

## Research



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Ingredients of 'rituals' and their cognitive  
underpinnings

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Ritual is not a proper scientific object, as the term is used to denote disparate forms of behaviour, on the basis of a faint family resemblance. Indeed, a variety of distinct cognitive mechanisms are engaged, in various combinations, in the diverse interactions called 'rituals' – and each of these mechanisms deserves study, in terms of its evolutionary underpinnings and cultural consequences. We identify four such mechanisms that each appear in some 'rituals', namely (1) the normative scripting of actions; (2) the use of interactions to signal coalitional identity, affiliation, cohesiveness; (3) magical claims based on intuitive expectations of contagion; (4) ritualized behaviour based on a specific handling of the flow of behaviour. We describe the cognitive and evolutionary background to each of these potential components of 'rituals', and their effects on cultural transmission.

This article is part of the XX 'Ritual renaissance: new insights into the most human of behaviours'.

## 1. Introduction

The term 'ritual' is commonly used, on the basis of a family resemblance, to denote situations as disparate as, e.g. the *Hajj* or pilgrimage to Mecca; the repetitive behaviours of young children before going to sleep; the recitation of a magical incantation or formula; participation in a Thanksgiving dinner; the compulsive actions of an OCD patient; military rules for standing, walking, saluting; and many others. It is a fool's errand to search for causally relevant common features in such disparate behaviours.

We cannot have a theory of rituals, nor do we need one, but we can have something much more productive, a precise understanding of the different kinds of mental systems activated, in diverse combinations, in the very diverse forms of behaviour and social interaction that have been called 'rituals', and a better understanding of their likely cognitive and social effects.

The point of understanding 'rituals' is to explain why people engage in those behaviours, and how they become 'cultural', that is, represented in roughly similar ways among individuals, as a result of interaction and communication [1]. Evolved predispositions make some kinds of representations easier to acquire than others, and make it likely that individuals will re-construct those particular representations on the basis of fragmentary, noisy or variable inputs, actualizing attractors in the space of possible cultural representations [2,3].

For each of the different mental systems described below, we try to show how it contributes to the cultural success of forms of interaction (including some 'rituals') that activate it, over behaviours or representations that do not.

## 2. Scripted, normative interactions: coordination effects

## (a) The phenomenon

Among the Swazi of South Africa, *incwala* is the name of a long sequence of social interactions, following particular scripts that all participants are expected to follow closely. For instance, *incwala* must occur just before people have

64 started consuming their new crops; only a member of the  
 65 royal clan may organize the ceremony; a black ox must be  
 66 taken from a commoner's herd for sacrifice; and there are  
 67 many other conditions [4,5]. Change some of those prescrip-  
 68 tions and people would certainly have the intuition that  
 69 *incwala* had not really been performed. People share expecta-  
 70 tions about the way specific interactions are expected to  
 71 unfold, and what different participants should do. Violations  
 72 of these rules, e.g. performing your *bar-mitzvah* on your own,  
 73 or without wearing the *tefillin*, often triggers the intuition that  
 74 the interaction that occurred was not 'really' an instance of  
 75 that named category.

### 77 (b) The evolutionary–cognitive background: normativity

78 We know that many instances of social interaction are *scripted*,  
 79 which means that participants hold a mental representation of  
 80 the various parts of the interaction, the various roles, their  
 81 causal dependencies, and so on [6]. Among scripted actions,  
 82 some are *named*, so that (a) participants know that there is a set  
 83 of actions that define the interaction, (b) they also know that  
 84 others have some representation of these actions, and (c) they  
 85 assume that it probably is the same representation as theirs [7].  
 86 Which interactions are scripted of course is a matter of local con-  
 87 ventions. For instance, a romantic 'date' is a named interaction in  
 88 the USA but is not so in other countries, e.g. France or Italy.

89 The fact that people name and thereby categorize scripted  
 90 interactions is obviously related to human social capacities,  
 91 notably the evolved capacities that sustain coordination.  
 92 In game-theory, the term denotes those interactions in which  
 93 the different players are better off, as long as they either do  
 94 the same as the others (e.g. drive on the left side of the road)  
 95 or do the opposite (e.g. walk through the door if someone  
 96 holds it for you) [8]. Most coordination games in actual social  
 97 interaction are much more complicated, as they require  
 98 the orchestration of many different behaviours from many  
 99 different actors.

100 Named and scripted interactions are often the object of  
 101 *normative* expectations, in the sense that (a) one expects  
 102 others to follow the rules, and (b) one expects others to  
 103 expect one to follow them [9]. These expectations are grounded  
 104 in an underlying norm psychology that seems to appear early  
 105 in development [10]. Indeed, children as young as 3 years of  
 106 age spontaneously attach normative rules to an arbitrary  
 107 sequence of acts that they learn, when they try to transmit it  
 108 to other children [11]. Young children also react to violations  
 109 of such 'norms' even if they have no detrimental practical con-  
 110 sequences [12]. Even though young children are sensitive to the  
 111 difference between mere conventions (that could be different in  
 112 different places) and moral rules (that, in their view, could not  
 113 be different) [13], they do not conclude that conventions are  
 114 therefore optional. The fact that 'elsewhere people do things  
 115 differently' does not for them entail that 'you may violate the  
 116 norm' [10].

117 We would expect scripted interactions to be all the more  
 118 culturally successful, as they include material that activates  
 119 this normative psychology, as is often the case in forms of  
 120 interaction identified as 'rituals'. The latter are culturally trans-  
 121 mitted, to the extent that individuals are motivated to reiterate  
 122 past instances, and do it in (roughly) the same way. Prescrip-  
 123 tions formulated as norms (e.g. 'one *must* use a black ox, only  
 124 from a non-royal clan') would enhance the motivation to  
 125 replicate the behaviours in detail.

## 3. Coalitional signalling: affiliation and cohesion

### (a) The phenomenon

In the modern USA, displaying an archaic version of the nation's  
 flag can be seen as clearly expressing the view that some groups  
 are not part of the nation [14]. For British people, notions of what  
 the nation is or should be have been for a long time evoked by  
 civil ceremonies like the Opening of Parliament, but also by festi-  
 ve occasions like the BBC Promenade concerts (Proms) [15]. In  
 a very different context, shared material objects and practices are  
 vested with great significance for cohesion in small groups such  
 as terrorist cells [16]. The connections between engaging in a  
 normative, scripted interaction, and conveying information  
 about group identity and commitment, are too familiar to  
 require further illustrations [17].

In many cases, as anthropologists have emphasized, the pre-  
 scribed actions promote cohesiveness by including *commentaries*  
 on the social order, ascribing positions and rank in hierarchies,  
 identifying social units and their relations. For instance, the  
*ekimomwar* of Turkana pastoralists in Kenya includes splitting  
 in half a sacrificed ox. All participants are then instructed to  
 form a line and cross the scene of this sacrifice, in a prescribed  
 order of clans, elders, then adult males crossing first, followed  
 by the adolescent and girls of marriage-age, within each clan,  
 providing a sequential representation of a (somewhat idealized)  
 social structure [18]. In such occasions, performance contributes  
 to common knowledge by creating an accessible reference point  
 that results in similar representations in participants [19].

Another potential effect of these forms of interaction is to  
 produce a strong feeling of cohesiveness in different individ-  
 uals, or even a sense of 'fusion' of the self into the group [20].  
 This may be the effect of shared arousing experiences, but  
 also of synchronized behaviour [21,22] that seem to enhance  
 altruistic dispositions towards other group-members.

### (b) The evolutionary–cognitive background: coalitional psychology

These aspects of scripted interactions are clearly connected  
 to human adaptations for living in groups [23]. In social  
 psychology, these phenomena are often described in terms of  
 attitudes towards 'ingroups' versus 'outgroups' [24], but  
 such attitudes are themselves the outcome of a broader set of  
 evolved mechanisms, that allow humans to build and maintain  
 coalitions [25,26].

Human coalitional psychology consists in a set of evolved  
 mechanisms designed to garner support from conspecifics,  
 organize and maintain alliances, and increase an alliance's  
 chance of success against rival coalitions. This psychology is  
 activated when conflicts or cooperation between non-kin go  
 beyond a dyad [27]. It allows interactions to scale up to large  
 numbers of individuals in highly similar manner, regardless  
 of whether the alliance in question is construed in ethnic,  
 racial, moral, or political terms [28]. Coalitional psychology  
 allows human beings to entertain the notion of groups of any  
 size as agents with beliefs, intentions and memories [29]. The  
 evolutionary background (males engaging in group defence  
 and inter-group conflict, women having to form alliances  
 with unrelated females) would explain why men and women  
 typically build different kinds of alliances (recruiting large  
 groups for specific goals, and cultivating durable small-scale  
 cooperation, respectively) [30,31].

Coalitional affiliation is uniquely beneficial to humans, as their fitness largely depends on collective action, and it is supported by unique human capacities, e.g. for memory and communication, that allow us to represent complex webs of past and present affiliations. Coalitional affiliation triggers the intuition that benefits (/costs) to one's group count as benefits (/costs) to self, as well as the frequent expectation that benefits accrued by distinct alliances are zero-sum [32]. It also triggers motivations (a) to join alliances, (b) to convey one's commitment to others, and (c) to monitor the commitment of others.

That is why signalling is crucial to coalitional mechanisms, and why some of the behaviours called 'rituals' seem quite natural in contexts of coalitional affiliation and conflict. First, specific signals serve to convey one's commitment to other members of the group, that is, one's willingness to incur costs for others in the future. As that is difficult to demonstrate *ex ante*, people often intuitively prefer 'costly' signals, for instance accepting heavy entry costs (e.g. painful initiation or effortful training) for the sake of joining a religious group, and being seen as a committed member [33]. Second, some behaviours create signals intended for other, possibly rival coalitions. Given widespread zero-sum assumptions, one is motivated to persuade other coalitions that one's own group is numerous, potentially aggressive (at least in its own defense) and highly cohesive. That is probably one of the reasons why participants in military groups, but also in large-scale religious groups, find it appropriate to create the illusion of a single, collective will, e.g. by identical uniforms, unison singing, synchronized gestures.

Coalitional psychology probably contributes to the cultural stability of particular 'rituals', inasmuch as these forms of interaction include signals of affiliation, of commitment to the group, or of group strength and cohesiveness. Also, we would expect those 'rituals' that include themes relevant to inter-group conflict to be typically performed by and for men. Our evolved motivation to send and monitor coalitional signals strengthen the motivation for reproducing interactions that include and require them.

## 4. Magical causation

### (a) The phenomenon

In Brazil, the term *simpatia* denotes a very diverse set of actions from which people expect specific outcomes, such as good grades at school, recovery from illness, an untroubled marriage or economic success. Most *simpatias* take the form of highly specific prescriptions, e.g. 'buy a new sharp knife and stick it four times into a banana tree on June 12th at midnight [...] Catch the liquid that will drip from the plant's wound on a crisp, white paper that has been folded in two...' and so forth [34]. In a similar way, among shepherds of Northern Greece, touching sacred objects such as crucifixes or icons, or sprinkling water blessed at particular religious holidays over one's sheep, will impart protection against misfortune [35].

Many (but not all) of the behaviours and interactions commonly identified as 'rituals' come with the belief that, because of the specific choice of actions and words, equally specific, physical effects will occur through inscrutable causal processes. The individuals engaged in such activities rarely ponder the nature of the causal processes involved. Some people in some places may have theories about that, but such speculation is not necessary for belief.

### (b) The evolutionary–cognitive background: contagion and relevance

Where does belief in magic come from? The phenomenon is widespread and has been the object of anthropological theorizing for more than a century [36]. Classical anthropologists noticed that claims to magical connections often mentioned some form of similarity or contiguity between cause and supposed effect. But this did not predict which kinds of similarity would be used, nor of course did it explain why people would find such connections of any special relevance [37].

Acceptance of some forms of magical processes is common in young children [38], and develops together with their more general understanding of causal processes in nature [39]. So it does not require a special 'mentality', or a suspension of ordinary causal cognition, to entertain magical claims. What is required are mechanisms that make those claims, in specific contexts, sufficiently compelling to be the object of what Sperber calls 'reflective beliefs', that is, not the belief that  $p$  but the belief that some version of  $p$  expresses some (undefined) truth [40].

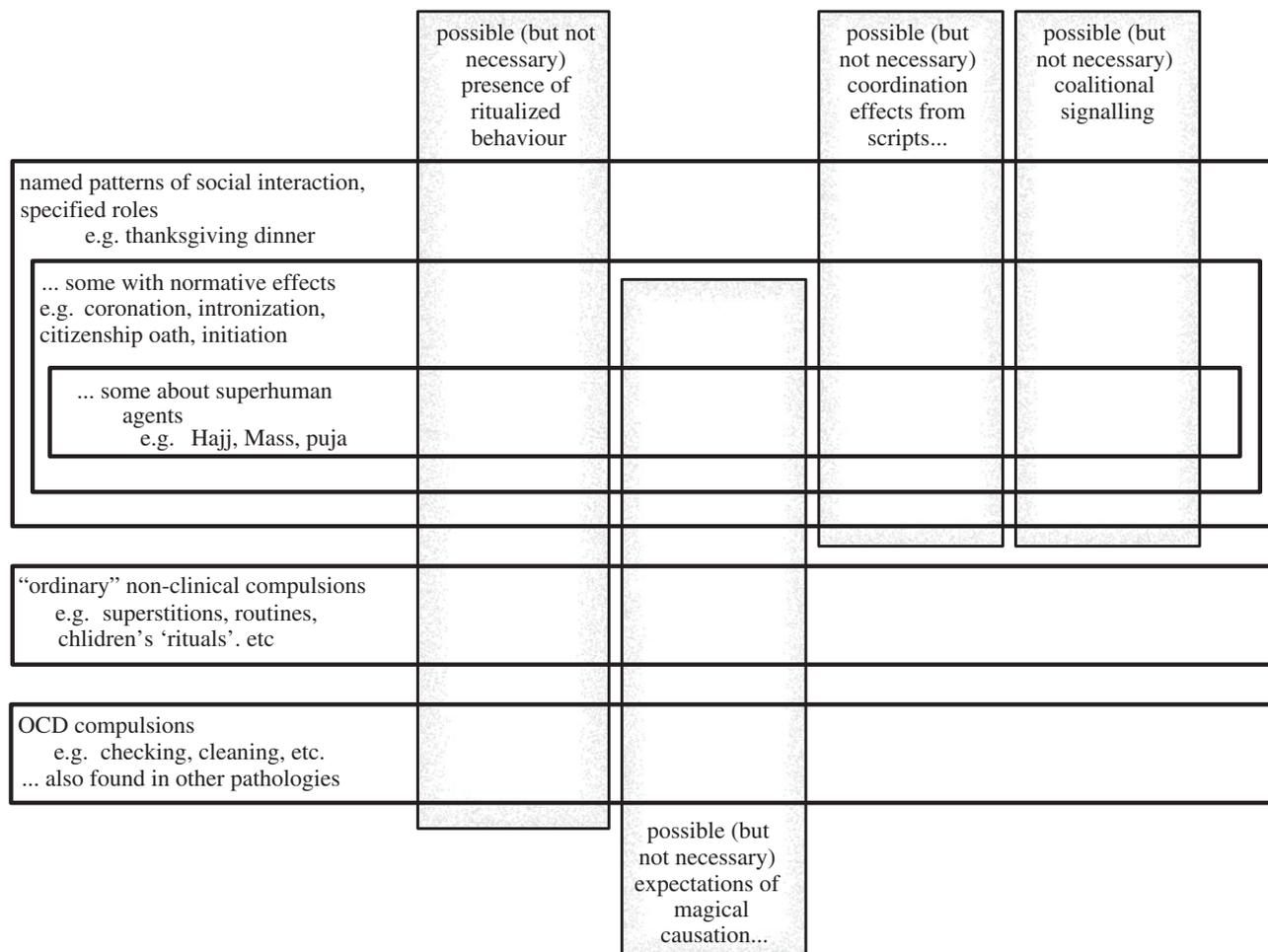
One important factor in boosting the 'naturalness' of such beliefs is that they seem to activate heuristics and tacit assumptions that underpin our intuitions about illness and contagion. In many places in the world, people hold explicit beliefs about contagion (e.g. through 'bad air' or 'miasma'). The theories are culturally successful because most human beings hold tacit intuitive expectations about disease transmission, specifying for instance (a) that it involves invisible vectors, (b) that use all modes of contact between people, and (c) show no dose effect – i.e. minimal contact is just as dangerous as extensive interaction [41]. Even young children hold those principled expectations, before they acquire cultural theories of illness [42].

As a consequence, forms of interactions that include specific causal claims (e.g. sticking a knife in a banana as causing success in school exams) will be all the more intuitively compelling, and therefore privileged in cultural transmission, that they evoke cognitive systems like our contagion psychology, which by themselves include opaque causal expectations.

## 5. Ritualized behaviour

Finally, we must describe a specific kind of action that is for many people the hallmark of 'rituals', although it is neither universal in what are called 'rituals', nor in fact exclusive to them. Consider our previous Turkana example. An ox with particular characteristic dreamt by a diviner (*emuron*) must be provided by a specific clan. The ox must be made to ambulate a specific number of times around the dancing participants. The animal must be made to gyrate in the direction opposite to the participants' round dance. The members of the clan who provided the ox must rub their bodies from head to loin on the forehead of the sacrificial animal. Each participant must step on the flat of an axe placed between the sacrificial animal's body parts. Such focal moments combine the following features:

- a. *Compulsion*. The agents feel a strong motivation to perform that set of actions, although they may not represent any specific reasons for performing it.



**Figure 1.** Some types of behaviour often called ‘rituals’ (horizontal boxes) and possible presence of specific psychological mechanisms (vertical boxes). In our view, only these systems are scientific objects—so that there can be a coherent theory of signalling, coordination, magical beliefs and ritualized behaviour, but no coherent theory of ‘rituals’.

- b. *Scriptedness*. The agent also feels that the actions must be performed in a specific way, and in a specific order. Again, the agent may or may not represent any reasons for the scriptedness.
- c. *Goal-demotion*. The overall series of actions may be described as directed to a goal, but there is no representation of how the different parts contribute to that goal.
- d. *Redundancy*. In many cases actions are repeated, although people do not need to represent why they should be repeated.

These features define what we called Ritualized Behaviour [43], a special form of action that is not present in all ‘rituals’, in fact usually occurs only at particular, limited moments of some ceremonies, and is found outside collective ‘rituals’, in some children’s repetitive actions [44] and in the behaviour of obsessive–compulsive patients [45].

Ritualized behaviour is the opposite of *routinized* behaviour, where the performance and sequencing of actions are automatic [46,47]. In ritualized behaviour as described here, the agent’s attention is entirely captured by explicit representation of the rules, while by contrast routinized automatic behaviour can be accomplished without engaging attentional networks.

Whether a specific action consists in ritualized behaviour in this sense or not only depends on the agent’s cognitive processes. So a specific set of actions may be ritualized

behaviour for one participant, and automatic routine for another. That may be the case for instance in adult baptism, in which the patient is representing all the rules as imperative and causally opaque, while the religious specialist may carry them out in a routinized manner.

### (a) Background: threat-detection psychology

We hypothesized that the attractiveness of Ritualized Behaviour, in the precise sense used here, is best explained in the context of the human capacities for the detection and prevention of potential threats [43,48,49]. Evolved neuro-cognitive structures specialized in potential danger differ from those responding to actual, imminent threats. The threat-detection system is specifically focused on potential hazards that were recurrent in ancestral conditions, such as predation, intrusion by strangers, contamination, contagion, social offence and harm to offspring [50].

Disruption of threat-detection systems results in specific pathologies, such as phobias, post-traumatic stress disorder, and, most relevant here, obsessive–compulsive disorder. Typical presentations of OCD include intrusive thoughts about potential dangers, as well as compulsive, repetitive scripted behaviours. Among the mechanisms involved is a biased appraisal of potential dangers [51], combined with an increased generation of risk scenarios [52]. A major component of OCD ‘rituals’ is the failure of precautionary behaviours to raise the patient’s intuitive security appraisal, leading to pathological

253 repetition [49,53]. Because of their roots in evolved threat-detection, these pathological presentations combine the formal aspects of ritualized behaviour (repetition, compulsion, redundancy, goal-demotion) with a very special set of themes, such as a concern with predators, invisible and dangerous agents, as well as cleanliness and protection from invisible pathogens, and a strong motivation to re-organize one's environment in a regular, predictable manner [54,55].

261 Both Ritualized Behaviour (in our precise sense) and the specific themes of OCD cognition are also present in many collective ceremonies, as noticed by many anthropologists and by Freud, who saw religious rituals as a collective form of the 'repetitive neurosis' [56]. A more sober interpretation is that people who participate in Ritualized Behaviour find ritual prescriptions intuitively natural and compelling, to the extent that these rules and themes activate associations with our threat-detection psychology [43]—for instance in the case of such rules as 'pass the carefully *cleaned* chicken *seven times, clockwise*, around the participants, to *protect* the community against *impurity*'. We need not postulate that people reiterate past ritualized behaviour because of a belief in its effects—all that is required is that the details of prescribed performance activate our threat-detection psychology, more than possible cultural variants.

## 6. No need for a theory of 'ritual'

281 What we commonly call 'rituals' are, in many cases, named social interactions that include some of the ingredients described

above. Some, but not all of these interactions, include some representation of magical causation. Some, but not all, include normative behaviours, with potential signalling of group identity or cohesion. Some include ritualized behaviour in the precise sense defined here, but that is not true of all things called 'rituals' and in general is only a small part of the 'rituals' that include it. For instance, the *simpatias* described by Legare & Souza [34] include primarily some magical causation and some normative scripted action sequences. The ox sacrifice among the Turkana includes some ritualized behaviour (in the precise sense used here), as well as signalling, and some coordination effect from scripts with normative entailments. Figure 1 sketches a more general map of these possible combinations.

Each of the features or processes described here, and often found in interactions called rituals, (a) have specific effects on social interaction, (b) engage specific cognitive processes and (c) are connected in specific ways to evolution by natural selection. The study of these processes has only just begun in evolutionary anthropology and psychology. If, like other mature disciplines, this field abandons familiar but misleading everyday categories (ritual' being like 'religion' or 'family'), it may well make much progress in explaining similarities and differences in interaction in human communities.

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