Kernels of Doubt: A Cross-Cultural Examination of the Ubiquity and Form of Religious (Non)Commitment

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Project Summary

Secularization theorists posit that the importance of religion diminishes as societies have more equal distributions of wealth, access to social safety nets, and effective secular judicial institutions (Norris & Inglehart, 2012; Solt, Habel, & Grant, 2011). However, this evidence primarily consists of data from industrialized nations. This narrow focus presumes that the individuals living in other forms of societies are similarly religious, despite observations to the contrary (Goody, 1996). Furthermore, discussion of secularism in the industrialized world has constrained our understanding of not just the prevalence of, but also the *forms* of secularism that might exist cross-culturally. For many, secularism implies atheism – that is, an absence of *belief* in supernatural agents. However, there is striking, and also largely untapped, cultural diversity in the extent to which belief and other features of religion, such as ritual participation, co-occur and support 'religiosity' (Cohen, Siegel, & Rozin, 2003; Fernandez, 1965; Purzycki & Sosis, 2011; Norenzayan, 2016). Here, we conduct a systematic cross-cultural examination of the prevalence and forms of religious commitment, and non-commitment, in a large sample ($N \sim 2000$) of participants from 17 diverse societies. Unlike many existing studies of secularization, this sample spans the various scales of human social complexity and its religious traditions are remarkably diverse, including animism, shamanism, polytheism, and monotheism. Across sites, participants reported on the extent of their beliefs (or lack thereof) in two types of deities (local and moralistic), and the frequency of religious practices they take part in or observe, and the emphasis on ideological beliefs and practical commitments in religious life. Participants also completed an extensive demographic survey that will provide the basis for predicting within- and across-site demographic contributions to secularism. By assessing the contributing factors to secularism (e.g., formal education, material security, sex differences, generational trends, traditional emphasis, etc.) and its prevalence among a variety of societies will be an important benchmark toward a more complete account of secularism across cultures.

Current Pre-registration Goals:

1. Selection of specific variables from a large existing database
2. Describe ways in which these variables are operationalized
3. Provide a general analytical plan and rationale

Study Information

1. Research Questions
    a. Descriptive:
        i. What is the cross-cultural frequency of the rates of absence of self-reported ideological and/or behavioral indicators of religious commitment?
        ii. Are there group-level trade-offs between ideological faith and behavioral commitments?

iii. Are these rates consistent across deities?
iv. Are these rates consistent across traditions?
v. Are these rates consistent across mode of subsistence?

b. Explanatory:
    i. What predicts these rates?
        1. Demographic factors – formal education, sex, age, material security, and family size?
        2. Tradition?
        3. Mode of subsistence?

Hypotheses:

In this section, we briefly review the existing literature on the relationships between forms of religious commitment and age, formal education, sex, material security, social stratification, tradition, and deity-type. We provide the following discussion to motivate variable selection. In brief, we hypothesize that these variables will predict religious commitment – in some capacity - in the current data set. We will use these predictors to model observed *belief* and *practice*, their relative importance as well as a generalized indictor of religious commitment. Ultimately, we will use these variables to find the best explanatory model of the observed data. We expect substantial between-site and between-deity type variability in the magnitude and direction of the effects of these variables on religious commitment. Indeed, identifying this variability, where it exists, is a focal concern of this research.

Religiosity across the lifespan

Religiosity ebbs and flows across the lifespan. In a survey of Americans, for example, Hayward & Krause (2013) present longitudinal evidence for decreases in frequency of religious practice in adolescence, followed by a stable period in adulthood, with a resurgence in attendance at religious services later in life. However, Bengtson, Silverstein, Putney, & Harris (2015) provide longitudinal evidence for stability in religious practices across the lifespan, but increases in self-reported intensity of religious beliefs as well as stronger endorsement of biblical literalism. Despite the apparent inconsistencies in these trends, a number of broad psychological mechanisms have been proposed to account for these relationships (e.g., mortality salience; Levin, Chatters, & Taylor, 2011). Furthermore, in their review of the extant overarching theoretical approach to understanding the causes of fluctuations in religious commitment over the lifespan, Levin et al. (2011) do little to acknowledge the likely influence of cultural context.

In a sample of Fijians, Shaver & Sosis (2014) tested hypotheses derived from life-history theory that ritual participation in kava-drinking, a costly endeavour, should be less pronounced when life demands require that resources are allocated in other domains. For example, they found support for their prediction ritual participation decreasing when individuals or their close kin have young children (i.e., decreases in participation in early adulthood which parallels patterns in the US). Furthermore, they predicted that ritual participation may decrease if status can be gained and maintained by alternative means (e.g., getting older and being educated). And indeed, results demonstrated that frequency and duration of attendance at kava-drinking ceremonies decreased with age and years of education. In contrast to ritual participation in Fiji, for example, Purzycki (2012) found that ritual participation (i.e., visits to sacred cairns) in the Tyva Republic markedly *increased* with age. Thus, we expect the effect of age to vary across

sites and traditions and we will therefore explore in our models both overall and site-specific effects. Furthermore, we note that, we cannot distinguish between *age* and *cohort* effects in this cross-sectional dataset – and also that participants in this data were no younger than ~ 17 years.

Formal education and religiosity

Formal education has long been argued to be a critical piece of the puzzle of *how* modernization might alter the global religious landscape (Weber, 1922/1993). In its process and content, formal education may lead individuals to doubt the reliance on mystery and revelation mandated in many religious traditions (Schwadel, 2015). Importantly, Schwadel's (2015) assessment of this relationship demonstrates that the strength of the negative relationship between individual differences in formal education and religiosity varies quite substantially (and in some cases reverses; e.g., South Korea) even in industrialized societies. And interestingly, longitudinal assessments of college graduates in the United States demonstrate clear effects of obtaining a bachelor's degree on religious belief, but not on practice (Schwadel, 2016). However, the strength of this association cross-culturally may be decreasing over time, and better accounted for by the co-occurring improvement of living conditions, and the cultural transmission of disbelief across neighbouring nations (Webster & Duffy, 2016). Thus, broadening the scope of the cultural diversity included in analyses of the effect of formal education (i.e., years of formal education) on religious belief, practice, and their relative importance will surely improve our understanding of this relationship.

Sex differences in religiosity

The Pew Research Center (2016) conducted a substantial analysis of global sex differences in religious commitment. They found that, in most countries, women are somewhat more likely to be religious affiliated, to pray, and to consider religion to be a more important part of everyday life than men. However, the sex differences in participation in religious services are much less stable across cultures, especially in the cases where religious norms surrounding practice are specifically gendered. For instance, Jewish and Muslim men report taking part in religious practices more frequently than women from either faith, but show no difference in reported importance of religion and related beliefs. Indeed, this report also demonstrates that there is substantially less of a gender gap globally in reported religious beliefs (e.g., beliefs in heaven, hell, and angels) – but where the gap *does* exist, women do report being more fervent believers. Here, we will examine, and hold constant, sex differences in our models.

Material security and religiosity

By 2050, The Pew Research Center (2015) projects a net *decrease* in the percentage of religiously unaffiliated individuals from the current 16.4% to 13.2% of the world's population. Indeed, religious adherence is expected to increase, especially in the poorer nations of the world where religion thrives (Oishi & Diener, 2014). In these nations, individuals are more frequently faced with everyday threats to their well-being from multiple sources at varying scales (e.g., from government corruption to managing uncertainty about future access to resources). Experimentally, feelings of generalized uncertainty have been demonstrated to bolster reported religious commitment (Randles, 2011). Importantly, this effect is not constrained to devout believers. For example, following a massive earthquake in 2011, the number of individuals turning to religion increased in predominantly secular New Zealand (Sibley & Bulbulia, 2012). In brief, this is the existential security hypothesis of religion (Atran & Norenzayan, 2004; Norris

& Inglehart, 2012; Vail et al., 2010) that suggests that religious beliefs (e.g., belief in divine intervention) and practices (e.g., social support of religious communities) might help combat the detrimental effects of living under uncertain conditions and thus motivates and maintains both forms of religious commitment. Waning of existential insecurities may thus play a role in reductions in religious commitment (Norenzayan & Gervais, 2013).

In the current study, material security is indexed by responses to items that asked participants to indicate the extent of their worry about having enough food over various future time periods (from Hruschka et al., 2014). Furthermore, family size may serve as an additional indicator of material security such that it is easier to provide, with certainty, for *fewer* children (Purzycki et al., 2016, 2017). Thus, more children should predict increased religiosity. However, the number of children may decrease the amount of time that parents can devote to religious practices, assuming that the costs of investment outweigh the returns (Shaver & Sosis, 2014).

Social stratification and religiosity

There is considerable evidence for how the evolution of prosocial religions may have helped solve the problem of how to monitor behaviours in ever-increasingly large groups (e.g., Botero et al., 2014; Norenzayan et al., 2016; Purzycki et al., 2016, 2017; Watts et al., 2015). However, the effects of the social stratification of societies on the relative importance of the *forms* of religious commitment are less clear. Purzycki & Sosis (2011) detail how social stratification can shape the content of the concerns of the gods, and correspondingly the ways in which individuals demonstrate their commitment to the gods. In smaller groups, gods are often preoccupied with ritual; and in small groups, monitoring ritual participation can be an effective strategy of monitoring religious (and therefore group-) commitment. However, as societies become larger, monitoring individual participation in ritual becomes increasingly difficult, and thus a potentially less consistent signal of an individual's trustworthiness. At which point, Purzycki & Sosis (2011) argue that gods become increasingly concerned with more generalized moral behaviours, and professed *belief* in omniscient, moralizing gods can become a potent signal of religious commitment and trustworthiness. In the current dataset, social stratification was indexed by economy type (i.e., foraging, herding, horticulturalist, market integrated).

Affiliation and religiosity

Broadly, religious traditions differ in the extent to which belief and practice are emphasized as indicators of religious commitment. For example, Christian, and especially Protestant groups have been demonstrated to more strongly emphasize the importance of belief than do Jewish groups (Cohen, Siegel, & Rozin, 2003) – which may be related to the extent to which traditions are ethnically-bound (Goody, 1996). Laurin & Plaks (2014) report similar differences between Christians and Hindus; the latter being more focused on practice. In our models, we will contrast Christian from non-Christian traditions in predicting religious commitment as well as exploring likely variability in the contributions of other predictors between religious traditions.

Local vs. moralistic deities

Purzycki & Sosis (2011) delineate how moralistic and local deities can often be differentiated by the extent of their concerns regarding general moral behaviors and ritually-prescribed behaviors. Moralistic deities are concerned with interpersonal social behaviors, and local deities are primarily concerned with whether or not rituals have been conducted to their

satisfaction and often do not care about what any given individual believes. Thus, we expect to observe substantial variation in the focus of belief and practice as indicators of religious commitment between local and moralistic deities. That is, if these agents do indeed care about these domains to different extents (and evidence from this dataset suggests they do; e.g., Purzycki et al., 2017) – then corresponding indicators of commitment to these agents should reflect this difference. Here, we will assess the relative contributions of our demographic predictors while controlling for deity type, and as well how these effects vary based on the target deity.

Sampling Plan

1. The data has already been collected in two waves of a large-scale cross cultural study of religion and morality directed by the Cultural Evolution of Religion Research Consortium and its associated researchers (see Purzycki et al., 2016, 2017). For more information about the primary motivations of this large-scale data collection, see the CERC Wave 2 Hypothesis Pre-Registration (available at https://osf.io/epkbw/).
2. When is this registration occurring?
    a. Registration prior to accessing the data.
    b. Baimel, the lead on this project had access to the variable codebook prior to registration. Early in its development, Purzycki worked on cleaning and preparing the data to compile, ensure data quality, and deal with back-end data issues such as ensuring that data is translated into English prior to being compiled, but has not analyzed it. Neither had access to the finished data set while modelling and formalizing hypotheses (see Appendix I for previously submitted grant application).
    c. No data analysis on this project has occurred prior to this registration.
3. Maximum sample size:
    a. Note that some sites and individual have missing data. We will assess a variety of data imputation procedures (frequentist and Bayesian) for consideration and comparison.
    b. ~2228 individuals
    c. 17 sites (Cachoeira, Brazil; Coastal Tanna, Vanuatu; Inland Tanna, Vanuatu; Kananga, DR Congo; Guangzho, China; Hadza, Tanzania; Hong Kong, China; Huatasani, Peru; Lovu, Fiji; Marajó, Brazil; Pointe aux Piments, Mauritius; Mysore, India; Samburu, Kenya; Sursurunga, Papua New Guinea; Turkana, Kenya; Tyva Republic; Russia; Yasawa, Fiji)
    d. The sampling methods applied across these sites was not always consistent. That is, in some societies, the sample may represent most of an entire population, in others, sampling may have occurred in specific religious locations (e.g., members of a specific church or religious tradition). Thus, we expect there to be site-specific differences in the observed variability of religious commitment.

Variables

4. Measured variables:

<u>Religiosity variables</u>: Labels in brackets at the beginning of the list items are variable names for use in analyses. Values in brackets at the end of list items are the coding schemes. Note here that "BG" or "BIG GOD" refers to those determined to be thought of as the most morally punitive and knowledgeable deity in the field site, whereas those denoted with "LG"—the "LOCAL GODs" are those that are locally important, but not necessarily as morally concerned or knowledgeable.

Belief Measures:

1. [BGBLV] Do you believe in BIG GOD? [1 = yes; 0 = no]
2. [LGBLV] Do you believe in LOCAL GOD? [1 = yes; 0 = no]
3. [BGTHINK] How often do you think about BIG GOD? [4 = Every day or multiple times per day; 3 = a few times per week; 2 = A few times per month; 1 = A few times a year; 0 = Very rarely/never]
4. [LGTHINK] How often do you think about LOCAL GOD? [4 = Every day or multiple times per day; 3 = a few times per week; 2 = A few times per month; 1 = A few times a year; 0 = Very rarely/never]
5. [BGFREQW] How frequently do you worry about what BIG GOD thinks about you? [0 = never; 1 = sometimes; 2 = frequently; 3 = all the time]
6. [LGFREQW] How frequently do you worry about what LOCAL GOD thinks about you? [0 = never; 1 = sometimes; 2 = frequently; 3 = all the time]

Composite Measures: We will use sum and mean responses to BGTHINK/BGFREQW [BGBLVC] and LGTHINK/LGFREQW [LGBLVC] as a continuous index of belief.

- [BGBLVC] Composite measure of BIG GOD belief measures (i.e., the sum of BGBLV, BGTHINK, BGFREQW) [Max score = 8]
- [LGBLVC] Composite measure of LOCAL GOD belief measure (i.e., the sum of LGBLG, LGTHINK, LGFREQW) [Max score = 8]
- We will also explore creating binary variables out of the non-binary scales so that all binary variables can be summed together:
    - 0 [Very rarely/never] and 1 [all other responses]
    - 0 < Mode, 1 > Mode (Mode determined *within* SITE)
    - 0 < Median, 1 > Median (Median determined *within* SITE)
- We will also explore conducting factor analyses on these variables and using the factor loadings (both across and within deities) as an indicator of belief.

Practice Measures:

1. [BGRIT] How often do you perform rituals or ceremonies devoted to MORALISTIC GOD? [4 = Every day or multiple times per day; 3 = a few times per week; 2 = A few times per month; 1 = A few times a year; 0 = Very rarely/never]

2. [LGRIT] How often do you perform rituals or ceremonies devoted to LOCAL GOD? [4 = Every day or multiple times per day; 3 = a few times per week; 2 = A few times per month; 1 = A few times a year; 0 = Very rarely/never]
3. [BGPERF] Do you perform activities or practices to talk to, or appease BIG GOD? [1 = yes; 0 = no]
4. [BGPERFHO] If yes, how often? [4 = Every day or multiple times per day; 3 = a few times per week; 2 = A few times per month; 1 = A few times a year; 0 = Very rarely/never]
    a. Note: As participants who answered "No" to BGPERF were not asked BGPERFHO, we will manually enter a score of "0 = Very rarely/never".
5. [LGPERF] Do you perform activities or practices to talk to, or appease LOCAL GOD? [1 = yes; 0 = no]
6. [LGPERFHO] If yes, how often? [4 = Every day or multiple times per day; 3 = a few times per week; 2 = A few times per month; 1 = A few times a year; 0 = Very rarely/never]
    a. Note: As participants who answered "No" to LGPERF were not asked LGPERFHO, we will manually enter a score of "0 = Very rarely/never".

Composite Measures: We will use sum and mean responses to BGPERF/BGPERFHO [BGPRXC] and LGPERF/LGPERFHO [LGPRXC] as a continuous index of practice.

- [BGPRX] Composite measure of BIG GOD practice measures (i.e., the sum of BGPERF, BGPERFHO) [Max score = 5]
- [LGPRX] Composite measure of LOCAL GOD belief measure (i.e., the sum of LGPERF, LGPERFHO) [Max score = 5]
- We will also explore creating binary variables out of the non-binary scales so that all variables can be summed together in the following ways:
    - 0 [Very rarely/never] and 1 [all other responses]
    - 0 < Mode, 1 > Mode (Mode determined *within* SITE)
    - 0 < Median, 1 > Median (Median determined *within* SITE)
- We will also explore conducting factor analyses on these variables and using the factor loadings (both across and within deities) as an indicator of practice.

Belief-Practice forced choice:

1. [BGBP] If you had to pick one, which is more important to you?
    a. That people participate in rituals devoted to BIG GOD [=1]
    b. That people believe in BIG GOD [=2]
    c. Neither are important to me. [=3]
2. [LGBP] If you had to pick one, which is more important to you?
    a. That people participate in rituals devoted to LOCAL GOD [=1]
    b. That people believe in LOCAL GOD [=2]
    c. Neither are important to me. [=3]

We will also recode these data to reflect a lack of religiosity in general where "Neither are important to me = 1; and all other responses = 0. This variable will be stacked and modelled with binomial regressions with the nested features of the data set appropriately modelled (e.g., deity, site, tradition, etc.).

General commitment:

1. [COMMIT] We will explore general commitment by combining variables for belief and practice. Summations will be used (as earlier, but now also across belief and practice composites), which will then be log-transformed- as we are not interested in absolute values of belief/practice/commitment but the proportion of weight they contribute to the measure. We could then assess whether this commitment was comparable across deities, traditions, market/economy types, sites.

Demographic Variables (D)

The following variables are fixed effect candidates.

1. [AGE.C] Age [in years; will be centered around the sample mean]
2. [AGE.CS] Age [in years; will be centered around the sub-sample mean]
3. [SEX] Sex [Factor: 0 = female 1 = male]
4. [FORMALED] Formal education [in years; not centered as many participants will have no formal education]
5. [MAT1] Material security: 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]
6. [MAT2] Material security: 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]
7. [MAT3] Material security: 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]
8. [MAT4] Material security: 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]
9. [MAT] Material security: Mean response to MAT1-4
10. [CHILDREN] How many children have you fathered or given birth to? [# of children]
11. [CHRISTIAN] Tradition [Factor: 1 = CHRISTIAN; 0 = Non-CHRISTIAN)
12. [ECONOMY] Economy type [Factor: 1 = Market; 2 = Herding; 3 = Horticulturalist; 4 = Foraging]
13. [MARKET] Economy type [Factor: 1 = Exclusively Market; 0 = other]
14. [DEITY] Deity (Factor: 0 = LOCAL God; 1 = BIG God)
15. [GOD1ST] Counterbalance variable for interview order [Factor: 1 = moralistic god questions asked first; 0 = local god questions asked first]

Variables for Models (Random Effect Structure; H)

1. In all models:

a. [CERCID] Participant ID
b. [SITE] Site ID
    i. Note: We will also explore nesting the random intercept of CERCID within SITE.

2. Potential random effects: Note that these are 'potential' random intercepts simply because including them all in any given model will certainly prevent model convergence. Thus, the contributions of these clustering variables will have to first be assessed independently. And, we will explore both crossed and nested-within SITE random effect structures of these variables.
    a. [ECONOMY]
    b. [MARKET]
    c. [DEITY]
    d. [CHRISTIAN]

Analysis Plan

Descriptive:

(1) Distribution and description of all variables within/across sites/deities/traditions.
(2) Bivariate correlations between all variables within/across sites/deities/traditions
(3) Developing composite measures for BELIEF and PRACTICE and (binary measures and frequency measures).

Explanatory:

The general mixed-effect model structure is:

$$y_i \sim \text{Distribution}(X_i\beta,\ \sigma^2_y)$$

where

$$X = \alpha_{i,k[i]} + \text{D} + \text{H}$$

Here, D refers to demographic variables: AGE.C (or AGE.CS) + SEX + FORMALED + MAT1(and/or MAT2, MAT3, MAT4, or mean estimate MAT) + CHILDREN and H refers to all potential higher-order variables to properly account for cross-cultural variation: MARKET, ECONOMY, SITE, CERCID, CHRISTIAN, and/or DEITY. We will explore the effects of our target fixed effects, when allowing for H variables to be included as random intercepts (individually), as well as *nested* random intercepts by SITE. We will also explore the effects of allowing D variables to be random slopes. Where possible, responses to local and moralistic god items will be stacked into a single variable, and an indicator variable will be created to identify the target of the response, and included as a fixed effect. We will compare models and effect estimates of this stacked by deity data to models fit to only the local or moralistic god data. Ultimately, we are interested in the extent to which the models can account for the variability in the dependent measures, as well as the contributions of the specified fixed effects – holding the other variables constant.

As discussed above, we have a host of individual-level dependent variables (y_i). Variables with binary outcomes will be modelled using binomial regressions, and frequency measures will be modelled using Poisson regressions. The forced-choice (belief, practice, neither) measure of commitment will be modelled using a multinomial regression. ***All models, and associated distributions, are subject to revision based on the extant variability in the dependent measures (e.g., scaled-frequency variables may be rescaled into binary variables), the most appropriate covariance matrix for varying effects, and the nesting structure of the data (e.g., multiple responses from individuals are nested within field sites).***

In all models, we will include a random-intercept for SITE. However, we acknowledge that we cannot disentangle site-specific variability from associated differences with the *types* of practices and beliefs that individuals were being questioned about during their interviews – as these were determined on a site-specific basis from interviews conducted among a different sample when possible.

As examples of potential full models, we provide the following models: (Notes: (1) where dependent variables are listed together in parentheses, this indicates that the corresponding BG and LG variables will be stacked to create a single variable. (2) For the sake of concision, all models reported here are approximate frequentist models in a modified R syntax where (1 | SITE) indicates a varying intercept for field site (whereas a single varying effect across sites would be, for example, BGPRX | SITE). We plan to also run the same models using the Bayesian framework, using weakly specified priors for model parameters. (3) varying intercepts for participant (1 | CERCID) and other factors are likely to change in the event of overfitting. We will also explore the effects of nesting participant CERCID within SITE, and SITE within CHRISTIAN.

BELIEF:

Binary measure of belief:

glmer(BGBLV, LGBLV) ~ 1 + AGE.C + SEX + FORMALED + MAT1 + CHILDREN + CHRISTIAN + ECONOMY + DEITY + (1|CERCID) + (1|SITE), data=cerc, family = binomial)

Frequency measure of belief:

glmer(BGBLVC, LGBLVC) ~ 1 + AGE.C + SEX + FORMALED + MAT1 + CHILDREN + CHRISTIAN + ECONOMY + DEITY + (1|CERCID) + (1|SITE), data=cerc, family = poisson)

PRACTICE:

Binary measure of practice:

glmer(BGPERF, LGPERF) ~ 1 + AGE.C + SEX + FORMALED + MAT1 + CHILDREN + CHRISTIAN + ECONOMY + DEITY + (1|CERCID) + (1|SITE), data=cerc, family = binomial)

Frequency measure of practice:

glmer(BGPERFHO, LGPERFHO) ~ 1 + AGE.C + SEX + FORMALED + MAT1 + CHILDREN + CHRISTIAN + ECONOMY + DEITY + (1|CERCID) + (1|SITE), data=cerc, family = poisson)

glmer(BGRIT, LGRIT) ~ 1 + AGE.C + SEX + FORMALED + MAT1 + CHILDREN + CHRISTIAN + ECONOMY + DEITY + (1|CERCID) + (1|SITE), data=cerc, family = poisson)

Relative Belief/Practice:
Multinomial Measure
glmer(BGBP, LGBP) ~ 1 + AGE.C + SEX + FORMALED + MAT1 + CHILDREN + CHRISTIAN + ECONOMY + DEITY + (1|CERCID) + (1|SITE), data=cerc, family = multinomial)

5. Inference criteria:
    a. What criteria will be used to make inferences?
        i. regression coefficients, confidence intervals (frequentist)
        ii. mean estimates, credibility intervals (Bayesian)
        iii. model fit indices (information criterion and forms of R^2) for model comparisons
        iv. conventional diagnostics for both statistical frameworks
6. Data exclusion:
    a. In all frequentist models without imputation, we expect that we will lose a number of participants (and even entire sites) when including certain variables. In building all models, we will aim to maximize sample size and inclusiveness of sites (which may require running separate models for specific sites).
7. Missing Data:
    a. Participants with missing data will, first, be excluded from models that include the variables they are missing (frequentist models)
    b. We will use a variety of imputation methods for the sake of comparison.

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