

A Unified Evolutionary Model of Social Systems: Resource Competition, Self-Presentation, Moral Internalization, and Normative Enforcement

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Abstract

This work proposes a unified theoretical model describing the emergence of social order, morality, legitimacy, and the classification of resentment ("justified anger" vs. "unreasonable grudge"). The model integrates perspectives from evolutionary game theory, coalition formation, social psychology, and political sociology. It treats morality and normativity not as primitive axioms but as emergent outputs of a deeper resource competition system. Individuals attempt to shape others into beneficial partners, strategically present themselves, and ultimately internalize recurrent behavioral strategies. At the system level, enforcement and the elimination of deviants stabilize collective equilibria. The model formally describes these dynamics through replicator equations, multi-layer agent behavior, and coalition payoff structures. This framework is applicable to human societies, non-human social animals, and large-scale political transitions.

1. Introduction

Social systems across species exhibit recurrent structures: individuals seek resources, attempt to influence others, form alliances, internalize behavioral patterns, and punish or eliminate deviation. Traditional research treats morality, legitimacy, and social norms as separate phenomena. This paper argues that they are emergent outputs of a single underlying evolutionary system.

The central thesis:

Morality, legitimacy, and normative order are byproducts of resource-driven strategic dynamics. They emerge from multi-layer interactions: other-shaping, self-presentation, internalization, norm formation, and deviant suppression.

We present a formal dynamical model integrating:

- Evolutionary game theory
- Coalition games
- Internalization dynamics
- Norm enforcement and deviant elimination
- Power-based legitimacy and the classification of resentment

This model unifies disparate theories from sociology (Foucault, Bourdieu), social psychology

(impression management), and evolutionary biology (ESS theory) under a single formal mathematical framework.

2. Model Overview

The model has **three interacting layers**:

1. **Individual resource competition**: agents seek to maximize heterogeneous resources (material, social, symbolic, reproductive).
2. **Behavioral internalization & norm formation**: repeated strategic interactions produce habitual behaviors, internal rewards, and emergent norms.
3. **Collective enforcement & deviant elimination**: norms stabilize through punishment, exclusion, or elimination of deviants.

The system exhibits feedback between micro-level strategic adaptation and macro-level social structure.

3. Layer I: Resource Competition Dynamics

Each individual i selects actions a_i to maximize resources:

$$R_i = F_i(R^{(material)}, R^{(social)}, R^{(symbolic)}, R^{(security)}, R^{(reproductive)})$$

A key assumption is **other-shaping**:

$$\frac{\partial R_i}{\partial a_j} \neq 0$$

Agents attempt to alter others' behavior to increase their own payoff.

4. Layer II: Self-Presentation and Internalization

4.1 Strategic Self-Presentation

Agents choose self-presentational behaviors b_i to influence social evaluation s_i :

$$b_i^* = \arg \max_{b_i} F_i(s_i(b_i))$$

4.2 Internalization Dynamics

Repeated optimal behaviors become habitual through internal rewards:

$$U_i^{(internal)} = mh(b_i)$$

Modified payoff:

$$R'_i = F_i(s_i(b_i)) + mh(b_i)$$

Internalization parameter m captures the emergence of "morality" as an energy-saving optimization rather than a primitive value.

5. Layer III: Norms, Enforcement, Deviant Elimination

5.1 Strategy Types

- E : Enforcers
- C : Conformists
- D : Deviants

Let x, y, z denote population shares of E, C, D .

5.2 Payoffs

$$\pi_E = U - c_E - \alpha z$$

$$\pi_C = U - \alpha z$$

$$\pi_D = V - p(x)P - \alpha z$$

Deviants gain advantage V but risk punishment.

5.3 Replicator Dynamics

$$\dot{x} = x(\pi_E - \bar{\pi}),$$

$$\dot{y} = y(\pi_C - \bar{\pi}),$$

$$\dot{z} = z(\pi_D - \bar{\pi}) - \mu p(x)z$$

Punishment term $\mu p(x)z$ models exclusion or death.

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6. Legitimacy and the Evolution of Resentment

We introduce a variable $L \in \{0,1\}$ defining which coalition's narrative is "legitimate":

- $L = 0$: old elite controls legitimacy
- $L = 1$: resentment-based coalition becomes new elite

Legitimacy transitions occur when coalition power $P_R(x)$ exceeds threshold Θ :

$$P_R(x) \geq \Theta \Rightarrow L: 0 \rightarrow 1$$

Thus:

"Justified resentment" is the narrative of the winning coalition;

"Unreasonable resentment" is that of the losing coalition.

This formalizes the political sociology insight that legitimacy is power-dependent.

7. Results and Implications

1. **Morality emerges** as internalized self-presentation within a stabilizing enforcement system.
 2. **Norms are attractors** of resource-driven strategic adaptation, not primitive axioms.
 3. **Legitimacy shifts occur** when deviants form a sufficiently powerful coalition.
 4. **Resentment classification** (justified vs. backward) is an endogenous consequence of coalition success.
 5. **Animal societies and human societies share the same underlying dynamics.**
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8. Comparison to Existing Theories

- **Nietzsche**: morality as power reaction \rightarrow consistent, but not formalized.
- **Foucault**: truth as product of power relations \rightarrow captured in variable (L).
- **Boyd & Richerson**: cultural evolution \rightarrow extended by adding resentment and enforcement.
- **Nowak**: cooperation dynamics \rightarrow extended to include deviance and legitimacy.

The novelty lies in **unifying these frameworks via explicit dynamical equations and coalition structures.**

9. Applications

- Animal dominance hierarchies
 - State formation and legitimacy shifts
 - Revolutions and political transitions
 - Online social dynamics and cancellation cycles
 - Corporate governance and norm drift
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10. Conclusion

This paper presents a unified model of social systems grounded in evolutionary dynamics. It integrates resource competition, self-presentation, internalization, norm enforcement, and legitimacy transitions. The model reframes morality and legitimacy as emergent phenomena, not foundational principles. Future work includes simulation experiments, parameter sweeps, and applications to empirical social data.

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