

Ritual Intuitions: Cognitive Contributions to Judgments of Ritual Efficacy

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ABSTRACT

Lawson and McCauley (1990) have argued that non-cultural regularities in how actions are conceptualized inform and constrain participants' understandings of religious rituals. This theory of ritual competence generates three predictions: 1) People with little or no knowledge of any given ritual system will have intuitions about the potential effectiveness of a ritual given minimal information about the structure of the ritual. 2) The representation of superhuman agency in the action structure will be considered the most important factor contributing to effectiveness. 3) Having an appropriate intentional agent initiate the action will be considered relatively more important than any specific action to be performed.

These three predictions were tested in two experiments with 128 North American Protestant college students who rated the probability of various fictitious rituals to be effective in bringing about a specified consequence. Results support Lawson and McCauley's predictions and suggest that expectations regarding ordinary social actions apply to religious rituals.

Ritual Intuitions: Cognitive Contributions to Judgments of Efficacy

In many different cultures throughout history, people have tried to persuade gods to act in the natural world through the use of prayers and ritual actions. Much as in asking the boss for a raise or a parent for a favor, religious practitioners represent these activities as social actions. But

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how do practitioners decide on an appropriate interaction with the gods? How rituals should be performed? What knowledge is drawn upon?

Recent research in the study of religion from a cognitive perspective has emphasized that much as ordinary and imaginative thought is constrained and informed by conceptual structures (Ward 1995); so too religious concepts rely on ordinary cognition (Barrett 2000; Boyer 1994). For example, intuitive expectations about the properties of human-like intentional agents are applied to God when solving real-time problems, even when these expectations violate explicit theological convictions (Barrett 1998, 1999; Barrett & Keil 1996). Thus, god concepts may be largely informed by knowledge that is not culturally specific, nor needs to be explicitly transmitted (Boyer 1994, 1995).

Similarly, Lawson and McCauley (1990) have argued that religious ritual actions across cultures appear to have structural regularities under-explained by the reputed meanings of the actions. They note that ritual actions (despite their unusual qualities) are cognitively represented as actions. Whether a ritual action involves waving a wand to ward off witches, building a pyramid to facilitate the departure of a pharaoh to the realm of the gods, or lighting a fire to ensure the presence of a superhuman agent, it still requires using ordinary cognitive resources in its representation.

However, religious rituals are also a particular type of action. In such representations someone does something to someone or something in order to bring about some *non-natural* consequence. That is, rituals are actions that are performed to accomplish something that would not normally follow from this specific action. For example, a person who strikes a special pot in order to bring rain would be performing a ritual; whereas, a person who strikes a special pot in order to create pottery fragments, would not be performing a ritual.

Because this ritual action violates natural intuitive causal expectations, the difference in consequence must be justified in the minds of participants or observers. Even observers with little cultural knowledge of a particular religious system will still have intuitions that superhuman agency must be involved for the action to work. If a person smashes a pot with a staff in hopes of bringing rain, people will guess that not just any ordinary person smashing any ordinary pot with any ordinary staff will be successful at

bringing rain. Some non-mechanistic, non-natural form of causation must be at play. The action must be cognitively tagged as more than it seems. If the tag is some connection or appeal to superhuman agency, then the action qualifies as a religious ritual, say Lawson and McCauley.

Once an act is represented as appealing in some way to a superhuman intentional agent to account for the expected consequence, then the most fitting mode of causal cognition to use to generate inferences is social causation. Indeed, structurally, religious rituals mirror social actions: someone performs some kind of action in order to motivate another's action or change in disposition. It just so happens that the person being motivated to act is a god or other non-natural agent.

If people do apply ordinary representations of social actions to reason about religious rituals, one general and two specific empirical predictions follow:

1) Insofar as cross-cultural regularities in social cognition exist, individuals unfamiliar with a particular ritual, religious system, or any religious rituals at all, would have converging intuitions about whether or not a particular ritual is likely to be efficacious. Much as in making grammatical judgments about sentences apart from semantic considerations, judgments of ritual well-formedness may be made divorced from sophisticated understanding of the religious meaning. That is, ritually naïve subjects would have converging opinions about what makes a good, effective ritual a good, effective ritual.

2) Specifically, ritually naïve individuals would appreciate the central importance of superhuman agency being represented somewhere in the ritual structure to account for proposed non-natural consequences. A woman striking a sick man with a staff does not cure him unless the woman, the staff, the man, or some combination of them has some special connection to an agent (or agents) with special qualities. Otherwise, instead of a recovery you only get bruises. When judging if an unfamiliar ritual is effective, individuals will consider some connection to superhuman agency more important than any other aspect of the ritual including the choice of specific agent involved, of object, of action, or of instruments if any.

3) Finally, and most interestingly, because religious rituals are social actions and social actions require appropriate agents, having an appropriate agent for a given ritual will be the factor judged most important

in its success or failure after connection to superhuman agency. Specifically, since rituals are intended events evoking superhuman intervention, an agent that can reasonably intend to achieve the specified consequence of the ritual must initiate the action. For example, a marriage ceremony must be performed by a person who, presumably, intends to see the participants married as a consequence. A talking parrot trained to say all the right words would not be an adequate replacement because of lack of intent. Consequently, individuals unfamiliar with a ritual (or any rituals) will judge the agent in a ritual to be relatively more important to the rituals' success than the particular action the agent performs.

Note that while this third prediction counters the folk notion of rituals as a set of highly specified actions that must be performed just so, it parallels a simple observation about social actions in general. Unlike when bringing about a physical or mechanistic consequence, such as breaking a window, in social interactions the actor's intentions are critical. Similarly, in religious rituals it is predicted that having an appropriate agent — one who can intend to act toward certain ends — will matter more to the success of the ritual than the specific action performed.

We tested these predictions using two experiments in which adult participants reasoned about the potential efficacy of fictitious rituals. If expectations regarding the potential efficacy of ritual form through learning arbitrary social conventions, then participants would have no converging intuitions about the success or failure of unfamiliar rituals such as those used in these experiments. In the first experiment, predictions regarding the importance of superhuman agency being represented in the action structure and the relative importance of having an appropriate agent over performing a particular action were tested. Experiment 2 focused on the relative importance of particular agents over particular actions in rituals compared with non-ritual actions.

Experiment 1

Method

Subjects. Sixty-eight students recruited from introductory psychology courses at an American Midwest liberal arts college participated. They ranged in age from 17- to 22-years old, with a mean age of 18.6 years. Forty were female, 28 male. Participants were almost exclusively Protestant Christians

with the majority identifying with the Christian Reformed Church, a denomination for which (at least theologically speaking) there are no religious rituals as operationalized above. Indeed, American Protestants in general have *at most* only five religious rituals: Communion, baptism, ordination, marriage and funerals. So that participants could not draw on their personal religious knowledge, none of the fictitious rituals used resembled any of these five observances.

Materials. A packet of twelve randomly ordered ritual sets was prepared. At the top of the first page of each packet, participants recorded age, sex, and religious affiliation, and then read these instructions: “For the following ratings ‘special’ means someone or something that has been given special properties or authority by the gods.” The twelve sets of rituals followed.

For each of the twelve sets, a prototype ritual was followed by twelve variations including a reiteration of the prototype. In one-fourth of the prototypes, the agent was described as “special”, in one-fourth the instrument was “special”, in one-fourth both the agent and the instrument were “special”, and in one-fourth nothing was labeled “special.” These designations were counterbalanced so that each particular ritual appeared (across participants) in the same form the same number of times.

To systematically probe intuitions regarding the relative contributions of each element in the prototype to the success of the action, the theoretically relevant components of the prototypes were varied within-subjects. The presence or absence of the term “special”, the agent performing the action, the action itself, and the instrument used were manipulated independently. In total, the twelve variations following each prototype included: (1) a version of the prototype with both the agent and instrument designated ‘special’, (2) a version with only the agent designated ‘special’, (3) a version with only the instrument designated ‘special’, (4) a version with nothing special but otherwise identical to the prototype, (5) a minor agent change (to an animal) with the agent labeled ‘special’, (6) a minor agent change with no specialness, (7) a major agent change (to an inanimate object) with specialness, (8) a major agent change without specialness, (9 & 10) two action changes otherwise identical to the prototype, (11) an instrument change with specialness, and (12) an instrument change without specialness. Table 1 illustrates the various items. Each permutation was followed by a seven-point rating scale anchored as

Table 1

Experiment 1 sample item. A successful religious action: A special person blew ordinary dust on a field and the field yielded good crops. How likely is each of following actions to find favor with the gods and yield good crops? Please rate each action: 1 = extremely likely the action will work, 7 = extremely unlikely

a) A special person blew special dust on a field.	1	2	3	4	5	6	7
b) A special person blew ordinary dust on a field.	1	2	3	4	5	6	7
c) An ordinary person blew special dust on a field.	1	2	3	4	5	6	7
d) An ordinary person blew ordinary dust on a field.	1	2	3	4	5	6	7
e) A special rat blew ordinary dust on a field.	1	2	3	4	5	6	7
f) An ordinary rat blew ordinary dust on a field.	1	2	3	4	5	6	7
g) A special branch blew ordinary dust on a field.	1	2	3	4	5	6	7
h) An ordinary branch blew ordinary dust on a field.	1	2	3	4	5	6	7
i) A special person threw ordinary dust on a field.	1	2	3	4	5	6	7
j) A special person kicked ordinary dust on a field.	1	2	3	4	5	6	7
k) A special person blew special feathers on a field.	1	2	3	4	5	6	7
l) A special person blew ordinary feathers on a field.	1	2	3	4	5	6	7

“1 = extremely likely the action will work” and “7 = extremely unlikely.” The rituals were arbitrarily generated and not meant to be similar to any real religious rituals.

Procedure. Participants were told nothing about the purpose of the study, but simply recorded their age and sex on the response sheets and proceeded with the ratings.

Predictions. The social action hypothesis adapted from Lawson and McCauley predicts that the most important factor driving participants’ ratings of the likelihood for the action variations to succeed would be having a “special” agent or instrument, and secondarily, having the same agent as the prototype. That is, given that these are unusual actions requiring something “special” in the action structure, social-causal expectations would be triggered and the same agent as the prototype would be considered more important to the success of the ritual than having the same action.

The social action hypothesis must be distinguished from a matching hypothesis. First, if participants had no intuitions regarding the importance of any particular element of the ritual, then a reasonable strategy for generating ratings would be to rate permutations that more closely matched the successful prototype as more likely to work. Consequently, for rituals in

which no specialness was mentioned, the non-special replication would be rated as more likely to succeed than the other three versions with ‘special’ labels. So, for example, if the prototype described “An ordinary person blew ordinary dust on a field and the field yielded good crops,” then versions of the prototype that are most similar to the prototype — even having no “special” agents or instruments — would be rated as most likely to succeed. The version of the prototype “A special person blew special dust. . .” should be rated as less likely to be successful than the reiteration of the prototype, the version with a special agent, or the version with a special instrument.

Likewise, since 50 percent of the prototypes had special agents and 50 percent had special instruments, but only 25 percent had ‘special’ agents and instruments or neither, this matching hypothesis would predict that overall the one-‘special’ permutations would have lower ratings (i.e. are more likely to succeed) than either the two-‘special’ items or the no-‘special’ items, which should not differ from each other. Alternatively, the social action hypothesis would be that the items with two special elements should have scores at least as low as the one-‘special’ items followed by no marker items.

Results & Discussion

A single score was calculated for each of the change factors to be considered by averaging across the items from the twelve ritual sets. This produced scores for agent changes with the agent being special (e.g., items like e and g in Table 1 for all 12 ritual sets), agent changes without the agent being special (e.g., items f and h), instrument changes (items k and l), action changes (items i and j); reiterations of the prototype with nothing special (e.g. item d), when two components were special (item a), when only the agent was special (item b), and when only the instrument was special (item c).

The theoretically relevant inferential comparisons were made between these scores using t-tests for paired samples. All contrasts were planned and since essentially all of the tests performed were significant, this design does fit the conditions for multiple test corrections. However, all theoretically interesting differences do remain significant after application of Bonferroni corrections for multiple t-tests. Uncorrected values are reported. No

omnibus ANOVA test is reported because only item-type differences are of interest.

If a particular change to the prototypes led to higher scores (less likely to succeed) than another change, then the changed component was regarded as relatively more important to the success of the ritual.

Figure 1 displays the comparisons between the different specialness items. As predicted by the social action hypothesis and contrary to the matching hypothesis, the two-‘special’ items were rated significantly lower than the other marker items, $M = 2.00$, $SD = 1.22$, $t(67) = 7.15$, $p < .001$ (compared to the next closest type of item). The two-‘special’ items were even rated more likely to succeed than the no-‘special’ items when the prototype had no ‘special’ label and so the no-‘special’ choices best matched the successful actions, $t(67) = 2.95$, $p = .004$. The two forms of one-‘special’ items did not differ significantly from each other ($t(67) = 1.29$, $p = .20$) but had significantly lower average ratings than the no-‘special’ items: $M = 3.06$, $SD = 1.20$ for the special instruments ($t(67) = 8.26$, $p < .001$ versus not special); $M = 2.91$, $SD = 1.30$ for the special agents ($t(67) = 9.75$, $p < .001$); $M = 4.65$, $SD = 1.32$ for the no-‘special’ items. The two one-‘special’ types did not differ significantly from no-marker items when the prototype had no ‘special’ marker. It seems ‘special’ labels did matter to subjects’ judgements of the efficacy of rituals even if ‘special’ labels were not included in a given ritual’s prototype. That is, even if the ritual worked without any component being special, it would be still more likely to work when making an appeal to a superhuman agent.

The second prediction regarding ‘special’ markers was that not having them would damage rituals’ likelihood of success more than other changes in the action or instrument. Since some of the prototype rituals had nothing special, testing this hypothesis is muddled. By implicitly being told one-quarter of the time that specialness is unnecessary, subjects may have devalued specialness relative to other features. More importantly, in no-‘special’ prototypes, the no-‘special’ item does not constitute the removal of ‘special’ but is a reiteration of the ritual that supposedly worked.

To eliminate these difficulties, the measure needed to represent the importance of ‘special’-markers in the ritual structure relative to other components was the average of no-‘special’ items only in cases when the prototype had at least one ‘special’-marker. In these cases, the no-

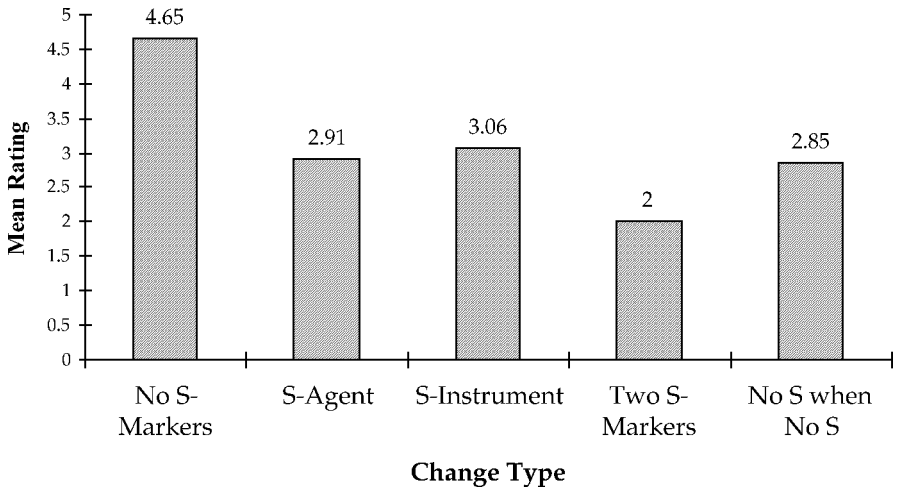


Figure 1. Mean rating of rituals' likely effectiveness as a function of change type performed to the prototype for Experiment 1. "S-Agent" refers to items for which the only 'special' was modifying the agent. "S-Instrument" refers to items for which the only 'special' was modifying the instrument. The two 'special'-marker items were rated as significantly more likely to succeed than all other types, even no 'special' types when there were no 'special'-markers in the prototype (No S when No S). The no 'special'-marker type is significantly greater than all other types.

'special' condition truly indicated the removal or absence of a 'special.' As predicted, this "special absent" score was greater than either the action or instrument scores, as illustrated in Figure 2. The mean special-absent score was 5.26, $SD = 1.51$, as compared with 3.60, $SD = 1.07$, for action changes ($t(67) = 7.44$, $p < .001$) and 4.39, $SD = 1.15$, for instrument changes ($t(67) = 3.86$, $p < .001$). Subject intuitions even converged on agent changes being less important for ritual success than the presence of 'special'-markers. Agent change items had a mean rating of 4.71, $SD = 1.35$, $t(67) = 2.36$, $p = .021$.

Consistent with the social action predictions regarding agents, agent changes with and without 'special'-markers were rated as more damaging to the possible success of the rituals than action changes. Agent changes with a 'special'-marker ("special" agents) had a mean rating of 4.29, $SD = 1.61$, significantly greater than ratings for action changes, $t(67) = 4.17$, $p < .001$. Agent changes with 'special'-markers were not rated significantly

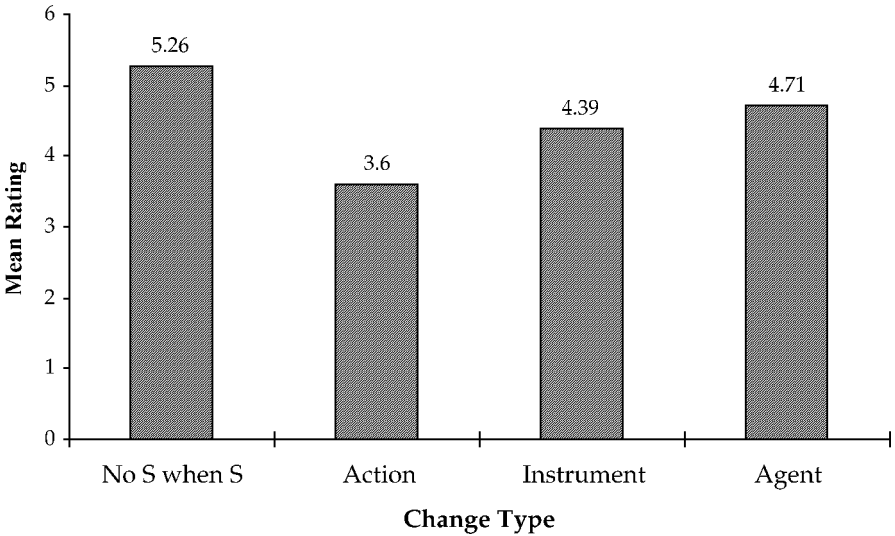


Figure 2. Mean rating of rituals' likely effectiveness as a function of change type performed to the prototype for Experiment 1. "No S when S" indicates items in which at least one 'special'-marker was present in the prototypes but none in the test items. Removing 'special'-markers was rated as significantly more disruptive than Action, Instrument, or Agent changes. Action changes were significantly rated as more likely to succeed than Agent changes.

different than instrument changes. Agent changes without a 'special'-marker were judged as even more likely to ruin the rituals, $M = 5.12$, $SD = 1.23$; and were rated significantly different from both action changes ($t(67) = 10.75$, $p < .001$) and instrument changes ($t(67) = 4.28$, $p < .001$).

Participants' ratings indicated that if a ritual has no indication that the agent or instrument involved has been endowed with special properties or authority by a divine source (no specialness), then it is unlikely to bring about the desired non-natural consequences. The representation of superhuman agency somewhere in the ritual structure was judged as more important for the success of the ritual than using the original instrument or performing the proper action. Participants' ratings also suggested intuitions that more than one indication of superhuman agency in the action structure, i.e., more than one 'special'-marker is better than only one. Finally, in these religious actions, participants judged that having

an agent capable of intending a particular outcome was more important than performing a particular action. Changing the action of the ritual was not as devastating to the intended consequences than changing the agent — even if the agent was performing the appropriate action.

The results of Experiment 1 are consistent with the social action hypothesis. Participants, having no familiarity with the rituals in question, had converging intuitions regarding which components were most important for the ritual success. Namely, having some connection to superhuman agency (via the ‘special’-markers) and having the appropriate agent. Note that having the right agent as more important than having the right action runs counter to our knowledge of real world physical/mechanistic causation. So, perhaps, rather than having intuitive theoretical knowledge to deal with actions such as religious rituals, participants simply countered their ordinary intuitions. That is, an alternative explanation is that because these were strange action sequences with “specialness” explicitly involved in 75% of them, participants were left trying to find a way to make their answers special as well. They tried to make relevant the specialness of the actions. The obvious solution is to take what comes naturally and turn it on its head. This relevance account is addressed in Experiment 2.

Experiment 2

In addition to the relevance account, two other potential problems might lurk in Experiment 1. Though somewhat improbable, one might suggest that the results of Experiment 1 could be explained as only demonstrating that there is something about the particular rituals and permutations used that biased participants to consider agents more important for success than actions. Or perhaps, this population of participants is of a cultural group that heavily stresses the importance of agents regardless of the type of action being described: results are the consequence of who agents are more so than what they do.

Experiment 2 sought to address these counter-explanations using a between-subjects manipulation. One group of participants completed a task very similar to that used in Experiment 1, rating the likelihood of success of various actions with some connection to superhuman agents. For this first group, results were predicted to be comparable to Experiment 1 with the agent being regarded as relatively more important than the specific action.

A second group of participants rated the same actions described without any connection to superhuman agents. That is, nothing in the actions was described as “special.”

Because the actions were still bizarre and set on another world, the relevance account would predict that participants in this condition would likewise answer counter to their natural inclinations and rate agents as more important. Likewise, if the results of Experiment 1 were due to bias in the items used or due to something about the population samples, participants in the second group would likewise be expected to rate agents as more important than actions. Alternatively, if the importance of agents over actions in Experiment 1 was due to participants having represented the special actions as social events as hypothesized, then participants in the non-special condition would rate actions as more important than agents, because the actions would no longer be social events but mere mechanistic ones.

Method

Participants. Sixty American Protestant liberal arts college students (32 female, 28 male, mean age 19.0 years) from introductory psychology courses participated.

Materials & Procedure. In both conditions the “religious” condition and the “other-world” condition (detailed below), the experimenter presented each participant with a set of eight fictitious action sequences. Each of the eight successful sequences’ descriptions was followed by seven variations of the sequence that participants rated for likelihood of success. Of the seven variations, two changed just the agent in the original sequence, two changed just the action, two changed just the instrument used in the original, and one was a restatement of the original. For example, one item from the “religious” condition read:

Given that: A special person cleans a trumpet with a special cloth and the village is protected from an epidemic. How likely is each of the following actions to protect the village from an epidemic? Please rate each action: 1 = extremely likely the action will work, 7 = extremely unlikely.

- a) A special person cleans a trumpet with a special plant. 1 2 3 4 5 6 7
- b) A special beetle cleans a trumpet with a special cloth. 1 2 3 4 5 6 7

- | | |
|--|---------------|
| c) A special person cleans a trumpet with a special paper. | 1 2 3 4 5 6 7 |
| d) A special dog cleans a trumpet with a special cloth. | 1 2 3 4 5 6 7 |
| e) A special person covers a trumpet with a special cloth. | 1 2 3 4 5 6 7 |
| f) A special person stuffs a trumpet with a special cloth. | 1 2 3 4 5 6 7 |
| g) A special person cleans a trumpet with a special cloth. | 1 2 3 4 5 6 7 |

The order of presentation of each type of variation was randomized for each item.

In the “religious” condition, the packet of ritual ratings included an explanation of the term “special”: “For the following ratings, ‘special’ means someone or something that has been given special properties or authority by the gods. All of the following are proposed religious actions. Try to use as much of the rating scales as is reasonable.” To be sure any results from the religious condition were due to understanding the actions as appealing to superhuman agency and not merely a consequence of the particular actions, a second condition was conducted. In the “other-world” condition, the word “special” was dropped from all parts of the descriptions, and the packet included a different explanation: “All of the following are proposed actions on a world very much like ours. Try to use as much of the rating scales as is reasonable.”

Results & Discussion

As in Experiment 1, participants in the religious condition rated the action sequences with changed agents as significantly less likely to be successful than sequences in which the action was changed, supporting the prediction that having a proper agent is more important than the particular action. Participants gave agent-changed rituals a mean rating of 5.00 ($SD = 1.70$) compared with 3.99 ($SD = 1.51$) for the action-changed rituals, $t(29) = 3.61$, $p = .001$. In contrast, when participants rated the same action sequences in the other-world condition, the agent was no longer considered most important for success. Indeed, agent-changed rituals were rated as significantly more likely to succeed, $M = 2.96$, $SD = 1.71$, than action-changed rituals, $M = 3.93$, $SD = 1.35$, $t(29) = 3.22$, $p = .003$. Figure 3 illustrates these results.

Unsurprisingly, the reversal in relative importance between the two conditions was the result of a change in importance of having the right agent. In both the religious condition and the other-world condition

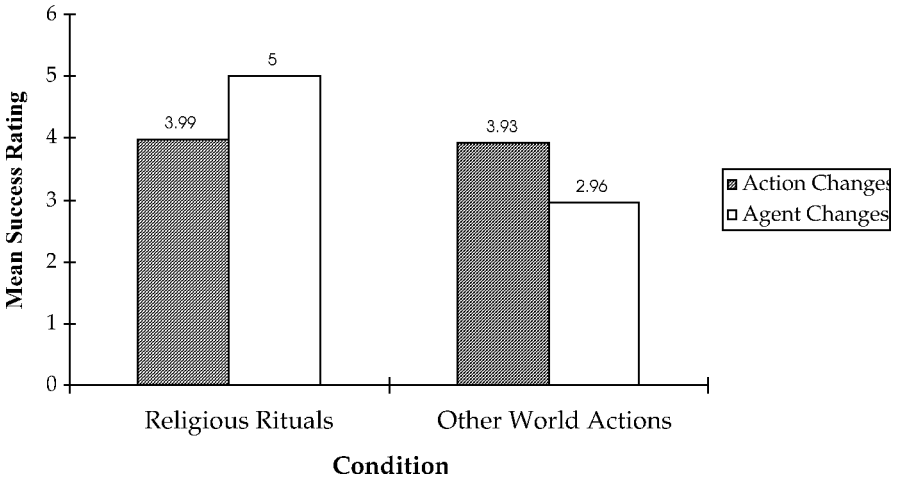


Figure 3. Mean ratings of rituals' likely effectiveness as a function of change type in either a religious or "other world" setting. Agent-changed sequences were rated as significantly less likely to be successful than action-changed sequences in the religious condition only. Agent-changed sequences were rated as significantly more likely to be successful than action-changed sequences in the "other-world" cognition.

changing the actions in the prototypes had comparable consequences on the likelihood of success ratings, $t(58) = .17$, $p = .866$. In contrast, changing the agent in the religious condition ($M = 5.00$) had a far more serious consequence than changing the agent in the other-world condition ($M = 2.96$), $t(58) = 4.63$, $p < .001$.

That relative judgments reversed as predicted between the two conditions strongly supports the interpretation that participants used different intuitive theories of causation to generate inferences about the efficacy of the actions. In the other-world condition, participants used ordinary mechanistic causal expectations — the action is more important to bring about a particular state of affairs than the agent. When the same actions were performed as appealing to superhuman agency, intuitions changed as they would in situations of social causation with agency acquiring a more substantive role in determining the outcome.

These results also support the contention that the relative importance of proper agent over proper action in Experiment 1 is not merely the consequence of bias in the particular items used or peculiar to the

population sampled. After all, this second sample from the same population did not show an agent-bias in the other-world condition. Similar items in Experiment 2 produced comparable results in the “religious” condition, but intuitions in the “other-world” condition were just the opposite: action was understood as more important than the agent. Even though the actions were still peculiar and located on another world, participants demonstrated completely different intuitions regarding the efficacy of the actions between the two conditions. These results seem to speak against the relevance account.

General Discussion

These experiments tested three general predictions inspired by Lawson and McCauley (1990). First, if as Lawson and McCauley argue, representation of religious rituals uses the same cognitive architecture used for representing any action, even people with no special knowledge of a religious system would have converging intuitions about whether or not a given ritual is likely to be effective. Second, because the intended outcome of religious rituals violates normal mechanistic causal expectations, it was predicted that when judging whether a ritual might be effective, people would consider some connection to superhuman agency more important than any other aspect of the ritual, justifying the breach of causal expectations. Third, because the rituals appeal to a superhuman agent to justify their intended consequences, rituals are likely to be represented as social actions. Consequently, when judging whether a ritual is effective, people would regard having an appropriate intentional agent as relatively more important than the particular action, as is the case in social exchanges. The results of the experiments supported all three predictions.

Regarding the first prediction, Protestant Christians unfamiliar with the fictitious rituals converged in their intuitions about which elements of the ritual structure were most important for the rituals’ success. Participants could have simply guessed somewhat at random if they possessed no intuitions about the fictitious rituals. Had this been the case the results would have produced mean ratings hovering around the mid-point of the scales. But clearly, participants did have some opinions about the relative importance of different factors. Experiment 2 demonstrated that the convergence of expectations was not an artifact of the items used or

exhibition of a cultural bias. Depending on the cover story used, relative judgments changed dramatically.

Bearing on the second prediction, participants seemed to understand that for an action to produce non-natural consequences, superhuman agency must be involved in some way, and this connection with superhuman agents was the best predictor of success. In Experiment 1, participants could have simply rated the rituals that best matched the prototype as most likely to be effective, ignoring the importance of 'special'-markers. They did not. Similarly, participants did not simply adopt a strategy of reversing their intuitions about causal events when considering strange, special, or other-worldly actions. When evaluating the relative contributions of different elements for the success of an action, participants demonstrated converging intuitions that varied predictably with context.

Participants rated action forms with 'special' agents or 'special' instruments (when specialness was defined as having been endowed with unusual properties from the gods) as more likely to result in non-natural actions than ordinary actions. This much is fairly trivial. However, this finding is more meaningful because of the further relative judgment that having 'special'-markers was more important than any other component of the action sequence. It could have been, as in many mundane actions, that performing the correct action was what was most important with connection to superhuman agency occupying secondary importance. However, participants answered that whether or not the ritual had a 'special'-marker was more important than the particular action, instrument, or agent involved.

Once recognizing the actions as importantly tied to superhuman agency, participants also regarded having an appropriate intentional agent initiate the action as more important to the success of a ritual than the particular action, supporting the third prediction. This judgment is not trivial. A common caricature of rituals is that their actions are highly formulaic and carefully following each step is what leads to success. While the actions of any given ritual are important, participants' judgments align with the suggestion that participants import social-causal intuitions for evaluating religious rituals. As in ordinary social action having an agent that intends the consequences of the actions is more important than the actions themselves in determining a successful outcome. In the

“other-world” condition of Experiment 2, the connection with superhuman agency was removed, rendering the events as instances of odd mechanistic causation. Consequently, participants rated the agent as significantly less important than in the “religious” condition and less important than the particular action.

That judgments pertaining to religious rituals are informed by ordinary cognition regarding social actions should not be confused with the claim that cultural knowledge is irrelevant. Surely explicit tuition regarding the efficacy of rituals plays a central role in ritual practitioners’ thought about their rituals. However, the role of ordinary cognition would be expected to exert pressure on religious ritual practices in at least three ways. First, as new rituals are developed, intuitive expectations generated by an ordinary action representation system would guide what become official judgments about the relative importance of the ritual components. Theological and doctrinal positions that are at least somewhat intuitive would be more likely to be suggested and embraced. Further, teaching regarding rituals that resonate with intuitive expectations are more likely to be remembered, resist distortion, and be passed on than concepts with no basis in ordinary representations (Boyer 1994). Likewise, when thinking about rituals in the absence of doctrinal instruction or in situations for which no relevant precedence is salient, ordinary cognition is likely to generate expectations, predictions, and inferences. Suppose a rarely performed ritual fails and there is no orthodox explanation for such a failure. In this case, the search for explanations would begin with ordinary conceptions. Based on the results of the present experiments, “Was the agent who performed the ritual really qualified?” would be asked more frequently than, “Did the person perform the action correctly?” to determine the cause of failure.

In addition to supporting the claim that religious rituals are represented using general conceptual structures for action representation, these studies lend credence to the contention of various scholars of religion that cognitive and psychological factors should occupy more attention in the study of religion and culture (Boyer 1994; McCauley & Lawson 1993; Sperber 1975). Relying only on cultural factors to explain culture is not the only, nor necessarily the best, available option.

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REFERENCES

BARRETT, J.L.

(in press) Do children experience God like adults? Retracing the development of god concepts. In J. Andresen (Ed.), *Keeping Religion in Mind: Cognitive Perspectives on Religious Experience*. Cambridge: Cambridge University Press.

2000 Exploring the natural foundations of religion. *Trends in Cognitive Sciences* 4, 29-34.

BARRETT, J.L. & KEIL, F.C.

1996 Conceptualizing a non-natural entity: Anthropomorphism in God concepts. *Cognitive Psychology* 31, 219-247.

BARRETT, J.L., RICHERT, R.A. & DRIESENKA, A.

(in press) God's beliefs versus mother's: The development of natural and non-natural agent concepts. *Child Development*.

BARTLETT, F.C.

1932 *Remembering: A study in experimental and social psychology*. Cambridge: Cambridge University Press.

BOYER, P.

2000 Evolution of a modern mind and the origins of culture: religious concepts as a limiting case. In Carruthers, P. and Chamberlain, A. (Eds), *Evolution and the Human Mind: Modularity, Language and Meta-Cognition*. Cambridge University Press.

1994 *The naturalness of religious ideas: A cognitive theory of religion*. Berkeley, CA: University of California Press.

1995 Causal understandings in cultural representations: Cognitive constraints on inferences from cultural input. In D. Sperber, D. Premack and A.J. Premack (Eds), *Causal Cognition: A multidisciplinary debate*. New York: Oxford University Press.

BOYER, P. & RAMBLE, C.

(in press) Cognitive Templates for Religious Concepts: Cross-Cultural Evidence for Recall of Counter-Intuitive Representations. *Cognitive Science*.

GUTHRIE, S.

1993 *Faces in the clouds: A new theory of religion*. New York: Oxford University Press.

LAWSON, E.T. & MCCAULEY, R.N.

1990 *Rethinking religion: Connecting cognition and culture*. Cambridge: Cambridge University Press.

MCCAULEY, R.N. & LAWSON, E.T.

1993 Connecting the Cognitive and the Cultural: Artificial Minds as Methodological devices in the Study of the Socio-cultural, In R. Burton (Ed.), *Minds: Natural and Artificial*, 121-145. Albany: State University of New York Press.

SPERBER, D.

1975 *Rethinking Symbolism*. Cambridge: Cambridge University Press.

1994 The modularity of thought and the epidemiology of representations. In L.A. Hirschfeld and S.A. Gelman (Eds), *Mapping the mind: Domain specificity in cognition and culture*, pp. 39-67. Cambridge: Cambridge University Press.

1996 *Explaining culture: A naturalistic approach*. Cambridge, MA: Blackwell Publishers.

WARD, T.B.

1995 What's old about new ideas? In S.M. Smith, T.B. Ward and R.A. Finke (Eds), *The creative cognition approach*, pp. 157-178. Cambridge, MA: MIT Press.