



Searching for Control: Priming Randomness Increases the Evaluation of Ritual Efficacy

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Abstract

Reestablishing feelings of control after experiencing uncertainty has long been considered a fundamental motive for human behavior. We propose that rituals (i.e., socially stipulated, causally opaque practices) provide a means for coping with the aversive feelings associated with randomness due to the perception of a connection between ritual action and a desired outcome. Two experiments were conducted (one in Brazil [$n = 40$] and another in the United States [$n = 94$]) to evaluate how the perceived efficacy of rituals is affected by feelings of randomness. In a between-subjects design, the Scramble Sentence Task was used as a priming procedure in three conditions (i.e., randomness, negativity, and neutral) and participants were then asked to rate the efficacy of rituals used for problem-solving purposes. The results demonstrate that priming randomness increased participants' perception of ritual efficacy relative to negativity and neutral conditions. Implications for increasing our understanding of the relationship between perceived control and ritualistic behavior are discussed.

Keywords: Randomness; Ritual; Perception of control; Illusion of control; Supernatural cognition; Superstition; Causal reasoning

1. Introduction

“We find magic whenever the elements of chance and accident, and the emotional play between hope and fear, have a wide and extensive range. We do not find magic whenever the pursuit is certain, reliable, and well under control of rational methods.”

— Malinowski (2004)

Anthropologists have long noted that the use of rituals for instrumental purposes is linked to conditions of risk and uncertainty (Bloch, 2004; Boyer & Liénard, 2006; Csordas, 2002; Fiske & Haslam, 1997; Humphrey & Laidlaw, 1994; Sørensen, 2007; Sax, Quack, & Weinhold, 2009; Whitehouse, 2001). When Malinowski (2004) visited the Trobriand Islands of New Guinea, he observed that sometimes behavior had clear causal rationales, whereas at other times it consisted of causally opaque practices such as ritual. For example, the Trobrianders rarely relied on ritual when fishing in a reliable and safe lagoon; they described their successes and failures in terms of skill. In contrast, extensive ritual preceded the uncertain and dangerous conditions of deep-sea fishing.

The Trobriand fishermen are not alone in their use of ritual to restore feelings of control when confronted with uncertainty (Souza & Legare, 2011). On college campuses, for instance, up to 70% of students employ such strategies to assist with performance on exams (Gallagher & Lewis, 2001) or athletic competitions (Bleak & Frederick, 1998; Ciborowski, 1997; Todd & Brown, 2003; Van Raalte, Brewer, Nemeroff, & Linder, 1991; Vyse, 2000; Womack, 1992). As Boyer and Liénard (2006) note, there are also intriguing similarities between cultural rituals and individual pathologies such as obsessive-compulsive disorder (Fiske & Haslam, 1997; Rapoport, 1991).

There is considerable empirical evidence demonstrating that lack of perceived control—an individual's belief that he or she cannot predict and affect future events—has applied consequences and is associated with a number of negative psychological states. For example, it contributes to the tendency to demonstrate depressive and pessimistic behavior and avoid facing challenging situations (Fast, Gruenfeld, Sivanathan, & Galinsky, 2009). Conversely, feelings of control promote increased self-esteem, optimism, and greater sense of agency (Scheier, Carver, & Bridges, 1994). Despite the positive associations with feelings of control (Kofta, Weary, & Sedek, 1998), people frequently experience situations in which they lack the capacity to exert the control they desire. Many of the most pervasive ailments that afflict humans such as chronic illness (e.g., cancer), economic insecurity (e.g., unemployment), and interpersonal problems (e.g., infidelity) are often not within individual control.

When people are unable to control and predict their environment, attributional biases are activated and strategies are implemented to restore feelings of control (Keinan, 2002; Underwood, 1996; Vaughn & Weary, 2003; Weary & Jacobson, 1997; Weary, Jacobson, Edwards, & Tobin, 2001). For example, people detect correlations among random sets of stimuli that are presumably unrelated when they are primed with feelings of lack of control (Kay, Gaucher, Napier, Callan, & Laurin, 2008; Whitson & Galinsky, 2008).

To the extent that the rituals have little or no actual bearing on the success of instrumental outcomes (Lobmeyer & Wasserman, 1986) and are not based on physical causation (Humphrey & Laidlaw, 1994; Legare & Herrmann, 2013; Legare & Souza, 2012), what motivates this behavior? We hypothesize that ritual is used for instrumental purposes to maintain an *illusion of control*. An illusion of control (Langer, 1975) occurs when people believe or respond as if contingencies between their behavior and the outcome exist, even if the outcomes are random (Alloy, Abramson, & Viscusi, 1981; Matute, 1994). Rituals, which we define as conventional, causally opaque procedures may

provide a means for coping with the aversive feelings associated with randomness by reestablishing feelings of control. In line with prior work on reasoning about ritual efficacy (Legare & Souza, 2012), we propose that the structure of ritual can be interpreted in light of intuitive causal beliefs about the efficacy of action (e.g., repetition and number of procedural steps) and not content familiarity with culturally specific rituals.

Actions vary along a continuum ranging from highly efficacious to neutral (e.g., placebo) to harmful (e.g., bloodletting). Where do most rituals lie on this continuum? Perhaps close to zero in actual efficacy. But if things like number of procedural steps and repetition are generally linked with more efficacious actions (Legare & Souza, 2012), rituals may parasitize elements that are statistically linked with more causally efficacious practices.

Despite the fact that engaging in causally opaque practices may seem to be a paradoxical means of increasing perceived control, we hypothesize that this is possible because rituals provide a socially stipulated and culturally sanctioned opportunity to exert agency through actions with the potential for causal efficacy, thereby giving the illusion of increased control (Kay et al., 2008; Thompson, Armstrong, & Thomas, 1998). Priming randomness increases the activation of attributional biases to detect a connection between action and outcome as a means of reestablishing feelings of control. The perception of a connection also increases the evaluation of ritual efficacy.

Seminal work on the relationship between illusion of control and superstitious behavior has examined first-person experiences (Keinan, 1994, 2002; Rudski, 2001; Rudski & Edwards, 2007). We predict that this relationship operates not only in first-person experiences with uncertainty but also when evaluating the experiences of others. In two studies we investigate this prediction directly by examining whether priming randomness affects the perception of the efficacy of rituals.

Study 1 was conducted in Brazil, a cultural context in which a particular type of ritual—called *simpatia*—is used to treat a variety of problems. *Simpatias* are ritualistic remedial procedures used to solve everyday biological (e.g., sinusitis, asthma), psychological (e.g., depression, anxiety), and interpersonal problems (e.g., attracting a partner, infidelity). They are available to the general population, relatively low in cost, and do not require any specialized expertise to be performed. Despite the lack of a physical-causal mechanism underlying their efficacy, *simpatias* are widely endorsed and used for a greater variety of problem-solving purposes. Here is an example of a *simpatia* used to treat everyday problems (Legare & Souza, 2012):

In the first day of last quarter phase of the moon, take the milk from a coconut and give it to the affected person to drink. After that, ask the person to spit three times in the hole made in the coconut. Following this, light up a brand-new white candle and drop the wax around the hole until the hole is sealed. Take the coconut to a far away beach or river.

Legare and Souza (2012) designed experimental *simpatias* to match the characteristics and content of existing *simpatias*. A selection of their stimuli was used in the current

studies to assess perceptions of ritual efficacy. To prime feelings of randomness, we used a previously validated task called the scrambled sentence task—SST (Kay, Moscovitch, & Laurin, 2010). A more detailed description of the task is provided below.

2. Study 1

2.1. Methods

2.1.1. Participants

Forty Brazilian Portuguese-speaking adults participated in the study. Participants were recruited from the metropolitan area of the city of Belo Horizonte located in the southeastern region of Brazil. They were recruited from public health centers located in a peripheral neighborhood of Belo Horizonte. The public health centers (known as *Posto de Saúde*) are centers maintained by the city administration, and they serve the population from the community in which the center is located.

According to the Brazilian Institute of Geography and Statistics (IBGE, 2010), Belo Horizonte has a population of over 6 million people with a per capita income of R \$17,313 (approximately US\$10,820). The ethnic composition of the population is 47% Black, 41% Pardo (mixed race), and 12% White. In terms of religious composition, over 68% of the population self-identify as Catholic, 19% Protestant, and 8% of the population reported not having any religious affiliation. Although census data has traditionally failed to capture the range of religious traditions available in Brazil (especially those of Afro-Brazilian roots), the endorsement of *simpatias* exists across all religious groups.

2.1.2. Materials

To assess the perceived efficacy of rituals, we used *simpatias* designed by Legare and Souza (2012). They were designed to match the characteristics of existing *simpatias* to maximize ecological validity (see Appendix A). A previously validated task called SST was used to prime randomness in one condition and negativity in the other (Kay et al., 2010). A baseline condition containing neutral words was also created. In the SST, each participant is given 16 scrambled sentence strings composed of five words each (see Appendix B). Participants are asked to rearrange four of the five words to form a meaningful sentence and then to cross out the one word left out. Some participants were given word sets containing words related to randomness (e.g., *chaotic*), whereas other participants were given word sets containing negatively valenced words (e.g., *lazy*) (Kay et al., 2010).

2.1.3. Procedure

Participants were randomly assigned to one of the two conditions (i.e., *randomness condition* and *negativity condition*). The second author, a native speaker of Brazilian Portuguese, interviewed each participant individually. Each participant was given a set of words (according to the condition assigned) and was asked to form sentences. Participants were allowed to take as long as they wanted to for the sentences. As mentioned before,

the *randomness condition* SST contained words related to randomness, whereas the *negativity condition* contained negatively valenced words.

Following the priming task, participants were presented with six *simpatias* paired with specific problems. The order of presentation was randomized across participants. Then participants were asked:

On a scale from 1 to 10, 1 being EFFECTIVE and 10 being INEFFECTIVE, how much do you think this *simpatia* is effective for treating this specific problem?

2.2. Results and discussion

Preliminary analysis revealed that the priming manipulation affected the efficacy ratings of all six *simpatias* equally. There was no main effect of specific *simpatias* used and no interaction between specific *simpatias* and priming manipulations. Thus, the ratings of the six *simpatias* were averaged to form a single index of ritual efficacy for each participant. Results revealed that participants in the randomness condition rated the *simpatias* as significantly more effective ($M = 4.33$, $SD = 0.31$) than participants in the negativity condition ($M = 4.64$, $SD = 0.40$), $t(38) = 2.65$, $p < .05$ (*simpatias* with lower ratings were judged to be more effective than *simpatias* with higher ratings).

This finding supports the hypothesis that the evaluation of ritual efficacy increases when the motivation to reestablish control is primed. Rituals may provide a mechanism for accomplishing this goal (Keinan, 2002). Another possibility is that the negativity condition reduced perceptions of efficacy, rather than the randomness condition increasing perceptions of efficacy. To explain this alternative explanation, in Study 2, we included a third condition containing neutral words. In previous research by Legare and Souza (2012), the evaluation of ritual efficacy did not vary between populations familiar with Brazil and unfamiliar with U.S. *simpatias*. Thus, to examine the generalizability of the results from Study 1 in a population unfamiliar with the content of these culturally specific rituals, Study 2 was conducted in the United States

3. Study 2

3.1. Methods

3.1.1. Participants

Ninety-four undergraduate students at a large research university located in the southwest of the United States participated in Study 2 for course credit.

3.1.2. Materials

The materials used in Study 2 were identical to the materials used in Study 1 except that they were translated from Brazilian Portuguese into American English by the second author.

3.1.3. Procedure

The procedure for Study 2 was identical to Study 1 except that the simpatias and efficacy ratings questions were presented using *E-Prime* rather than being read to participants. Again, participants were asked to rearrange four of the five words to form a meaningful sentence and then to cross out the one word left out. For 33 participants (randomly selected), the word sets contained words related to randomness (e.g., *chaotic*), for 32 participants, these words were negatively valenced words (e.g., *lazy*), and finally for 29 participants, the words were neutral words extracted from the Affective Norms for English Words (ANEW) database (Bradley & Lang, 1999).

3.2. Results and discussion

The objectives of Study 2 were to examine the generalizability of the effect in a cultural context unfamiliar with simpatias and explore the possibility that negative words reduced the evaluation of ritual efficacy. As predicted, although the simpatias were rated as less effective in the U.S. sample than in the Brazilian sample (consistent with Legare & Souza, 2012), a one-way ANOVA revealed a main effect of condition, $F(2,91) = 5.07$, $p < .05$, $\eta^2 = 0.10$ on the efficacy ratings. Post hoc tests (Bonferroni corrected—cutoff at .02) demonstrated that participants primed with randomness rated the simpatias as significantly more efficacious ($M = 8.06$, $SD = 1.64$) than participants in the neutral condition ($M = 9.01$, $SD = 0.97$), $t(60) = -2.71$, $p < .002$, and marginally more efficacious than participants in the negativity condition ($M = 8.84$, $SD = 1.02$), $t(63) = 2.27$, $p = .02$. Notably, there was no significant difference between the efficacy ratings of people in the neutral condition and negativity condition. The results demonstrate that even with unfamiliar content, priming randomness increased ritual efficacy evaluations, consistent with the results of Study 1. The lack of difference between the negativity and neutral condition suggests that randomness increases perceptions of ritual efficacy, rather than negativity decreasing ritual efficacy evaluation.

4. General discussion

When faced with randomness, attributional biases are activated and strategies are adapted to reestablish feelings of control (Weary & Edwards, 1994; Weary & Jacobson, 1997; Weary et al., 2001; Wichman, Brunner, & Weary, 2008). Our results support the hypothesis that perceptions of the efficacy of ritualistic behavior are influenced by the desire to regain a sense of control. For example, participants in the randomness condition rated simpatias as significantly more efficacious than participants in the control condition. One potential explanation of this effect is that rituals may provide an opportunity to posit a connection between action and outcome. It is also possible that priming randomness alters the perceived cost of performing the ritual versus the perceived benefit of the intended outcome. One productive line of future research could explore the relationship between perceptions of control and actual control as they relate to ritualistic behavior.

Research of this kind has the potential to speak to the evolved function of this behavior by determining if the proposed psychological mechanism produces positive consequences in behavioral outcomes and is not limited to psychological states.

Examining the interplay of perceived control and ritual is of pervasive interdisciplinary interest with long-standing roots in both anthropology (Bloch, 2004; Boyer & Liénard, 2006; Csordas, 2002; Fiske & Haslam, 1997; Humphrey & Laidlaw, 1994; Sax et al., 2009; Sørensen, 2007; Whitehouse, 2001) and experimental psychology (Keinan, 1994, 2002; Rudski & Edwards, 2007). Despite this widespread interdisciplinary interest, the current studies are the first to examine the relationship between priming randomness and reasoning about the efficacy of ritualistic practices used by others. By examining this relationship experimentally, we have demonstrated that ritual may serve as a mechanism for reestablishing the perception of control and have provided insight into the cognitive foundations of the evaluation of ritual efficacy. Studying ritual from this perspective contributes to the body of research (Boyer & Liénard, 2006; Kay et al., 2008, 2010; Keinan, 1994, 2002; Rudski, 2001), demonstrating that one of the functions rituals serve is to make the world seem more comprehensible, certain, and predictable.

References

- Alloy, L., Abramson, L., & Viscusi, D. (1981). Induced mood and the illusion of control. *Journal of Personality and Social Psychology*, 41(6), 1129.
- Bleak, J., & Frederick, C. (1998). Superstitious behavior in sport: Levels of effectiveness and determinants of use in three collegiate sports. *Journal of Sport Behavior*, 21(1), 1–15.
- Bloch, M. (2004). Bringing ritual to mind: Psychological foundations of cultural forms. *Journal of the Royal Anthropological Institute*, 10, 202–203.
- Boyer, P., & Liénard, P. (2006). Precaution systems and ritualized behavior. *Behavioral and Brain Sciences*, 29(06), 635–641.
- Bradley, M., & Lang, P. (1999). *Affective Norms for English Words (ANEW): Instruction manual and affective ratings* (Technical Report C-1). Gainesville, FL: The Center for Research in Psychophysiology, University of Florida.
- Ciborowski, T. (1997). Superstition in the collegiate baseball player. *The Sport Psychologist*, 11(3), 305–317.
- Csordas, T. (2002). *Body/meaning/healing*. New York: Palgrave Macmillan.
- Fast, N., Gruenfeld, D., Sivanathan, N., & Galinsky, A. (2009). Illusory control a generative force behind power's far-reaching effects. *Psychological Science*, 20(4), 502–508.
- Fiske, A., & Haslam, N. (1997). Is obsessive-compulsive disorder a pathology of the human disposition to perform socially meaningful rituals? Evidence of similar content. *The Journal of Nervous and Mental Disease*, 185(4), 211–222.
- Gallagher, T., & Lewis, J. (2001). Rationalists, fatalists, and the modern superstitious: Test-taking in introductory sociology. *Sociological Inquiry*, 71(1), 1–12.
- Humphrey, C., & Laidlaw, J. (1994). *The archetypal actions of ritual: A theory of ritual illustrated by the jain rite of worship*. Oxford, England: Clarendon Press .
- IBGE. (2010). Pesquisa nacional por amostra de domicílios. *República Federativa do Brasil*.
- Kay, A., Gaucher, D., Napier, J., Callan, M., & Laurin, K. (2008). God and the government: Testing a compensatory control mechanism for the support of external systems. *Journal of Personality and Social Psychology*, 95(1), 18.

- Kay, A., Moscovitch, D., & Laurin, K. (2010). Randomness, attributions of arousal, and belief in god. *Psychological Science*, 21(2), 216–218.
- Keinan, G. (1994). Effects of stress and tolerance of ambiguity on magical thinking. *Journal of Personality and Social Psychology*, 67(1), 48.
- Keinan, G. (2002). The effects of stress and desire for control on superstitious behavior. *Personality and Social Psychology Bulletin*, 28(1), 102–108.
- Koftera, M., Weary, G., & Sedek, G. (1998). *Personal control in action: Cognitive and motivational mechanisms*. New York: Springer.
- Langer, E. (1975). The illusion of control. *Journal of Personality and Social Psychology*, 32(2), 311.
- Legare, C., & Herrmann, P. (2013). Cognitive consequences and constraints on reasoning about ritual. *Religion, Brain & Behavior*, 3(1), 63–65.
- Legare, C., & Souza, A. (2012). Evaluating ritual efficacy: Evidence from the supernatural. *Cognition*, 124, 1–15.
- Lobmeyer, D., & Wasserman, E. (1986). Preliminaries to free throw shooting: Superstitious behavior? *Journal of Sport Behavior*, 9(2), 70–78.
- Malinowski, B. (2004). *Magic, science and religion and other essays 1948*. Whitefish, MT: Kessinger Publishing.
- Matute, H. (1994). Learned helplessness and superstitious behavior as opposite effects of uncontrollable reinforcement in humans. *Learning and Motivation*, 25(2), 216–232.
- Rapoport, J. (1991). Recent advances in obsessive-compulsive disorder. *Neuropsychopharmacology: Official Publication of the American College of Neuropsychopharmacology*, 5(1), 1.
- Rudski, J. (2001). Competition, superstition and the illusion of control. *Current Psychology*, 20(1), 68–84.
- Rudski, J., & Edwards, A. (2007). Malinowski goes to college: Factors influencing students' use of ritual and superstition. *The Journal of General Psychology*, 134(4), 389–403.
- Sørensen, J. (2007). *A cognitive theory of magic*. New York: AltaMira.
- Sax, W., Quack, J., & Weinhold, J. (2009). *The problem of ritual efficacy*. New York: Oxford University Press.
- Scheier, M., Carver, C., & Bridges, M. (1994). Distinguishing optimism from neuroticism (and trait anxiety, self-mastery, and self-esteem): A reevaluation of the life orientation test. *Journal of Personality and Social Psychology*, 67(6), 1063.
- Souza, A., & Legare, C. (2011). The role of testimony in the evaluation of religious expertise. *Religion, Brain & Behavior*, 1(2), 146–153.
- Thompson, S., Armstrong, W., & Thomas, C. (1998). Illusions of control, underestimations, and accuracy: A control heuristic explanation. *Psychological Bulletin*, 123(2), 143.
- Todd, M., & Brown, C. (2003). Characteristics associated with superstitious behavior in track and field athletes: Are there NCAA divisional level differences? *Journal of Sport Behavior*, 26(2), 168–187.
- Underwood, G. (1996). *Implicit cognition*. New York: Oxford University Press.
- Van Raalte, J., Brewer, B., Nemeroff, C., & Linder, D. (1991). Chance orientation and superstitious behavior on the putting green. *Journal of Sport Behavior*, 14(1), 41–50.
- Vaughn, L., & Weary, G. (2003). Causal uncertainty and correction of judgments. *Journal of Experimental Social Psychology*, 39(5), 516–524.
- Vyse, S. (2000). *Believing in magic: The psychology of superstition*. New York: Oxford University Press.
- Weary, G., & Edwards, J. (1994). Individual differences in causal uncertainty. *Journal of Personality and Social Psychology*, 67(2), 308.
- Weary, G., & Jacobson, J. (1997). Causal uncertainty beliefs and diagnostic information seeking. *Journal of Personality and Social Psychology*, 73(4), 839.
- Weary, G., Jacobson, J., Edwards, J., & Tobin, S. (2001). Chronic and temporarily activated causal uncertainty beliefs and stereotype usage. *Journal of Personality and Social Psychology*, 81(2), 206.
- Whitehouse, H. (2001). Transmissive frequency, ritual, and exegesis. *Journal of Cognition and Culture*, 1(2), 167–181.

- Whitson, J., & Galinsky, A. (2008). Lacking control increases illusory pattern perception. *Science*, 322(5898), 115–117.
- Wichman, A., Brunner, R., & Weary, G. (2008). Immediate and delayed effects of causal uncertainty inductions on uncertainty accessibility. *Journal of Experimental Social Psychology*, 44(4), 1106–1113.
- Womack, M. (1992). Why athletes need ritual: A study of magic among professional athletes. In S. Hoffman (Ed.), *Sport and religion* (pp. 191–202). Champaign, IL: Human Kinetics.

Appendix A: Experimental simpatias

Employment In the first day of the last quarter phase of the moon, take the milk from a coconut and give it to the unemployed person to drink. After that, ask the person to spit three times in the hole made in the coconut. Following this, light up a brand-new white candle and drop the wax around the hole until the hole is sealed. Take the coconut to a far away beach or river.

Depression For five days, the person with depression should go to a crossroad. While there, the person should say: “Depression, stay here!” The person should not walk through the crossroad for one year.

Infidelity Throw a shoe and a shirt of the unfaithful person into a streaming river unbeknownst to the person. As the river flows away, you say: “I hope the river takes the infidelity away as fast as it can.” Take some of the water from the river and keep it somewhere in the house.

Lack of Luck Get an orange, peel it, squeeze its juice, and bury its flesh. Place the peel on top of the dirt. Drink the juice three times a day (morning, afternoon, and evening).

Lack of Money Collect seven red apples directly from an apple tree. In the morning, before eating anything, peel the apples, eat them, and save the peel. Right before going to bed, make a tea with the peel.

Appendix B: Scrambled sentence primes

Randomness condition

- committee the door **chaotic** is
- brown play desk the is
- systematic sew anarchists **disorder** hurdle
- orange at he **random** chose
- easily paper store ripped the
- ball the hoop toss normally
- the **haphazardly** flew for robin
- athletes the perform confusion **unpredictably**
- sky the seamless is ruddy
- forget not try fool to

- send I mail it over
- long the today is book
- faith virtue is a **mayhem**
- that garbled spoke **nonsense** Mary
- Dennis flat **chance** a takes
- big chairs they box are

Negative-valenced condition

- committee the door **lazy** is
- brown play desk the is
- systematic sew armies **fear** hurdle
- orange very he **poorly** chose
- easily paper store ripped the
- ball the hoop toss normally
- eat **slimy** worms for robins
- athletes bloody have table **injuries**
- sky the seamless is ruddy
- forget not try fool to
- send I mail it over
- long the today is book
- faith virtue is a **vomit**
- teammates loss hated **idiotic** Mary
- Dennis flat **rat** a sees
- big chairs they box are

Neutral control condition

- committee the door green is
- brown play desk the is
- wallet the table on sit
- languages two he house speaks
- easily paper store ripped the
- ball the hoop toss normally
- is scotland the green box
- cellphone blue the is mouth
- sky the seamless is ruddy
- forget not try fool to
- send I mail it over
- long the today is book
- faith virtue is a car
- Canada lives in book Mary
- Dennis flat car a sees
- big chairs those box are