to upset the equilibrium of phylogenetically evolved patterns of social behaviour" (p. 249). Social manners represent "culturally ritualised exaggerations of submissive gestures most of which probably have their roots in phylogenetically ritualised motor patterns conveying the same meaning" (p. 77).

Illness or misfortune may provide occasions for complex cultural rituals indeed, but it makes sense to insist that their function – like that of social manners – is to foster *social cohesion* in complex societies. What makes collective rituals attention-grabbing and compelling is not their presumed ability to "activate the Hazard-Precaution system by including cues for potential danger" (sect. 8.5, para. 2); instead, their compelling nature and stability within traditions may stem from their role as a socially acceptable outlet for instinctive intraspecific aggression and culturally appropriate medium for negotiation of rank order. Participation in cultural rituals – and adherence to social norms in general – is not compulsive, but compulsory – that is, demanded by the group – insofar as it deflects instinctive intraspecific aggression from the group and signals submission and conformity. Deviation from norms and rituals is *dangerous* indeed because it leads to social rejection; and it is in this sense that fear plays a role.

Boyer & Lienard's (B&L's) suggestion that their attempt to "explain a disposition to participate in coordinated social action" stands out from other such attempts in that they resolved "why these common endeavors should include scripted, goal-demoted, redundant scripting of familiar actions" (sect. 9.1, para. 2), attests to today's ignorance of Lorenz's work. In contrast to Lorenz, B&L dispute that "obvious similarities between human rituals and various forms of animal communication, notably in the context of agonistic and sexual displays" could be seen as "evidence for the deep phylogenetic ancestry of ritual" (sect. 9.2, para. 1). Their model *demands* that apparently similar behaviours "actually stem from very different cognitive processes," – suggesting, for instance, that *in animals* "signals must be clear and distinct enough to preclude ambiguities." However, human cultural rituals too have a signal function: they signal social assertion or submission in aggressively motivated competition within the group for ranking positions and resources.

Obsessive and compulsive phenomena are not just exaggerated versions of risk avoidance behaviour, as B&L maintain. Compulsions and obsessions are characteristically *egodystonic*; they are accompanied by inner resistance reflecting a conflict between drives. This is usually between an urge to escape a specific hazard and fear of aggression. Expectations of punishment, which relate to patients' preserved insight into the abnormality and social unacceptability of their compulsions – psychoanalytically conceptualised as fear of the superego – are the source of much of their suffering. Obsessive thoughts about harming or offending others indeed elicit fears of social ostracism, representing a conflict between the individual's aggressive drive and his fear of becoming the target of others' aggression.

Rather than linking obsessive-compulsive disorder (OCD) to "a *dysfunction in a satiety signal*, plausibly generated in brainstem structures" (sect. 3.3, para. 4; emphasis in the original), we should emphasise the motivational instability between conflicting drives, ultimately between existential anxiety urging human relatedness (transformed into a specific fear) and the fear of aggression. As B&L recognise, "conflict in groups threatens each member's access to resources," so that the motivational conflict derives its immediacy precisely from the "human dependence on conspecifics for all aspects of survival" (sect. 5.4.3). These conflicts would be expected to activate the anterior cingulate gyrus in patients with OCD, consistent with findings by Fitzgerald et al. (2005), bearing in mind that the anterior cingulate cortex is more likely a structure representing basic motivational/emotional states, including fear and anxiety (Behrendt 2005; Ploghaus et al. 2003), rather than an "error-detection network" (Winterer et al. 2002). What may be of greater pathophysiological relevance is the association of OCD with prefrontal lobe/basal ganglia pathology, given that compulsiveness is clinically related to *impulsivity* – part of the dysexecutive syndrome.

What else is driving ritualized behavior, besides the "Hazard-Precaution system"? Developmental, psychopathological, and ethnological considerations

DOI: 10.1017/S0140525X06009368

Oana Benga[a] and Ileana Benga[b]

[a]*Department of Psychology, Babes-Bolyai University Cluj-Napoca, 400015 Cluj-Napoca, Romania;* [b]*Folklore Institute of the Romanian Academy, 400015 Cluj-Napoca, Romania.*

oanabenga@psychology.ro **ileana_benga@yahoo.it**
www.psychology.ro

Abstract: The target article presents arguments for a motivational system dedicated exclusively to the detection of, and reaction to, particular threats to fitness, the so-called "Hazard-Precaution System," which, according to the authors, drives ritualized behavior. We approach the issue of a motivational system from three perspectives – developmental, psychopathological, and ethnological.

The goal of an integrated model of ritualized behavior, put forward by Boyer & Lienard (B&L) in the target article, is both ambitious and laudable. Yet the search for commonalities might sometimes overlook differences between partly or superficially similar phenomena. Like the authors, we approach from three perspectives – developmental, psychopathological, and ethnological – a key aspect in this search: the issue of a motivational system dedicated exclusively to the detection of, and reaction to, particular threats to fitness, the so-called Hazard-Precaution system, driving ritualized behavior.

From a developmental perspective, one of the major claims by B&L draws our attention: that ritualized behavior cannot be routine-like or automatic, but rather, requires high-order cognitive control. The distinction between routines and rituals *per se* is conceptually a worthy one. However, there is a corollary claim that rituals involve an explicit emphasis of the agent on his or her own proper performance of actions – and, at the clinical end, that rituals even involve a patient's recognition of his own irrationality. But this *self-reflection* or *autonoetic consciousness* (Tulving & Markowitsch 1998) involves a degree of *metacognition* which is not easily present in the cognitive system of 2 to 4 years old children.

The positing of such self-consciousness is even more problematic with regard to what is the most flourishing period of compulsive behavior in normal children, that is, age 2 to 4 years (see Evans et al. 1997). Evans and Gray (2000) have suggested that younger mental age groups (MA) (2–5 years) exhibit a greater number of ritualistic behaviors than do older ones. Yet, far from functioning maturely, some "basic ingredients" of self-reflection are barely emergent during the same age interval: ingredients such as, self-concept (Howe & Courage 1993; Povinelli et al. 1996), understanding mental representations (Perner & Ruffman 1995), and episodic thinking about the personal past (Nelson 1993; Welch-Ross 1995) and future (Atance & O'Neill 2005). Therefore, it might be worthwhile to further explore the very construct of ritualization as proposed by B&L, in relation to early childhood compulsive behaviors.

In exploring the early beginnings of ritual behaviors, a closer look at child development suggests a possible link with knowledge structures, for example, scripts and narratives, rather than with fear management.

Script theory (Schank & Abelson 1977) assumes that people have generic knowledge structures that reflect an understanding of the temporal and causal sequences of actions. For early childhood, scripts are considered basic building blocks of

https://doi.org/10.1017/S0140525X06009368 Published online by Cambridge University Press

cognition (Nelson 1986, 1996). Children easily establish these forms of knowledge representation when encountering repeated events (Bauer & Mandler 1990). Already at ages 1 to 2 years, children can retain and reproduce causal, temporal, and goal-directed structures of events (Bauer et al. 1998). Scripts become increasingly abstract or schematized with experience (Fivush & Slackman 1986). However, Farrar and Goodman (1992) indicate that younger children (aged 4 versus 7) are more schema-dependent when encoding an event.

Higher prevalence of ritualistic behavior, synchronized with the prevalence of script knowledge structures, may signal a child's need for cognitive mastery of the environment (see also Piaget 1952). Computational economy, rather than the notion of reaction to inferred threats to fitness, could better explain such a rich cognitive and behavioral canonical repertoire.

Shifting now to child psychopathology, one particular case unexplored by the target article is that of autistic spectrum disorders. Here again, rituals, as cornerstone psychopathological features, are performed without any clear connection to threat avoidance. "Need for sameness," restrictive interests, and repetitive behaviors are classical autistic symptoms (Kanner 1943). But autistic rituals are performed out of the realm of consciousness. And more basic brain mechanisms involved in change detection seem to function atypically in this case: people with autism have some difficulty in involuntary attention switching when processing unexpected infrequent stimuli (Gomot et al. 2006). Behavioral, ritualistic "avoidance of change" would then be a secondary dysfunction, an adaptive behavior aimed at keeping the environment as predictable as required by such an atypical neural/cognitive system.

The ethnological approach distinguishes coercion within tradition from compulsion within individual threat-responding ritual behavior.

In order to locate the segment of tradition we are addressing, we need to temporarily set aside the questions of origins of orally transmitted cultural facts. These are hardly reducible – in both shape and content – to sharply and easily recognizable items such as rituals, customs, and narratives. Therefore, we may safely hypothesize that their incidence at a given moment in time, for a certain community, represents far more than the sole transmission from a previous segment of time, subdued to rigidity within tradition; a snare of relations that makes both ceremonials (individually or collectively performed) and narratives (individually and collectively produced) be strongly a matter of active creativity, just as they continue to be a matter of "adherence to script" (see target article, sect. 2.5). Field results we were able to collect from within what we call Romanian folkloric culture of today, vividly show a continuum among folkloric genres of enacted tradition-transmitted knowledge (Benga 2005): to quote but one example, the complex choreutic therapy performed by the ritual dance of *Căluş* is explicitly linked to abundant local narrated mythology about the specific trance-like disease called *luatul din iele*, and about the mythic culprits – a category of fairies. Yet, new forms of coercion have lately replaced the old motivations, in the form of competition for stage virtuosity on the occasion of socialist-time flavored festivals. The ethnologist is himself compelled to treat these with just as much seriousness as he does treat the confessions of old peasants – because what he witnesses today is precisely one of several forms of survival of the old ceremonial/ritual dancing: in other words, a genuine form of cultural transmission.

This is why we favor, as much more fertile, the concept of "salient memories" in analyzing the transmission of tradition (Boyer 1990, pp. 8–20), over the somehow restrictive, although method fueling, framework that delineates religious behavior in cognitive terms (Boyer 1993, pp. 4–18; cf. target article, sects. 8.2, 8.3). For, whatever learning process our brains might be prepared for, that fact alone shall not provide a religion to the bearer (Boyer 2001a, p. 13) – which brings us nicely back to the subtle relation between the "what" and the "how" of transmission, be it, successively, more orally, or more ritually, salient.

Ritualized behavior in animals and humans: Time, space, and attention

DOI: 10.1017/S0140525X0600937X

David Eilam

Department of Zoology, Tel-Aviv University, Ramat-Aviv 69978, Israel.
eilam@post.tau.ac.il **http://www.tau.ac.il/~eilam**

Abstract: A study of the organization of obsessive-compulsive disorder (OCD) rituals in time and space illuminates a postulated mechanism on shifting focus in action parsing, from mid-ranged actions to finer movements (gestures). Performance of OCD rituals also involves high concentration rather than the automated, less attended performance of rituals in normal and stereotyped behaviors in animals and humans.

The target article suggests that two systems may account for the occurrence of ritualized behavior. One system is of "inferred threats to fitness," the second is of "action-parsing." Manifestation of movement parsing is overt and the actions that comprise rituals are visible and measurable by virtue of animal behavior studies that have scrutinized ritualized behavior, developing conceptual frameworks and analytic tools that are also applicable in studying ritualized behavior in patients with obsessive-compulsive disorder (OCD). Indeed, recent utilization of such an approach in studying OCD rituals (Eilam et al. 2006) revealed facets that coincide with the question raised by Boyer & Lienard (B&L). Specifically, the outstanding question is not only as posed in the target article, "*why* ritualized behavior," but also *where* and *how* does ritualistic behavior occur. "Where" refers to the typical coupling between rituals and specific locations or objects; "how" refers to the high concentration involved in compulsive performance.

In the target article, action parsing is described at three levels that correspond to those offered by Zacks and colleagues (Zacks & Tversky 2001; Zacks et al. 2001b) as: (1) simple gestures; (2) behavioral episodes; and (3) script. B&L hypothesize that an excessive focus on the level of simple gestures is what happens in cultural and individual rituals, in contrast to spontaneous focusing on the mid-ranged behavioral episodes in normal behavior. Indeed, this is precisely what was revealed when tools derived from studying the quinpirole-treated rat model of OCD (Ben-Pazi et al. 2001; Szechtman et al. 1998) were applied in studying rituals in OCD patients (Eilam et al. 2006). Parsing categories became obvious when described in the context of the location or object at which they were performed, especially since OCD rituals carry a remarkable spatial component with a strong affinity between compulsion and specific location or object (Eilam et al. 2006). Specifically, the space in which a ritual (=behavioral episode) is carried out may be viewed as the set of sites or objects at which actions (=movements or gestures) are performed. Behavior can then be scored by notating the movements at each location/object. This is illustrated in Table 1, describing the OCD ritual of car-locking.

First, the patient's ritual was divided into two distinct domains in which it was executed: acts performed inside the car (Table 1), and those performed outside the car (not shown here). Then, the locations at which the patient displayed acts were identified as the ignition key, light switch, and so on (top rows in Table 1). Finally, the set of acts in each of these locations was scored in terms of a verbal description of the acts. The resulting description shown in the table provides the sequence of acts, highlighting the repetitive performance in the OCD patient compared with a control individual who was asked to execute the same action (bottom of Table 1). The entire sequence of the control individual took 11 seconds, compared with 63 seconds taken by the OCD patient. The excessive duration of the OCD ritual was thus generated by the repetitive manner of the compulsive ritual, which becomes apparent when the number of acts (=gestures) is summed for each location, resulting in 30 acts $(6 + 4 + 5 + 13 + 2)$ for the OCD patient, compared with four

https://doi.org/10.1017/S0140525X06009368 Published online by Cambridge University Press