Extreme Rituals Promote Prosociality

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Extreme rituals entail excessive costs without apparent benefits, which raises an evolutionary cost problem (Irons, 2001). It is argued that such intense rituals enhance social cohesion and promote cooperative behaviors (Atran & Henrich, 2010; Durkheim, 1912). However, direct evidence for the relation between ritual intensity and prosociality is lacking. Using economic measures of generosity and contextually relevant indicators of group identity in a real-world setting, we evaluated prosocial effects from naturally occurring rituals that varied in severity.

Our study took place in Mauritius, a multicultural country where citizens frequently negotiate between parochial ethnic-religious and inclusive national identities (Ng & Verkuyten, 2010). We examined two rituals that were part of the annual Hindu festival of Thaipusam, one of the most widely celebrated religious festivals the world over: a low-ordeal ritual involving singing and collective prayer (Fig. 1a) and a high-ordeal ritual (Kavadi; Fig. 1b) involving body piercing with multiple needles and skewers, carrying heavy bamboo structures, and dragging carts attached by hooks to the skin for over 4 hr before climbing a mountain barefooted to reach the temple of Murugan.

On the basis of evolutionary perspectives on the social functions of religious practices (Norenzayan & Shariff, 2008; Sosis, 2003) and recent evidence on extreme rituals and empathic arousal (Konvalinka et al., 2011), we predicted that higher ritual intensity would lead to greater generosity for both performers and observers. We also predicted an effect of ritual intensity on social identification. Classical findings from psychology (Aronson & Mills, 1959; Festinger, 1957; Tajfel, Billig, Bundy, & Flament, 1971) and evolutionary perspectives on parochial altruism (Choi & Bowles, 2007; Ginges, Hansen, & Norenzayan, 2009) suggest that ritual intensity is associated with subgroup identification. However, recent intergroup theories

(Gaertner & Dovidio, 2000; Hornsey & Hogg, 2000) suggest that in Hindu-dominated Mauritius, where Thaipusam is celebrated on a national scale, the ritual of the majority religious group affirms the inclusive nature of the superordinate Mauritian national identity.

Method

Participants were 86 males, all belonging to the same religious and social group: 19 were high-ordeal performers of the Kavadi, 32 were high-ordeal observers (nonperforming participants who walked alongside performers), and 35 were low-ordeal performers who participated in a collective prayer 3 days earlier. Observers were typically related to the performers and had previously performed the Kavadi. All participants took part in both rituals, although each was tested in only one, selected randomly to avoid self-selection biases. Both rituals occurred at the same venue and had similar durations and numbers of attendants. Participants were recruited by local assistants immediately after each ritual. Following the ritual, they entered a room near the temple and answered a questionnaire before engaging in a donation task. The questionnaire was delivered on computer screens by Presentation software (Version 0.70; NeuroBehavioral Systems, www.neurobs.com). Participants used the arrow keys on a standard keyboard to move a cursor along unmarked sliding scales anchored by verbal labels in the local Creole language.

We operationalized prosociality in terms of behavior (charity) and attitudes (social identification). Identity was measured on a scale anchored by the parochial

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Fig. 1. Photos from the annual Hindu festival of Thaipusam and results showing the effects of ritual intensity. Subjects were participants in a low-ordeal ritual involving singing and collective prayer (a) and performers in or observers of a high-ordeal ritual involving body piercing with multiple needles, hooks, and skewers (b). Mean ratings of social identity (parochial Hindu vs. inclusive Mauritian; c) are shown as a function of group. Mean donations in Mauritian rupees (MUR) are shown both (d) as a function of group and (e) as a function of the high-ordeal group, collapsed across performers and observers ($n = 51$) and divided into quartiles based on participants' pain ratings. Error bars in (c) through (e) represent standard errors of the mean.

ethnic-religious Hindu identity at one end and by the superordinate inclusive national Mauritian identity at the other. Religiosity was measured in terms of belief and temple attendance. These questions were adapted from the World Values Survey (2012, Items V145 and V147) in discussion with focus groups. Pain was measured on a scale anchored by *no pain at all* and *most painful thing ever*. The question “how painful is it to perform the Kavadi?” allowed us to examine experienced pain for

performers and perceived pain for observers. After completing the questionnaire, participants were paid 200 rupees in coins of 20 rupees (approximately 2 days' salary for an unskilled worker) for participating in the study. On leaving, participants entered a booth, where they had the opportunity to anonymously donate any part of this money to the temple. A system of numbered envelopes and questionnaires enabled us to track individual donations while maintaining anonymity.

Results and Discussion

Low-ordeal participants donated an average of 80.91 Mauritian rupees ($SD = 69.18$), high-ordeal observers donated 161.25 rupees ($SD = 65.04$), and high-ordeal performers donated 132.63 rupees ($SD = 72.79$; Fig. 1d). An analysis of variance (ANOVA) showed a main effect of group on donation, $F(2, 83) = 11.78, p < .001$. The difference between charity in the low-ordeal group and high-ordeal group (performers and observers combined) was significant, $t(84) = -4.61, p < .001$, whereas that between high-ordeal performers and observers was not, $t(49) = 1.45, p = .15$; this finding suggests that the high-ordeal ritual was associated with greater levels of generosity for both performers and observers than the low-ordeal ritual.

Focusing on the high-ordeal group (performers and observers), we performed a bootstrapping analysis and found that pain correlated with donations ($r = .36, p < .01$). Notably, this effect held even after controlling for age, religiosity, and temple attendance—95% confidence interval (CI) = [.09, .66], $p < .05$. To further assess the effect of perceived pain on donations, we divided the high-ordeal group into four quartiles based on participants' pain ratings. The overall difference among quartiles was significant, $F(3, 46) = 3.34, p < .05$. A linear polynomial contrast on these quartiles was highly significant, $F(1, 46) = 8.13, p < .01$, which indicates that higher levels of perceived pain were directly associated with greater donations (Fig. 1e). There were no significant differences between experienced pain (performers) and perceived pain (observers). The number of piercings did not predict how much participants donated, which suggests that effects were driven by subjective experiences of pain (Hadjistavropoulos et al., 2011). There were no differences between groups in religiosity or temple attendance, which indicates that responses did not arise from intrinsic differences in religiosity or familiarity effects but rather from the ritual conditions.

In line with modern intergroup theories, low-ordeal participants expressed the most parochial identities ($M = 1.71, SD = 6.50$), seeing themselves as more Hindu than high-ordeal observers ($M = 3.03, SD = 6.50$) and high-ordeal performers ($M = 7.13, SD = 3.46$), who both favored the more inclusive Mauritian identity (Fig. 1c). An ANOVA showed a main effect of group on identity, $F(2, 83) = 5.16, p < .01$. The difference between participants in the low-ordeal ritual and high-ordeal ritual (performers and observers combined) was significant, $t(84) = 2.11, p < .05$, as was that between high-ordeal observers and performers, $t(49) = 2.54, p < .05$; these findings suggest that the intensity of the ordeal amplified the more inclusive social identity. A bootstrapping analysis revealed that greater judgments of pain predicted more inclusive identities ($r = .28, 95\% \text{ CI} = [.01, .53], p < .05$). However,

there was no correlation between self-identification and donations, which suggests that the two were independent effects of ritual intensity.

These findings support long-standing anthropological conjectures about the cooperative effects of intense rituals (Durkheim, 1912). We offer the first natural demonstration that suffering predicts prosociality by capitalizing on intense, real-world stimuli that would be hard to manipulate in the laboratory. Furthermore, our study links recent experimental findings that perceived pain increases prosociality (Olivola & Shafir, 2013) with field experiments showing that extreme rituals promote empathic arousal among observers of the ordeals of actors (Konvalinka et al., 2011; Xygalatas, Konvalinka, Roepstorff, & Bulbulia, 2011). These results suggest that costly displays of group commitment (though apparently wasteful) may be conserved because they intensify prosocial behaviors and attitudes among the wider community (Henrich, 2009; Sosis & Bressler, 2003).

Finally, we note that identity always functions in a social context (Tajfel, 1984). In the context of a public ritual that recognizes the Hindu majority group, situated in a larger community whose members hold multiple identities, ritual intensity enhanced the superordinate national identity (also see Clingingsmith, Khwaja, & Kremer, 2009). Overall, extreme rituals appear to amplify prosocial attitudes and behaviors, and direct or empathic experiences of pain may be the link connecting these ordeals to prosociality.

Author Contributions

D. Xygalatas developed the study concept. D. Xygalatas, P. Mitkidis, R. Fischer, P. Reddish, and J. Bulbulia designed the experiment and collected the data. J. Skewes and D. Xygalatas developed stimuli, and J. Skewes provided technical support. D. Xygalatas, A. Roepstorff, R. Fischer, and J. Bulbulia analyzed and interpreted the data and wrote the article. A. W. Geertz contributed to revising the paper. All authors provided critical revisions and approved the final version of the article for submission.

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The authors declared that they had no conflicts of interest with respect to their authorship or the publication of this article.

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