How do extreme ritual practices impact psychophysiological well-being? Findings from a Tamil Hindu kavadi ritual in Mauritius

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Religion has major consequences for personal and public health

• Religious customs affect the quality of life of millions of people around the world (Koenig 2001, 2012; Zimmer et al. 2016)

• Positive effects of practices like prayer, yoga, and meditation on psychological and physical well-being (Bernardi et al. 2001; Gupta et al. 1997)

• Similar health benefits have also been shown for participation in collective rituals
  • Reduced stress following celebrations of the Hindu holidays Holi and Navratri (Snodgrass, Most, and Upadhyay 2017)
  • Increased perceived well-being among participants in a massive pilgrimage (Tewari et al. 2012)

• Little is known about the effects of physically intense cultural practices that involve acute stress, pain, and/or bodily mutilation (Xygalatas 2012)

• Such rituals are performed voluntarily by millions of people around the world (Rossano 2015; Xygalatas 2011) and in fact are often considered culturally prescribed remedies for a variety of maladies, most commonly those related to mental health (Jilek 1982)
Methods

• 39 males (M age=45.21, SD=15.76): 19 participants who carried a kavadi and underwent body piercings, matched with 20 controls from the same community

• Participants wore a portable monitoring device that recorded measures of electrodermal activity, skin temperature and heat flux, and acceleration of movement (BodyMedia SenseWear mini armband; 92.2% of the time on average)
  • a) three weeks before (Pre-ritual)
  • b) during the week of the ritual
  • c) three weeks after (Post-ritual)

• Participants’ blood pressure recorded daily, demographics including status

• Survey instruments were administered at the end of Pre- and Post-ritual time-points to assess various aspects of psychological well-being
Table 2. Models of pain and stress and of outcome variables for the ritual group measured after the kavadi ritual (imputed data set)

<table>
<thead>
<tr>
<th>Variables</th>
<th>Pain</th>
<th>Stress</th>
<th>Quality of life</th>
<th>Perceived health</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Intercept</td>
<td>−2.30 (1.05)*</td>
<td>−1.20 (.78)</td>
<td>4.06 (1.22)**</td>
<td>3.29 (.91)**</td>
</tr>
<tr>
<td>Illness</td>
<td>2.30 (1.33)*</td>
<td>...</td>
<td>−1.59 (1.55)</td>
<td>...</td>
</tr>
<tr>
<td>Socioeconomic status</td>
<td>...</td>
<td>−2.11 (1.10)**</td>
<td>...</td>
<td>−.05 (.80)</td>
</tr>
<tr>
<td>Pre</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td>Stress</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td>Pain</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td>Observations</td>
<td>17</td>
<td>17</td>
<td>17</td>
<td>17</td>
</tr>
</tbody>
</table>

Note. Each modeled number contains coefficients with SEM. Pain is modeled with logistic regression predicting the probability of being in the high-pain group. Stress is modeled with generalized linear model assuming gamma distribution. Quality of life and self-assessed health were modeled with ordinary least squares regression, holding their mean pre-ritual levels constant. Intercept is the mean of centered predictors. Pre = measurements pre-ritual.

* P < .1.
** P < .05.
*** P < .01.
Low status males participate more intensely (n=86)
Summary of findings/ explanations

• No detectable persistent harmful effects on participants, who in fact showed signs of improvement in their perceived health and quality of life.

• **Bottom up**: The sensory, physiological, and emotional hyperarousal involved in strenuous ordeals can produce feelings of euphoria and alleviation from pain and anxiety (Fischer et al. 2014; Xygalatas 2008), and there is evidence of a neurochemical basis for these effects via endocrine alterations in neurotransmitters such as endorphins (Boecker et al. 2008; Lang et al. 2017) or endocannabinoids (Fuss et al. 2015).

• **Top down**: Cultural expectations and beliefs in the healing power of the ritual may act as a placebo (McClenon 1997), buffering stress-induced pressures on the immune system (Rabin 1999).

• Performed collectively, these rituals can provide additional comfort through forging communal bonds, providing a sense of community and belonging, and building social networks of support (Dunbar and Shultz 2010; Xygalatas et al. 2013)
Effects of Extreme Ritual Practices on Psychophysiological Well-Being

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Effects of Extreme Ritual Practices on Psychophysiological Well-Being

Religious beliefs and practices have major consequences for personal and public health. From dietary restrictions and substance use and avoidance to family planning, organ donation, and the prevention of sexually transmitted diseases, religious customs affect the quality of life of millions of people around the world (Koenig 2001, 2012; Zimmer et al. 2016). Previous research suggests that regularly engaging in certain religious activities may have beneficial health outcomes. Specifically, various studies have found positive effects of contemplative practices like prayer, yoga, and meditation on psychological and physical well-being (Bernardi et al. 2001; Gupta et al. 1997). Similar health benefits have also been shown for participation in collective rituals. For example, recent studies conducted in India have documented reduced stress following celebrations of the Hindu holidays Holi and Navratri (Snodgrass, Most, and Upadhyay 2017) and increased perceived well-being among participants in a massive pilgrimage (Tewari et al. 2012).
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