The Proximal Chemical Mandate Principle: A Framework For Invariant Biological Dynamic Optimization

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INTRODUCTION & AIM

Current neuroscientific and evolutionary models often engage in a *"forced fit,"* attempting to explain every **complex human behavior** solely through the lens of adaptive survival and reproductive need. When behaviors fail this test—such as the devastating reality of suicide or the grip of addiction—they are dismissed as **"system failures"** or a lack of **"willpower."** Conversely, behaviors that seem to ignore biological survival—such as volunteer childlessness, engaging in abstract art, or the **pure love of knowledge**—are often viewed as **"overrides"** of our fundamental nature.

Aim: **To establish a unified theoretical lens for the analysis of all human behavior—encompassing** *adaptive, maladaptive, and complex manifestations*—**without resorting to classifications of** *"willpower"* **or the** *"overriding"* **of biological imperatives.**

METHOD

This framework was developed through a cross-disciplinary synthesis of behavioral neuroscience and clinical pathophysiology. The PCM heuristic is founded upon three core principles:

❖ **Principle 1**: The Invariant Mandate (**Objective**) – All neurobiological systems are driven by a constant requirement to execute the mandate – maximize reward ($R\uparrow$) and minimize stress ($S\downarrow$). This mandate execution functions as a *biological constant* across **species possessing neurochemical systems** capable of generating distinct reward and stress signals.

❖ **Principle 2**: Mutability of Implementation (**Individual Strategy**) – While the objective ($R\uparrow$, $S\downarrow$) is invariant, the behavioral pathways (strategies) to achieve it are highly plastic and shaped by individual experience, associative learning, mental health, homeostasis, etc.

❖ **Principle 3**: Environmental Determination of Ultimate Outcome– The **Ultimate Outcome** of the mandate execution is mostly determined by the environmental **"Field"** in which the organism operates. Identical neurochemical optimization logic leads to divergent outcomes based on context:

- o **Natural Selection Field** (NSF): The baseline environment(ancestral environment) where mandate execution ($R\uparrow$, $S\downarrow$) supports survival and reproduction (e.g., foraging, threat avoidance).
- o **Natural Culturophiliart Field** (NCul-F): An environment of complex fulfillment where the mandate is satisfied through intellectual growth, art, and social bonding (e.g., scientific discovery, creative expression, culture, music).
- o **Natural Counterproductive Field** (NCF): A mismatched environment where the mandate execution leads to maladaptation through "Supernormal Stimuli" or extreme chronic stress (e.g., addiction, suicide).

Executor Mapping (Neural Hardware)
The execution of these principles is mapped onto a **deterministic** neural architecture:

➤ **Basal Ganglia**: Primary executor; utilizes competitive disinhibition to select thoughts(e.g., **'I am the initiator of action X'** or **'I am going to initiate the action X'**) and motor programs (e.g., **Action 'X'**) to maximize reward and/or minimize stress.

➤ **Prefrontal Cortex**: High-order supervisor (**Won't**, not **free won't**);

validates or suppresses subcortical **proposals** via the **hyperdirect pathway** based on reinforced long-term schemas. (*Complex Mandate Execution*)

➤ **Thalamus:** Contextual hub; assigns incentive salience and filters sensory information to satisfy the current mandate.

RESULTS

❑ **Intracranial Self-Stimulation** (ICSS) **(Olds & Milner, 1954)**
- • **The Setup**: Rats with electrodes implanted in the medial forebrain bundle can trigger a lever to receive direct electrical stimulation of the reward circuitry.
- • **Mandate Execution**: The rat's Basal Ganglia selects the lever-pressing action because it provides an immediate, massive neurochemical reward ($R\uparrow$) that far exceeds any natural stimulus.
- • **NCF Maladaptation**: In this artificial environment (the **Natural Counterproductive Field**), the rat will continue to press the lever—often to the point of exhaustion or starvation—ignoring food, water, and mates.
- • **Perfect Execution**: The behavior is not a "system failure" but a "perfect execution" of Principle 1 (maximizing **R**); the rat is simply following its invariant mandate in an environment where that mandate leads to evolutionary failure.

❑ **Pathophysiological Execution**
- • **Parkinsonian Akinesia**: Under low dopamine, the associative stress of action initiation increases exponentially while reward prediction signals undergo computational attenuation. Striatal circuitry calculates that the energetic expenditure fails to satisfy the Reward-minus-Stress optimization function, leading to a "precise execution" of the mandate by selecting '*don't move*'.
- • **Paradoxical Kinesia**: During acute existential threats(e.g., Fire alarm), the Sympatho-Adreno-Medullary (SAM) axis induces extreme physiological arousal. The system recalculates the net stress variable as the danger of remaining stationary becomes greater than the associative stress of action initiation. The mandate is executed by selecting the escape motor program to minimizing the stress from the SAM axis.

DISCUSSION & CONCLUSION

The **PCM** framework proposes that a wide range of behaviors can be analyzed as executions of a core neurochemical optimization heuristic ($R\uparrow$, $S\downarrow$). This approach does **not reduce complex behavior** but rather uncovers the underlying mechanisms that drive it. It suggests that concepts like **"willpower failure"** may be reinterpreted as the mandate operating within specific environmental contexts (fields). **In fact**, if we follow this logic, we can conclude that even the thought **'I have free will'** is itself a product of **basal ganglia's mandate execution**. This **heuristic** integrates learning, neural circuitry, and environment into a single model for generating hypotheses across adaptive, maladaptive, and complex behaviors. **Future work** should focus on developing formal computational models to test and quantify these proposed neural optimization processes. This approach **shifts** the focus from labeling behaviors as "normal" or "faulty" to understanding them as **mandate executions** within specific environmental fields, offering **novel perspective** for research in **mental health**, **addiction**, and **human motivation**.