11   Ritual and Religion as Social Technologies of Cooperation

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Introduction

This chapter takes as its point of departure the influential French sociologist Émile Durkheim's view that religion and ritual are inherently *social* phenomena (Durkheim, 1912/1965). Although we emphasize the social aspects of religion and ritual in this chapter, this is not to deny the value of approaches that focus on the individual as the unit of analysis.[1] We focus on the role that collective rituals and religious beliefs play in fostering and maintaining cooperation and coordination. This seems to put us once again on Durkheim's side, insofar as his theory of religion and ritual is functionalist and thus presents them as playing a role in maintaining social order in society. However, we do not seek to defend a functionalist *explanation* of religion and ritual here. Rather, we aim to consider the effects of these cultural technologies. Our focus is empirical, however, rather than just theoretical. We examine the effects that collective rituals can have on cooperation and coordination by reviewing recent work from experimental and developmental psychology, as well as the fields of cognitive anthropology and cultural evolution.

By "ritual," we mean a culturally sanctioned, collectively performed set of actions that are characterized by such traits as normative rigidity, repetitive redundancy, and functional or causal opacity (Boyer & Liénard, 2006; Liénard & Boyer, 2006; Rappaport, 1999; Rossano, 2012; Whitehouse, 2011). By "religion," we mean the social and psychological phenomena associated with culturally shared beliefs in supernatural agents or forces (Boyer, 2001; Guthrie, 1993; Jong, 2015; Pyysiäinen, 2003, 2009; Sutherland, 2012)[2]

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[1] Idiosyncratic supernatural beliefs and experiences are topics of investigation in their own right, as are rigid, repetitive, and non-functional behaviors. Furthermore, there is increasing evidence for a panoply of psychological effects of religious belief and ritual participation at the individual level, such as the alleviation of grief (Norton & Gino, 2014), the mitigation of death anxiety (Jong & Halberstadt, 2016), the bolstering of feelings of control (Kay et al., 2010), and the provision of a sense of life's meaningfulness (Park, 2005, 2011).

[2] Without denying that religious beliefs and ritual behaviors can and often do interact, we treat them separately and emphasize that rituals can and do occur frequently outside of religious contexts (see, for example, state rituals: Kapitány et al., 2019; Verkaaik, 2010).

and entailing social, collectively performed behaviors (Rossano, 2012).[3] Given these definitions, rituals may or may not make reference to supernatural agents, and insofar as they do, they count as *religious* rituals.

We begin our chapter with a discussion of rituals and their relationship with cooperation, examining them both inside and outside of religious contexts. We then proceed to examine the associations between cooperation and religious beliefs and consider whether this corresponds to what we found with rituals. Finally, we consider the role of religions in cultural evolution and thus the potential interactive effect of rituals and religious beliefs.

Ritual Processes That Promote Coordination

Causal Opacity and Social Learning

Two exemplars of ritual processes are the Roman Catholic mass and the Shinto *misogi*. The Catholic mass is centered around a sacrificial meal, in which participants consume bread and wine consecrated by a priest. *Misogi* is a type of Japanese purification ritual in which participants cleanse themselves – usually with water, including under running waterfalls. These two culturally distinct phenomena have much in common, including the recitation of prede-termined prayers, repetition of words and actions, donning of special garments, and collective participation.[4]

They are also characterized by what cognitive anthropologists and psychologists are increasingly recognizing as a defining property of ritualized behavior: causal opacity. Rituals are causally opaque in that the relationship between actions and stated goals cannot *in principle* be specified in physical–causal terms (Humphrey & Laidlaw, 1994; Whitehouse, 2011). To seek out a practical rationale is to misunderstand the very nature of ritualized behavior. Thus, social anthropologists have often observed that ritual participants are powerless to explain why they carry out the particular procedures that constitute any given ritual, appealing only to tradition or the authority of ancestors.

For example, why the particular liturgical formulas used in a Catholic mass can evince transubstantiation of bread and wine into the body and blood of Christ is difficult even for professional theologians to explain. Similarly, for many *misogi* participants, the specific *kami* (Shinto deities) that are evoked in the chants or venerated at specific shrines remain largely unknown; they are singing to gods, but they do not know which ones. Even for the minority of

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[3] We recognize that rituals may also be enacted in solitude but our interest here is in collective performances and their social consequences.

[4] *Misogi* rituals can also be an individual ascetic practice; and there is also a provision for Catholic priests to celebrate the mass *sine populo*.

practitioners who can identify the relevant *kami*, few would be able to provide doctrinal details about what individual elements of the *misogi* signify. Indeed, some have argued that participating in ritual practices with pragmatic goals and a lack of theological articulation is a defining characteristic of Japanese religion (Kavanagh, 2016b; Kavanagh & Jong, 2020; Reader & Tanabe, 1998). This corresponds to a wider distinction (Bell, 1997; Berling, 1987) between religions and cultures that are *orthodoxic*, meaning they place "an emphasis on belief, on the assent to propositions and on Doctrinal conformity," and those that are *orthopraxic*, which in contrast place "greater stress on external behaviour rather than internal belief" (Szerszynski, 2002, p. 61).

The Ritual Stance and Overimitation

Causally opaque actions are not amenable to instrumental interpretation. They do not make sense in physical–causal terms and instead assume that whatever it is that requires us to observe this particular sequence of actions in this particular way derives from an altogether different way of reasoning. The reasoning is seldom transparent; the actions may be regarded as symbolic, the product of divine or supernatural forces, or simply part of tradition (Whitehouse, 2012, pp. 266–7). In any case, when we consider actions in this way, we have abandoned the *instrumental* stance and adopted the *ritual* stance toward them (Whitehouse, 2011). This point may be illustrated by the different ways in which swords can be used. Historically, swords have been used instrumentally as effective weapons by many military forces, but swords are also regularly used in rituals, including to confer a knighthood by tapping the flat edge of the blade on the candidate's shoulders.

But why would behaviors not thought to have any rational causal structure spread across human populations and become culturally entrenched? It may relate to our species' tendency to "overimitate" others' actions, that is, imitate actions that make no obvious contributions to intended end-goals. Recent psychological research suggests that overimitation, if not unique to our species, plays a far greater role in human learning as compared with other primates (Hoehl et al., 2019; Hoppitt & Laland, 2013; Horner & Whiten, 2005; McGuigan et al., 2011; Whiten et al., 2009). Studies have shown that from a very young age children copy modeled behaviors in their entirety, even when the procedures include superfluous elements that they have been told to exclude (Lyons et al., 2011, 2007).

These studies have employed a variety of methods, but the most common procedure involves participants attempting to retrieve a reward from a "puzzle box" after observing a model do so. To extract the reward from the box the model performs some actions that are instrumental and some that are superfluous. Experimental conditions vary by how salient the superfluous actions are

made, for instance by using a transparent puzzle box to reveal that certain actions have no impact on the box unlocking mechanism, and then measuring the degree to which casually superfluous actions are imitated. Studies using similar procedures have demonstrated the tendency to "overimitate" superfluous actions to be cross-culturally recurrent (Clegg & Legare, 2016; Corriveau et al., 2017; Nielsen & Tomaselli, 2010; Nielsen et al., 2014; Taniguchi & Sanefuji, 2017) and to persist into adulthood (Flynn & Smith, 2012; McGuigan et al., 2011; McGuigan, 2012; Whiten et al., 2016). Indeed, counter to expectations, results to date suggest that adults are more, not less, prone to overimitation than children.

Similarly, recent studies have demonstrated that young children seem to be sensitive to the difference between opportunities for ritual (i.e., group-specific conventional behavior) and instrumental learning in a modeled imitation task (Clegg & Legare, 2015; Herrmann et al., 2013). The basic paradigm in the studies comparing ritual and instrumental actions (Legare et al., 2015) is to present novel objects to young children with which the model then demonstrates a series of arbitrary actions. In the ritualistic condition, the end state of the action sequence is identical to its beginning. Nothing has been achieved, and so it makes little sense to look for an overarching goal of the actions performed. Conversely, in the instrumental condition, a change is introduced at the end of the same sequence, suggesting the actions served some purpose. These studies have generally found that children copy the ritualistic actions more rigidly than they do the instrumental actions. One interpretation of these results is that overimitation is driven by social concerns, and especially the desire to affiliate, rather than concerns about practical outcomes (Kenward et al., 2010; Nielsen & Blank, 2011). Indeed, depending on the context and the characteristics of the model, goals can vary between focusing on social versus learning goals and this can impact overimitation tendencies (Over & Carpenter, 2009; Schleihauf et al., 2018; Wood et al., 2016). This kind of social learning may be a vital part of acquiring and maintaining membership of groups, defined by arbitrary rituals that range from distinctive styles of greeting and address to more elaborated forms of etiquette, attire, and ceremony (Whitehouse, 2011).

Building on this, recent studies have set out to explore what kinds of social conditions encourage children to engage in ritualistic behaviors. If rituals are about belonging to a group, children might be more eager to copy ritualistic actions after being primed with an ostracism threat, such as when they are made to feel excluded by their peers. In two studies using the Cyberball paradigm – an ostensibly online ball-tossing game used to manipulate feelings of social ostracism via the exclusionary actions of other "players" (Williams & Jarvis, 2006) – Watson-Jones et al. (2014, 2016) experimentally manipulated children's feelings of ostracism or social exclusion, and found that the

advantage of ritual imitation over instrumental imitation was greater under those conditions. These findings imply that the adoption of the ritual stance serves as a social reinclusion strategy.

If the ritual stance is about affiliation to a group, then children should also be sensitive to *social* cues suggesting that a causally opaque behavior is shared by a group, which should in turn motivate high-fidelity imitation. Herrmann et al. (2013) compared identical actions in a group of preschool children that were verbally framed in a ritualistic (e.g., they are "always done this way") or instrumental manner (i.e., where the outcomes of the actions were described) and found that imitative fidelity was higher with the ritual framing and was also higher when two models performed the actions synchronously (i.e., simultaneously) than when the actions were performed individually. Thus, rituals do not have to differ in form from instrumental actions (e.g., in terms of start–end states); social cues alone can increase the likelihood of adopting the ritual stance and its behavioral consequences.

Synchronous Rituals as Bonding Activities

Having considered what we think of as an essential trait of rituals – causal opacity – we now turn to one that is merely extremely widespread. Almost all collective rituals, whether in religious or in secular contexts, involve some degree of synchronized behavior – the matching of actions in time, examples of which include speaking, singing, and marching. This is, we believe, no accident; rather, collective rituals often involve synchrony because it is an effective means to bond individuals within groups. The experimental evidence for this has grown rapidly in the past decade. The study by Herrmann et al. (2013) described above, for instance, found that synchrony enhances imitation fidelity. Other studies have shown that synchrony also increases positive attitudes and prosocial behaviors toward in-group members, both among adults (Hove & Risen, 2009; Reddish et al., 2013; Valdesolo & DeSteno, 2011; Wiltermuth & Heath, 2009) and children (Cirelli et al., 2014a, 2014b, 2016; Kirschner & Tomasello, 2010; Rabinowitch & Knafo-Noam, 2015; Tunçgenç & Cohen, 2016; Tunçgenç et al., 2015). Meta-analyses of the available research have confirmed the general conclusion that synchrony increases prosocial attitudes and behaviors (Mogan et al., 2017; Rennung & Göritz, 2016).

The cultural prevalence of ritualized synchrony might reflect a leveraging of intuitive behaviors that manifest in early infancy as there is some evidence that newborns readily match adult behavior, though true imitative behavior probably only emerges toward the child's second year of life (see Jones, 2009, for a critical review). Some psychologists have even argued that this tendency to mimic others' behavior is foundational for the development of social cognitive

abilities (Meltzoff, 2007) and is likely linked to the function of "mirror neurons" (Iacoboni, 2009). Adults also automatically mimic others during normal social interactions, and there is increasing evidence that this behavior increases positive feelings between both mimicker and mimickee (Chartrand & Bargh, 1999; Stel & Vonk, 2010). Synchronous rituals may, therefore, be a form of culturally constructed mimicry.

Currently research has focused on the mechanisms underlying the relationship between synchrony and social bonding. One promising theory is that synchrony and related forms of behavioral matching produce social benefits by increasing feelings of similarity between actors or within groups, perhaps even to the extent that the boundary between self and other is blurred. Consistent with this theory, several experiments have found that synchrony increases perceived similarity (Rabinowitch & Knafo-Noam, 2015; Valdesolo & DeSteno, 2011) as well as feelings of the group's unity or "oneness" (Lakens, 2010; Lakens & Stel, 2011; Reddish et al., 2016), though Mogan et al.'s (2017) meta-analysis found that such self-report measures generally evinced weaker and less robust results than did behavioral measures.

Finally, there is also some evidence from both the mimicry and the synchrony literature that these effects extend beyond the dyad or group in question. Experiments have shown that participants who were subtly mimicked were subsequently more likely to help others absent from the mimicry situation; these effects have been found in the laboratory (van Baaren et al., 2004), on the streets (Fischer-Lokou et al., 2011), and among eighteen-month-old infants (Carpenter et al., 2013). Similarly, experiments on synchrony have found prosocial effects on nonperformers, including even out-groups and out-group members (Reddish et al., 2014, 2016). This suggests that, as a social technology, collective synchrony may be leveraged in rituals to promote widespread cooperation.

Costly Rituals as Persuasive Signals

All rituals, as we have defined them, involve causal opacity, which is important for social learning; most rituals involve synchronous behaviors, which fosters cooperative and prosocial behavior. Some rituals are also *costly* in some way, for example because they involve physical or psychological pain. Earlier we discussed Japanese *misogi* rituals, extreme versions of which entail immersion in freezing water while wearing little clothing during the coldest months of winter, and these are far from an isolated case. Consider, for instance, the mass public spectacles of bloody self-flagellation practiced by Shia devotees during the Islamic celebration of *Ashura* (Norton, 2005) or the multiple piercings endured by Tamil Hindus as part of the *kavadi attam* ritual

practiced annually as part of the *Thaipusam* festival (Jegindø et al., 2013; Xygalatas et al., 2013).

The costliness of rituals like these raise questions for evolutionary anthropologists about their functions and benefits, both at the individual and group level. In recent theorizing on this question, two mutually consistent proposals have arisen. First, costly rituals might serve as *credibility-enhancing displays* (CREDs) that help to foster trust and also to produce ideological – and theological – consensus within the group, particularly by persuading nonparticipants (Henrich, 2009; Irons, 2001; Sosis, 2003; Sosis & Alcorta, 2003). Second, collective participation in costly or *dysphoric* rituals might serve as a potent means of generating strong relational bonds between co-participants, particularly when the ritual is personally consequential and leads those involved to feel that they have collectively shared a self-defining experience (Swann et al., 2012; Whitehouse & Lanman, 2014). We discuss this second proposal a little later; in the next section, we focus on the role that costly rituals can play as "hard-to-fake" social signals.

Rituals' Effects on Observers

From the social-psychological literature on persuasion, we know that source credibility is an important factor in persuasiveness (see Pornpitakpan, 2004, for a critical review), and that the credibility of the source is not merely dependent on their actual expertise. Rather, people tend to attribute credibility to sources based on indirect cues like similarity (Bandura et al., 1961), group membership (Clark & Maass, 1988; Simons et al., 1970), prestige (Hovland & Weiss, 1951), and even physical attractiveness (DeBono & Harnish, 1988; Patzer, 1983). Most relevant to the role of rituals in persuasion is the research on the effects of various forms of costliness. For example, Walster et al. (1966) found that a source is more persuasive when arguing for a position opposed to their own self-interest; the message itself can therefore be the costly signal of trustworthiness. Similarly, on literal financial costliness, Willard et al. (2016) found that participants judged a counterintuitive story as more believable when they witnessed someone else bet money on its truth.

Consistent with costly signaling theory, field experiments on costly rituals suggest that they affect observers as well as performers. Xygalatas et al.'s (2013) study of the *Thaipusam* in Mauritius, for instance, found that both performers of the *kavadi attam* and related observers displayed greater generosity to a local temple than those performing less onerous ritual prayers. This accords with the hypothesis that costly rituals serve as potent illustrations of genuine commitment to a group and thus are able to serve as effective signals to other members and encourage progroup actions.

In another field experiment conducted at a *kavadi* festival, Mitkidis et al. (2017) found evidence that related observers were more honest in reporting results in a dice rolling task after witnessing the rituals, whereas no such change was found with the performers themselves. Mitkidis et al. suggest this implies that "observers chose to cleanse themselves by acting more morally" (Mitkidis et al., 2017, p. 5) in response to observing the prosocial moral signal provided by the endurance of a physical ordeal by performers. Similarly, in the context of a Mauritian firewalking ritual, Fischer et al. (2014) found a divergence in the emotional response to the ritual between performers and related observers: Compared to baseline, firewalkers reported increased happiness and decreased fatigue – a "fire-walker's high" – whereas related observers reported no change in happiness but an increase in fatigue. This finding, again, suggests that while performers may receive a psychological "payoff" for their suffering in terms of feeling morally cleansed, purified, or having demonstrated their devotion; a corresponding psychological "debt" may be generated among group members who observe such events. That observers can be strongly physiologically impacted by watching others perform rituals has been demonstrated in a study of a Spanish firewalking festival by Konvalinka et al. (2011). They found that performers' and their relatives' heart rates synchronized during the ritual; whereas no such synchrony was observed for unrelated observers.

Recent research has also examined the effects of exposure to CREDs on religious belief itself. Lanman and Buhrmester (2017) reported two retrospective correlational studies on American participants which found that childhood exposure to religious CREDs – including caregivers' religious observance – was a better predictor of current belief in god than were caregivers' verbal emphasis on religion or even participants' own childhood religious observance. Willard and Cingl (2017), similarly, found that exposure to CREDs explained much of the difference in religious belief and participation between two historically and culturally comparable but religiously divergent countries: the societally secular Czech Republic and unrepentantly Catholic Slovakia.

Rituals and Self-Persuasion

Social-psychological research also suggests that costly behavior might serve as a signal to oneself (Bem, 1972) or as a means of reducing a "dissonance" induced by the performance of an unpleasant act (Festinger, 1957). For example, in a classic study by Aronson and Mills (1959), participants – who were led to believe that they were volunteers for a discussion group – were first asked to read aloud in front of the experimenter a list of words, as part of their initiation into the group. The list could either contain mildly sexual words or highly sexual words. The participants who were assigned the highly sexual

words – an embarrassing task, especially in the 1950s –subsequently rated the discussion group, which was by design rather boring, to be more positive. Gerard and Mathewson's (1966) conceptual replication of the study, which replaced the reading task with the endurance of electric shocks of varying intensity, also found that unpleasant initiations increased progroup attitudes. In their study of college hazing activities, Keating et al. (2005) found that the harshness of the initiation predicted how important members thought their group was to them; in an experiment comparing humiliating induction activities against innocuous ones, they found that the severe initiation promoted conformity and social dependency. More recent attempts at replication have produced mixed results (Hautaluoma & Spungin, 1974; Lodewijkx & Syroit, 1997; Van Raalte et al., 2007), but insofar as the effect holds, both dissonance reduction and self-signaling accounts provide reasonable explanations.

In the classic dissonance account, enduring painful or unpleasant events introduce a subsequent need to justify the actions to decrease any psychological inconsistency (Festinger, 1957). Later formulations of the theory emphasized the importance of personal responsibility (Cooper & Fazio, 1984) and the central role of dissonance within self-concepts (Aronson, 1968, 1999). Another development, relevant to the effects we described on observers in the preceding section, is the theory of "vicarious dissonance" (Cooper & Hogg, 2007). Cooper and Hogg suggest that "under conditions of intersubjectivity," such as being a member of the same group, "observers are able to experience the actor's inner states as their own" and thus can "experience cognitive dissonance vicariously" (Cooper & Hogg, 2007, p. 395).

A self-perception account (Bem, 1972) would suggest that initiates infer from their willingness to undergo severe rituals that they are committed to the group, which in turn increases their commitment. The precise relationship between dissonance and self-perception accounts has been a long-enduring and still unresolved controversy, but notably advocates of cognitive dissonance theories also recognize the importance of self-persuasion processes (Aronson, 1999).

Another more recent model, that could also account for the results discussed above, is the "biosocial model of affective decision making" proposed by Kitayama and Tompson (2015). Their model argues that when facing a conflicting choice between two behaviors, such as participating in a painful ritual vs. avoidance, people feel compelled to find a positive incentive to choose between the options. If participation is selected, then they suggest that the ritual will be experienced affectively more positively and thus regarded as being more valued, pleasant, or important.

Alongside research focusing on individual psychology, there has also been research conducted on hazing and other initiation rituals that interprets them as an evolutionary mechanism that enables current members to test and thus

better assess the intentions and relevant qualities of incoming members. In two studies, Cimino (2011, 2013) found that when asked to imagine strongly cooperative, enduring coalitions, people tended to desire more severe initiation practices than those who were asked to imagine less cooperative groups. In other words, people designed more severe initiations for higher quality groups. Relatedly, Young's (1965) study of male initiation rites found that societies with more powerful coalitions tended to have more dramatic initiation practices, and a similar pattern was reported for mystery cults in Melanesia (Allen, 1967; Strathern, 1970).

There has also been research on the group-level effects of costly demands and other CREDs – not limited to painful rituals or severe hazing activities – in religious contexts. Iannaccone (1994, p. 1181), for example, found that strict churches – those that demand "complete loyalty, unwavering belief, and rigid adherence to a distinctive lifestyle" – tend to grow faster than lax ones. Similarly, in their study of nineteenth-century American communes, Sosis and Bressler (2003) found that the communes that imposed costlier requirements were able to survive for longer than those whose membership were less demanding. Notably, this relationship was only observed for religious and not for secular communes.

These studies converge on the finding that costly rituals – college hazing, Hindu Tamil *kavadi*, Spanish firewalking, and so forth – have effects beyond the performers themselves. However, more work still needs to be done to disentangle the *signaling* effects of costly rituals from other mechanisms that produce social cohesion. For example, the fact that in some studies only those related to ritual performers were affected complicates the view that costly rituals serve as signals to observers as a general category: Not all observers are created equal. Emotional investment and a shared social identity are likely to be key contributing factors to producing significant effects on observers (Cooper & Hogg, 2007; Kitayama & Tompson, 2015). Finally, there are a variety of possibilities regarding the content of the signals themselves: Rituals may advertise fitness to potential partners (Zahavi & Zahavi, 1997), or commitment to other group members (Cimino, 2011, 2013), or the benefits of a group relative to others (Bulbulia & Sosis, 2011). These are unlikely to be mutually exclusive propositions, but we are still at the early stages of establishing how they fit together.

Costly Rituals and Collective Effervescence

The previous section surveyed the evidence that costly rituals serve as social signals, focusing primarily on how those receiving the signal respond. This section focuses on the psychological effects that participation has on the ritual performers themselves. Durkheim (1912/1965) theorized that taking part in

emotionally arousing collective rituals helped to generate a sense of collective unity, which he referred to as a "collective effervescence" (Durkheim, 1912/1965). Yet in the decades that followed, despite insightful ethnographic work (Turner, 1969, 1985; Van Gennep, 1909/1960), there was very little empirical exploration of collective rituals. Recently, this has begun to change as cognitive anthropologists and psychologists have started to employ field- and lab-based experimental methodologies to examine the physiological and psychological effects of collective rituals.

The field experiments introduced in the preceding section on *kavadi* and firewalking rituals are from this new wave and were primarily intended to test hypotheses inspired by Durkheim. As such, they focused on whether these dramatic ritual events evoked a shared physiological and emotional response among performers and observers. As summarized, there is now some evidence for shared physiological arousal, but crucially this is restricted to ritual performers and *related* observers (Fischer et al., 2014; Konvalinka et al., 2011). Hence, a recent field study conducted at four Shinto and Buddhist firewalking festivals in Japan found that patterns of inclusive vs. exclusive social identification and identity fusion diverged between nonlocal observers and local observers (Kavanagh, 2016a). Collectively, results from field experiments at ritual events demonstrate that simply observing an arousing ritual is insufficient to generate a collectively shared response; to produce such effects, it seems clear that "observers must share membership in the group and have a (preexisting) relationship" (Konvalinka et al., 2011, p. 8518).

Alongside the differential impacts on observers, questions remain concerning the effects on the ritual performers and the extent to which, through their participation, they establish an independent shared "effervescence" with the other performers. We have already discussed the growing evidence that synchronous activities, including rituals, generate social bonds, but independently there is also emerging evidence for the affiliative properties of shared pain. The suggestion of an affiliative role for pain may seem counterintuitive given that pain typically serves as a reliable threat-signal that should encourage individuals to withdraw from whatever is causing the pain. However, this fundamental desire to escape from pain also serves to motivate individuals to increase their relational focus, as they search for sources of social support to aid their escape or provide comfort. In support of this, perceived social support was found to predict pain adjustment among patients suffering from chronic pain (López-Martínez et al., 2008) and to correlate with lower self-reported labor pain during childbirth (Cogan & Spinnato, 1986; Lidderdale & Walsh, 1998). Moreover, laboratory-based studies that ask participants to endure various types of experimentally induced pain (for an in-depth review, see Bastian et al., 2014) have found that participants report less pain when they are reminded of partners (Master et al., 2009; Younger et al., 2010), salient group

identities (Jones & Jetten, 2011; Platow et al., 2007), when they are provided with social support (Brown et al., 2003), or when they are allowed to hold a partner's hand (Coan et al., 2006). One study also found that religious images were capable of reducing the perception of pain for religious believers (Wiech et al., 2008). These results illustrate that pain is not purely an individual experience and can be significantly modulated by reminders of social affiliation. However, it remains less clear whether the reverse is true, that is: Do shared painful experiences, such as those involved with costly rituals, induce social cohesion?

Attempting to address this question, Bastian et al. (2014) reported three experiments examining the effects of shared painful experiences on cooperation and social bonds. All three experiments demonstrated a consistent pattern of participants in the pain conditions reporting stronger bonds (Study 1) with other group members and more cooperation in an economic task (Study 2 and Study 3). The authors note that since the painful tasks were framed as individual rather than group tasks, "the enhanced bonding and cooperation . . . emerged from the (shared) experience of the pain rather than . . . (in enduring) pain for the group" (Bastian et al., 2014, p. 84).

A real-world correlation with these findings was provided by Xygalatas et al. (2013) in the previously discussed study of the Mauritian *Thaipusam* piercing festival. Donations to an in-group temple were positively correlated with the perceived pain of the task for both participants and observers. These two results offer preliminary evidence that collectively experienced pain can increase progroup behavior and group solidarity. However, countervailing evidence also exists with no relationship being found between perceived pain and in-group donations in data collected from Japanese firewalking festivals (Kavanagh, 2016a) and a similar lack of correlation between pain and social cohesion measures found in Kavanagh et al.'s (2018) study of Brazilian jujitsu belt promotion experiences (which often involve painful belt whipping). Given the current small numbers of studies, especially those collected from actual ritual events, the existence of a relationship between pain and social bonding or progroup behavior requires further investigation to confirm.

Ritual Modes and Different Types of "Social Glue"

We have now seen how different kinds of rituals can lead to similar outcomes, describable as increases in social bonding or cohesion. Nevertheless, the costliness of rituals like the *kavadi* raises the question about what added social value they might provide over less arduous rituals. Costly signaling theories offer one possibility: Unlike mere synchrony, emotionally and physiologically demanding rituals serve as good signals. Another possibility is that different kinds of ritual produce different kinds of social bonding. According to

Whitehouse's *divergent modes of religiosity* (henceforth, Modes) theory, there is an important "divergence in modalities of religious experience and practice" (Whitehouse, 2004, p. 63) between small-scale *imagistic* traditions and larger, more hierarchical *doctrinal* ones. The imagistic mode refers to "small scale local traditions, with loosely defined doctrines and highly arousing but rarely performed rituals" (Whitehouse, 2004, p. 63). The doctrinal mode refers to "larger, more hierarchical doctrinal traditions that contain explicit doctrines, transmitted through frequently repeated low arousal rituals" (Whitehouse, 2004, p. 63).

Early evidence for the distinction between doctrinal and imagistic modes of religiosity came from ethnographic fieldwork conducted in Papua New Guinea with followers of the *Pomio Kivuing* religious movement that had developed into a large, hierarchical organization (Whitehouse, 1995). Despite its stable mainstream form, however, the *Pomio Kivung* also spawned a series of a small-scale, localized splinter movements. These splinter groups encouraged novel interpretations of the *Pomio Kivung* religious doctrine and developed distinctive rituals that were dramatic and emotional. These divergent modes of religiosity, Whitehouse argued, conformed to a recurrent global pattern (Whitehouse, 1995, 2000, 2004; Whitehouse & Laidlaw, 2004, 2007; Whitehouse & McCauley, 2005). Accordingly, a large cross-cultural coding study of 645 rituals by Atkinson and Whitehouse (2011) found that rituals do cluster around these expected divergent modes: intense and rare rituals on one hand, and mild and frequent ones on the other. Here it should be noted that the divergent modes do not represent a dichotomous typology but rather a ritual spectrum with two cognitively attractive clusters (Atkinson & Whitehouse, 2011). These clusters, in turn, appear to be constituted by cross-culturally statistical recurrent factors, which include positive and negative arousal, physical and psychological pageantry, kin, frequency, and "viscera" (Kapitany et al., 2020). Modes theory does not argue there will never be groups that have ritual practices combining imagistic and doctrinal elements but rather that such groups are unlikely to be as stable or successful as groups that adhere *predominately* to one of the two modes or in which the modes are associated with distinct domains within the tradition (e.g., mainstream movement versus splinter group or monastic tradition versus local cult).

Modes theory also posits distinctive forms of social bonding commensurate with imagistic and doctrinal practices, respectively (Whitehouse, 2013; Whitehouse & Lanman, 2014). In the doctrinal mode, the bonds created between ritual members are diffuse and extend across a large "imagined community" (Anderson, 1983) based on shared identity markers, whereas in the imagistic mode the bonds are localized and directed at specific individuals who share intense ritual experiences. This model parallels a raft of recent research in social psychology advocating for important distinctions between the

categorical and depersonalized group bonds described in classic social identity theory (Abrams & Hogg, 1988; Hogg, 2006; Hornsey, 2008; Tajfel & Turner, 1985) and a more recently postulated form of group bonding termed *identity fusion* (Gómez et al., 2011; Swann et al., 2009, 2010, 2012, 2014). Identity fusion is argued to be distinct from group identification because it involves retaining "a highly agentic personal-self" alongside "a visceral feeling of oneness with the group" and relies on forming relational, rather than categorical (Brewer & Gardner, 1996), bonds with fellow group members (Swann et al., 2012).

Identity fusion has thus been proposed as a potential mechanism generating the intense bonds created in collective imagistic rituals (Swann et al., 2012; Whitehouse & Lanman, 2014). More specifically, Modes theory proposes that imagistic rituals generate rich autobiographical memories that invite long-enduring reflection (Whitehouse, 2002). This is important because "the perception that one shares with others' episodic memories that are essential components of one's autobiographical self-concept" (Whitehouse & Lanman, 2014, p. 677) can create a sense of psychological kinship (Bressan & Kramer, 2015; DeBruine, 2005; Krupp et al., 2012).

Some evidence consistent with this model has been provided by a set of studies which indicate that shared highly arousing experiences, including traumatic events, are associated with higher levels of identity fusion with relevant groups. Among revolutionary fighters during the 2011 Libyan civil war, for instance, nearly half of frontline combat troops reported being more strongly fused with their battalion than they were with their biological family (Whitehouse et al., 2014). Jong et al. (2015) also provided correlational and experimental evidence linking reflection on shared negative experiences (viz., of the Northern Irish Troubles and the Boston Bombing) to levels of identity fusion. Similarly, Whitehouse et al. presented a diverse array of evidence that sharing painful experiences produces identity fusion and that this in turn can motivate self-sacrifice, including a mathematical evolutionary model showing that cooperation conditioned on past negative experiences increases the overall fitness of groups and their members (Whitehouse et al., 2017).

Focusing specifically on ritual settings, a study by Páez et al. (2015) examined both negatively and positively valenced ritualized gatherings and found that participation in such events "consistently strengthened collective identity, identity fusion, and social integration" and that "perceived emotional synchrony (collective effervescence) with others mediated these effects." Finally, a study that examined the experience of promotional rituals of over 600 Brazilian jujitsu practitioners (Kavanagh et al., 2018) found that subjective positive assessment of promotion rituals, including painful events with belt whipping ordeals, was associated with greater levels of identity fusion with the training group.

In contrast to the intense relational bonds generated by costly imagistic rituals, Modes theory conversely suggests that the routinized rituals of doctrinal traditions serve to enhance the categorical ties of group identification, by providing repeated reinforcement of beliefs and practices that serve as group identity markers in semantic memory. The key distinction here is that group identification enables the bonding of "larger assemblages of more distantly related individuals" (Whitehouse & Lanman, 2014, p. 678) as the relationship is with an abstract social category as opposed to individual group members.

There has been comparatively little direct empirical research into the connection between doctrinal rituals and group identification as the research literature has remained focused primarily on studies of costly rituals. Nevertheless, the previously reviewed literature on the affiliative effects of synchronous ritual and evidence from developmental studies that even simple ritual action sequences can foster group identities suggest that repeated participation in culturally salient ritual performances is likely to serve as an effective reinforcer of relevant social identities.

Religion's Role in Promoting Coordination

The previous section outlined the important role that rituals play in promoting cooperation and coordination, highlighting some potential mechanisms underpinning this association. Accepting that collective rituals are a means of reinforcing and inducing cooperation and that they feature prominently in religious contexts, one could reasonably anticipate that religion might promote the same outcomes. However, religion is not entirely reducible to rituals and, as we stressed in the introduction to this chapter, our intention is to treat religion by focusing particularly on the impacts of supernatural beliefs. In so doing we critically interrogate widespread assumptions that religion inevitably begets cooperation.

The social and cultural units that people commonly refer to as religions – Christianity, Islam, Judaism, Buddhism, Shintoism, Hinduism, Melanesian cargo cults, and so forth – are each complexes of beliefs, practices, and social structures too diverse for conceptual reduction and unification. Thus, attempts to generate necessary and sufficient criteria for religion tend either to exclude or include too many characteristics (for further critical discussions of definitional issues, see Arnal & McCutcheon, 2012; Boyer, 2011; Jong, 2015; McCutcheon, 1997). Fortunately, such criteria are unnecessary for our purposes. It is sufficient to stipulate a provisional definition, deferring questions of universal generalizability for the future. Our definition of religion, as stated in the introduction, is reminiscent of the early anthropologist E. B. Tylor's (1871, p. 383) "belief in Spiritual beings," but this ought not saddle us with Tylor's particular brand of evolutionism and intellectualism (Jong, 2017). Rather, we

recruit Tylor's definition for Durkheimian purposes, asking how beliefs in supernatural agents – gods, ghosts, angels, demons, souls, ancestral and shamanic spirits, and so forth – contribute to or detract from social coordination and cooperation. This approach does privilege one aspect of religion, which we consider the most distinctive, but it does not deny that other features of religion – social identity, structures of authority, collective rituals – might also play important roles.

Religion as a Harmful Social Virus

The role that religion plays in society has been an enduring topic of scholarly interest (Durkheim, 1912/1965; Freud, 1961; Weber, 1930) with earlier accounts tending to represent the religious traditions observed around the world as fitting into a linear evolutionary hierarchy. E. B. Tylor is illustrative of this approach. He argued that all religions were ultimately based on *animist* beliefs that objects, places, animals, and people possess a distinct spiritual essence and that this represented a prescientific effort to explain the world and cope with mortality. Tylor's evolutionary framework presented polytheism and later monotheism as emerging from animism, but he conceived these later religious systems as elaborations of an animist core (Tylor, 1871). This led Tylor to disparage religious systems as providing "primitive" systems of thought that would inevitably be replaced by science and rationalism (Strenski, 2006).

A modern descendant of this kind of rationalist critique of religion can be found in the popular works of the writers collectively known as the "New Atheists" (Dawkins, 2007; Dennett, 2006; Harris, 2006; Hitchens, 2008). The evolutionary theorist Richard Dawkins is perhaps the most prominent member of this group and has famously argued that religions represent a pathological "virus of the mind" generating self-replicating and harmful "meme-complexes" (Dawkins, 2004). Religious meme-complexes in Dawkins's view are like an infective virus that exploit the evolved features of human cognition to generate delusional beliefs (and eventually religious institutions) that enable them to replicate and spread further but that are harmful to both their host's intellect and to societal progress more generally, increasing intolerance and out-group prejudice (Dawkins, 2017, Section IV).

In summary, then, for both the New Atheist and Tylorian models, religions are vestigial social organs from our evolutionary past that in the modern era are, at best, unnecessary and, at worst, active and dangerous impediments to social progress. Such a uniformly negative assessment of the role of religion faces strong challenges from contemporary research on the evolution of religion and morality, which tends to argue that rather than being an obstacle to progress, supernatural agent beliefs represent a critical cultural invention that enabled humans to achieve levels of cooperation and social living with non-kin

that is unprecedented in the animal kingdom (Bellah, 2011; Henrich, 2009; Johnson, 2015; Norenzayan, 2013; Purzycki et al., 2016, 2017; West et al., 2006; Wilson, 2010).

Gods and the Evolution of Cooperation

There are two dominant theoretical views about the role of supernatural agent beliefs in the evolution of human cooperation. In both cases, gods are presented as cultural technologies that solve two related social challenges: first, of promoting culturally normative (e.g., cooperative) behavior and, second, of outsourcing punishment and reward. According to the *big gods* hypothesis, a particular form of religion – that which involves morally interested high or "big" gods (Norenzayan, 2013) – enabled cooperation to extend more effectively to strangers, contributing to the cultural evolution of large-scale societies. On this view, big gods are the supreme third-party punishers, because they can detect every norm violation by virtue of their omniscience and are able, due to their omnipotence, to issue penalties in this life and the next. The *supernatural punishment* hypothesis (Johnson, 2015; Piazza et al., 2011) downplays the necessity of big gods, and posits that even small gods – ancestral or shamanic spirits, for example – can be morally interested, and have sufficient access to knowledge and power to serve effectively as moral police in local contexts. As we shall see later, these two theories posit rather different histories of the evolution of religion and morality, but both assume that belief in gods promotes prosocial behavior.

Do Religious Believers Behave More Prosocially? Many attempts have been made to ascertain whether religious believers behave more prosocially than unbelievers; however, this research literature has produced mixed results (Bloom, 2012; Galen, 2012; McKay & Whitehouse, 2015; Saroglou, 2006). For example, while self-reported religiosity (e.g., religious affiliation, service attendance, and orthodox belief) has generally been found to predict self-reported charitable giving, volunteering, and other acts of kindness (for review, see Brooks, 2006; Putnam & Campbell, 2012), this relationship is rarely reflected in studies that measure actual behavior (Annis, 1976; Darley & Batson, 1973; Grossman & Parrett, 2011; Hofmann et al., 2014; Smith et al., 1975). There is also evidence that certain forms of religiosity predict prejudice against ethnic, sexual, and religious others (Johnson et al., 2012; Scheepers et al., 2002; Siegman, 1962; Whitley, 2012).

The inconclusiveness of the literature is further exacerbated by the multiple interpretability of the findings: Prejudice may be damaging to the out-group while being beneficial to the in-group. In other words, it may represent the flipside of loyalty by being prosocial, albeit in a very narrow sense. In this

regard, from a moral foundations theoretic (Graham & Haidt, 2010; Graham et al., 2009, 2013) perspective, religiosity is associated with group-focused "binding" moral emphases on attributes such as authority, loyalty, and purity, rather than "individuating" ones such as care and fairness. Therefore, what has conventionally been defined as *moral* concerns may reflect a restrictive liberal bias that excludes the kind of moral issues prevalent in religions, such as concerns about the preservation of traditions or the respect for authority. There is some evidence for this claim, but so far, only at the level of self-report (Johnson et al., 2016; LaBouff et al., 2017).

To date, most research on this topic has been conducted on Western Christians. Nevertheless, two recent attempts to go beyond this convenient sample have provided some support for the big gods hypothesis. First, Henrich et al. (2010) reported that across fifteen societies – including communities in Colombia, Kenya, and Papua New Guinea – participants who were involved with world religions, which all posit morally concerned high gods, were more generous toward anonymous strangers. Second, Purzycki et al. (2016) found that the more individuals rated their moralistic gods as punitive and knowledgeable about human thoughts and actions, the more generous they were to geographically distant co-religionists.

Overall, the evidence for a relationship between religious traits and prosocial behaviors is weak, but this may be unsurprising from a social-psychological perspective, which has long given us reason to doubt the predictive power of self-reported attitudes (Fishbein & Ajzen, 1975; Mischel, 1968). Rather, behaviors are the product of interactions between personalities and situations (Ross & Nisbett, 1991). We might, therefore, expect religious situations to promote prosocial behaviors, even if religious traits prove to be poor predictors. This raises the possibility that religious *reminders* are necessary, even for moralizing religions, to increase prosociality.

Does Religious Priming Promote Prosociality?   Whether because of fears of supernatural punishment, belief in moralizing high gods, or other alternative mechanisms, recent experimental and quasi-experiment findings suggest that religious priming – the making salient of religious concepts – does increase prosocial behavior. For example, actual religious environments (e.g., chapels, temples) stimulate greater levels of cooperation than similar secular environments (Ahmed & Salas, 2013; Johnson et al., 2012; Ruffle & Sosis, 2010; Xygalatas, Klocová, et al., 2016; Xygalatas, Mitkidis, et al., 2013). Furthermore, following an influential paper by Shariff and Norenzayan (2007), which found that implicit priming of god concepts increased "prosocial behavior in an anonymous economic game" regardless of stated religiosity, a substantial body of laboratory-based priming studies suggests that the priming of religious concepts promotes a range of prosocial behaviors, such as honesty

(Randolph-Seng & Nielsen, 2007), obedience (Saroglou et al., 2009), and third-party punishment (McKay et al., 2011). A recent meta-analysis of this literature examined ninety-three religion priming studies (Shariff et al., 2015; but see Van Elk et al., 2015 for a critical view) and concluded that the effects of religious priming on prosocial behavior is robust, based on a subanalysis of twenty-five studies, but only for religious participants; effects on nonreligious participants were unreliable. This suggests that both religious belief and religious priming are necessary.

However, as with the correlational research reviewed earlier, a closer look at the research provides a more complicated picture. It is not a simple matter to interpret whether the motivations producing the effects observed (McKay & Whitehouse, 2015, pp. 458–60) are due to the reminder of supernatural punishment, teachings that promote compassion for the disadvantaged, or a more general aversion to inequity (Fehr & Schmidt, 1999). Moreover, studies have shown that in addition to prosociality, religious priming can elicit aggressive or prejudicial responses. For instance, Bushman et al. (2007) found that after reading a violent passage, participants who were told it came from the Bible displayed greater aggression than those who were told it came from an ancient scroll. Similarly, Saroglou et al. (2009) found that after being primed with religious concepts, participants indicated more willingness to take revenge on an individual who had criticized them, although this effect was restricted to those who scored high in personal submissiveness. Finally, Johnson et al. (2010) found that priming Christian concepts in ethnically diverse samples increased racial prejudice (see also Ginges et al., 2009; LaBouff et al., 2012; Van Tongeren et al., 2013). The current results from the literature taken collectively then suggest a more nuanced relationship in which religious priming can elicit both "prosocial" and "non-prosocial" or parochial outcomes, depending on contextual factors (see Galen, 2012, and McKay & Whitehouse, 2015, for reviews).

In addition to the interpretive issues and parochial outcomes observed there are also questions about the validity of the effects observed. In particular, a large-scale preregistered attempt at replicating Shariff and Norenzayan's (2007) experiment failed to reproduce their findings (Gomes & McCullough, 2015), as did a preregistered cross-cultural replication attempt in Japan (Miyatake & Higuchi, 2017). Furthermore, Purzycki et al. (2016, Supplementary Material) reported finding "no overall effect beyond chance" for religious primes in a five-country sample – including Mauritius, Brazil, Fiji, Russia, and Tanzania. In general, the current preponderance of samples from Western populations, and the reliance on references drawn from Abrahamic religious traditions, make it uncertain how far the priming results, if they are indeed replicable, are generalizable outside of such contexts – a point acknowledged even in positive reviews (Shariff et al., 2015, p. 42).

Big Gods or Supernatural Punishment?

Overall, we lack sufficient cross-cultural evidence to adjudicate between the two theoretical approaches on the evolution of religion and morality. The distinction between them may seem minor, but they posit different historical trajectories. Moralizing high gods would appear to be a relatively recent cultural innovation (Baumard et al., 2014). Outside the Abrahamic faiths, supernatural agents are reported to vary significantly in their levels of knowledge and power, and the extent to which they care about moral activity (Purzycki, 2013; Purzycki & Sosis, 2011). The spirits and deities of smaller societies, including hunter-gatherers and foragers, are argued to display more limited moral concern and powers of enforcement, with "intermediate" forms found in chiefdoms and early states (Norenzayan et al., 2016, p.9). This would seem to be consistent with the prediction that big gods are only needed in big societies.

While big gods could be one way of enforcing cooperation among relative strangers, the same effect could be achieved through beliefs in broad forms of supernatural punishment not requiring agents, for example by positing instead impersonal forces such as karma. Accordingly, a recent study by Watts et al., (2015) used a Bayesian phylogenetic approach to analyze beliefs in ninety-six Austronesian societies and predict their likely historical emergence. Watts et al.'s (2015, p. 1) analysis found that "broad supernatural punishment drove political complexity, whereas moralizing high gods *follow* political complexity." Moreover, recent analyses of data from 414 societies over 10 000 years from *Seshat* – a newly constructed historical database (Turchin et al., 2015; Turchin et al., 2020.) – to examine relationships between social complexity and supernatural enforcement of morality found that "moralizing gods follow – rather than precede – large increases in social complexity" (Whitehouse et al., 2019, p. 226).

To date the evidence thus appears to run counter to the idea that big gods helped to drive the emergence of big societies and raises questions about whether beliefs in moralizing high gods – strongly associated with the Abrahamic religions – are as significant as has been proposed to systems of cooperation. This remains an active area of research, and there is no established consensus but the growing emphasis on cross-cultural samples, historical analysis, and more nuanced measures of religious belief, ritual practices, and "prosociality" offer cause for optimism that progress is being made.

Conclusion

Our overview is far from exhaustive, but it touches on several key topics and active areas of research relating to both ritual and religion in promoting cooperation. As we have emphasized, rituals are not solely the province of

groups espousing religious beliefs (as defined here); many of the potential mechanisms discussed in the first section are likely to have broad relevance across a wide range of activities. Indeed, it is hard to think of an area of social life that does not involve rituals and ritualized behavior. Overall we find the evidence for a link to prosocial behavior is stronger for ritual than for religion.

To end on a cautious note of optimism, we would emphasize that many of the studies we consider are from the last ten years, reflecting a surge of recent interest in empirical research on ritual and religion. We welcome this but also note that the majority of findings remain in need of high-quality replications and more substantial cross-cultural investigations before strong generalizable conclusions can be drawn. This remains the case even for topics that have been studied for decades, such as the disputed link between prosociality and religion.

This is not to deny that progress has been made; there is now a broad consensus among relevant researchers that both rituals and religions play an important role in promoting social coordination, at least within in-group boundaries (Bulbulia et al., 2013). However, it is essential to take insights about methodological reforms, derived from the "replication crisis" in social psychology, seriously (Nosek et al., 2015; Open Science Collaboration, 2015; Simmons et al., 2011). That is, studies should be appropriately powered to answer the questions they ask, preregister their models and predictions where appropriate, and adhere to open science practices with regard to data sharing and transparency. Taking the potential impact of these methodological reforms seriously means that the current era presents exciting new opportunities for scholars interested in religion and ritual to make genuine discoveries that can help resolve some of the longstanding theoretical debates discussed in this chapter.

Acknowledgments

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