Cognitive Sovereignty & Active Inference in the State of Exception

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Abstract

This paper provides an analysis of Giorgio Agamben's book *Homo Sacer* in the tradition of Active Inference. *Homo Sacer* articulates the relationship between bare life and political existence in Western politics and metaphysics. Agamben argues that politics is founded on the inclusive exclusion of bare life, where natural biological life – the physiology and cognition of the body – is politicized only through its exclusion as an exception. Drawing on Aristotle's definition of man as a political animal, Agamben traces the historical development of this structure and its continuation in modern biopolitics.

Here we develop the above concepts in the setting of cognitive sovereignty and connect Agamben's framing of the political state of exception with Thomas Kuhn's theory of revolutionary science. We assert that realized epistemic agency is grounded in the enacted policy selection of the cognitive sovereign. A given paradigmatic framework, whether in the normal political or normal scientific setting, establishes what counts as valid knowledge and action. Such normative establishments periodically enter crises, which are exited by cognitive and material restructuring downstream of the sovereign's cognitive agency (an agent's cognitive sovereignty).

The paper explores how Active Inference, a theoretical framework for scientific inference, can enhance our understanding of sovereignty, agency, and the state of exception. As an introductory offering into this space, several concordances are drawn between Active Inference and *Homo Sacer*. Specifically: the state of exception is discussed in terms of affordances, bare life is discussed in terms of variational free energy, and sovereign agency is discussed in terms of expected free energy. Pseudocode of an "Active Stateference" entity is provided.

Overall, this paper offers an initial accounting of *Homo Sacer* from the Active Inference perspective, and sketches some salient directions for understanding the dynamics of power, knowledge, and sovereignty in politics and science.

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Homo Sacer and the Logic of Sovereignty

In the work *Homo Sacer*, Giorgio Agamben analyzes the relationship between bare life and political existence in Western politics and metaphysics [1]. Here I provide an overall summary and contextualization of the work, to provide a foundation for the coming sections which will augment these ideas with perspectives from cognitive sovereignty, philosophy of science, and Active Inference.

Agamben argues that politics is founded on the inclusive exclusion of bare life, meaning that natural embodied life is politicized only in its exclusion as an exception. Conversely, politics is founded on the inclusive exclusion of bare life. The politicization of bare life is the originary activity of sovereignty. Agamben traces this structure back to Aristotle's definition of man as a political animal and examines the implications of Aristotle separating mere life (*zoē*) from politically qualified life (*bios*). Agamben suggests that modern biopolitics continues this metaphysical tradition of deciding on the humanity of living bodies through the politicization of bare life.

The book's protagonist concept is "*homo sacer*", an obscure figure of archaic Roman law whose life could be taken with impunity but who could not be ritually sacrificed. This liminal figure is used to interrogate and articulate the thresholds between bare life and political existence in the Western tradition.

Homo Sacer offers a political-philosophical analysis of biopower, tracing the fraught relationship between natural life and politics from Aristotle and Roman law down to modern biopolitical states and phenomena like the concentration camp [2]. Agamben examines the state of exception and how it creates zones of indistinction between law and lawlessness. The state of exception, initially proposed by Carl Schmitt [3], describes the sovereign's meta-/extra-legal maneuver that steps outside or straddles the law; transiently existing both inside and outside it. States of exception are situations in which the normal rules and procedures of governance are suspended in order to deal with a crisis or emergency. Examples include declarations of emergency and martial law. The state of exception creates zones of indistinction between law and lawlessness, while distinguishing friend and enemy. Such states of exception have become a key political technology over the previous centuries and decades. This history has led to rich exploration of the topologies (structure, interfaces, and connectednesses) and topographies

(geometric spatialities and instrumented measures) of political technologies enacted by states today, which exclude bare life while including it as the object of power [4].

There is an irreducible link between violence and justice (enacted as law via the juridical order). Law relies on the violence that posits it, as well as the violence that preserves it in a dialectical oscillation (through the *nomos*, “the underlying set of laws that structure societies*”* [5]). Agamben describes inoperativeness (defined as the relational capacity of the sovereign to the law to symbolically and actually “suspend its old use, and ideally, repurpose it to a new use that is postuse, not a means to any end” [6]) as a way to break the dialectic between law-making and law-preserving violence, as inoperativeness is a potentiality that is not exhausted in the actualization of work.

Overall, *Homo Sacer* conducts a political-philosophical interrogation of the fraught thresholds between bare life and political existence in the Western tradition, with the aim of understanding modern biopolitics and sovereignty.

Normal and Revolutionary Science

Scientific research is a complex and multifaceted process that involves different stages, methods, and goals. In his seminal work from 1962 "The Structure of Scientific Revolutions," Thomas Kuhn proposed a novel way of understanding the dynamics of scientific knowledge and practice [7]. According to Kuhn, science is not a linear and cumulative process of accumulating knowledge and refining theories, but rather a dialectical and discontinuous process of normal science and revolutionary science. Normal science refers to the dominant mode of scientific research that operates within a given paradigm or framework of assumptions, methods, and values. In normal science, scientists work within a shared set of concepts, models, and methods that allow them to solve problems, test theories, and accumulate knowledge. Normal science is characterized by incremental progress, routine research, and a high degree of consensus among the professional scientific community or a sub-field.

Normal science is not immune to anomalies, contradictions, and failures. When the accumulated data and evidence challenge the assumptions and predictions of the prevailing paradigm, a crisis emerges. The crisis can lead to the emergence of a new paradigm or a shift to revolutionary science, which involves a radical and transformative change in the basic

concepts, models, and assumptions of a scientific field. Revolutionary science is characterized by a period of intense debate, innovation, and experimentation, where different paradigms compete for dominance. Revolutionary science is not just a matter of replacing one theory with another but involves a fundamental restructuring of the foundations of knowledge and practice. Revolutionary science often leads to the creation of new disciplines, subfields, and methodologies, which challenge and transform the existing scientific landscape.

Over the recent decades, Kuhn's theory of normal science and revolutionary science has been extended, critiqued, and utilized in many ways. Contemporary authors continued to focus on the role of paradigms, anomalies, crises, and paradigm shifts in scientific research [8–10].

A Fully Synthetic Cognitive Sovereignty

Cognitive sovereignty is a concept that has undergone significant development in recent years, drawing on ideas from various disciplines including philosophy, sociology, and political science [11–13]. In this section, we seek to explore the concept of cognitive sovereignty in preparation for an analysis involving Agamben's logic of sovereignty in *Homo Sacer*, Kuhn's model of revolutionary science, and Active Inference cognitive modeling.

Agamben's work on sovereignty provides a framework for understanding the essentially political relationship between power and knowledge. In his view, and building in the long tradition of this idea, the sovereign is the one who decides on the state of exception, that is, the circumstances under which the law can be suspended (the coincidence of law and fact). This decision is not subject to any external authority; rather, it is grounded in the sovereign's own enacted power. This action- and outcome-oriented definition of sovereignty leaves open questions such as internal/cognitive agency (about any sovereign action, synchronic or diachronic individuals may differ in how they evaluate that action as it relates to e.g. localization of agency and free will).

Kuhn's work on revolutionary science helps us to understand how a given epistemic paradigm can be disrupted and transformed. According to Kuhn, scientific revolutions occur when the existing paradigm is no longer able to explain or accommodate new observations. At this point, a new paradigm emerges, accompanied by a shift in the criteria for valid knowledge. This process of revolutionary science is analogous to the sovereign decision on the state of exception. Just as the sovereign's decision on the state of exception grounds the law,

knowledge is grounded in a paradigm that establishes what counts as valid knowledge and what does not. This new scientific paradigm, like the sovereign, is (at least initially) not subject to external authority; rather, it is the product of a historical process of consensus-building among experts (themselves subject to the “laws”, or at least regularities, of nature).

In both the political and scientific cases, theory describes a breaking discontinuity with the existing order, followed by the establishment of a new order based on different criteria. While the sovereign political decision is arbitrary, intersubjective, and involves the law-violence dialectic, the process of revolutionary science is guided by empirical evidence, rhetorical argumentation, and ultimately the regularities of nature. A tantalizing direction from here is to explore the woven nexus of scientific and political technique in past, present, and future biopolitical regimes.

This section has introduced the concept of cognitive sovereignty and its relationship to politics and science. In the coming sections, we will embrace and extend this Agambenien-Kuhnian synthesis using Active Inference, a theoretical and methodological framework that provides a formalization of the process of scientific inference. We will explore how Active Inference can help us to understand and extract actionable information from the relationships among cognitive sovereignty, political sovereignty, and scientific discovery.

Active Inference in the Social Sciences

Active Inference is an analytical framework for modeling cognitive ecosystems [14,15]. Sentient behavior is modeled with Active Inference in terms of how agents perceive and interact with their environment [16,17], specifically in terms of flows on partitioned maps [18]. Active Inference is a scale-free theory that can be used to account for the working of brains, bodies, colonies, and organizations [19,20]. Active Inference agents are modeled as (topological quantum) flows of perception, cognition, and action [21] under the auspices of the Free Energy Principle. The resulting Bayesian Mechanics [22,23] enables the consideration of paths of least action in arbitrary informational spaces [24].

Active scientific agents are constantly generating hypotheses about the world around them and testing these expectations against incoming sensory information [25–27]. This active scientific process, which manifests low-level novelty and productivity while at a higher-level stationarity, is similar to what Thomas Kuhn called "normal science," where scientists work within a particular

paradigm to test and refine theories, making minor or quantitative changes as needed. Active Inference can also be applied to situations of abductive reasoning [28] and revolutionary science, both inside and outside the purely intellectual sense of science. Active Inference provides the tools to build multiscale material and cognitive generative models of ecosystems of shared intelligence, considered in the following sections in the setting of a state of exception.

Active Inference in the State of Exception

The following sections discuss the state of exception in terms from the Active Inference Ontology [29]: the state itself is analyzed in terms of affordances, bare life is considered in terms of variational free energy, and sovereign agency is explored in terms of expected free energy.

Affordances and the State of Exception

One key concept in Active Inference, drawing from ecological psychology, is that of affordances [30]. Affordances are the action possibilities that are opened up by a given environment. For example, to a given agent, a chair may afford sitting, a door may afford opening, and so on. By perceiving and engaging with the affordances in their environment, living systems can select the actions that will minimize their free energy.

Considering the causes and consequences of different types of affordances, we can analyze how states of exception arise and are perpetuated. In such situations, the sovereign (the entity that can afford to declare the state of exception) has access to a different set of affordances than in normal times. For example, the sovereign may have the affordance of modifying the law or using enhanced security powers. In modern settings, this could be reflected by suspension of *habeas corpus*, declaration of war, emergency proclamations, and so on. These exceptional affordances are not present in normal (or civic non-martial) times, but emerge as a result of new precision dynamics of the system.

Changes in overt (bodily) and covert (attention) policy selection regimes are associated instrumentally with changes in precision – a measure of the uncertainty or confidence in the system's internal model of the world [31]. In states of exception, the precision dynamics change and intertwine with the emergence/creation of new affordances and constraints. The perception of the state as dangerous or threatening is also crucial for the perpetuation of exceptional

states. By perceiving the state as dangerous, the system can maintain and internally/externally justify the exceptional affordances that were opened up by the declaration of emergency.

By analyzing the precision dynamics and the perception of danger, we can gain insights into how exceptional states arise and are perpetuated. Beyond the political, an epistemic state of exception would be associated with an ungrounding and reconstitution of basic concepts and relations. This reformulation manifests in mind however has to be enacted in order to be realized.

Variational Free Energy and Bare Life

This section introduces and elaborates upon connections between “Bare Life” from Giorgio Agamben's *Homo Sacer*, and the concept of “Variational Free Energy” (VFE) from Active Inference.

Homo sacer is a figure of archaic Roman law whose life could be killed with impunity but who could not be sacrificed. *Homo sacer* represents bare life (*zoē*) - biological life stripped of political protections. Bare life is included in the political order solely through its exclusion as an exception. The sovereign decision on the exception is what politicizes bare life.

In Active Inference, organisms minimize variational free energy to maintain their integrity and existence [32]. The surprise-bounding VFE represents the real-time divergence between an organism's beliefs and its sensory states. Minimizing VFE entails perceiving and acting on the world to bring internal states and sensory states into alignment.

Bare life can be understood as biological integrity devoid or apart from political representation. Minimizing VFE also corresponds to maintaining biological integrity [33]. Thus via a transitive construction we can anchor the association between “bare life” and VFE. The sovereign exception politicizes bare life by stripping organisms of political protections for their intrinsic drive to minimize VFE. Including bare life in the political order solely through its exclusion mirrors the violence of politicizing the basic biological drive for integrity.

The sovereign exception introduces novel regimes or types of generative model uncertainty by altering normal protections in discontinuous fashion. In this state of exception, for example

during a political or bioregional crisis, the political subject must minimize their variational free energy — weighing integrity, complexity, risk, and survival. The figure of *homo sacer* represents the predicament of VFE-minimizing bare life in this complexified world where cognitive and material integrity are jeopardized.

Expected Free Energy and Sovereign Agency

This section introduces and elaborates upon connections between the kind of agency exhibited by the sovereign in the state of exception, and the concept of “Expected Free Energy” (EFE) from the theory of Active Inference.

EFE describes a proactive approach towards policy selection that bounds future sensory surprise under a generative model of the world. Organisms minimize EFE to allostatically maintain their integrity and existential homeostasis. On the other hand, the state of exception suspends the normal order, introducing chaos and uncertainty. In this state, the generative model $P(s,a|\theta)$ is destabilized, and prior parameters θ no longer apply. The key point of connection between EFE and the state of exception is that minimizing EFE now requires balancing end-to-end integrity and multi-scale flexibility in updating the generative model itself. In other words, the sovereign decision in instituting the exception mirrors the structural recapitulation of the generative model. It is unprestatable in what ways the agent-world unfolding occurs as symmetries break and form [34].

One of the critical aspects of Active Inference and ecological psychology more broadly is “optimal grasp”, describing a stance or posture related to a tool or concept which optimally prepares its use [35]. Optimal grasp, and the policy decisions that lead to such grasp, can be deployed in the setting of normal or revolutionary epistemic foraging (e.g. getting a better grip on the flashlight or magnifying glass while trying to read in a dark room; getting a better understanding of a scientific concept or political scenario). In this political context, the decisions of the sovereign may have a bent or ratchet towards better (optimal) or simply tighter grasp over the citizen through Law/Politics/Bureaucracy [36]. This leads to an increased drive to reduce uncertainty about personal details (via e.g. domestic and foreign surveillance) and to reduce uncertainty about future states (via e.g. agentic regulation and intervention).

The figure of *homo sacer* represents bare life in the chaos of the exception (a VFE that is subject to another's EFE). Stripped of prior forms of *bios*, *homo sacer* must use VFE to bound surprise in conditions of an ungrounded, recapitulated generative model. The sovereign, in that moment for themselves and beyond (within the total the scope of that cognitive ecosystem), is the one who materialized their cognitive EFEas the new structural order. *Homo sacer* comes to embody the subject(ed/ive) contingency and uncertainty inherent in the state of exception.

Hence, through the crucible/regime of the state of exception, the {VFE - Bare Life} connection of the political subject grounds the {EFE - Sovereign Agency} relationship of the sovereign. In summary, Active Inference concepts provide meaningful tools to formally understand the dialectic of subjective (sensemaking about) bare life and sovereign decision-making.

Active Stateference: A sovereign agent in the state of exception

Only in theory does the State of Exception exist in the realm of timeless *Kairos*. In actuality the State is manifest on a Date of Exception — occuring within the timeful *Chronos*. It may be the case that previous works of political theory (abstract/decontextualized/timeless) make good theoretical sense, however did not (or could not) provide specific translatable tools (e.g. a Process Theory, Low Road, or Policy selection approach). I assert that Active Inference provides an appropriately-expressive/general semantics for (multi-)agentic epistemic settings and hence already delivers epistemic and pragmatic value in the current scientific-political setting; value which can be extended through formal developments as done here.

Here we provide a draft of pseudocode for "Active Stateference" an Active Inference generative model of the state of exception. The pseudocode implementation includes consideration for: importing libraries, defining the states and their prior probabilities, defining the generative model relating states to observations, initializing the variational density over states from the prior probabilities, declaring the state of exception, updating the generative model for the state of exception, calculating the variational free energy, updating the variational density to minimize the variational free energy, generating an action based on the updated variational density, updating the environment based on the action, and running the main Active Inference loop.

The model implements an Active Inference agent with prior beliefs about states related to law, justice, violence, and *nomos*. It uses a likelihood model to infer the posterior probability over

states given observations. The beliefs are updated based on the posterior and transition probabilities. Actions are sampled from the updated beliefs to fulfill the agent's goals and reduce uncertainty about its environment. The prediction errors update the model if the observations deviate significantly from the predictions. The section further describes how the generative model operates during a state of exception, a moment of indistinguishability between lawful and unlawful states, and the relationship between Justice and Violence. It also discusses how the Sovereign acts to restore order through changing the world and changing the mind in this moment of indistinguishability (the two routes for an agent to reduce free energy).

Pseudocode for the Active Stateference model

```
# Import necessary libraries
import numpy as np
from scipy.special import softmax

# Define the states and their prior probabilities
states = ['lawful', 'unlawful', 'just', 'unjust']
prior_probs = np.array([0.25, 0.25, 0.25, 0.25])

# Define the generative model relating states to observations
gen_model = {
 'lawful': ['order', 'peace', 'rights'],
 'unlawful': ['chaos', 'conflict', 'oppression'],
 'just': ['fairness', 'morality', 'ethics'],
 'unjust': ['corruption', 'abuse', 'suffering']
}

# Initialize the variational density over states from the prior probabilities
variational_density = softmax(prior_probs)

# Declare the state of exception
def declare_exception():
 print("State of exception declared.")

# Update the generative model for the state of exception
def update_gen_model_exception():
 gen_model_exception = {
'lawful': ['unlawful', 'chaos', 'oppression'],
'unlawful': ['lawful', 'order', 'rights'],
'just': ['unjust', 'corruption', 'suffering'],
'unjust': ['just', 'fairness', 'morality']
```

```
 }
 return gen_model_exception

# Calculate the variational free energy
def calc_vfe(observation, variational_density, gen_model_exception):
 # Compute the negative log probability of the observation given the states
 neg_log_prob = -np.log(np.array([gen_model_exception[state].count(observation) for state in states]))
 # Compute the variational free energy as the expectation of the negative log probability under the variational density
 vfe = np.sum(variational_density * neg_log_prob)
 return vfe

# Update the variational density to minimize the variational free energy
def update_variational_density(vfe):
 # Update the variational density using the softmax function to ensure it remains a valid probability distribution
 variational_density = softmax(-vfe)
 return variational_density

# Generate an action based on the updated variational density
def generate_action(variational_density):
 # Sample an action from the variational density
 action = np.random.choice(states, p=variational_density)
 return action

# Update the environment based on the action
def update_environment(action):
 print(f"Action taken: {action}")

# Main active inference loop
def active_inference_loop(observations):
 declare_exception()
 gen_model_exception = update_gen_model_exception()
 for observation in observations:
vfe = calc_vfe(observation, variational_density, gen_model_exception)
variational_density = update_variational_density(vfe)
action = generate_action(variational_density)
update_environment(action)
 print("State of exception ended.")

# Run the active inference loop with a list of observations
observations = ['chaos', 'corruption', 'peace', 'fairness']
active_inference_loop(observations)
```

Some next steps for Active Stateference

The Active Stateference model could be enriched proximally by incorporating further important concepts from the book *Homo Sacer*. These concepts can be used as a metaphorical framework to structure and enrich the code, making it more understandable and meaningful to those who are familiar with the work. We do not intend to literally simulate the concepts of the book in code, but to use them as a guide to model the interactions among entities and artifacts in terms of processes, properties, and perspectives [26,37].

The Active Inference model presented earlier describes the cognitive dynamics and environment of the sovereign in the state of exception. Some useful and interesting concepts to integrate into the code could be: *Homo Sacer*, Sovereign Power, Bare Life, Biopolitics, The State, The Camp, The Ban, The Wolf, The Sacred, The Profane, The Ambivalence of the Sacred, The Paradox of Sovereignty, The Politicization of Life, The Rights of Man, The Life That Does Not Deserve to Live, Leviathan/Behemoth, The Kingdom and the Glory, The Sacrament of Language, The Highest Poverty, The Use of Bodies, The Oath, The Archive, The Witness, The Monastic Rules, The Form-of-Life, The Nomos Basileus, The Potentiality and Law, The Form of Law, The Vitae Necisque Potestas, The Sovereign Body and Sacred Body, and The Civil War as a Political Paradigm.

Terms can be integrated with the creation of variables, functions, classes, or even entire modules that encapsulate the concepts they represent. For example, we could create a HomoSacer class with properties like sovereignPower, bareLife, and biopolitics, and methods that model the interactions between these properties. We could also create functions that model the processes described in the book, such as politicizeLife(), banish(), makeOath(), or sacrifice(). These additions will make the code more interesting, useful, and connected with key concepts from *Homo Sacer*. By enriching the code with these concepts, and working with Generative Research Teams [38], we can create a more profound and meaningful model to solve the problems at hand and also help us think about situations in new and creative ways.

From Active Stateference towards Active GovernAnts

There are developmental possibilities for the Active Stateference model, which implements the state of exception with Active Inference generative model. Some possibilities include:

- **Multi-agent settings**. Currently the model only considers a single decision-making agent. We can explore the use of multiple agents to enhance its capabilities and make it more robust (e.g. into a fuller Active GovernAnts). This line could extend work on Active Inference models of the Ant colony [39]. Here, nestmates-as-agents could interact via direct cyberphysical interactions and via stigmergy (semiotic niche modification).
- **Cognitive Security** Eventually we can explore the role of cognitive security in the context of the Active Stateference model [40–43]. This can involve drawing on cutting-edge work on law as a Bayesian inferential system [44] and developing new techniques to protect the model from exoteric and esoteric psychological, social, and cyber attacks.
- **Quantum Cognitive Sovereignty**. We can explore the use of quantum mechanics to improve the expressivity and performance of the model, drawing on Quantum concepts of space, time, causality, and communication.
    - Quantum information has a key role in the future of mixed cyberphysical and cognitive warfare: we can explore the use of quantum information to enhance the applicability of the model in these settings [45], which may be a natural fit for the Topological Quantum Control Flow models of Active Inference systems [21].

Overall, the Active Stateference model has potential for improving our understanding of complex epistemic (eco)systems. By exploring these various developmental possibilities, we can continue to enhance the performance of the model and make it even more useful for a wide range of applications.

Conclusions

In this paper, we have explored the mechanics of the state of exception and its effects on the dynamics of political power. By means that can be technically described as Active Stateference (or “Bayesian State Mechanics”) in the state of exception, the Expected Free Energy (agentic planning as inference) of the sovereign causally influences the Variational Free Energy (bare life) of the subject. Through this means, power flows from agency in the direction of time (especially during a crisis) and agency flows in time in the direction of power. The intensity of this nexus is especially pronounced during times of crisis when time and power flow in a complex manner.

Here we have argued that for the sovereign, the state of exception represents a state of realized expectations (only understood or clear, after the fact). This means that the sovereign is able to realize their justified true beliefs (by truly justifying their realized beliefs) about the expected pragmatic value of actions they take within a state of exception (whether as a means of ending or extending that state). What happens after the decisive action is likely of epistemic value for all, however especially and proximally of pragmatic value for the sovereign.

These insights allow us to better understand the complex power dynamics that arise during times of crisis and the implications of these dynamics for those in positions of authority. By recognizing the importance of Bayesian State Mechanics (implemented in the Active Stateference program) and the role of realized expectations in the state of exception, we can integrate perspectives to develop processes which blossom with the properties we expect and prefer.

A closing quotation from [1] Part II, section 4.8 (page 221):

"One day humanity will play with law just as children play with disused objects, not in order to restore them to their canonical use but to free them from it for good. What is found after the law is not a more proper and original use value that precedes the law, but a new use that is born only after it. And use, which has been contaminated by law, must also be freed from its own value. This liberation is the task of study, or of play. And this studious play is the passage that allows us to arrive at that justice that one of Benjamin's posthumous fragments defines as a state of the world in which the world appears as a good that absolutely cannot be appropriated or made juridical [46]."

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