prosociality regardless of the targets' group membership (e.g., not only "coreligionists"). Any group favoritism promoted by religiosity in small societies is irrelevant to large-scale societies in which anonymous strangers cannot be presumed coreligionists. For the same reason, any "deep trust and commitment … characteristic of global religious communities" (sect. 5.2) cannot be extrapolated to pluralistic large-scale societies. Out-group-inclusive trust is not associated with religiosity (Welch et al. 2007) but can appear so because trusting "most people" connotes in-group members to those in more religious countries, but out-group members or strangers to those in less religious countries (Delhey et al. 2011). The use of terms such as "stranger" and "anonymous" (sect. 3) to refer to individuals known to be from a given island or from within the community is oxymoronic from the standpoint of distinguishing a complete stranger – possibly an out-group member – from someone who shares some group affiliation with the participant.

Another problem with the Big Gods theory, as Norenzayan et al. partly concede, is that phenomena attributed to religion are by-products of more generalized, secular mechanisms. For example, supernatural monitoring is a subset of a broader social monitoring function. Equivalent effects are elicited by priming social scrutiny or self-awareness (Gervais & Norenzayan 2012a). Other contextual primes shown to promote honesty include mirrors and bright lights, which activate intuitions such as "what would others think of me?" (Chiou & Cheng 2013; Diener & Wallbom 1976). Supernatural concepts such as "God is watching" or "avoiding the evil eye" are thus variations of social monitoring intuitions projected as stemming from external agents, rather than uniquely religious in character.

Similarly, the authors often state that prosocial effects (e.g., in sect. 4) are attributable to "religious commitment." However, naturalistic as well as experimental studies indicate that prosociality is promoted by secular factors such as general group involvement, rather than by uniquely prosocial effects of religious beliefs (Galen et al. 2015; Thomson 2015). Many of the studies in the meta-analysis found varied effects depending on the specific primed content such as "religion" versus "God" (only the latter associated with out-group prosociality; Preston & Ritter 2013). Hence, any prosocial priming effects are not the result of "religious belief" but of certain versions of religious as well as secular content exhibiting positive or reward-related semantic associations (Harrell 2012; Pichon et al. 2007).

In sum, Norenzayan et al. concede throughout their impressive body of work that religious influences are: (1) not necessary for prosociality; (2) intertwined with non-prosocial influences; (3) context dependent; and (4) reliably linked to in-group cohesion rather than extended prosociality. In numerous places, the language used to describe religious group solidarity is properly qualified as referring only to within-group benefits. But elsewhere, phrases are used such as "large-scale cooperation" and "benefitting others" without the crucial qualifier "within the group." What may seem to be a picayune terminological issue becomes more serious when extrapolated to a generalized conclusion that religious concepts have prosocial effects. In modern pluralistic societies consisting of individuals from mixed religious and ethnic backgrounds, group cohesion is not tantamount to extended prosociality, and indeed often opposes it. As stated by the authors, sacred non-negotiable beliefs exacerbate the "dark side" of intergroup intolerance by sanctifying and moralizing it (sect. 5.3, para. 3).

Therefore, group cohesion should not even warrant the term prosociality for the same reason that selective nepotism does not. It is one thing for religiosity to connote concepts such as "God is watching and wants you to be nice to fellow group members," but this is not equivalent to more abstract moral enhancement such as "treat all others the way you want to be treated" or simply "be nice to others." In many cases (e.g., interactions with a coreligionist), the resulting actions could be identical. However, if the interaction is not with a presumed group member, the two concepts will predict different forms of behavior.

Recognizing religion's dark side: Religious ritual increases antisociality and hinders self-control

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Abstract: The target article develops an account of religious prosociality that is driven by increases in self-control. We suggest this account is incomplete. Although religion might increase prosociality to the in-group, it decreases it to the much larger out-group. Rituals, for example, lead to out-group derogation. We also challenge the link between religion and improved self-control, offering evidence that religion hinders self-control.

The cultural evolution account proposed by Norenzayan et al. does a nice job of integrating multiple lines of scientific research. We mostly agree with the authors' theoretical framework. However, there are two points that have been overlooked in their model and that warrant further discussion. First, in considering the evolution of religious behaviors, specifically costly ritual displays, the authors focus on intragroup prosociality, but they have little to say about how religious ritual increases out-group hostility. Second, the link between religion, self-control, and prosocial behavior, as outlined in the article, does not account for recent neurophysiological evidence showing that religious mind-sets predict brain states associated with less (not more) self-control. We discuss these two points in relation to research from our lab and others.

Intergroup competition has helped shape the cultural evolution of religious belief and practice (e.g., Bulbulia 2004). According to the model, cultural pressures of intergroup conflict fuel prosociality among a group's adherents, galvanizing in-group ties and fostering solidarity. But how far does this prosocial behavior extend? This prosociality, the authors posit, is within the in-group, and a central feature of the authors' model is that by prosocial, they mean parochial altruism (Choi & Bowles 2007), or affiliation and prosocial behaviors toward in-group members, coupled with hostility toward out-group members. It logically follows, then, that the current account is as much about out-group hostility as it is in-group cooperation. The cultural evolution of *antisocial* religions is the other, less appealing side of the coin and one that we feel has been overlooked in the cognitive science of religion literature (e.g., Atran & Ginges 2012; Ginges et al. 2007; 2009; Neuberg et al. 2014) and, perhaps as a result, in the target article. The authors recognize that there is a dark side of prosocial religions and state that we ought to understand "the conditions under which prosocial religions become accessories to intergroup intolerance, conflict, and violence" (sect. 5.3, para. 3). Beyond this, however, there is little mention of the relationship between the prosocial and antisocial elements of religion. And although they hint at it in their model, the authors fall short in making explicit these divergent effects of in-group versus out-group, giving considerably more weight to the prosocial (i.e., in-group) element than the antisocial (i.e., out-group) one. A complete picture of religion is therefore missing.

Recent evidence from our lab shows that ritual – even mock ritual that is devoid of cultural meaning – leads to heightened out-group discrimination (Hobson 2013; Hobson et al. 2015). In a series of studies, we show that ad hoc collective ritual is capable of promoting discriminatory attitudes and behaviors toward out-group members and that this bias is amplified as the ritual behavior (the sequences involved) becomes more effortful and onerous. What is more, these socially motivated out-group biases appear to be biologically rooted in the reward systems in the human brain, where group rituals appear to tune people to the punishment of out-groups. Across these studies, we find that extravagant ritual

display, one of the hallmarks of prosocial religions, might in fact act as a signal of not only in-group allegiance but also of out-group hostility and separation. Religious rituals embolden the in-group, but by doing so maintain the sense of "us" versus "them" (e.g., Allport & Ross 1967; Hunsberger & Jackson 2005). More research is needed here to understand the full picture.

As a second point, the authors briefly outline the link between religious prosociality and self-control, taking the position that religion leads to prosociality through improvements in self-regulation. We question whether there is a direct link here between religiosity and greater self-control. For example, although widely discussed (e.g., McCullough & Willoughby 2009; Rounding et al. 2012), the evidence in favor of religion supporting self-control is thin. The association, for example, between religiousness and conscientiousness (a personality trait associated with self-control) may be driven by a person's need for orderliness rather than his or her industriousness or trait self-control (Eisenberg 1992) – a pattern of effects that has been found in conservative personalities (Hirsh et al. 2010). Moreover, numerous neuroscience studies in our lab have shown that religious primes predict brain states associated with less control (Inzlicht et al. 2009; Inzlicht & Tullett 2010; see Inzlicht et al. 2011 for a review). In a recent study (Good et al. 2015), for example, we found that reminders of God's forgiving nature diminished the amplitude of the error-related negativity, an evoked brain potential thought to reflect performance monitoring, critical for control. We further found that such reminders decreased, not increased, actual behavioral control. Importantly, we found no evidence that reminders of God's punishing nature increased performance monitoring or behavioral control (even on a religiously important task), which directly contradicts the authors' model of Big punishing Gods keeping people honest. Perhaps, then, religious prosociality (targeted at the in-group) does not come about because of simple increases in self-control, but through some other route. Recent fMRI work complements these findings, showing that certain features of religious interactions and group ritualized behaviors limit people's executive resources by narrowing the focus of attention toward emotional, low-level action units (Schjoedt et al. 2013). Religious experiences turn down (not up) the brain's self-control system, making people less self-oriented and more likely to go along with the beliefs and practices of the group.

As a final, more general point, although the cultural evolution model provides a plausible ultimate explanation of the function of religion, it does little to address proximal explanations.

A comprehensive psychological theory ought to consider how ultimate, evolutionary accounts map onto the underlying proximate mechanisms. How does the authors' ultimate account explain religious prosociality in terms of basic cognitive and affective processes? We think that much of the work in this field would benefit from using neuro- and psychophysiological tools to arrive at questions related to process. Indeed, if we are to agree with the authors' view, then a methodological approach focused on proximal mechanism is needed.

Cultural evolution and prosociality: Widening the hypothesis space

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Abstract: Norenzayan et al. suggest that Big Gods can be replaced by Big Governments. We examine forms of social and self-monitoring and ritual practice that emerged in Classical China, heterarchical societies like those that emerged in pre-Columbian Mesoamerica, and the contemporary Zapatista movement of Chiapas, and we recommend widening the hypothesis space to include these alternative forms of social organization.

Norenzayan et al. offer a rich, syncretic account of how prosocial religions allowed societies to scale up from bands of hunter–gatherers to the large-scale, multiethnic societies we now inhabit. They argue that successful cultures foster cooperation, harmony, solidarity, and growth by: (1) outsourcing social monitoring to moralizing Big Gods; (2) developing rituals to build and signal commitment; and (3) creating practices to exploit in-group favoritism and tribal psychology. With secularization (1) erodes, and (2) and (3) can decay in turn. So how can societies leave behind Big Gods while remaining prosocial? Norenzayan et al. suggest that as Big Gods wane, Big Govs – that is, Big Governments – can serve as surrogates. But are there other possibilities?

The hierarchical thought and organization fostered by Big Gods (like those of the Abrahamic traditions) and Big Govs manage prosociality from the top down. But centralized power can be supplemented (or even replaced) by forms of mutual accountability that are sustained by more mundane forms of social monitoring and communal practice. Focusing on religious traditions that flourished in the Levant, and forming hypotheses in light of these, may downplay other ways of fostering cooperation and prosociality, which flourished in other parts of the world.

Classical China provides an interesting example. As Norenzayan et al. note, Big Gods clearly exist in the earliest historical record, and they exhibit moral concern. Yet, it is unclear what role they played in fostering prosociality and enabling widespread cooperation and trust (Sarkissian 2015). Big Govs, including centralized governance backed by state punishment, played a substantial role. And other forms of monitoring and ritual practice (1 and 2, above) developed alongside these forms of top-down governance. Commitments to social monitoring developed early in China, in part owing to the advent of labor-intensive sustenance agriculture (Nisbett 2003; Nisbett et al. 2001). Shared commitments to cooperation were crucial in this context, spurring practices of self and other monitoring, along with increased attunement to one's impact on others (Sarkissian 2010). Social and self-monitoring continue to influence prosociality in collectivist societies today (e.g., Heine et al, 2008; Sarkissian 2014), and they might lessen the need for Big Gods or Big Govs. Moreover, when it comes to ritual practice, there is a sizable and impressive literature in the classical period (not unlike the theory adopted by Norenzayan et al.) that recognizes its instrumental value in strengthening social bonds and taming personal impulse, promoting harmonious prosocial behavior without supernatural incentives (e.g., Puett 2013). Mundane monitoring and ritual theory, then, can be found alongside Big Gods and Big Govs in the classical period, and both are amenable to appropriation today.

The heterarchical power structures that developed in Mesoamerica suggest a second interesting phenomenon. The lowland Mayan economy relied on short-range, self-organized practices of exchange, but they made room for the centrally controlled exchange of ritual goods (Potter & King 2008). Similarly, the massive, multiethnic city of Teotihuacan appears to have been organized as a decentralized network of semiautonomous communities, structured around kinship but leaving room for corporate governance (Manzanilla 2012). The archeological remains at Teotihuacan reveal a distinctive lack of dynastic monuments and limited interest in emulating existing Mayan and Zapotec writing systems, which were commonly used to record dynastic information. Self-organizing practices can be resilient to fluctuations in the availability of goods and resources, and they can preserve ethnic and cultural diversity. There is no consensus regarding the nature of the gods at Teotihuacan, but costly rituals and CREDs (including bloodletting and ritual intoxication) were critical to intergroup cooperation and the maintenance of local power throughout Mesoamerica (Munson et al. 2014). And it is possible