Prefigurative Play as Pre-Compilable Affordance Spheres in Spherepop: A Playcosmic Formalization

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Abstract

Prefigurative play, as articulated in the Playcosm framework, is formalized in the Spherepop calculus as *pre-compilable affordance spheres*: bounded simulations of not-yet-materially-feasible systems, executable in cognitive and cultural space via ritual-gestural interfaces. These spheres scaffold future ontologies through tacit-rich, high-entropy boundaries that resist compressive pops from the Technological Society $\mathcal{T}$. We prove that prefigurative spheres with sufficient ritual duration $d \geq d_0$ and tacit entropy $h_{\text{tacit}} \geq h_0$ are anti-admissible, enabling epistemic incubation and technological supersession via non-flattening pop$^+$. The result positions toys as formal forecasting engines against Goodhartian metric collapse.

1 Prefigurative Play: Phenomenological Core

In the Playcosm, prefigurative play enacts simulations of future technologies—wooden carts modeling vehicular dynamics, paper gliders refining aerostability—predating material feasibility.<grok-card data-id="f0623d" data-type="citation$_c ard$" >< $/grok - card$ >< $grok - carddata - id$ = "166512"$data - type$ = "$citation_c ard$" >< $/grok - card >$ $These proto - artifacts evolve through iterative affordances, not formal R\&D, functioning as an epistemic incubator where spe$

Key properties:

- **Pre-compilability**: Runtime-infeasible in physical space, executable cognitively/culturally.
- **Generative rehearsal**: Gestural syntax scaffolds sociotechnical imaginaries.
- **Resistance to flattening**: Tacit intuitions evade explicit codification.

2 Spherepop Formalization

Definition 1 (Pre-Compilable Affordance Sphere)**.** *A* ***prefigurative sphere*** $S^{pref} = (I^{fut}, B^{play}, \Sigma^{pre})$ *where:*

- I^{fut}*: future interior ontology (e.g., flight physics),*
- B^{play}*: gestural interface (e.g., push-glide-crash),*

- $\Sigma^{pre} : I^{fut} \to B^{play}$*: partial homomorphism (lossy, anticipatory).*

Pre-compilability holds if Σ^{pre} *is executable despite* I^{fut} *being materially unrealized.*

Definition 2 (Simulation Fidelity)**.**

$$f^{pre}(S) = I(I^{fut}; B^{play})/H(I^{fut}),$$

mutual information ratio. High f^{pre} *implies effective forecasting.*

Axiom 1 (Epistemic Incubation)**.** *Iterative play on* S^{pref} *evolves* Σ^{pre} *toward full realizability:*

$$\Sigma^{pre}_{t+1} = refine(\Sigma^{pre}_t, feedback(B^{play})).$$

3 Playcosmic Resistances

Prefigurative Example	Ritual d	Tacit h_{tacit}
Wheeled cart	Sequential push-friction-momentum ($d \gg 1$)	Embodied dynamics ($h \gg 0$)
Paper glider	Fold-launch-stabilize-refine ($d \gg 1$)	Aerostability intuition ($h \gg 0$)

Table 1: Prefigurative resistances.

4 Anti-Admissibility Theorem

Theorem 3 (Prefigurative Anti-Admissibility)**.** *Let* S^{pref} *satisfy* $d \geq d_0 = \lceil \log_{1/\delta}(t_{max}/c_{step}) \rceil$ *(ritual gestures) and* $h_{tacit} \geq h_0 = \log_2(q_{max}/c_{query}) + 1$*, with path dependence* $\delta \leq 1/2$*. Then* S^{pref} *is anti-admissible w.r.t.* $\mathcal{R}$*:*

$$\Pr[pop(S^{pref}, T) \text{ succeeds}] \leq 2^{-|B|}.$$

Moreover, S^{pref} *admits* pop^+*:*

$$\dim(pop^+(S^{pref}, S')) > \dim(S^{pref}) + \dim(S').$$

Proof. **Ritual bound**: Gestural sequence requires d embodied steps; $\mathbb{E}[T] \geq d(1/\delta)^d > t_{\max}$.
Tacit bound: $I^{\text{fut}} \mid B^{\text{play}}$ demands $\Omega(2^{h_{\text{tacit}}})$ queries.
Superadditivity: Future ontology gated by play ritual; compression loses f^{pre}.
Non-flattening: Iterative refinement increases boundary expressivity ($\Delta H > 0$). □ □

Corollary 4 (Supersession)**.** *Prefigurative Playcosms escape* $\mathcal{T}$ *via* pop^+*, realizing* I^{fut} *in* $\mathcal{S}_{t+1}$*.*

5 Design: Engineering Prefigurative Spheres

1. **High-**d **rituals**: Sequential, feedback-rich gestures.
2. **Tacit-rich** B^{play}: Preserve h_{tacit} against articulation.
3. **Progressive gates**: Unlock I^{fut} layers via mastery.
4. **Elastic** Σ^{pre}: Support meta-renegotiation.

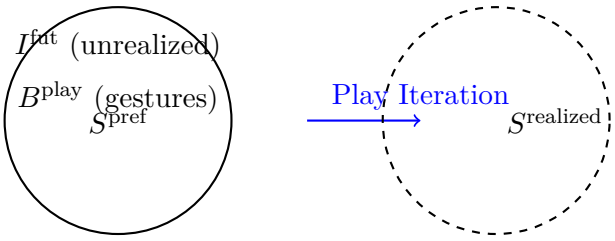

Figure 1: Pre-compilation via play.

6 Conclusion

Prefigurative play is the *pre-compilable affordance sphere*: a ritual-tacit incubator resisting pop closure while bootstrapping future realities. Toys do not mirror the world—they *compile* it.