
WHICH GOD IS WATCHING?

DIVINE PUNISHMENT, MATERIAL INSECURITY, AND IN-GROUP FAVORITISM IN YASAWA, FIJI

Rita Anne McNamara^{1*}

Ara Norenzayan¹

Joe Henrich^{1,2}

1 Department of Psychology, University of British Columbia,

2 Department of Economics, University of British Columbia

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* Corresponding Author

ABSTRACT

Threat of supernatural punishment is known to influence prosocial behavior in large-scale societies; however its impact in smaller societies with less powerful deities is poorly documented. Parallel research also links perceived material insecurity to increasing religious belief, but it remains unclear how insecurity, combined with supernatural punishment beliefs, affect prosocial behavior. Participants were villagers in Yasawa, Fiji, who live mainly as forager-horticulturalists and hold co-existing Christian (“Bible God”) and local, deified ancestor (*Kalou-vu*) beliefs and practices. They were interviewed about supernatural and secular punishment beliefs (Bible God/ *Kalou-vu*/ Police punishment scores); then days later completed a die-rolling task measuring covert cheating (Random Allocation Game, RAG) and reported food and money concerns anticipated in one month to five years (material insecurity). Perception of the Bible God as more punishing predicted less cheating for low and moderate but not high material insecurity. Punishing *Kalou-vu* also predicted less cheating at low and moderate insecurity, but more cheating at high insecurity. Police punishment did not strongly predict cheating, suggesting more isolated communities may be less affected by perceived secular authority. Results suggest divine punishment’s social effects may depend on both aspects of the punisher and perceived material insecurity.

1. INTRODUCTION

Ritual practice and religious belief have been shown to help build cohesive communities (Graham & Haidt, 2010; Haidt, 2012; Sosis & Ruffle, 2004; Wilson, 2003). One aspect of this religious group cohesion is increased cooperation; even subtle reminders of religious ideas can encourage prosocial behavior (Ahmed & Hammarstedt, 2011; Randolph-Seng & Nielsen, 2007; Shariff & Norenzayan, 2007; Xygalatas, 2012). The Supernatural Monitoring Hypothesis (Gervais & Norenzayan, 2012; Norenzayan & Shariff, 2008) holds that believing in an all-seeing, all-powerful, morally-concerned deity can increase cooperative behavior (Laurin, Shariff, Henrich, & Kay, 2012; Shariff & Norenzayan, 2007) and decrease antisocial behavior (McKay, Efferson, Whitehouse, & Fehr, 2011; Shariff & Norenzayan, 2011). However, how this phenomenon evolved remains unclear. Over time, elements of religious belief and practice – shaped by an array of psychological mechanisms dealing with social information – may have culturally evolved into the forms seen today, forged in the crucible of inter-group competition (Atran & Henrich, 2010). Because deities take many different forms across societies – with only some qualifying as Supernatural Monitors (Boyer, 2001; Norenzayan, n.d.; Purzycki & Sosis, 2011)– the diversity of supernatural agents suggests that not all will have the same prosocial effects.

Additionally, variation in perceived insecurity influences religious adherence; this has been documented across cultures (Fincher & Thornhill, 2011; Gray & Wegner, 2010; Norris & Inglehart, 2004; Zuckerman, 2007), and for individuals (Kay, Gaucher, McGregor, & Nash, 2010a; Laurin et al., 2012; Norenzayan, Dar-Nimrod, Hansen, & Proulx, 2009). Because insecurity can magnify reliance on religion, social effects of supernatural monitoring may also be moderated by perceived insecurity; belief in a socially-concerned supernatural agent may alleviate the fear of being cheated, facilitating greater trust and cooperation above and beyond other norms suppressing cheating. Additionally, material security is conflated with access to economic market resources endemic to large-scale societies (Henrich et al., 2010; Hruschka &

Henrich, 2013; Hruschka et al., Submitted; Seabright, 2010). Thus, diversity of supernatural agent beliefs, more varied material insecurity, and less frequent anonymous interactions make small-scale societies an interesting window into how supernatural monitoring beliefs may have evolved. The present work investigates how beliefs about supernatural and secular punishment interact with chronic perceptions of material insecurity to predict covert cheating in a small-scale society in Yasawa, Fiji.

2. BACKGROUND

Because cooperation can deteriorate without cheater deterrents (Axelrod, 1984; Hardin, 1968), humans developed a wide range of cultural devices to maintain cooperation (Henrich & Henrich, 2006). These cultural devices minimize cheating either through knowledge of individuals (Bowles & Gintis, 2004; Friedman & Singh, 2004), or through external rule enforcement (third-party punishers – (Fehr & Fischbacher, 2004; J. Henrich, 2006). Religious systems advocating a watchful, moralizing God may be one such external enforcement device (Roes & Raymond, 2003; Shariff, Norenzayan, & Henrich, 2010). Belief that an unseen, supernatural monitor will sanction anti-social actions may lead to more cooperation and less cheating against even anonymous others – not just kith and kin (Norenzayan & Gervais, 2011; Norenzayan & Shariff, 2008). Religious activity produces trustworthiness cues facilitating extended trust, and provides a necessary precursor to cooperation among strangers (Ruffle & Sosis, 2010; Sosis, 2005; Tan & Vogel, 2008). Indeed, religiously-motivated cooperation norms may have helped scaffold the development of modern, large-scale societies (Norenzayan, n.d.; Wright, 2009).

Belief that a powerful, moralizing God is watching may be a key ingredient behind religious prosociality (Norenzayan & Shariff, 2008). Studies among North Americans support this notion (Gervais & Norenzayan, 2012; Shariff & Norenzayan, 2007). However, whether small, face-to-face communities show similar effects remains unclear. Individuals experience much less privacy in these societies (though

of course even the smallest-scale foragers have secrets, theft and adultery). In these societies, resource sharing and acquisition are far more dependent on individual interactions than broad norms like equity. For example, despite frequent food sharing (stinginess is one of the worst insults in some of these groups; see Gurven, 2004), economic game offers in small-scale societies are often minimal (Henrich et al., 2010), and overt punishment is rare (Henrich et al., 2010; Marlowe et al., 2008). Thus, face-to-face interactions may be sufficient for cooperation without an additional unseen observer.

Small-scale societies might not need the external enforcement of a supernatural monitor. However, their typical distance from the material security of economic market resources may bring God back into the picture. Broad, cross-national surveys indicate decreasing religious devotion as threats from famine, pestilence, violence, and environmental changes are reduced by effective rule of law and reliable economic systems (Gray & Wegner, 2010; Norris & Inglehart, 2004; Zuckerman, 2007). Feelings of insecurity, particularly when external governmental enforcement is unreliable or nonexistent, will often push believers to trust religion instead (Kay, Shepherd, Blatz, Chua, & Galinsky, 2010b; Laurin et al., 2012; Norris & Inglehart, 2004). Belief in controlling supernatural agents can provide solace in the face of an insecure world (Kay et al., 2010a; Norenzayan et al., 2009). Conversely, distance from economic resources and poor governmental control predict persistent in-group favoritism (Hruschka et al., Submitted; Hruschka & Henrich, 2013). Similarly, insecure environmental factors like high disease prevalence can boost adherence to local norms and religious affiliations (Fincher & Thornhill, 2011). As a result, supernatural monitoring should promote cooperation outside of the immediate in-group primarily when individuals feel sufficiently materially secure to expand their circle of concern to the wider religious community.

3. WHY FIJI?

The people of Yasawa, Fiji hold concurrent belief in both the Christian “Bible God” (*Kalou nivola*, “god of the book”) and locally-concerned, less powerful, deified ancestors, or *Kalou-vu* (“root/ ancestor god”).

The Bible God is often seen as more universally concerned about morality but less involved in daily village affairs, while the *Kalou-vu* are believed to focus on village customs with location-based access to strategic social information. Yasawans have a subsistence-oriented lifestyle that depends on cooperation organized around a traditional, highly-structured clan-based hierarchy culminating in a hereditary chief. Because the nearest town is a day’s journey by boat, villagers rely on local production and food-sharing networks. Shortages on non-local staple foods like flour and sugar are not uncommon. Additionally, Yasawans live day-to-day with little governmental intervention, local utilities, or police. Yasawans therefore provide access to the psychology accompanying life in a highly integrated, face-to-face community; a dearth of market resources; and duality of religious belief.

4. STUDY

We seek to test whether belief in a powerful, universal, moralizing supernatural monitor among people in a smaller-scale society will predict reduced cheating – even against an anonymous stranger. Further, because material insecurity often motivates closer adherence to the local in-group, we predict that high material insecurity should relate to continued in-group favoritism. Therefore, perceptions of powerful supernatural monitors should best suppress cheating among relatively secure believers who may be more willing to look beyond local interests. Additionally, we test whether less powerful, local deities will have comparable relationships to cheating. Because of their local locus of control, we expect that these smaller gods should have more influence as insecurity increases, and as a result motivates greater concern for the ingroup. We explore these predictions by asking villagers in Yasawa, Fiji, about how

punitive the Bible God, *Kalou-vu*, and police are; then days later ask them to perform a covert cheating task – the Random Allocation Game (RAG) – followed by interviews about their perceived material insecurity. We expect Bible God punishment to predict less cheating, especially as material security increases. The *Kalou-vu*, on the other hand, should relate strongest to in-group concerns, especially for the most materially insecure Yasawans. Finally, we explored whether perceptions of police punishment related to cheating.

4.1 PARTICIPANTS

Participants (N=30; ages 17-71, M=40.4; formal education 5-16 years, M=8.97; 16 men) were randomly selected from Dalomo, Yasawa, in June and July 2011. Villagers all spoke and understood Standard Fijian. Study materials were translated into Standard Fijian and back-translated into English by research assistants fluent in both languages. Research assistants read all study materials to participants due to variable literacy among villagers.

4.2 METHOD

Data collection took place in two phases (5-10 minutes and 20-30 minutes respectively): perceptions of supernatural and secular punishment were collected, then participants played the RAG followed by interviews one week later.

Punishment scores: Participants rated how fourteen adjectives (positive: forgiving, comforting, loving, compassionate, kind, gentle, peaceful; negative: punishing, harsh, terrifying, angry, fearsome, vengeful, jealous) applied to each of three target agents – (1) Bible God, (2) *Kalou-vu*, and (3) Police. The punishment rating scale ranges from 1 (completely agree) to 7 (completely disagree). Positive and negative items were averaged; the negative average was subtracted from the positive to form a single

punishment score. A higher score indicates belief in a more punishing deity. This scale has been used for the Christian God among North Americans (Shariff & Norenzayan, 2011). Cronbach's alphas for both Bible God punishment ($\alpha = 0.81$) and *Kalou-vu* punishment ($\alpha = 0.87$) indicate good internal reliability. Police punishment was measured as a secular control. The effect of secular prosociality has been shown in North American samples, and may depend on secular institutions' reliability in maintaining social order (Shariff & Norenzayan, 2007). Police punishment scores also showed internal reliability ($\alpha = 0.75$).

The second phase took place one week later and followed the basic protocol for the Virtues in Conflict project (Hruschka et al., Submitted): the RAG followed by interviews about perceptions of material insecurity, interviews asking participants to answer questions about different scenarios, and measures of perceived closeness to others at varying degrees of social distance.¹

The RAG had two conditions: in one condition, participants chose between allocating coins to the self vs. an anonymous out-group member – a person from another island; in the second condition, participants chose between an anonymous in-group member – a person within their *yavusa* (chiefdom) – vs. an anonymous out-group member. The *yavusa* consisted of the field site's two small villages. All participants played both conditions in counter-balanced order. For each condition, participants distributed 30 coins, each worth 20 cents for a total of \$6 Fijian dollars (approximately 1/2 day's wage) into cups – one for the self/ in-group and one for the out-group. Cups were labeled with a line drawing and in Fijian. Participants used a six-sided die – with three black sides and three white sides – to determine coin allocation. The rules stipulated participants should silently decide where to place the coin for die color before rolling. If the die roll came up as the other color, they were to place the coin in the other cup. For example, a participant might decide to place a coin in the in-group cup if the die roll

¹ For analysis of scenarios and closeness interview data, see McNamara, R.A & Henrich, J. (n.d.) *Conflicting Virtues in Fiji*. in D. Hruschka *Choosing the Good*. Manuscript submitted for publication, (copy on file with author).

came up black. After making this decision, the participant would roll the die. If following the rules, the participant should place the coin in the out-group cup if the die roll was white. (see Batson, Thompson, Seufferling, Whitney, & Strongman, 1999; Greene & Paxton, 2009).

Participants gathered at our hosts' house for each session. There, the researchers completed the introduction and consent process for the study. Index cards with numbers 1-32 in groups of 8 (1-8 day 1, 9-16 day 2, etc.),² were distributed to determine participation order. Participants awaited their turn in the sitting area and were asked to avoid discussing the study until data collection ended. One villager, often monitored by Henrich, kept conversation about the study in the sitting area to a minimum; he was also the final participant.

The RAG was conducted in private; participants sat so only the experimenter could see them but could not see their game activity. Pre-roll decisions were not stated aloud or in any way made public. Each participant carried their cups, preventing researchers from detecting cup weight differences (indicating cheating). A researcher who could not see the participants counted the final coin allocations; no names were recorded on any research materials.

After the RAG, participants moved to another room, where a second research assistant conducted the interviews including material insecurity.

Material insecurity: Both food and financial insecurity were measured with a series of four yes/no questions. Food insecurity questions asked: "Do you worry that in the next [one month/ six months/ one year/ five years] your household will have a time when it is not able to buy or produce enough food to eat?" Each "yes" answers was added together to create a food insecurity score, with 4 being the most insecure. Food insecurity was internally reliable ($\alpha = 0.85$). Similarly, financial insecurity questions asked:

² An additional two participants were dropped from analysis because they did not complete the supernatural and secular punishment interview.

“Do you worry that your household will have to pay for a big event (such as a wedding, funeral, festival, or illness in the family whether planned or not) in the next [one month/ six months/ one year/ five years] that your household will not be able to pay for alone?” Financial insecurity was also internally reliable ($\alpha = 0.81$). All eight insecurity questions were added into a single composite measure material insecurity; the combined material insecurity scale was also internally reliable ($\alpha = 0.87$).

Finally, participants were directed to a second house where one of the researchers distributed earnings and made out receipts. Participants were free to leave after signing their receipts and collecting their earnings. After the final day of data collection, the researchers generated a random list of ID numbers corresponding to villagers who had not participated in the study. Research assistants delivered in-group allocations to villagers on this list. Research assistants delivered out-group allocations to random people from the main island at the end of the field season.

5. RESULTS

To assess RAG cheating, we first compare allocations to the in-group and the self against the expected binomial distribution. Next, we analyze which demographic and belief variables predict allocations to either in-group or self. Using hierarchical logistic regression, we cluster 60 coin allocations (30 for self and 30 for in-group) together by participant, and then predict each individual’s deviation from the expected binomial by the across-participants measures of demographic and belief variables. Finally, we consider each belief variable as moderated by material insecurity.

Table 1 shows the zero-order correlations among variables. First, the strongest relationship in the dataset shows those who gave more coins to themselves also gave more to the in-group ($r = 0.71, p < 0.001$). Table 1 also shows that the only other significant correlation is between food insecurity (FI) and

financial insecurity (EI), ($r=0.54$, $p=0.002$).³ Because of the positive correlation between the two insecurity measures (food and financial), analysis will consider moderation effects of the combined material insecurity score. Data were analyzed using the lme4 package (Bates, Maechler, & Bolker, 2011) for R (R Core Development Team, 2008).

5.1 CHEATING

The first step in the analysis is to determine the probability of cheating. For the in-group allocations, the range of allocations given to the in-group (other members of the two small villages in the field site) extends from 10 to 30 of 30 coins, with a mean and a modal allocation of 17.9 of 16 coins respectively. For allocations to the self-cup (hereafter, self-allocations), the range extends from 12 to 30 coins, out of the 30 possible coins, with a mean and modal allocation of 18.9 and 20 coins, respectively. Given that these allocations were based on a binary outcome (either a black or white side of the die), the most appropriate theoretical is binomial. Figure 1 depicts the percent of sample offering each possible number of coins (self in light grey, in-group dark grey) compared to the theoretical probability of that allocation based upon the binomial distribution (in black). This figure shows that there were distinct discrepancies towards higher-than-expected allocations for both self and in-group.

5.2 PREDICTING CHEATING

Because self and in-group allocations were highly correlated, we stacked offers for both conditions together for each participant, resulting in 60 coin allocations (30 for self and 30 for in-group) per participant. The dependent variable – coin in self or in-group cup vs. coin in out-group cup – is binary, so

³ Food insecurity correlates negatively with both in-group and self-allocations while financial insecurity correlates positively with both - though neither reaches statistical significance. Though the combined effect of these two insecurity measures adds noise to the estimates, the moderation effects remain consistent. See SOM for regressions using food and financial insecurity as separate predictors.

we used logistic regression. Because the 60 coin allocations were repeated for each participant, the probability of cheating – here defined as deviations from the expected binomial distribution – were analyzed using hierarchical logistic regression ($n=30$). This allows us to cluster the repeated observations together by individual participant, and then predict how each participant's allocation distribution deviates from the expected theoretical binomial distribution by the demographic and belief variables. Because perceptions of insecurity may change individuals' willingness to look beyond the in-group, effects of belief in an observant, universal God; local deities; and secular authorities on prosocial, rule-following behavior should be moderated by perceived material insecurity. The moderator effect of insecurity is captured as an interaction term in the equation below (e.g. punishment score*material insecurity). Age, years of formal education, and sex are added as controls. Punishment scores, age, and education are held constant at their mean values. Self and In-group recipient conditions are added in the model as a dummy variable with in-group as the reference. Women are held as the reference group for sex; the coefficient for sex represents how men differ from women. Because zero corresponds to the lowest level of insecurity and is a meaningful reference point for the insecurity measures, these variables are held constant at 0. The resulting equation is:

- Probability of coin in self or in-group cup = b_0 + Punishment belief score (BG/KV/P) + Material Insecurity (MI, held at 0) + Condition (Self) + Age + Male + Education + Punishment belief score (BG/KV/P) * MI + (1 | Participant)

Table 2 shows the results for Bible God, *Kalou-vu*, and Police. The first notable finding is Bible God punishment scores have predict a dramatic decrease in probable cheating, ($OR=0.22$, $z=1.98$, $p=0.048$). Second, though *Kalou-vu* punishment scores show a smaller effect overall (from $OR=0.57$, $z=1.72$, $p=0.09$ to $OR= 0.63$, $z=1.97$, $p=0.048$), material insecurity significantly moderates *Kalou-vu* punishment scores.

Police, on the other hand, are neither significantly moderated by insecurity, nor do their estimates ever reach significance.

5.3 SUPERNATURAL AND SECULAR PUNISHMENT WITH MATERIAL INSECURITY

The interactions between punishment scores and material insecurity were decomposed to move the reference point of the distribution from low (0, the lowest possible insecurity rating) to medium (4) and to high (8) using the Aiken and West approach (Aiken & West, 1991). All following analyses hold age and education at their average with female and in-group as the reference for sex and condition respectively.

Decomposing the Bible God punishment scores' interaction with material insecurity (Figure 2) reveals patterns similar to North American samples (Shariff & Norenzayan, 2011). The interaction between material insecurity and Bible God punishment shows an odds ratio larger than one (1.22, $z = -1.87$, $p = 0.06$), indicating cheating does decrease as Bible God is seen as more punitive, but Bible God's punishment becomes a weaker predictor as material insecurity increases. At low material insecurity, the probability of cheating drops significantly as Bible God punishment scores increase (showing more punishment – $OR = 0.22$, $z = 1.97$, $p = 0.048$). At the medium levels of material insecurity, probable cheating still decreases as the Bible God is seen as more punitive; this relationship is marginally significant ($OR = 0.48$, $z = 1.94$, $p = 0.053$). However, probability of cheating is not well predicted by perceptions of the Bible God at the highest level of material insecurity ($OR = 1.08$, $z = -0.35$, $p = 0.73$).

Kalou-vu punishment, (Figure 3), predicts less cheating when material insecurity is low and more cheating when material insecurity is high, as is indicated by the significant interaction ($OR = 1.09$, $z = -2.42$, $p = 0.02$). Low material insecurity predicts a lower probability of cheating when *Kalou-vu* are perceived as more punitive, though this relationship is marginal ($OR = 0.63$, $z = 1.72$, $p = 0.09$). *Kalou-vu* punishment scores poorly predict cheating at moderate levels of material insecurity ($OR = 0.91$, $z = 0.72$,

$p=0.47$). However, more punishing *Kalou-vu* perceptions significantly predict a *higher* probability of cheating when material insecurity is high ($OR=1.3$, $z= -2.67$, $p=0.008$). Interestingly, this is opposite to the relationship between cheating and a punishing monotheistic God in previous studies (Shariff & Norenzayan, 2011) and depends on material insecurity.

Police punishment (Figure 4) has no significant interaction with material insecurity ($OR=0.97$, $z=0.73$, $p=0.46$). Furthermore, police punishment fails to significantly predict cheating at any level of material insecurity (low: $OR=1.3$, $z= -1.19$, $p=0.23$; medium: $OR=1.16$, $z= -1.22$, $p=0.22$; high: $OR=1.03$, $z= -0.17$, $p=0.87$). Though these trends do not reach significance, the direction of these predictions is opposite to both Bible God and *Kalou-vu* punishment.

6. DISCUSSION

The current study shows evidence that perceptions of supernatural beings as punitive predict lower amounts of covert cheating in the context of a village in Yasawa, Fiji. This effect was found for both the powerful Bible God and to a lesser degree for the local, less powerful *Kalou-vu*. These findings are consistent with similar patterns identified in North America (Shariff & Norenzayan, 2011).

We also show perceptions of supernatural punishment impact cheating as a function of perceived material insecurity. When Yasawans perceive their material resources to be secure, seeing supernatural beings as punishers predicted a lower probability of cheating – similar to North Americans. However, when these villagers were unsure about future resources, supernatural punishment gradually predicted more cheating. At the highest levels of material insecurity, more negative perceptions of the *Kalou-vu* in particular actually predicted *more* cheating for both self and in-group.

Police punishment failed to show any significant relationship to cheating. This makes sense given the minimal impact national-level authority has on daily village life. Secular authority should only suppress antisocial behavior when experienced as a regular and reliable source of third-party influence. Had this study been conducted in the city, this secular influence may have shown a stronger relationship to cheating. Further, had this study included local human authorities like the village chief or elders, then an effect of secular control may have been detected. Finally, it could be that police for these villagers are similar to minor deities in some cultures – unconcerned and far away. However, they differ in that they are known to be totally human, and therefore unable to see infractions even if they did care about them. Thus, the hypothesis that secular control may matter less when secular influence is only distantly felt remains a viable explanation.

The most striking finding is the reversal in *Kalou-vu* punishment's effect on cheating. Previous scholars have noted that groups experiencing high insecurity tend to rely upon kin and close social ties (Fincher & Thornhill, 2011; Schaller & Murray, 2010) climactic variation: (Van de Vliert, 2011) and food insecurity: (Hruschka & Henrich, 2013; Kaplan & Gurven, 2005). In order to cooperate with strangers, a giver may already need to believe that his or her resources are relatively secure. Therefore, when people are most worried about whether they will have enough resources in the future, the impetus is to invest as heavily as possible in local connections. Thus, any behavior that does not favor the self or in-group in the context of such high concern about resource security may be deemed counter-normative, and perhaps even morally wrong. Particularly given the local-centric concern of the *Kalou-vu*, seeing *Kalou-vu* as more punishing predicting more cheating against the out-group as material insecurity increases may indicate that squandering resources on a stranger could be seen as subject to supernatural reprimand.

7. CONCLUSION

Across many societies, some religious beliefs and practices help maintain cooperation vital to daily life.

The current study provides access to a wider range of material insecurity, at a lower level of social complexity, than much of the previous psychological research on religious prosociality. This opens new perspectives into how these social dynamics interact with religion, allowing for greater understanding of how these solutions to social dilemmas may have evolved.

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Table 1.

Zero-order correlations among variables.

	In-Group Coins	Self Coins	Bible God	Kalou-Vu	Police	Food Insecurity	Financial Insecurity	Age	Sex	Education
Self Coins	0.71***	-								
Bible God	-0.02	0.1	-							
Kalou-Vu	0.32'	0.27	-0.36	-						
Police	0.07	0.17	-0.29	-0.23	-					
Food Insecurity	-0.23	-0.1	-0.29	-0.02	-0.08	-				
Financial Insecurity	0.21	0.07	-0.17	0.13	0.16	0.54**	-			
Age	-0.29	-0.24	0.01	-0.42	-0.22	0.19	0.06	-		
Sex	-0.02	0.14	0.02	-0.26	-0.19	-0.21	-0.16	0.1	-	
Education	-0.21	-0.18	-0.05	0.14	-0.1	0.14	-0.05	0.2	-0.1	-
Total	32	32	30	30	30	32	32	31	32	32

' p<0.1, * p<0.05, ** p<0.01, *** p<0.001

Table 2.

Full and reduced models for material insecurity as moderator for predicting Random Allocation Game offers' deviations from expected binomial distribution as predicted by Bible God (BG), Kalou-vu (KV), and Police (P) punishment scores. Effect estimates presented as odds ratios with standard errors in parentheses; larger odds ratios indicate more probable cheating that predictor increases.

	Bible God Full	BG Model 1	BG Model 2	Kalou-vu Full	KV Model 1	KV Model 2	Police Full	P Model 1	P Model 2
Bible God	0.22 (0.77)*	0.22 (0.82)'	0.22 (0.82)'	0.85 (0.19)	0.86 (0.19)	-	0.9 (0.21)	0.93 (0.21)	-
Kalou-vu	1.16 (0.09)'	1.18 (0.08)*	1.19 (0.08)*	0.63 (0.27)'	0.57 (0.27)*	0.59 (0.27)*	1.18 (0.1)'	1.16 (0.08)'	1.15 (0.08)'
Police	1.11 (0.11)	1.09 (0.1)	-	1.15 (0.11)	1.09 (0.1)	-	1.3 (0.22)	1.36 (0.22)	1.37 (0.22)
Material Insecurity	0.93 (0.06)	0.92 (0.07)	0.92 (0.07)	0.99 (0.05)	0.99 (0.05)	1.0 (0.05)	0.98 (0.06)	0.95 (0.06)	0.96 (0.06)
Condition (Self)	1.17 (0.1)	1.17 (0.1)	1.17 (0.01)	1.17 (0.10)	1.17 (0.1)	1.17 (0.1)	1.17 (0.1)	1.17 (0.1)	1.17 (0.1)
Age	1.0 (0.01)	-	-	1.0 (0.01)	-	-	1.0 (0.01)	-	-
Sex (Male)	1.58 (0.27)'	1.52 (0.27)	1.46 (0.27)	1.28 (0.27)	-	-	1.45 (0.29)	-	-
Education	0.93 (0.06)	-	-	0.93 (0.06)	-	-	0.93 (0.06)	-	-
BG*MI	1.22 (0.1)'	1.22 (0.11)'	1.23 (0.11)'	-	-	-	-	-	-
KV*MI	-	-	-	1.09 (0.04)*	1.11 (0.04)**	1.1 (0.04)*	-	-	-
P*MI	-	-	-	-	-	-	0.97 (0.04)	0.95 (0.04)	0.95 (0.04)
Constant	2.15 (0.45)'	2.3 (0.47)'	2.32 (0.47)'	1.42 (0.37)	1.66 (0.33)*	1.53 (0.32)*	1.55 (0.44)	2.15 (0.38)*	2.09 (0.37)*

' p<0.1, * p<0.05, ** p<0.01, *** p<0.001

Figure 1.

Percent of sample giving offers to either self or in-group compared to the expected binomial distribution. Both In-group and self-offers show probable cheating, especially for the self.

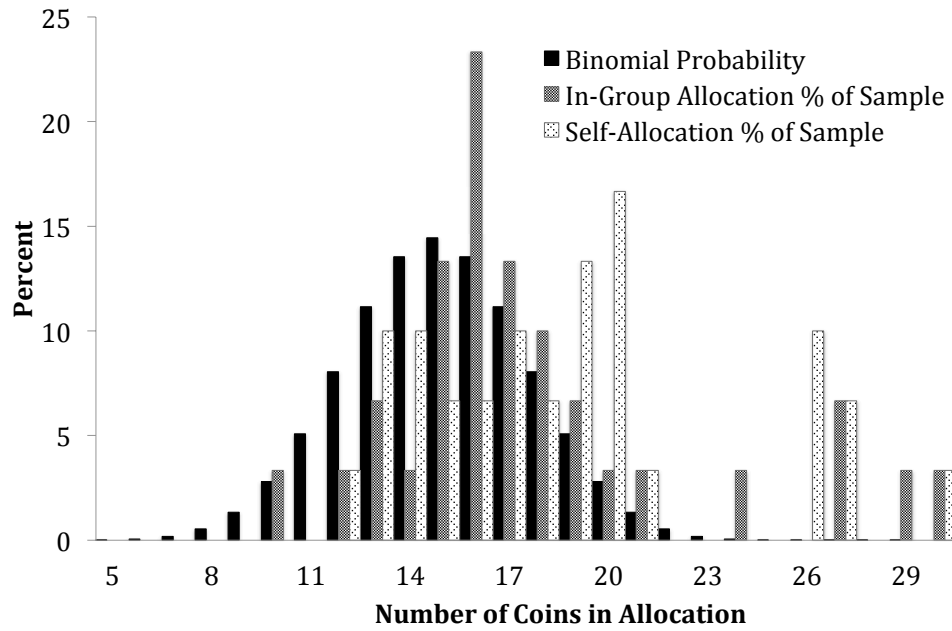


Figure 2.

Interaction Plot of Bible God Punishment predicting cheating at Low, Medium, and High Material Insecurity. Punishment scores range from forgiving (negative scores) to punishing (positive scores).

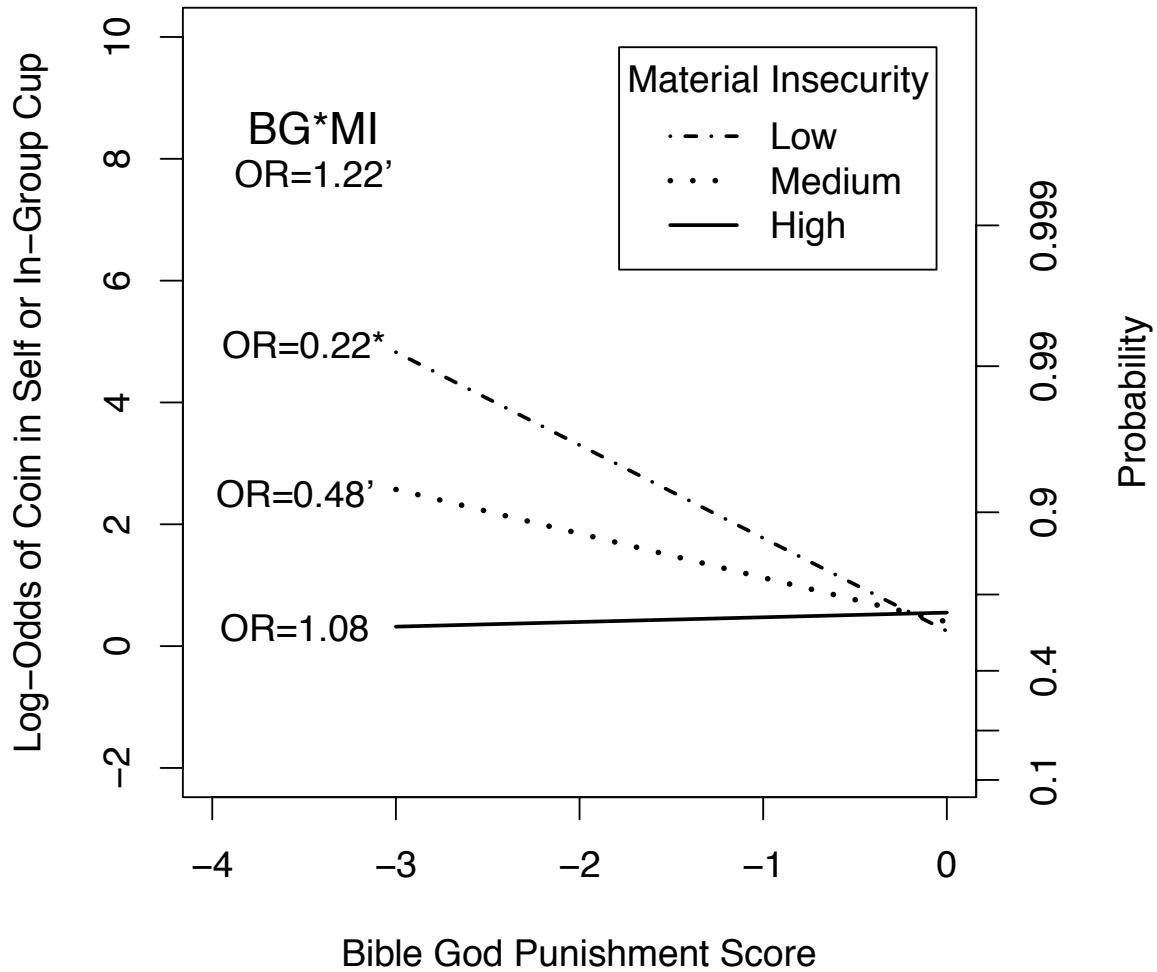


Figure 3.

Interaction Plot of Kalou-vu Negativity Predicting Cheating at Low, Medium, and High Material Insecurity. Punishment scores range from forgiving (negative scores) to punishing (positive scores).

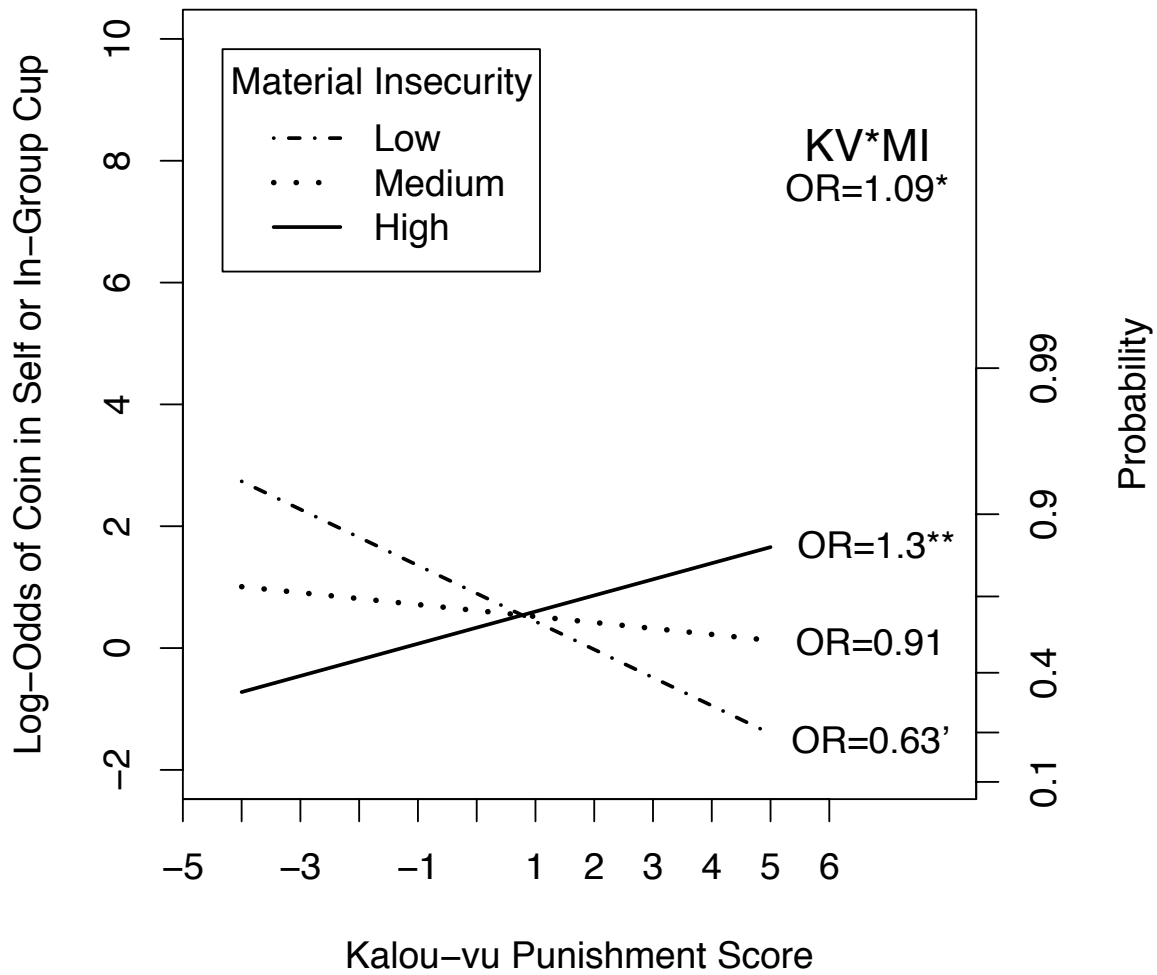


Figure 4.

Interaction Plot of Police Negativity Predicting Cheating at Low, Medium, and High Material Insecurity. Punishment scores range forgiving (negative scores) to punishing (positive scores).

