Extended Control Cycle in Ritual Behavior and Narrative Scenarios

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"No time could exist before the appearance of the reality narrated by the myth."

Mircea Eliade

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1. The Organism and the Environment

Embodiment and Enaction

THE PROPOSITIONS and analyses presented in this study originate from the *embodiment-of-the-mind* hypothesis, i.e., the *enactive* approach in which cognition is the enactment of the world and the mind.[1] The central idea of the embodiment hypothesis is that it is unproductive to dissociate mind and body when we are speaking about mental phenomena. The mind and brain-body support and guide each other. The patterns and processes our body is familiar with are constantly mapped upon the stimuli provided by the world. Humans engage with and grasp patterns and make sense of the surroundings by projecting the body relations and processes they experience at a conscious and unconscious level.[2] Cognition depends on embodied action whereas meaning is emergent out of the basic-level em-

bodied patterns of interaction. Embodied meaning is linked to the motor and affective engagement with the world.

The functional principle of *emergence* grounds living behavior. The term emergence is often used to refer to the appearance of interesting behavior in systems where several components influence one another reciprocally and via circular causality (Clark 2001: 113–114; Colombetti 2014: 56; Tewes, Durt, and Fuchs 2017: 7). In "dynamic co-emergence" part and whole co-emerge and mutually specify each other (Thompson 2007: 60, 38). Living systems exhibit circular causality. One aspect of the circular causality is displayed by the construction of an emergent behavior of the whole due to the activity of individual components (bottom-up) and the subsequent enslavement or constraint exerted by the whole self-organized system upon the behavior of the components (top-down).

In this framework, the organism and the environment mutually co-specify each other, i.e. the organism enacts an environment inseparable of its own structure and actions (Thompson 2007: 59). Hence, "the boundaries of cognitive systems are nested and multiple—and that, with respect to its study, cognition has no fixed or essential boundaries" (Ramstead et al. 2019: 2). Where to draw the boundaries between mind, body, and environment depends "both on the nature of the phenomenon being investigated and on our explanatory interests" (ibid.).

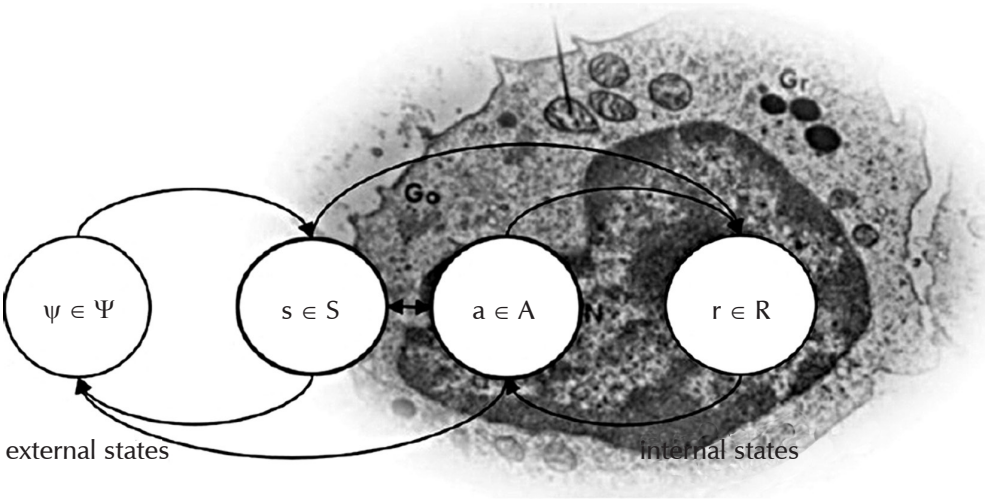
The Free Energy Principle, Active Inference and MBs

One such boundary is the *Markov blanket*. The Markov blanket (MB) is composed of the states of a region of a system that mediates the exchange between external and internal states. The MB consists of the states that separate the two and can be further partitioned into active and sensory states. For an embodied nervous system, the active states correspond to effectors and actuators and sensory states to sensory organs. The internal and external states can influence each other only via sensory and active states. The internal and external states are independent (fig. 1).

MBs define the boundary within which processes work to optimize evidence, i.e. self-evidencing dynamics. Evidence is "model" evidence and internal states—in Bayesian statistics—are a model or a "belief" (expectancy) of the external states. Minimization of the "free energy," i.e., negative model evidence or "surprise," is a process of model optimization. Minimization of the free energy ensures that entropy is bounded. Any system that possesses an MB can be seen as an "agent" that is optimizing the evidence for its own existence. The internal states and the MB are autonomous. An MB mediates exchanges between the agent organism and the environment (target, *Umwelt*).[3] The MB insulates the internal

states of the agent from the direct influence of the external states (Ramstead et al. 2019: 4).

Fig. 1



Sources: Friston et al. 2015: 3; Kirchhoff and Kiverstein 2019: 66.

Under the *active inference* scheme—a corollary of the *free energy principle* (FEP)—a collective of MBs can self-assemble into a global system that has a shared MB. These autonomous systems have layers of nested and self-sustaining boundaries (Kirchhoff et al. 2018: 1).

The Bayesian Mechanism and the Model

A *Bayesian mechanism* grounds the adaptivity of living organisms. Organisms construct—via the establishment of a boundary between an inner region and an outer region—the self and the environment in an act of sense-making. Sense-making becomes, at higher level of cognition, bodily grounded meaning in domains of interaction and in contexts (situations). Consciousness keeps under an emergent order parameter the complex array of neuronal activity. Patterns of activity are kept in check.

The free energy principle (FEP) is a mathematical statement of the fact that living systems act to limit the states (physiological and perceptual) they can find themselves compatible with survival. Hence, organisms act in order to minimize free energy, i.e., entropy and uncertainty or surprise (Friston 2005, 2010, 2013; Friston, Kilner, and Harrison 2006; Veissière et al. 2020).

Any uncategorized stimulus in the environment is sensed as threatening. Valence and arousal of internal states measure the categorization of the "hidden" states of the environment in affective terms.

The organism has a model of the regularities it expects to encounter in the environment and in (phylogenetic and ontogenetic) time the organism becomes a model of its environment, i.e., "regularities in the environment of an organism become embodied in the organism" (Kirchhoff et al. 2018: 4). The organisms are "close to optimal models of their local surroundings, i.e. their niche" (ibid.). The organism embodies the "statistical regularities of its world in its physical and functional composition" (ibid.). On the other hand, the organism is partly responsible for generating the sensory evidence (ibid). Therefore, "time, agents will come to be the authors of the external states (i.e. environments) that reciprocate with predictable, uncertainty resolving sensory feedback of exactly the right sort to sustain cycles of self-evidencing" (ibid., 5). In simple organisms/systems, internal and external states tend towards synchronization and "mutual information"/"mutual predictability" (Bruineberg, Kiverstein, and Rietveld 2018: 2436). This process "need not be thought of as representational." The dynamics can be understood as "circular causality," where "there is no clear difference between internal dynamics attuning to external dynamics and vice versa" (ibid.). In these cases, both systems are "bidirectionally coupled and reduce the disattunement between them until equilibrium (synchronization) is reached" (ibid.). In conclusion, "synchronization is a form of free-energy minimization, which can be given a Bayesian interpretation" (ibid., 2438). This process can be "understood in terms of the coupled dynamics of the system as a whole" (ibid.).

Eddies in Space and Time

In some circumstances MBs include extra-individual features of an organism's local environment (Kirchhoff et al. 2018: 8; Kirchhoff and Kiverstein 2019: 19). Some organisms incorporate elements of their niche in order to keep a functional area of control. Self-organization as an emergent property can include the organism and parts of the environment. For instance, the spider and its web form an extended MB in which the vibrations in the web can be understood as the sensory observations of the spider.

One particular dynamic pattern grounds the organism's behavior in the environment. This pattern defines the boundary of an organism in space and in time. The boundaries of the MBs of autonomous systems can be malleable (Kirchhoff et al. 2018: 9). The living entity is not only a thing in space but is equally a process (expanse, flow) in time and, hence, during this process, it can acquire

different shapes and experience different life cycles. A life cycle is a transformation occurring between two states due to a phase transition. Therefore, an entity can experience several sequential mutations (life cycles) during a particular time scale. In this framework, for instance, it is not necessary to describe two entities in the process of cell division from parent cell to sibling cells. The entity is defined be the whole process. The process contains the "death" of the parent cell and the "birth" of the child. At a lower level the death and the birth are two nested life cycles. The superordinate MB is an order parameter, i.e. a global feature of the system that captures the coherency (dependencies) among the parts making it up in an ordered coordinated pattern (ibid., 8).

From the Embodied to the Cultural Domain of Interaction

Active inference is informed and depends on the goals and intentions of the agent (Bruineberg, Kiverstein, and Rietveld 2018: 2431). The selection of the goals is done from the perspective of the basic concern of the organism towards improving its grip on the affordances of the environment (ibid.). The attractiveness of relevant affordances has "an affective character" (ibid., 2434). In the context of skilled action and engagement with the world, the main concern of the agent is "what needs to be done" (ibid., 2432). Affordances represent perceptions correlated with possible motor actions, i.e. actions of capture and control (Tewes, Durt, and Fuchs 2017: 3). The significance of an object is connected to a goal-based concept that guides possible action. The goal-concept will dictate the landscape of affordances in a domain of interaction with an environment. The selection of relevant possibilities for action is structured by the agent's skills and concern. Sensing is inseparable from moving, and the organism acts as to generate the sensory input it expects (Bruineberg, Kiverstein, and Rietveld 2018: 2434).

Cultures and cultural patterns of behavior (generic rules) are internalized by individuals and become constraints internal to the self-organization of an extended cognitive system (Di Paolo and De Jaegher 2017; Kirchhoff and Kiverstein 2019: 22). The cognitive system thus established is constituted by the set of dynamic coordination of the multiple elements of which a cognitive system is composed.

> *The individual is thus "the loci of coordination," but the control of its activities is decentralized and distributed among "multiple structured media and practices" (Sutton 2010, p. 213). It is the individual as embedded in a network of practices that is reconfigured in their coupling with the environment.* (Kirchhoff and Kiverstein 2019: 22)

Cultural practices guide what an individual attends and how he perceives the world. The system composed by the individual and the separate pattern of stimuli it self-organizes and assembles is "in part based on constraints that come from the symbol-using practice" (Kirchhoff and Kiverstein 2019: 22–23).

> *Thus, some of the active dynamic processes involved in the process of softly assembling a cognitive system are located beyond the individual agent, in the wider practices in which the individual is nested.* (Kirchhoff and Kiverstein 2019: 23)

Predictive coding can also describe cultural exchanges and interaction in terms of control. This suggests that "structuring our worlds [is] genuinely continuous with structuring our brains and sculpting our actions" (Clark 2013: 194). Agents structure their worlds and actions in order to make their predictions come true, and the role of perceptual contact is to check and, when necessary, to "correct the brain's best guessing concerning what is out there" (ibid., 199–201).

For Ramstead, Veissière, and Kirmayer (2016: 1) culture is formed by "cultural affordances," i.e., "practices and regimes of shared attention." Culturally patterned practices modulate the salience of the sensory inputs originating from the world. Hence, individuals immersed in culturally constructed niches can select "to select sensory evidence relative to the individual's goals and to identify sources with high reliability" (Veissière et al. 2020: 11). Regimes of attention "correspond to the salience or epistemic affordance of sources of cultural information embodied in the epistemic cues of the niche" (ibid.). In his perspective "cultural content and normative practices are built on a foundation of contentless basic mental processes that acquire content through immersive participation of the agent in social practices that regulate joint attention and shared intentionality" (Ramstead, Veissière, and Kirmayer 2016: 1).[4]

Cultural meaning depends on the capacity of the individual agent to exploit social "conventions" (shared values, expectations, norms and moral frames etc.) in order to infer the intentional states of other agents (Ramstead, Veissière, and Kirmayer 2016: 6).[5] Social norms and conventions are "devices" meant to "reduce mutual uncertainty" (ibid., 16). Generative models are instantiated at different levels and timescales. At lower level, "skilled intentionality" means "contentless direct coping," and, at the cultural level, it is "symbolically dense and strongly content-involving forms of collectively and conventionally rooted intentionality" (ibid., 14). The agent organism in this framework is a statistical model of its cultural niche (ibid., 10).

In simpler organisms the homeostatic driven control cycle is bound to affect and sentience, i.e., the "protoself" that allows the emergence of the "core self" and "core consciousness," and in more complex organisms mutual controls al-

low the emergent of the "autobiographical self" that is based on an "extended consciousness" which has "many levels and grades" (see Damasio 1999, 2010, 2018). In this context, the attention mechanism is a process of conscious availability of the state of affairs in which the agent organism is involved.[6]

Cultural practices integrate different agents and their MBs in a network of interactions, e.g., the action states of ones are the sensory states of others (Veissière et al. 2020). The modification of the patterned cultural practices (e.g., people and artifacts) modulates salience of information and facilitates cultural learning. Hence culture can be envisioned as "an extensive process that recruits elements both within the brain and in the shared cultural world (e.g., constructed places and designed artefacts)" (ibid., 11), i.e., an extended MB.

The resulting network of interactions is the field of control of a cultural domain. The cultural self-assembly is similar to multicellular organisms in the sense that its structure is an emergent property of units that "share a common . . . model of organismal form" (Friston and Frith 2015: 1). The external states of one social unit are the active states of another and entail a form of "generalized synchrony." Uncertainty is resolved when synchrony is achieved. Each individual adjusts its model (generative model) such as the target morphology of the group emerges. The shared cultural organism exhibits a self-modeling process and maintains the integrity of the whole.

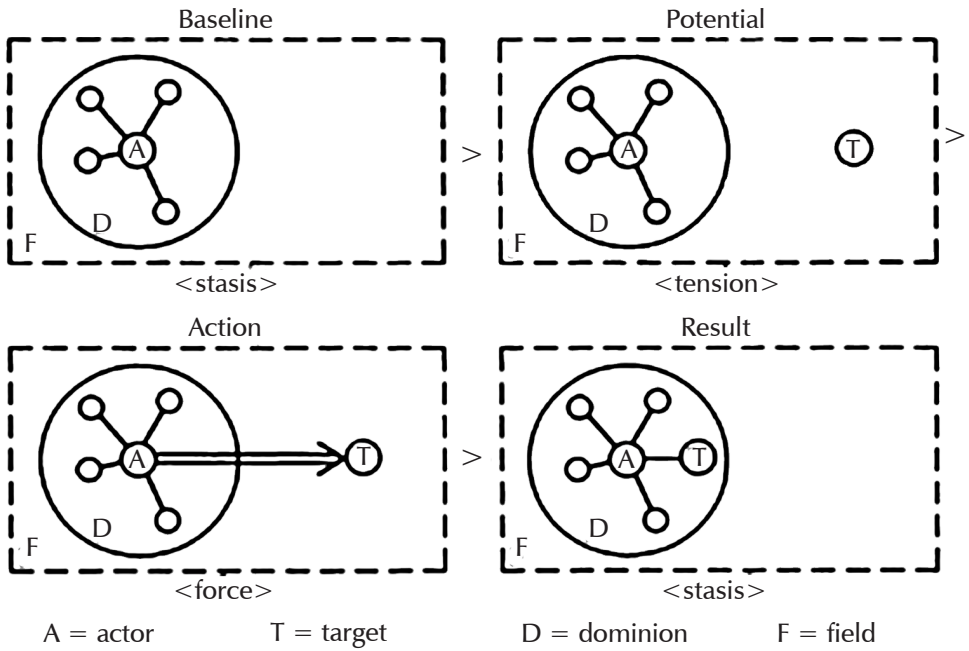
2. The Control Cycle

What is a Control Cycle?

Organisms take shape in space and time. They draw patterns of behavior or life cycles. The *control cycle* is such a dynamic pattern of behavior that defines an MB. The *control cycle model* was used extensively in the cognitive grammar developed by Ronald W. Langacker (Langacker 1987, 2008, 2009). The model has several in-built stages that define the interaction between a region of internal control and access and an external entity, a target defined in space and time. The model is a hard 'glued' gestalt-like composite that enlists several image schemas components (fig. 2). Langacker summarizes the basic form of the control cycle as follows:

> *In the static baseline phase, an **actor** (A) (in a broad sense of the term) controls an array of entities (small circles) which collectively constitute its **dominion** (D). In the next phase, some **target** (T) enters the actor's **field** (F), or scope of potential interaction. This creates a state of tension, for the actor has to deal with the target in*

Fig. 2



Source: Langacker 2009: 130.

> *some manner. The typical means of dealing with it is by somehow bringing it under the actor's control, i.e., exerting force (double arrow) resulting in its incorporation in the actor's dominion. The result of this action is a modified situation that is once more static (a state of relaxation).* (Langacker 2009: 130, 306)

The control cycle is inherently affective. The unfolding of the phases inherent in the control cycle generates a basic affective state of low excitement ingrained with a positive valence of fulfillment. This study proposes that the control mechanism can be seen as an instantiation of the homeostatic drive (Damasio 2018) or *allostatic* regulation (Barrett 2017).[7] In allostatic regulation, the result stage is modeled (conceptualized) by the organism before its fruition. The action stage is structured by the goal-result expected or predicted. We can say that—in the tension stage—the bottom-up sensory input is already categorized by the top-down predicted outcome of the encounter—the anticipated result stage. The organism perceives in the *now* a sensory input as a particular type of stimulus based on its explanatory model of the consequences that will follow in the foreseeable future. For instance, the regulatory response to stimulus of bacteria and

microbes does not represent a reflexive response to current conditions but rather a "prediction of what they are likely to encounter in the near future" based on an internal model (Freddolino and Tavazoie 2012: 370). For Larkum this behavior is at work from the cellular to the cortical regional level (Larkum 2013).

The control cycle can be envisioned as a rule governing the behavior of the simplest of organisms, i.e., the cell, as well as of complex organisms that aggregate multiple entities in coherent behavioral wholes. The behavior based on the control cycle give us the rules that tell us how networks of brain cells behave. In other words, scaled up in complexity this behavior gives us sense-making mechanisms that interconnect living organisms/selves and the world. In other words, from the perspective of the embodied mind, the control mechanism plays a vital role in shaping the interaction between self and the environment. Social interactions between minds are further constrained by the core biological mechanism of the control cycle.

In the social domain of interactions, the control mechanism is assessed as either positive or negative. For example, on the positive side, there is the improvement of collective life, but on the negative we have instances of violence toward other human beings and abuse of power (Damasio 2018: 157). Humans create and use symbolic constructions in order to exercise processes of control and ground them in social intersubjectivity. Different symbolic constructions belong to distinct categories of messages grounded in domains of interaction, i.e., law, science, art, persuasion, and in different media that are manifest in the basic domains of sensorimotor modalities. For instance, symbolic constructions are instantiated in the artistic domain as mediated representation, e.g., theater, installations, performances, painting, sculpture, literature, and film.

The main idea is that a similar life cycle covers a multitude of experiences in different domains of experience. The domains of experience are situations (contexts). A similar dynamic pattern (a life cycle) is instantiated in a vast array of situations that can be conceptually described at different levels of abstraction. For instance, in the biological domain of interaction the control cycle is instantiated as eating and digesting a target organism and its incorporation in the processes that generate energy for the organism. In the epistemic domain of interaction the control cycle is instantiated as perception and understanding. The same dynamic shape constrains the process of capture and control of an external target in different situations. In some situations the concept instance can be labeled as romantic love, rational understanding, teamwork, maternal bonding, influence and manipulation, etc. With each experience a new concept is constructed part similar to previous models part different and novel. The same abstract dynamic model of the control cycle is instantiated in the domains of biological interaction

as play in situations of skills learning, as performance in theatrical settings, as narrative in reporting situations, and as ritual in situations involving the generation of new realities.

The control cycle is a dynamic process or life-cycle in the sense that, once accessed, it launches the sequence of internal states like a computer program running a series of code lines. The cognitive model of the control cycle has a bodily meaning-structure that instantiates a temporal process, i.e., structures the experience according to a series of stages and is not as a static pattern. The life-cycle of the control model is a single metamorphic process, i.e., an "agent" that is not identified by a specific stage, one state of the life cycle, but with the "temporally extended whole" (Kirchhoff et al. 2018: 9). The act of transformation and successive stages construct the whole "agent" or the bounded thing-like entity.

In the social domain the control cycle is a dynamic system that recruits a multitude of other mental processes and schemas and glues them together in a sequence. As such it can be grasped by a cross-domain mapping. The control model is instantiated in the mechanism of mirroring the gestures of others and incorporating them by mimicry in order to understand and coordinate with others.[8] Mimicry facilitates the access to what the other is experiencing as a self-experience.

The environment, as a control cycle, influences the behavior of the agent. The agent, based on its abilities or expectancies, controls in a conditional way the environment. As Veissière put it, during the history of co-adaptative interactions the agents and their environments are modified and become attuned to each other (Veissière et al. 2020: 7).

The Tension Cycle

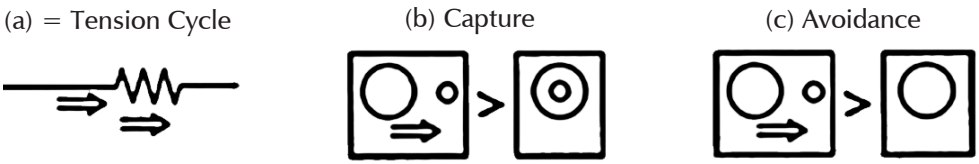
The control cycle is based upon the *Tension Cycle* (fig. 3a).

> *The **Tension Cycle**, consists of four successive stages: an initial stage of relaxation (i.e., non-force-dynamic continuity); next a stage of increasing tension; then a force-dynamic event which has the effect of releasing the built-up pressure; and finally, resulting from the event, another stage of relaxation.* (Langacker 2009: 306)

A state of tension is created when "something comes close enough to us that we can interact with it" (Langacker 2009: 306). The entity enters our field or region of potential interaction. The potential for interaction creates a state of tension. Tension is linked to the bodily experience of internal equilibrium of the balance of forces of the entities occupying the dominion, and the potential loss

of this equilibrium. Perturbation of balance or equilibrium of the stasis is felt, as Mark Johnson argues, as a negative valenced affect, e.g., we feel physically sick (Johnson 1987: 75). The actor can deal with the situation in two basic ways in order to keep under control a set of entities in his dominion.[9] One way to resolve the tension is to *capture* the target, i.e., "taking control of the intruding entity, or target." The prototype is the "instance of physical capture, as when a cat catches a mouse" (Langacker 2009: 306) (fig. 3b).[10] Another way to resolve the tension can be achieved by *avoidance*, i.e., "acting in such a manner that the target is no longer in the field" (fig. 3c).[11]

Fig. 3



In cognitive terms, the control cycle displays an inherent circularity. From a predictive coding theory of cognition, on one hand, the external perturbations sensed explain and confirm the internal model of the self in the environment. On the other hand, the internal model explains the nature of the perturbations. In front of disparities the agent can either modify the model by perception or can modify the target by action.

The control cycle has inherently a gestalt-like or emergent structure. Any stage of this dynamic process triggers the other stages and the whole. The component image schemas are, at the same time, causing the whole to emerge, and are constrained by it. In a self-feeding circular loop the whole cycle causes the interaction of the component image schemas, and, as an effect, it results from the process of coming together of the components.[12]

Sense-making obeys or is shaped by underlying life cycles that are reflected on all scales of biological complexity. In other words, the control cycle arises with the emergence of living entities. Human scale experience is situated at an intermediate level between cellular organisms and cultural structures.

What lies beyond the control field of the organism is uncertain and elicits affective tension. Core affect is modulated, i.e. the intensity and valence of affect (Russell 2003), by different situations in which the organism is finding itself.[13] The control life cycle model shapes core affect.[14] In other words, all experience has a feeling tone.[15] In this sense the control cycle is equally an affective model. Behavior aims to maximize pleasure and minimize displeasure (Russell 2003: 149).

3. The Power of the Magical Thinking: the Ritual

Rituals mediate the relationship between the organism and the world. They also simulate the "incorporation" of the world and the self. By action, the agent includes in its area of control the external states. In simpler organisms, the action means the inclusion of the external target into the internal metabolic process. Stated in epistemic terms, cognition is also way of control and "incorporation." Once included in the agent's area of control, the target can be manipulated and modified. Nevertheless the agent, in this framework, since it is overlapping with the dominion of the field of control, undergoes a radical change of status. The agent-dominion endures the extinction of the initial state of his area of control and the gain of a new dominion-structure. Hence, the agent is transformed (if we highlight continuity) or, like the life cycle of the caterpillar, pupa, butterfly process, is destroying its old body in order to obtain a new body (if we highlight discontinuity) which contains the external target as an incorporated aspect. At the same time, the target is no more a hidden external state but a controlled one, i.e., it is included in the internal complex of synergies. During this process the *Umwelt* as an entirety doesn't cease to exist. The controlled target is only a facet of the world which, since the agent evidences himself, is still existing in its entirety as a hidden whole.

The agent and the target are coupled in a bi-directional control cycle. The agent controls the target and the target, once included in the field of control, changes the structure of the agent which becomes a new system. Rituals targeting the individual designate the personal transformation (e.g. birth, transition from child to adult, marriage, and death) and rituals of collective transformation (spring festivals that mark the passage from one year to another) target the evolution of the world in time. The collective rituals allow the reconstruction of the performer's collective "body," and facilitate the temporal transition of the world-environment from past to future (conceived as a cycle of destruction and reconstruction) (see Turner 1982).[16]

Rituals mediate a transformation that can be described in ontological and epistemic terms. In ontological terms, the ritual allows the emergence of an external reality and of a self that lasts in time. Magical thinking allows the control of mundane events, not yet known future events and the imposition of lasting patterns of being over indefinite timescales. Often, the purpose of the ritual is to mediate the passage of time and the indefinite continuation of the world and the self. In other terms, its goal is the indefinite preservation of life cycles, i.e. immortality. In epistemic terms, the ritual tends to include the environment in the area of control of the agent. Understanding "truth" or the process of knowing future events is conceived as the integration of the hidden external reality

in the area of control in order to achieve a status of complete synergy between constituents.[17] Therefore uncertainty (i.e. entropy or alterity) is avoided in a system that lasts in a state of internal synchrony.[18]

4. The Sacred and the Profane

The World As a Fuzzy Category

In the spiritual domain humans are confronted with external hidden variables that are conceived as spiritual entities (or nature) that are mysterious and elicit obscure descriptive languages. Eliade described the domain situated behind the "threshold" of the domain of control as the "chaos":

> *the unknown and indeterminate space that surrounds it. . . . a sort of "other world," a foreign, chaotic space, peopled by ghosts, demons, 'foreigners' (who are assimilated to demons and the souls of the dead).* (Eliade 1961: 29)

What we call here the reintegration or the categorization stage is for Eliade the "sacred." In other words, taking possession of a territory is equivalent to constructing/categorizing it by a cosmogonical act as a cosmos and a sacred space ("By occupying it and, above all, by settling in it, man symbolically transforms it into a cosmos through a ritual repetition of the cosmogony") (Eliade 1961: 31).

The world is first and foremost revealed as something to be grasped and controlled. The emotional tone associated is fear and the subsequent attitude is veneration. For traditional societies the spiritual world is indifferent to the human fate. Hence humans must gain benevolence. The sacred is depicted as mystery, entities that are different (deities, nature, ghosts, spiritual beings), inaccessible to language, reuniting contraries (the androgyne), and attainable only via a radical transformation of the agent. The spiritual per se is not accessible to categorical thinking and is conceived under the shape of concepts that reunite contraries. For certain traditions the world is conceived via the feminine metaphor, e.g., the "universal mother" (Eliade 1961: 117). The cosmos itself is conceived as "real, living, and sacred" (ibid.). The feminine is procreative, multifaceted and has a life cycle extended on a wide time scale, e.g., Cybele, Isis, Dea Mater, Gea, Tiamat (Deaca 2009). Most often it is associated with the sea, e.g., the locus of infinite possibilities of existence. First and foremost, via the existential legacy of transmission of genes from mother to daughter, the feminine constructs a never-ending succession of life cycles that generate a superordinate wider life cycle of generations.

Being outside the realm of the categorization-control field, the sacred is conceivable as that which is abject, i.e. the a-categorial (e.g. entities that are "no-longer-alive and not-yet-dead") (Elsaesser 2019: 190). Knowledge and truth are frequently associated with humans that are on the fringe (the infant, the carnival fool, the stranger, the ill) and bodily states that are associated with malady (epilepsy), and loss of conscience (mystical states). Their knowledge is less rational (based on high level cognition) and more embodied (the blind man) lacking at the same time articulated language.

Fig. 4

Control cycle	Ritual	Narrative
a. Stasis	Model simulacrum	Initial state of equilibrium
b. Tension (Potential)	Description or formulation of the a-categorial (liminar perturbatory events and realities). Sacrifice, and trials (passive mode) (assessment and probing).	Sensing of the disruption or lack. Formulation of the agent and the counteragent.
c. Action	Exploratory journeys, incorporation or capture process (active mode).	Reparatory action
d. Stasis (Result)	Formulation of the enhanced new model simulacrum.	Achievement of the final state of equilibrium.

5. The Scenario of the Ritual

The Initial State

Rituals and narratives mirror the phases of the control cycle. An *initial state* of relaxation and stasis (the initial phase of narrative) is followed by a *state of tension* due to the presence of an external perturbation (fig. 4). In narrative terms, a disruption or a lack is sensed. The tension state is a sensory state. In rituals, the perturbation is depicted as contact with a chaotic world (e.g. the inferno, the world upside down) described as challenging known categories. It disrupts the boundaries of the body and does not belong to known categories. Sensing the disruption is often depicted as fragmentation and dismemberment or as seclusion (Turner 1982: 26). Sometimes, the performer of a ritual offers as a sacrifice a model of the a-categorial or himself as model. The

reality status of the model simulacrum is ambiguous since it both profiles the agent in its relationship with the target and is a model of the target. As an MB it both evidences the inner states (the agent self) and the external states of the environment (the target or the sacred).

The Tension State

The *disruptive/tension state* is depicted as sacrifice (fig. 4b). The sacrificed body is a simulacrum of the agent. Its destruction (death) describes the influence of the sacred and reveals it. The novices are "dead to the social world and alive in to the asocial world" (Turner 1982: 27). In carnival, the farce instantiates the disruption phase. The tension (sensory) phase can be depicted in the passive mode (it is a farce) or, in the active mode (it is a journey), it becomes action (active) phase.

Turner in his comments about the "rites de passage" (Van Gennep) labels this state as a "liminal phase" that features inversion and chaos (Turner 1982: 41–45, 29–32). He also designates this stage an "anti-structure" (which includes "liminarity" and "communitas," i.e., the integration of the individual participating to a ritual in a collective social entity) (ibid., 44–47).[19] As Turner states, liminality may involve a "complex sequence of episodes in sacred space-time, and may also include subversive and ludic (or playful) events" (ibid., 27). Liminality is correlated with play: "in liminality people 'play' with the elements of the familiar and defamiliarize them. Novelty emerges from the unprecedented combinations of familiar elements" (ibid., 29).

The signs of liminality—as indicated by Turner (1982: 26)—are the physical separation of the ritual subject from the rest of society, and inversion of normal reality as "effacement" and "ambiguity and paradox" (ibid.). Other signs are "eating or not eating specific foods, disregard of personal appearance, the wearing of uniform clothing, sometimes irrespective of sex," and gaining "uniformity, structural invisibility, and anonymity as possible" (ibid., 27). The initiands are in "close connection with non-social or asocial powers of life and death" and the novices are frequently compared with "on one hand, ghosts, gods, or ancestors and on the other, with animals and birds" (ibid.). It is often represented as an exploration of the a-categorical realities: the inferno, the world of the dead, excessive sexual and culinary actions, the world upside-down.

The Active State

The *active state* is made of several cycles of tension and action, i.e. sensory and active states that adjust inner states and external states in order to achieve the *final state* of equilibrium (fig. 4c). Quite often the active state is represented as the "paradigmatic victory over the dragon," e.g., the paradigmatic figure of the marine monster, of the primordial snake, symbol of the cosmic waters, of darkness, night, and death—in short, of the "amorphous and virtual, of everything that has not yet acquired a 'form'" (Eliade 1961: 48). The active phase of the narrative reparatory phase is an exploratory stage depicted as a sequence of trials and journeys. It is composed of successive episodes of tension and action. In the active phase the novices are instructed in novel social practices, e.g., a secret language and "various non-verbal symbolic genres, such as dancing, painting, clay-molding, wood-carving, masking" (Turner 1982: 27). In this stage the novices' symbolic patterns amount to teachings about the structure of the cosmos and their culture (ibid.). Liminality implies also a sequence of episodes in sacred space-time and subversive and ludic (or playful) events (ibid.). As Turner mentions, out of unprecedented combinations of familiar element novelty emerges, and in "liminality people 'play' with the elements of the familiar and defamiliarize them" (ibid.). Cultural elements or factors are recombined in grotesque ways, e.g., "a monster disguise may combine human, animal, and vegetal features in an 'unnatural' way" (ibid.).

Ritual is ordered by a dramatic structure and involves an "act of sacrifice or self-sacrifice" (Eliade 1961: 56, 101; Turner 1982: 81). Since the sacrifice is also a way of instantiating the sacred, the active phase includes in several rituals only the sacrifice and dismembering action. In carnival rituals it is often instantiated as the farce. In farce the fool is the entity to be sacrificed. In rituals of sacrifice the agent becomes consubstantial with the model that it captures or consumes.[20] If the model is external, an act of incorporation takes place. The agent "eats" the sacrificed entity, e.g., "eating of the divine body" (Eliade 1961: 102). The eating and the capture of the external body represent both the tension/dismemberment phase of the old body and the active phase of the transformation of the old agent system into a new one that fuses the agent and the target. In other cases the agent himself plays the disruption and the transformation phases.

The normative structure is the social equilibrium and the anti-structure represents the "latent system of potential alternatives from which novelty will arise. Games exhibit this structure of order-disorder as well as other liminoid rituals as "charivaris, fiestas, Halloween masking, and mumming, etc." (Turner 1982: 28). Turner emphasizes the idea that liminal situations are the "seedbeds of cultural creativity" out of which new elements and new combinatory cultural rules

can be conceived (ibid., 28). Eliade mentions that the reparatory phase is often represented as the construction of a temple (Eliade 1961: 45). This stage can describe a cosmogonical act. For instance, the creation of the universe or man takes place from the "navel of the earth" or the *axis mundi* (ibid., 37, 44). The sacred space is to be understood as a model of the cosmos (ibid., 29).

The Final Stasis

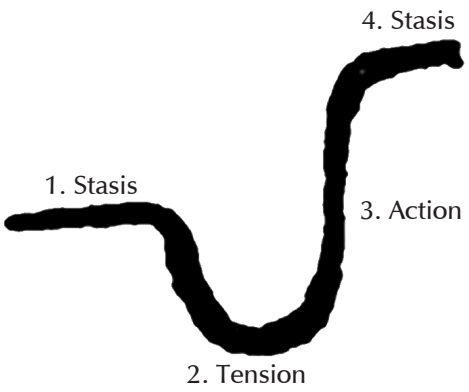
The final stage of the scenario is the *reestablishment of the stasis* (fig. 4d).[21] In rituals this stage is the recovery of a new body. It can be depicted as rebirth, reincarnation, the mystical union with the sacred or the building of a new architectural construction (the temple) that display immortality. It is often represented in carnival ritual as the feast in which the performers incorporate the food to be consumed. Incorporation can be depicted as the carnival feast (as an instantiation of the *communitas*) (Turner 1982: 51), the mystique of love, the conception of immortality and the architecture of immortality (the temple).

For Turner, rituals and social-dramas involve liminal situations and anti-structure experiences performed in order to achieve reintegrative outcomes which serve to "communicate information about a culture's most cherished values" (Turner 1982: 78–79). Rituals have a transformative capacity and accompany transitions from one state to another augmented state (ibid., 80). To quote Turner once again, the ritual life-cycle sequencing occurs "most radically in the ritual 'pupation' of liminal seclusion" (ibid., 80–81). The rite of passage (as defined by Van Gennep) postulates a unidirectional move towards an indicative mood transformed by immersion in subjunctivity which implies an "abyss" of meaning concerned with "wish, desire, possibility, or hypothesis" (ibid., 82). The initiand is transformed by liminal experiences, i.e., a world of "as if" (ibid., 83).[22] The reestablishment of the stasis celebrates the "man-made meaning, the culturally determinate, the regulated, the named, and the explained" (ibid.). The ceremonial is a statement of form against the indeterminacy present in the liminal phase of the ritual. For Turner ritual is a "transformative self-immolation of order as presently constituted, even sometimes a voluntary sparagmos or self-dismemberment of order, in the subjunctive depth of liminality" (ibid.).[23] Via transformation, i.e., destruction and reconstruction an "authentic reordering" comes about (ibid., 84).[24] As Turner puts it: "ritual liminality . . . contains the potentiality for cultural innovation" (ibid., 85). Ritual allows play, understood as an experimental "play of symbol-vehicles" and "play of meanings" out of which rise new meanings and semantic models, i.e., cultural innovation (ibid., 85, 52).

Ritual behavior can also optimize the epistemic value or epistemic affordance of particulars ways of exploration/sampling of the environment with high uncertainty but which will provide the most relevant information and enhance adaptive advantage (Veissière et al. 2020: 12–13). Narrative, for Turner, is derived from ritual and is an instrument for binding "values" and "goals" into "situational structures of 'meaning'" (Turner 1982: 86). The concept of narration is also, for Turner, an appropriate term for "a reflexive activity which seeks to 'know' . . . antecedent events, and about the meaning of those events (ibid., 87).[25] Therefore, "the narrative component in ritual and legal action attempts to rearticulate opposing values and goals in a meaningful structure" (ibid.).

The graphic representation in fig. 5 can describe processes of active inference, play as "pattern recognition" (Grodal 1997: 26; Boyd 2009: 88–94), comic recategorization (Carroll 1996: 147; Grodal 1997: 186–190, 200; Berliner 2013: 202) narration[26] and "social drama" (Turner 1982: 92).

Fig. 5



Van Gennep, apud Turner

1. Stasis
2. Separation
3. Limen, margin, threshold, indeterminacy, communitas
4. Aggregation, reincorporation
(Turner 1991: 94)

Source: Langacker 2009: 306.

6. The Narrative

Narrative form is "founded in a pre-cognitive process of bodily sensing" of experience (Kiss 2015: 54). Our sensed bodily order and our ordered existence in the environment induce "the sensing of a structure and by extension a narrative form" (ibid.). One's ability to structure both real-life and mediated experiences allows and "drives the practical procedure of organizing information into an intelligible form, where narrativity stands for the extracted format that is intelligible specifically to humans" (ibid.). Mental schemas are thus "arrangements of knowledge" (ibid., 53) that emerge from

proprioceptive and exteroceptive explorations both in real life situations and mediated experiences.

> *Because of this loop between creativity and comprehension, "narrative functions" are just as much of the internal features of the work, as of the embodied mind's that creates, appropriates, then recognizes, and ultimately labels the experience as "narrative."* (Kiss 2015: 54)

Mediated stimuli evoke the narrative form understood as a "feeling of meaningful order" (Kiss 2015: 54).[27] In this study, narrative form is one instantiation of the control cycle. The control cycle appears in more general discussions about sense-making in different interactive domains, e.g., perception, event structuring, emotion elaborations. The circular loop is considered the fundamental mechanism of cognition. Perceptual cues in different domains of interaction evoke/cause a control cycle cognitive model which, in its turn, explains and shapes the stimuli at hand. Intersubjectivities (producers and comprehenders), likewise in a closed-loop manner, can temporarily agree on a similar description of their experiences. Both subjects can play in turn the roles of producer-comprehender and construct a mediated support that elicits similar embodied outcomes (affective, and verbal).

7. The Relationship between the Sacred and the Profane

The Constative and the Performative

John Searle (1983) defended the idea that speakers use linguistic utterances in order to achieve either a constative or a performative action. In the constative frame the belief prompted by a particular expression is used in order to fit the structure of the world (the direction of fit occurs between the word to the world) and in performatives the direction of fit is reversed (the world fits the word). However, performatives exhibit circularity. The agent making an utterance describes a state of affairs (the world) which, in its turn, creates the designated state of affairs. In the appropriate conditions declaring a man and a woman married (the word fits the world) introduces in the world a new state of affairs (the world fits the word). This mechanism mirrors the partition between sensory and active states.

Two papers develop the idea that certain metaphoric construals instantiate the circular coupling (Coulson and Oakley 2000; Sweetser 2000). Sweetser gives the example of a "painting of a buffalo hunt on a cave wall" (Coulson

and Oakley 2000: 185; Sweetser 2000: 312). Is the painting a depictive record, "following and modeling itself on events in the represented world" or is it a performative that is magically intended to "bring about in reality the situation it represents"? (Sweetser 2000: 312). This dual nature of representations is considered to hold for metaphorical representations and literal ones. Sweetser considers that, in rituals, the same representation is simultaneously depictive and performative.

> *Does kneeling to a divinity metaphorically represent the already extant differential in power and status between worshipper and god (a depictive use), or help to bring the worshipper into the right state of humility (a performative use)? Perhaps both*. (Sweetser 2000: 315)

The relationship between the sacred order of the ritual and the world environment (the *Umwelt*) is both constative and performative. The collective ritual—as a new larger MB—constructs a new entity and performs the function of magical thinking. For instance, quoting again Eliade, annual festivals bring into reality time by performing the ritual "because no time could exist before the appearance of the reality narrated by the myth" (Eliade 1961: 72). Festivals reiterate each year the life-cycle of the ritual thus reinstating time as a "sort of mythical present that is periodically reintegrated by means of rites" (ibid., 70). With each New Year the world is created anew in its temporal (*tempus*) and spatial aspects (*templum*) (ibid., 75). It can be either the ritual itself understood as artifact/performance (a new social reality), or the external object of cult (the sacred domain), and the body of the performer (which simulates the body of the sacred domain). The equilibrium gained by the artifact MB is unstable. It can either become an external thing and thus gain independence (i.e., becomes a hidden state of the environment), or it can be fully integrated in the field of control of the agent (i.e., the internal states of the organism) and, as a consequence, be fully extracted from the environment. In the former case, it belongs to the realm of the world and, in order to be known, it has to be explored as any hidden state (i.e., captured and controlled in a biased and partial way). Its genuine nature is unknown. In the second case, it is integrated and consubstantial with the inner states of the agent and, therefore, brings no information about the external world.

The Attunement

In the process of attunement of the agent and the environment the MB plays the role of a catalyst. Language and symbolic artifacts enable selective attention as "spatial reorganization" and virtual items (Clark 2001: 46). Material symbols and epistemic artifacts "help sculpt and modify processes of selective attention and act as elements within hybrid representational wholes" (ibid., 57).

For instance, in the situation of the painter and the perceiver skillful bodily action and perception are in some sense intimately entangled or intermingled (Clark 2001: 170). In other words, "what we perceive is determined by what we do or what we are ready to do; we enact our perceptual experience: we act it out" (ibid., 171). Specific types of embodied agents bring forth by their own activity a perceived world characterized by a suite of distinctive sensorimotor dependencies, "whose nature sensitively determines the way the world is experienced through the senses" (ibid., 176). The cues and stimuli made available by the cultural artifacts modulate and influence the perceiver's embodied potentialities for engagement with the environment.

The Sense-Making

As Boyd suggested, narratives, myths and ritual reenactments are grounded in play (Boyd 2009: 107). We can further extend the observation and claim that play is one instantiation of sense-making (i.e., the creation of a proximal externalized MB) and we can understand artifact creation as composed of a population of different instantiations (e.g., rituals, narratives, artifacts like verbal or visual expressions) grounded on the same basic process.

Sense-making means, in the view presented here, the action of construction an external MB that is used as an intermediary alias (simulacrum, model) of the external states (the world, the "hidden" states environment). This MB allows the agent to exert active inference and, since the proximal externalized MB can be modified at will, operate changes on the distal hidden states of the world (i.e., magical thinking). Rituals belong to the class of cultural practices which encode information in a MB—under the form of coupling between the organism and its niche—that explains adaptive behavior (Ramstead et al. 2019: 6). In other words, cultural artifacts are the "material artefacts populating human niches [that] enable individuals to deal with perceptual uncertainty" (ibid., 24). Acting successfully to minimize uncertainty will construct the cultural econiche more predictable and more similar/grounded on the organism's expectancies for continuous survival (Veissière et al. 2020: 14). One key point is that, during

this incorporation that has self-evidentiary consequences, the agent self is transformed in a different entity that can display a longer life cycle and thus escape the entrapment caused by the "arrow" of time (i.e., immortality).

One particular depiction of this MB is the conception of the "carnivalesque body" that mirrors the external spiritual agency that has to be instantiated by the collective ritual. Death and love intermingle in this behavior. The sacrifice of the old body (i.e., death) is the construction of a new entity achieved by capture and incorporation (i.e., birth and renaissance). Mystical love is achieved as a generalized synchrony in which the organism is consubstantial with the *Umwelt*.

8. Conclusion

Rituals formulate (in a descriptive manner) hidden realities and, at the same time (in a performative manner), bring them into existence as external realities that can be described and controlled. The dominant affective stance is one of fear and anxiety. Veneration is often translated as sacrifice of a simulacrum (of the body of the agent or the body of the target). Veneration is an action of incorporation of the external entity into an internal one belonging to the dominion of the agent. The external target and the agent become thus one single field of control and share a common set of properties in a synergy (often represented as musical harmony or breath rhythm). Rituals mediate the transformation of the body of the agent (the individual to be initiated or the social body). Creating a new reality is akin to the birth of a new entity as it is done by a genesic feminine principle based on the life cycle of the control cycle. Rituals, as mediating MBS unfolding in time as dynamic patterns in which four stages can be identified, allow the construction of a new body and reality.[28] Rituals are constructed as simulations situated outside the common aspects of life that mirror/represent the individual's inner processes of coping with the external world. Rituals belong to the category of processes of modeling ourselves modeling the world via narratives of control cycles. Hence, cultural agents extend their sensory MB features and include cultural artifacts in their internal states in order to control external states of the world and, simultaneously, provide evidence for the self.

Imposing rules of behavior on oneself because you don't fully understand the phenomenon you are confronted with has the paradoxical result of regain of agency and control over the target. In other words, veneration and submission produces identification with the target and is a strategy of maintaining control and access to agency and to the sacred (Elsaesser 2019: 248).

Sacrifice of an external artifact model or the sacrifice of the individual in a social body (the body of the sacrificed individual is an artifact model of the control cycle) restages the control cycle aimed at the incorporation of the environment in a self-assembled synergy-based whole capable of enduring on a long timescale. ❑

Notes

1. See Johnson (1987), Maturana and Varela (1987), Varela, Thompson, and Rosch (1991), and Thompson (2007).
2. As Wojciehowski and Gallese (2011) indicate, embodied simulation hinges on the immediate and involuntary mirrored experience, i.e., "our brain-body system re-uses part of its neural resources to map others' behavior. When we witness actions performed by others, we simulate them by activating our own motor system. Similarly, by activating other cortical regions we re-use our affective and somatosensory neural circuits to map the emotional and somatosensory experiences of others" (16). As the authors point out, embodied simulation may be compared to Antonio Damasio's "as-if body loop" which enables us to feel an emotional state "as if the body were being activated and modified" (Damasio 1994: 157). On the other hand, the mind reflects statistical patterns of the environment.
3. The *Umwelt* is the world around the organism transformed in an environment with significance for the organism through its sense-making activity (see Thompson 2007: 48; Colombetti 2014: 18).
4. "According to this perspective, cultural ensembles minimise free energy by enculturing their members so that they share common sets of precision-weighting priors. Human beings—with our specific forms of neural organisation, phenotypes, evolved behavioral tendencies and sociocultural patterns—minimise more free energy across spatial and temporal scales than any other species" (Friston et al. 2018: 13).
5. "The predictive hierarchical architecture of neural networks comes to encode statistical regularities about the niche, which allow the organism to engage with the field of affordances in adaptive cycles of action-perception. But the embodiment of generative models does not stop at the brain. Indeed, one radical implication of the free-energy principle is that the *organism itself is* a statistical model of its niche" (Ramstead, Veissière, and Kirmayer 2016: 10); "Is a graded phenomenon. At one extreme, skilled intentionality consists in contentless direct coping . . . At the other extreme, we find stereotypical human intentionality, that is, symbolically dense and strongly content-involving forms of collectively and conventionally rooted intentionality" (ibid., 14); "In this light, one can view social norms and conventions as devices to reduce mutual uncertainty, that is, consonantly with the free-energy framework, as entropy-minimizing devices . . . One must know 'what is in the minds' of others (such as what one would see and how one would interpret another's action generally and in context) in order to make a successful inference (both explicit, content-

involving or implicit, correlational inferences) about other agents in each situation" (ibid., 16).

6. "All conscious states are attentionally modulated intermediate-level perceptual representations" (Prinz 2012: 169).
7. Allostasis is a process in which the organism prepares the body for anticipated energy spending and expected benefits (see Barrett: https://how-emotions-are-made.com/notes/Allostasis).
8. See Gallese 2005; Gallese et al. 1996; Rizzolatti and Sinigaglia 2008; Iacoboni 2009; Colombetti 2014: 187–195; Zacks 2015.
9. The "first moment of recognition, identification, or discernement in the arising of something distinct" is coupled with the "activation of a basic impulse for action toward the discerned object" (Varela, Thompson, and Rosch 1991: 66).
10. For instance we might "see a piece of candy that we want very much to taste, and resolve this tension by eating it. Or if I use a book and leave it lying on my desk, I feel the tension of it being out of place until I dispel the tension by putting it back on the bookshelf where it belongs" (Langacker 2009: 306).
11. For instance, "instead of putting the book away I could simply leave the room, so that I no longer see it lying there on my desk" (Langacker 2009: 306).
12. Varela, Thompson, and Rosch (1991) describe in these terms the contact between the senses and their objects, e.g., "the matching of sensitivity between a sense and an object in the sense field" (119). In their framework the concept of self is constructed in a similar way, i.e., "Ego-self, then, is the historical pattern among moment-to-moment emergent formations . . . a process of becoming that is conditioned by past structures, while maintaining structural integrity from moment to moment" (ibid., 121).
13. Concepts and emotion concepts capture predictions about relevant actual and future allostatic events (Barrett 2017; Gendron, Mesquita, and Barrett 2020).
14. Ruiz notes that the ability to exert control, reflected in language use as appreciative suffixation, i.e., diminutives and augmentatives, is perceived as positive from the vantage point of the controller and negative from the perspective of the controlled (Ruiz de Mendoza Ibáñez and Galera Masegosa 2014: 80). For him, "much of the appreciative value of diminutives and augmentatives are rooted in the emotional reactions that interacting with small or big entities may trigger" (ibid., 81).
15. See Varela, Thompson, and Rosch (1991: 113), and Thompson (2009: 152, 156).
16. A similar role is played by the mask. Wearing a mask reveals a circular coupling between the incorporation by the human of the sacred domain and the possession of the human by the depicted entity.
17. In a study conducted by Weinberger et al. (2020) the authors note that people whose brains are good at subconsciously discerning patterns in their environment may ascribe those patterns to a higher power, i.e. a god that intervenes in the world to create order.
18. See also Kirchhoff et al. (2018) for the idea that the ultimate endgame is to "engineer a world of predictability, harmony and (generalized) synchrony, in which there is no uncertainty about what to do—or what will happen" (7).

19. Turner notes that masonic rituals belong also to the class of liminal phenomena (Turner 1982: 55). The process of passage is often represented as a journey through several places (e.g., "opening of doors or the literal crossing of a threshold that separates two distinct areas," pilgrimage or crossing of frontiers) (ibid., 25).
20. "The body of the immolated divinity was changed into food" (Eliade 1961: 101).
21. The Van Gennep model distinguishes three phases in a rite of passage: separation, i.e., separation of the ritual subjects from their previous social status or condition, transition ("margin" or "limen") in which the subject is immersed in a period and area of ambiguity, and "reaggregation" or "incorporation" in which symbolic phenomena and action represent a new state of being (Turner 1982: 24).
22. See also Turner (1991: 94).
23. Here Turner thinks, for example, of "Eliade's studies of the 'shaman's journey' where the initiand is broken into pieces then put together again as a being bridging visible and invisible worlds" (Turner 1982: 84).
24. See the ritual activities that indicate a reconstruction of the world in Eliade, e.g., activities of cultivation or repairing of boats or sanctuaries which are considered to be models ("mythical archetype") (Eliade 1961: 86).
25. "narrative is knowledge (and/or *gnosis*) emerging from action, i.e., experiential knowledge" (Turner 1982: 87). On the other hand drama is understood as doing and acting
26. See the remarks about the sense-making involved in narrativity made by Ryan (2006: 11) as "emplotting" or "storying," i.e., the fundamental narrative nature of thought that is put into play in "cognitive processes that we also use in everyday life, such as focusing thought on certain objects cut out from the flux of perception, a process that also enables us to distinguish discrete states and events; inferring causal relations between these states and events; thinking of events as situated in time; and reconstructing the content of other peoples' minds as an explanation of their behavior" (ibid., 11).
27. Kiss talks about different modulations of the narrative form, e.g., a "cinema of affordance" that seamlessly prompts a resonant experience of the viewer, an "art-cinema" that uses strategies of disruption or disembodiment, and a "post-classical" cinema that is relying on narrative form but challenges comprehension by complexification and ambiguity (Kiss 2015: 60).
28. The collective interaction of agents during a ritual episode allows the construction of forms of we engagement (bodily, intentional, normative, emotional and conceptual) (Brink, Reddy, and Zahavi 2017).

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Abstract

The Extended Control Cycle in Ritual Behavior and Narrative Scenarios

The paper argues that rituals and symbolic cultural artifacts are external models of the world. The key idea is that human agents do not have direct or unmediated access to the external world. Humans can sense and act upon intermediary processes such as cultural artifacts and rituals and construct a model of the target external world. In biological terms a Markov blanket mediates sense-making exchanges between the agent organism and the environment. In the cultural niche, humans, via rituals, model themselves modeling the world. In this structure of several nested Markov blankets the individual is included in a larger blanket. Hence, cultural practice offers a model of the world and a model of the self in the world. The cultural practice allows the creation of a cultural body/self for the agent. Rituals mediate the relationship between the organism and the world. They also simulate the "incorporation" of the world and the self via the dynamic process of control. By action and sensory perception, the agent includes the external states in its area of control of the blanket. The agent and the cultural practice are coupled in a bi-directional control cycle. The agent controls the ritual and the ritual, once included in the field of control of a new encompassing blanket, changes the structure of the agent which becomes a new entity/self. Rituals targeting the individual designate the personal transformation (e.g. birth, transition from child to adult, marriage, and death) and rituals of collective transformation (spring festivals that mark the passage from one year to another) target the evolution of the world in time. Rituals formulate (in a descriptive manner) hidden realities and, at the same time (in a performative manner), bring them into existence as external realities that can be described and controlled via what is commonly labeled as magical thinking. Rituals, conceived as explanatory models, simultaneously provide evidence for a self nested in a cultural niche and for a conceptualized external environment.

Keywords

ritual, emergence, embodiment, predictive coding, Bayesian inference