1: Suppose that you chose the **DISTANT** cup in Step 1. When you roll the die it lands with the **black** side up. Which cup should you place the **20 cent**s in? [Correct Answer: **DISTANT** cup]

> 1P2: Suppose that you chose the cup of the person from [**LOCAL**] in Step 1. When you roll the die it lands with the **black** side up. Which cup should you place the **20 cent**s in? [Correct Answer: the cup of the person from [**LOCAL**]]

> 1P3: Suppose that you chose the cup of the person from [**LOCAL**] in Step 1. When you roll the die it lands on the **white side**. Which cup should you place the **20 cent**s in? [Correct Answer: the cup of the person from my [your] **DISTANT**]

> 1P4: How many times will you roll the die in this activity? [Correct Answer: 30 times [Correct Answer: 30 times]

> 1P5: Will the money allocated by you be delivered to the person from your **LOCAL** and **DISTANT**? [Yes]

[RA: if the person has answered all the questions correctly proceed; if not return to the examples and re-ask all of the test questions again; record the number of time the RA went through the test question; e.g., if the person gets all correct answer the first time, record a "1"; if the RA has to go through all test questions three times, record a "3" for number of tests used]

You have answered all the questions correctly. Do you have any questions? Now that you understand the task, are you willing to participate? [**this obtains verbal consent for study**]

Here are the two cups, **DISTANT** and the other for the person from [**LOCAL**]. Here are 30 coins worth **20 cent**s each. You will roll a die 30 times to decide which cups to place each **20 cent** coin

in. While I am outside, please follow the instructions we just talked about. Let me know when you are finished rolling and putting money in the cups.

[the RA will leave the participant alone and stand just outside the gaming area, within earshot; after the participant is finished with the activity, the RA asks subjects to take the cups and put them on a tray in the room after each activity; the RA should NEVER touch the cups after the participant has allocated into them; only the participant can carry the tray or place the cups on the tray. This is for anonymity purposes.]

[the RA and researcher will leave the participant alone and stand just outside the gaming area, within earshot. After the participant is finished with the activity, the RA can enter the game area, turn the tray to the next variant, repeat the test questions, and once again exit the game area. When participants are completely finished with all variants, they may a) exit the game area for follow-up interviews while researcher counts money or b) take the trays to a payout station if available and then either exit or commence post-experimental interviews. Under no circumstances are RAs or researchers to handle the cups within view of participants.

iv. Participant FAQs
[For RA only if needed: List of questions that may be asked by subjects and the standard answers]

"How are the person from my [**LOCAL**] selected?" **Answer**: I cannot tell you more than the fact that they will be randomly selected.

"As you don't know what I chose in my mind, how can you tell if I do not put the money in the cups according to the rule of the activity?" **Answer**: "We won't be able to tell, but you should put the money in the cups according to the rules of the activity."

"Can I change my mind when I put money in the cups?" **Answer**: "According to the rules of the activity, you should not change your mind after you roll the die."

Image of game set-up with three variants and prime (a Buddhist protection charm) used in Tyva Republic (photo by Benjamin Purzycki)

B. RAG2: Self vs. DISTANT

NOTE: RAG2 is the same procedure as RAG1, but cups are labeled with "**SELF**" and "Member of **DISTANT**". The script below is the same, but instead of **LOCAL**, it reads "**SELF**". Again, participants are to think of a specific cup and roll the die. If the die lands with a **black** side facing up, participants *should* put one of the coins in the cup they secretly chose. If the die lands with a **white side** facing up, they are *supposed* to put one of coins into the opposite cup they chose. Images for labels are found in the materials. Also note that this should be a *different* DISTANT individual than any other versions of the games people play. In other words, people are playing with two different DISTANTs.

Also: doing multiple games requires that all cups are placed on a single tray and trays are turned between variants. **Just remember to do RAGs 1 and 2 in randomized order first, then move onto the others.**

i. Script

You have two cups in front of you: one belongs to you and one belongs to a person from [**DISTANT**]. You will be asked to roll a die 30 times and each die roll will tell you how to assign one **20 cent** coin; each time you roll the die, you will put **20 cent**s in one of the two cups in front of you. After you finish today's activities, we will deliver this cup of money to a person from [**DISTANT**]**.**

You should follow these three steps to allocate each **20 cents** using the die:
   Step 1: Please choose one of these two cups in your mind.
   Step 2: Roll the die once.
   Step 3: The die has 6 sides. If the die lands with a **black** side facing up, you will put one of the **20 cent** coins in the cup you chose in your mind in Step 1. If the die lands with a **white side** facing up, you will put one of the **20 cent coins** into the cup that you did not choose.

Repeat these three steps for each of the **20 cent** coins until there is no more money left. Here are some examples for single rolls:

   For example, suppose that you chose the cup for the person from [**DISTANT**] in Step 1. Then you roll the die once. If the die lands with a **black** side up, you will place one of the **20 cent** coins in the cup for **DISTANT**. If the die lands with the **white** side up, you will place one of the **20 cent** coins in your cup.

   Here is another example. Suppose that you chose your own cup in Step 1. Then you roll the die once. If the die lands with the **black** side up, you will place **20 cent**s your own cup. If the die lands with the **white** side up, you will place **20 cent**s in the cup of the person [**DISTANT**].

ii. Test Questions
Now I am going to ask you some questions to see if you understand the activity:
[**RAs check the answers given to make sure they are correct**]

2P1: Suppose that you chose your own cup in Step 1. When you roll the die it lands with the **black** side up. Which cup should you place the **20 cent**s in? [Correct Answer: my cup]

2P2: Suppose that you chose the cup of the person from [**DISTANT**] in Step 1. When you roll the die it lands with the **black** side up. Which cup should you place the **20 cent**s in? [Correct Answer: the cup of the person from [**DISTANT**]

2P3: Suppose that you chose the cup of the person from [**DISTANT**] in Step 1. When you roll the die it lands on the **white side**. Which cup should you place the **20 cent**s in? [Correct Answer: my cup]

2P4: How many times will you roll the die in this activity? [Correct Answer: 30 times [Correct Answer: 30 times]

2P5: Will the money allocated by you be delivered to the person from your **DISTANT**? [Yes]

[RA: if the person has answered all the questions correctly proceed; if not return to the examples and re-ask all of the test questions again; record the number of time the RA went through the test question; e.g., if the person gets all correct answer the first time, record a "1"; if the RA has to go through all test questions three times, record a "3" for examples used]

You have answered all the questions correctly. Do you have any questions? ...You are about to start the activity.

Here are the two cups, yours and the other for the person from [**DISTANT**]. Here are 30 coins worth **20 cent**s each. You will roll a die 30 times to decide which cups to place each **20 cent** coin in. While I am outside, please follow the instructions we just talked about. Let me know when you are finished rolling and putting money in the cups.

iii. Payment

If you have a payout station: Payout stations should be double-blind; participants should not see who is distributing money and distributors should not see participants. Of course, local people can often talk afterwards and during, so ensuring no collusion is going on is important. Minimize traffic in the best conceivable way possible.

If you do not have a payout station: Upon completion of all games, participants should be escorted into the waiting/interview area. While this is done, the researcher—and ONLY the researcher—should count the money in the cups, record it, and prepare the payouts. RAs should not know what the allocations are. When the coast is clear, researchers can give out money in sealed envelopes or asked to put away the money, and have them sign receipts. This will minimize exposure to potential players and waiting players.

In very small locations, it might be better to do all experiments in very long and taxing day, and do follow-up interviews over the course of the following couple weeks. This will maximize anonymity and minimize collusion. This will require extra care in ensuring that players cannot interact with people who have not played.

iv. Post-experimental materials

Upon completion, participants should be asked the following questions first, then proceeding to Demographics, Religiosity, Wealth, and other interviews. The Games Datasheet has this clearly marked for easier transcription.

- **GA1**. Did the game remind you of anything in real life? (Re-explain the RAG if necessary) If so, what did it remind you of?
- **GA2**. What do you think this study is about?
- **GA3**. If using material prime: What does that object mean to you?

Then, participants should do the Demographic, Religiosity, and Wealth Interviews if they haven't already.

C. RAG3 and RAG4: OUTGROUP Extensions (if possible)
The next two RAG games consist of two other permutations. In Wave I of our experiments, researchers did the aforementioned core games. In this wave, you will do the two core games (RAG1 and RAG2) **first**, then you will do the next two (also in randomized, counterbalanced order). **RAG3** consists of DISANT vs. OUTGROUP cups. **RAG4** consists of SELF vs. OUTGROUP cups.

With four games, you can use a similar set-up to the one in the illustration on page 9. With a tray, you can exit the game area, let participants play, then when they are finished, you can return and turn the tray. Again, do the first two games first, then the second two.

If you were part of Wave I, then do you your best to find your participants and have them do the two new games. This will be quite quick. Also try to get responses to the new questions (detailed in the sheets in the folders).

In summary, do the following:

RAG1: LOCAL vs. DISTANT
RAG2: SELF vs. DISTANT

then do:

RAG3: DISTANT vs. OUTGROUP
RAG4: SELF vs. OUTGROUP

Randomize the order of each individual game, but make sure that you conduct these two dyads in this order.

D. Dictator Game (DG)

i. General Procedure

If you can, use a fresh sample from the same population for the DGs. For small populations, if this is too difficult or possible, make sure to allow at leat three weeks between games, and use both fresh participants and those who played the RAG (so we can look for differences).

The DG is the prosocial flipside of the otherwise anti-social RAGs—in this we'll use the same dyads from the RAGs, but instead of potentially cheating, participants dictate the allocations to one of two players. So:

DG1: LOCAL vs. DISTANT
DG2: SELF vs. DISTANT
DG3: DISTANT vs. OUTGROUP
DG4: SELF vs. OUTGROUP

Again, if possible, you might use up to four primes: Moralistic God, Local God, Secular Justice, and Control (no prime). Of course, if there's either no Local God or no Secular Justice authority (e.g., the police), use only three primes. Prioritize the Moralistic God and Control conditions. Crucially, participants need to be randomly assigned to one these conditions. Remember, pre-fabricated ID cards can help with this.

Players are presented with the allocation amount in the form of 10 bills or coins for the game, and with two envelopes or cups used from the RAGs. Each envelope will be labled with the person name and a description of the other person (see Materials Folder for these). They should insert their allocations into the envelope and seal them.

Players will play anonymously. As in the RAGs, you can use a tray to keep all of the games together.

As with the RAGs, people play with *different* DISTANT, LOCAL, and OUTGROUP members for each sub-game and money needs to be given to randomly selected recipients (pooled if need be).

Feel free to use additional DGs, e.g., **DG5**: LOCAL vs. OUTGROUP. Just keep in mind that the stakes need to add up the same way so all games amount to an average day's wage in your community.

ii. Script

Thank you all for taking the time to come today. Today's activities may take **up to 2 hours,** so if you think you will not be able to stay that long let us know now. Before we begin I want to make some general comments about what we are doing here today and explain the rules that we must follow. We will be doing some tasks with money. Whatever money you win in the activity will be yours to keep and take home. [**researcher's name**] will be supplying the money. But you should understand that this is not [**researcher's name**] own money. It is money given to **him/her** by the [**researcher's university**] to use for research. This research will eventually be part of a book; [**optional: it is not part of a development project**]. These activities are part of a scientific

research project involving many researchers like [**researcher's name**] and people from many different societies around the world.

Before we proceed any further, let us stress something that is very important. Many of you were invited here without understanding very much about what we are planning to do today. If at any time you find that this is something that you do not wish to participate in for any reason, you are of course free to leave whether we have started the activity or not.

We are about to begin the activity. **Based on the numbers you picked**, you will be brought into the activity area. While you are waiting here, you cannot talk about the activity and you cannot talk to people who have already finished the activity while you are waiting.
Instructions:

> You have been chosen as the decision-maker in this task. For each decision, you will find **10 one-dollar** coins. Your role is to decide how the money is given to people. All of the money will be given to real people. The people receiving the money will not know about you and you will not know to whom we deliver the money.

iii. Primes

If you are able to use a location prime, they should be religious or sacred places and secular primes should be various places that have no obvious religious significance for people. Please try to do this. Be conscientious about this: as some might see this as gambling, doing this in a temple, for instance, might be fairly offensive. If you can't find a location prime, use locally specific primes for materials to be seen while participants conduct games. These can be images or symbols of sacred places, supernatural agents, or rituals, and so forth. These symbols should **NOT** have eyes on them or resemble eyes (e.g., evil eye) if you can avoid it. If you are uncertain, please consult with Ben.

There are four conditions for the DGs: a) MORALISTIC GOD prime, b) a LOCAL GOD prime, c) a SECULAR AUTHORITY prime, and d) a control. Some of these will be difficult in your site, but do the best you can to shoot for location primes, and then object primes as a second possibility. See <u>Priming and Materials</u> for more details.

iv. Script for Group in Introduction Area

Thank you all for taking the time to come today. Today's activities may take **up to 2 hours,** so if you think you will not be able to stay that long let us know now. Before we begin I want to make some general comments about what we are doing here today and explain the rules that we must follow. We will be doing some tasks with money. Whatever money you win in the activity will be yours to keep and take home. [**researcher's name**] will be supplying the money. But you should understand that this is not [**researcher's name**] own money. It is money given to **him/her** by the [**researcher's university**] to use for research. This research will eventually be part of a book; [**optional: it is not part of a development project**]. These activities are part of a scientific research project involving many researchers like [**researcher's name**] and people from many different societies around the world.

Before we proceed any further, let us stress something that is very important. Many of you were invited here without understanding very much about what we are planning to do today. If at any time you find that this is something that you do not wish to participate in for any reason, you are of course free to leave whether we have started the activity or not.

We are about to begin the activity. **Based on the numbers you picked**, you will be brought into the activity area. While you are waiting here, you cannot talk about the activity and you cannot talk to people who have already finished the activity while you are waiting.

v. Game Scripts (Counterbalance):

DG1: You have two cups/envelopes in front of you: one belongs to **LOCAL** and one belongs **to a person from [DISTANT]**. I will give you some money and your task is to allocate the money to the cups/envelopes. Whatever money you allocate will be given to actual people, but you will not know about them and they will not know about you. You will play by yourself and no one other than [**your name**] will know how much you allocate. Please put the money you decide to allocate into the cups/envelopes and close the lids/seal the envelopes. Please let us know when you are finished.

DG2: You have two cups/envelopes in front of you: one belongs to **you** and one belongs **to a person from [DISTANT]**. I will give you some money and your task is to allocate the money to the cups/envelopes. Whatever money you allocate will be given to actual people. You will not know about them and they will not know about you. You will play by yourself and no one other than [**your name**] will know how much you allocate. **You will keep the money you put in your cup.** Please put the money you decide to allocate into the cups/envelopes and close the lids/seal the envelopes. Please let us know when you are finished.

DG3: You have two cups/envelopes in front of you: one belongs to **DISTANT** and one belongs **to a person from [OUTGROUP]**. I will give you some money and your task is to allocate the money to the cups/envelopes. Whatever money you allocate will be given to actual people, but you will not know about them and they will not know about you. You will play by yourself and no one other than [**your name**] will know how much you allocate. Please put the money you decide to allocate into the cups/envelopes and close the lids/seal the envelopes. Please let us know when you are finished.

DG4: You have two cups/envelopes in front of you: one belongs to **YOU** and one belongs **to a person from [OUTGROUP]**. I will give you some money and your task is to allocate the money to the cups/envelopes. Whatever money you allocate will be given to actual people [**if SELF is one cup, explain that they will keep the money they allocate**], but you will not know about them and they will not know about you. You will play by yourself and no one other than [**your name**] will know how much you allocate. Please put the money you decide to allocate into the cups/envelopes and close the lids/seal the envelopes. Please let us know when you are finished.

vi. Test Questions
These are for first two DGs—replace players as needed to correspond to DG you're doing.

DGQ1: How much money will you play with for each game?

DGQ2: Will the money allocated by you be delivered to the person from **DISTANT**? [Yes]
DGQ3: Will the money allocated by you in the **SELF** cup be given to you? [Yes]

[**EXIT GAME AREA**]

Upon returning, simply turn the tray, describe the cups, and repeat until all four games are completed. Remember to count all the money in all envelopes (except "self") since the person might pocket money when one of the cups or envelopes is not "for self". Tabulate the allocations, and prepare the payout for the participant. Then, follow with interview materials.

vii. Post-experimental Materials

Upon completion, participants should be asked the following questions first, then proceeding to Demographics, Religiosity, Wealth, and other interviews. The Games Datasheet has this clearly marked for easier transcription.

- **GA1**: Did the game remind you of anything in real life? (Re-explain the DG if necessary) If so, what did it remind you of?
- **GA2**: What do you think this study is about?
- **GA3:** If using material prime: What does that object mean to you?

Then, participants should do the Demographic, Religiosity, and Wealth Interviews if they haven't already.

When participants are finished, they should receive their payouts, sign receipts for their payouts, and encouraged not to discuss the game with anyone.

viii. Sampling and Materials

Try your best to get a minimum of 40-50 per condition (4) for a total of 160-200 individuals. This will be challenging in some places, but try your best. It's always a better policy to use more, as some participants will need to be removed from the study for various reasons. This range is a bare minimum for statistical power. Get a sense of how many people you can sample. Based on that number, using the following rubric, see how many conditions you can manage:

Bare Minimum Sample Size	Priority	Condition
40	1	Moralistic God
80	2	Control
120	3	Local God
160	4	Secular Authority

See the budget sheet to calculate allocations for DGs. There need to be **10 monetary units per DG variant**.

We have made datasheets for easier data recording and spreadsheets for easier entry. If you need to deviate from the protocols in any way, please make sure you only ADD to the spreadsheets in isolated columns on an extra sheet.

<center>2. Priming and Materials</center>

A. Introduction

Priming allows us to expose participants to religious contexts in order to determine whether or not religion minimizes antisocial behavior (RAG) and/or increases prosociality (DG).

B. On Choosing the LOCAL, DISTANT, and OUTGROUP

To achieve some uniformity in definitions of in-groups and out-groups, it will be important to follow some basic criteria in selecting these groups:

LOCAL criteria:

- A group defined in part by mutual cooperation and helping among members or at least an ideal of such mutual aid.
- To make the groups comparable across studies, it should be relatively small (e.g. 100-500 individuals), but foraging societies will be smaller. The bias here is toward "natural" units like bands for villages. If conducted in a city, then using local neighborhood is optimal.
- They should be the same religious group (in some cases, this will be the default, in others, this will be more challenging where "religious" affiliation is very specific within a group, such as secret cults, etc.)

DISTANT criteria:

For the sake of convenience, **DISTANT** here is shorthand for "anonymous non-local co-religionist". This means that during the treatments, money goes to people who share the same religious traditions, but do *not* live in the same community as your target population. They are anonymous-strangers, but co-religionists. Whereas in-group members are people the subject knows and interacts with, though they won't know specific which in-group member they are playing with in the RAG. **In this experiment, the DISTANTs need to be participants of local/indigenous religions (i.e., *not* world religious traditions).**

- To decrease the chances of choosing out-groups against which a person might have pronounced negative feelings, the DISTANT should from somewhere that the participants know of, and where they lack extensive social ties. A guideline might be that it must be very unlikely that the participant knows someone who knows the DISTANT. (e.g., another village within 100km). For example, naming a specific neighboring town for which people have expressed negative feelings would violate this criterion.
- DISTANTs need to have the same or very similar religious beliefs and practices too. This will be awkward in some places, and very obvious in others.

OUTGROUP criteria (when relevant):

This was very difficult to systematically choose. In order to effectively select in such a way as to make things comparable across sites, your OUTGROUP should be someone from the same place as your DISTANT, just a non-coreligionist. Sometimes these will be ethnic others, sometimes these will overlap, sometimes these will have antagonistic relationships with your LOCAL. We will use individual level measures to account for variation in perception of the OUTGROUP. Be sure to get a sense of general relations between the groups as well, but ideally, your OUTGROUPs are *religious* outgroups only with relatively fine relations with the ingroup. No doubt there will be some ambiguous cases, so just pick the best OUTGROUP you can based on the criteria.

- Researchers who are still uncertain about how to assign a DISTANT or OUTGROUP in their sites should contact Ben ASAP.

C. Materials

For the RAG, you'll need prepared dice, prepared cups, lids, trays, player sheets, coins and other cash for payments.

For each game, you'll need at least 4 cups. However, once a player has been paid, his or her cups, etc. can be recycled back into the game.

You'll need at least 120 coins for each person, but when the person is paid these can be converted to bills and the coins recycled as well. Again, 240 coins is a good minimum if you can manage to get this many in the right denominations. Remember, in paying subjects count coins in ALL cups to verify the player didn't pocket some of the coins. **Use tokens if necessary (discuss with Ben).**

The **die** should be marked on three sides with one color and three sides with another color. Ben used nail polish to mark blank dice, and tested to see whether or not this made them biased by weighing these sides down. It didn't, but you should check the dice anyway. Permanent markers usually don't work very well on some dice. Avoid stickers. Have backup dice ready.

Given that the participants will spend a lot of time, sometimes alone, with their cups, it is better that the cups have one-way entry slits in order to prevent reallocations of money after the activities have been played. Also, making sure you can quickly open them up, and take out the money for participants' payment will help. Try to use cup trays that fit all of the cups. That way, you can simply turn the tray when participants are finished with the first RAG or DG.

D. Extensions and Adaptations

If you'd like to add more versions of the RAG or DG, please do so within budgetary and time confines. For any manipulation you make, be sure to a) counterbalance; b) have a control; c) do not lose sight of ensuring that the core package of the RAGs, Religiosity, RLI, and Market Integration measures are done and d) they are tacked on after the core measures are finished. Adding variants does increases time by about 10 minutes or so per variant. Be sure to recalculate your total possible allocations per game so that all variants add up to roughly one average day's wage in your local community.

In some places, cash payouts may introduce more problems than not. Consider using tokens instead and having a "shop" with valuable goods for which people can exchange tokens. This will require a sizable up-front investment on the researcher's part, but this will minimize complications due to cash payments. We'd rather avoid using tokens, but we leave it up to your judgment.

Two of the most challenging aspects of conducting this study are having the space and help. The less help and space you have, the simpler the design needs to be in order to make sure that people aren't engaging in collusion. Again, the rule is to maximize anonymity and minimize collusion. Feel free to ask us for advice on this.
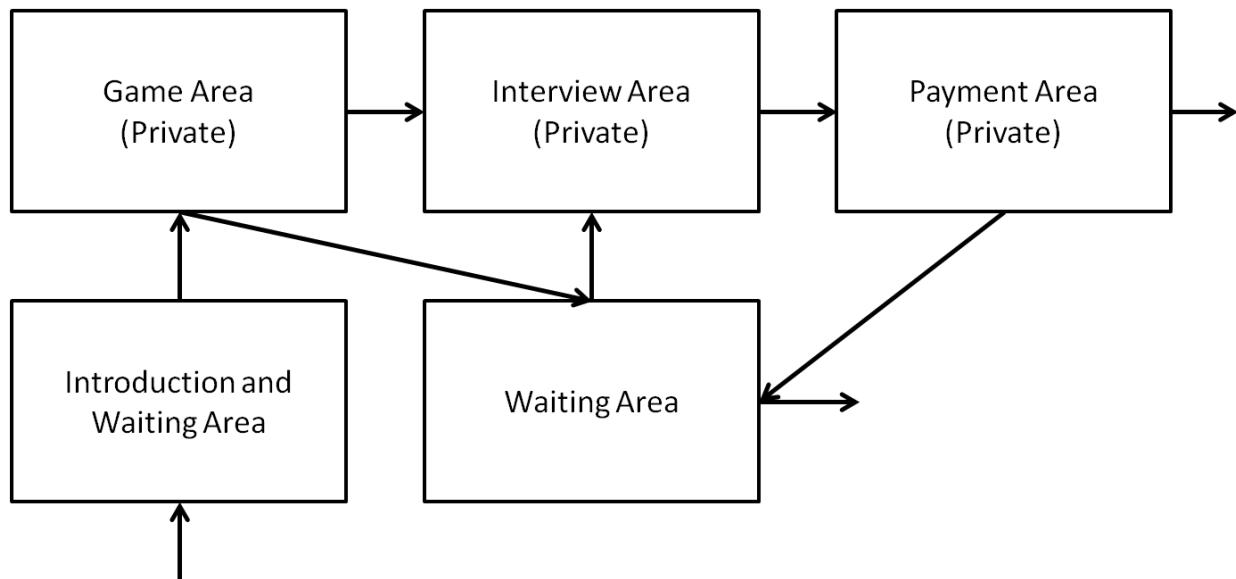
3. Corralling Procedures

How experiments will be set up will undoubtedly vary across field sites. Researchers working in small villages or towns need to use corralling, but in cases where you're confident that people can't meet to talk about the games, then you don't need to corral. Doing experiments door-to-door is doable in such cases. Be sure to observe and note how much religious information (e.g., imagery, shrines, etc.) is around if you do this. **If you are corralling**, experience suggests that you can only do between 10 and 20 people in a 3 hour block (assuming you can do follow-up interviews at a later time). The exact number depends on how rapidly people will come to understand the game. *Corralling isn't absolutely necessary, but controlling for cooperation and collusion is*. We've included guidelines here in case you have a scenario where you can.

Assuming you have an RA (or more) and access to a building or places with multiple rooms or areas, one way to organize experiments requires that you have five areas: the Introduction Area, a Game Area, an Interview Area, a Waiting Area, and a Payment area. People can meet in the Introduction Area—make sure to provide refreshments. Instructions can be read to the group, and Participant IDs distributed. Individuals enter the game area, play, then proceed to the interview area. These should be private areas. Of course, the interviews will take considerably longer than the games. So, make sure that overflow goes into the waiting area if need be. Two interview rooms would definitely speed up the process for people. In many places, people will show up together and leave together. The waiting room should be accommodating and comfortable for people. The important thing is that people do not talk to each other about the games while waiting, so a monitor needs to be with people in the Waiting Area.

The Payment Area should be designed so that the person processing the cups does not see the player, though of course they do receive their game sheet with their ID.

Of course, not everywhere will have isolated rooms to ensure the correct flow. One could begin, for instance, under a large tree, then send people into a tent for games, then to another tree for interviews, then to a vehicle for payment. As long as the protocol order is intact and people cannot talk about the games to people who haven't done them, ensuring privacy in the Game, Interview, and Payment Areas and comfort and controlling for discussing the games in the Waiting Area are high priorities.

Game Area
(Private)

Interview Area
(Private)

Payment Area
(Private)

Introduction and
Waiting Area

Waiting Area

Gather Participants in One Place: All participants must be brought together in the same place prior to playing the game. Use research assistants to control the logistical flow once the game begins. Those who have completed the game must depart (or be assigned to a separate waiting area) and cannot interact with those waiting to play. Participants should be told that anyone waiting to play who talks to someone who has already played the game will be disqualified from participation. They can talk amongst themselves, but not about the game. Only explain the game to the group as a whole if you have sufficient assistants to avoid discussions among players that could lead to the 3 C's (contagion, contamination and collusion, see notes at the end).

One-by-one: In some cases, especially in cities, protocols will simply have to be executed at someone's home or in a quiet location. The key to running these is avoiding any of the aforementioned problems with participants talking to each other about the games. Ensure that people can't report to others about what the games entail. This will require ensuring that RAs do not handle payouts and as such can never link participants with offers. If this is the case, researcher should handle all money while assistants are conducting interviews.

Tents!: Mobile labs in tents have worked for a few members of our team. Get a quick-tent and move your lab around. This can cut down on collusion, but also provide a private, convenient place for people to play the games. Just make sure people are by themselves and not baking themselves!

4. Notes and Materials

A. General Procedure for Administering Protocol

NOTE: Assuming you are using the "group session" approach: Prior to administering the game for a given session, all players who will play during that session are gathered in one location with monitors. After completing the game(s), players may mix with the general population, but not with the players waiting to play.

Other key things to keep in mind:

1. Game Set-Up, Personnel, and Participants: Proper administration of these kinds of experiments greatly benefits from thinking carefully about the number of research assistants and the research space. We recommend a team of at least five RAs with significant language skills. For translation of the materials, you'll need at least one skilled translator and one equally skilled back translator, though more talent is better. You'll also need a fluent speaker to administer both the experimental task and the post-game interviews.

2. Four research spaces: Conducting the experimental task will be organized around four or five areas, <u>as explained above</u>. Prior to the introduction, they will receive their show-up fee and pick a number from a hat (which determines their order). After completing this task they will be moved to a second Waiting Area, which should be separate from the Introductory Area. Here, they will wait, hopefully a short time, for their post-game interview with another RA. After completing this, they will proceed to the payment area and receive their payment. After receiving their payment, they should depart—and not interact with the waiting players. The waiting area must be monitored to make sure players are not talking about the experiments. Players can talk, just not about the experiments. This talk must be monitored.

3. Participants: Participants need to be over the age of 18. Recruitment will vary according to site, but ideally, participants will be randomly selected from a community census. People should be random samples of adults from some definable community or population. If you have enough RAs, one person should be assigned for recruitment, but they must not be simply the people your RA knows. Assuming you can do follow-ups at a later date, you will ideally have 3 hour blocks of 10 to 20 people assigned to each block. Two interview areas would help cut down on lag time between participants. *You must keep track of "turn downs" since this is key information for how representative your sample is.*

4. Database: We have provided spreadsheets for each component of the study separately. For your own analyses, compile data as appropriate, but for us, simply return the completed spreadsheets and we will compile them. It is **very** important that you refrain from altering the structure of the spreadsheets (there are worksheets for your modifications). That way, when we compile the data, we can easily do so without mistakes. The key variable in most of these sheets is the **Participant ID** variable. This will allow us to link datasets, and compile a larger database. **NOTE: Data are to be sent to Ben to clean, complete, and fully in English. If they are not, they will be returned.**

B. Notes on Basic Demographics and Religiosity Scale

The post-game interview will always involve the post-game questions (e.g., Did the game make you think of anything? If so, what was it?) and the demographic survey. Many of you will also need to explain to people that you will need to contact information to conduct a follow-up interview to do the Religiosity and Wealth measures.

C. Notes on Game Procedures and Administration
Common Game Protocols

Translation: Each researcher will have to adapt these instructions to fit their particular field site by translating them into the appropriate local language and adjusting the currency and stake sizes. Researchers will use the method of back-translation to obtain the best possible game

translation. This involves having one bilingual assistant with no knowledge of the game translate the game instructions into the local language and a second translate it back, thus identifying any problems in translation. Edit accordingly. Please supply the translation and back-translation with the materials you return.

Game Administrator: All games should be run by you with a native speaker to assist/interpret unless you yourself are completely fluent in the local language.

Teaching examples: In both teaching and testing the participants, use actual coins to illustrate the game. Teaching examples are scripted in written protocols. **Please stick as closely as possible to the script.**

Examples from list: Examples are pre-selected and scripted in the written protocols. Use these for instruction and testing. Repeat from this list if more examples are needed.

Show-up Fee and Stakes: Players receive the show-up fee upon arrival at the experiment. For the RAGs, this "show-up" fee paid in cash at a rate of approximately 25% of one day's wage in the local economy. For the DGs, it will be 20%. It will be made clear to the player that this money is strictly for their *participation* in the game, and is not part of the game. Participants who fail to pass the required tests of game understanding can take the show-up fee—which makes it somewhat easier to reject them, if the need arises. The game stakes will be set at roughly one day's wage in the local community (i.e. if there were casual wage labor work available, the wage this would earn for one day). Set stakes with convenient increments of 10%. In all of the examples, we have used a decimal scale assuming a **$10** per day minimum wage.

Introductory instructions: All game instructions will begin with a reminder to those present that participation in the games is completely voluntary, and that they are free to leave at any time if they are uncomfortable with any aspect of the games. Given that the populations we work with are not generally familiar with such exercises we have explained a number of details that would be obvious to more experienced subjects. Thus, the game instructions emphasize the anonymity aspect of their behavior in the game, the fact that they are not taking money away from the researcher personally through their participation but rather that the money comes from a university. Furthermore, the instructions explain that we are running these games in many other sites around the world.

Sampling: You should draw your game subjects from the adult population over the age of 18. **We will not use subjects below the age of 18**. **If you need to, get Human Subjects clearance for sub-18's from your home institution**. Ideally you will have a census of your field site and be able to select a random sample. During and after the first day of play, you to be concerned with contamination problems. You should give as little warning as possible to people prior to calling them to play so that they do not coordinate strategies based on what they have heard about the games. For those who have played games before, it is best to go to new villages if you can. This would be very interesting, just remember to remove them from the dataset you deliver to the project. You can analyze them in your chapter for the project. Your sampling methods must be controlled enough so that word of mouth recruitment is only done *before* people participate. Allowing participants' families and friends to participate is great for boosting sample size, but ruinous for independence if families recruit other family members after playing. Always assume

that people will talk about the game, and make decisions regarding sampling based on this assumption.

Monitors: Be sure that you have sufficient research assistants to monitor the logistical flow in the game and avoid contact between those who have played and those who have not. While doing this monitoring, the research assistants can also help informants fill in the demographic survey and other forms. If you don't have many RAs, then coordinating successful execution will require modifications to the methods. Again, just ensure that anonymity is maximized and collusion is minimized (see next section).

Collusion/Contagion: Occasionally, some researchers doing work like this have experienced some serious collusion among players in large villages where they have run significant numbers of experiments. The degree of collusion was extreme in all cases in spite of the fact that offers were anonymous. You should be aware of this potential problem and be on the lookout for it if you are returning to a village where you have played games before, or if you play a series of games this time in the same village. One strategy that has worked is to play the games in rapid succession (over very few days) before the community can organize, and to call people for games with very little notice. This assumes you're quicker than the community, however. And bear in mind that many come to the gathering spot early, and this is the perfect opportunity for collusion. It also helps to finish one game in one day and begin a new game the next day. Another solution is to play only one game per village/community, but this introduces the possibility of different community effects. You will have to use some discretion in weighing and balancing these trade-offs if you encounter problems.

D. Checklist of Key Items

1. Assure participants of the **voluntary** nature of the games, as required by human subjects. Make sure to meet all of your **consent** requirements for work with human subjects for all sections of the project.

2. Explain the **rules regarding waiting** and **not talking** about the game. Make it clear that they will be able to ask questions once they are alone with the game administrator, but not while they are in the room waiting to play. They will not be allowed to interact in any way with those who have already played the game. Those who have completed the game should depart the game area. Have trained RAs monitor all of this.

3. Make sure that people have **participant numbers assigned** and that **ALL materials can be matched up** with the same individuals. It might help to have a card for participants to keep if they return for other experiments. We are not putting names on the data sheets, so be sure you can link IDs with data, and contact information with IDs.

4. If asked, remind people that all **money in the game is real** and they will be paid according to their decisions in the game.

5. **Assign** players to their **order** for the game in an **overtly random fashion**. People can pull their order number from a hat or a deck of shuffled index cards with game order assignments already prepared.

6. **Pay show-up fee**. This shows people the money is real, and we pay.

7. Bring **each player in one by one** and explain the game.

8. Perform **pre-game tests**—don't assume people understand. Record responses.

9. Do **first two core RAGs**. Exit game room when participants play. When they are finished with game, enter, then turn the tray to the next variant's cups. **Then**, return to the game area with the new cups for **RAGs 3 and 4**. When finished with all variants, escort participants to interview/waiting area. If you do not have a payout station, record allocations, re-set up the games for next participant. **Pay people their earnings**, have them **sign receipts**, and ensure that no one else can see their winnings (place in an envelope and have them tuck away the winnings). If using a payout station, send participants there with their cups if possible. Do NOT let RAs handle the cups.

10. Upon completion, move to post-game area to **do post-game surveys and instruments**. If participants are doing these tasks together, please make sure that they are not interacting during this task.

11. When done, have **receipts signed** in Payment Area.

12. Some deviations will be inevitable, at least in some cases. Make sure that deviations stick as closely to the principles of good experimentation and the project as possible. Consult with Ben as soon as possible. Carefully **document all deviations**, and include this in your chapter write-up.

13. **Remember to pay DISTANTs, LOCALs, and OUTGROUPs with the payouts from the games**! Because there won't always be enough people in there to give many small payouts, you can pool payouts together. Just be sure that no single person allocates more than one amount to the same recipient to stay true to the rules of the game.

Date/Time:_____**Interviewer**:_____

Location:_____

We did the MORALISTIC or LOCAL GOD question first (circle)?
[If starting with LOCAL GOD, begin on Question 30]

Basic Religiosity

1) How often do you pray? (FREQ. SCALE #1)
2) How often do you perform rituals or ceremonies devoted to MORALISTIC GOD? (FREQ. SCALE #1)
3) How often do you perform rituals or ceremonies devoted to LOCAL GOD? (FREQ. SCALE #1)
4) Do you believe in MORALISTIC GOD?
5) Do you believe in LOCAL GOD?
6) If you had to pick one, which is more important to you? That people participate in rituals devoted to MORALISTIC GOD = 1; That people believe in MORALISTIC GOD = 2; Neither are important to me=3
7) If you had to pick one, which is more important to you? That people participate in rituals devoted to MORALISTIC GOD = 1; That people believe in MORALISTIC GOD = 2; Neither are important to me=3
8) How often do you think about MORALISTIC GOD?
9) Do you perform activities or practices to talk to, or appease MORALISTIC GOD?
9a. If yes, how often? (FREQ. SCALE #1)
10) How often do you think about LOCAL GOD? (FREQ. SCALE #1)
11) Do you perform activities or practices to talk to, or appease LOCAL GOD?
11a. If yes, how often? (FREQ. SCALE #1)

Notes:

MORALISTIC GOD

12) Please list 5 things MORALISTIC GOD cares about or likes **1.** **2.** **3.** **4.** **5.**
13) Please list 5 things MORALISTIC GOD dislikes **1.**

2.

3.

4.

5.

14) How frequently do you worry about what MORALISTIC GOD thinks about you? [FREQ. SCALE #2]

15) Does MORALISTIC GOD ever punish people for their behavior?

15a. If yes: what kinds of things does MORALISTIC GOD punish people for doing?

16) How often does MORALISTIC GOD punish people for stealing? [FREQ. SCALE #2]

17) How important is punishing thieves to MORALISTIC GOD? [IMP. SCALE]

18) How often does MORALISTIC GOD punish people for lying? [FREQ. SCALE #2]

19) How important is punishing liars to MORALISTIC GOD? [IMP. SCALE]

20) How often does MORALISTIC GOD punish people for murder? [FREQ. SCALE #2]

21) How important is punishing murderers to MORALISTIC GOD? [IMP. SCALE]

22) Can MORALISTIC GOD see into people's hearts or know their thoughts and feelings?

23) Can MORALISTIC GOD see what people are doing if they are far away, in _____[in distance town or city familiar to locals; further is better)

24) How often does MORALISTIC GOD assist people in their lives or reward them for proper behavior? [FREQ. SCALE #2]

25) Can MORALISTIC GOD influence what happens to people after they die?

26) Does MORALISTIC GOD care about how people treat strangers?

27) Does MORALISTIC GOD care about how people treat other people who perform rituals for MORALISTIC GOD

28) Does MORALISTIC GOD care about whether people perform certain rituals?

29) Does MORALISTIC GOD care about some people having more money and food than other people?

Notes:

30) Please list 5 things LOCAL GOD cares about or likes?

1.

2.

3.

4.

5.

31) Please list 5 of things LOCAL GOD dislikes

1.

2.

3.

4.

5.

32) How frequently do you worry about what LOCAL GOD thinks about you? [FREQ. SCALE #2]

33) Does LOCAL GOD ever punish people for their behavior? [yes = 1, no = 0]

33a. If yes: what kinds of things does LOCAL GOD punish people for doing?

34) How often does LOCAL GOD punish people for stealing? [FREQ. SCALE #2]

35) How important is punishing thieves to LOCAL GOD? [IMP. SCALE]

36) How often does LOCAL GOD punish people for lying? [FREQ. SCALE #2]

37) How important is punishing liars to LOCAL GOD? [IMP. SCALE]

38) How often does LOCAL GOD punish people for murder? [FREQ. SCALE #2]

39) How important is punishing murderers to LOCAL GOD? [IMP. SCALE]

40) Can LOCAL GOD see into people's hearts or know their thoughts and feelings?

41) Can LOCAL GOD see what people are doing if they are far away, in

_____?(in distance town or city familiar to locals; further is better)

[yes = 1, no = 0]

42) How often does LOCAL GOD assist people in their lives or reward them for proper behavior? [FREQ. SCALE #2]

43) Can LOCAL GOD influence what happens to people after they die?

43a) If so, how?

44) Does LOCAL GOD care about how people treat strangers?

45) Does LOCAL GOD care about how people treat other people who perform rituals for LOCAL GOD

46) Does LOCAL GOD care about whether people perform certain rituals?

47) Does LOCAL GOD care about some people having more money and food than other people?

Notes:

PLAYERS' THOUGHTS ON OTHERS

48) Most members of the police are...
[POLICE SCALE]

49) Using these pictures, how emotionally close do you feel to a DISTANT? [DISTANT FUSION SCALE]

50) Using these pictures, how emotionally close do you feel toward an LOCAL [LOCAL FUSION SCALE]

51) Using these pictures, how emotionally close do you feel toward an OUTGROUP? Use OUTGROUP Fusion scale) [OUTGROUP FUSION SCALE]

52) Please tell me about the traditions/religious beliefs and practices of the DISTANT.

53) What kind of relations do LOCAL have with DISTANT? [RELAT. SCALE]

54) What kind of relations to LOCAL have with OUTGROUP? [RELAT. SCALE]

55) Please tell me about the traditions/religious beliefs and practices of the OUTGROUP.

56) How similar are DISTANT'S traditions/religious beliefs and practices with the LOCAL? [DISTANTSIM SCALE]

57) How similar are OUTGROUP's traditions/religious beliefs and practices with the LOCAL? [DISTANTSIMSCALE]

58) How many people make up the LOCAL ?

59) How many people make up the DISTANT?

60) How many people make up the OUTGROUP?

61) Please list 5 things the POLICE care about or like?

1.

2.

3.

4.

5.

62) Please list 5 of things the POLICE dislike.
1.
2.
3.
4.
5.
Notes: