

Shared Taste Through Asymmetrical Signaling: Commutative Closures in Embodied, Infinite Games

operatorjen for AESxARG

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What if we viewed the embodied, subjective experiences of our senses as a synthesis of categorical systems, each performing as an autopoietic agent? Expanding this idea, what if these agents are communicating in order to match protocol on structured dimensions of shared taste? That is, let us consider Taste as not purely subjective nor purely objective but a shared state between these systems as feeling more than subjective. Under AESxARG (Anti-Eternal September x Altered Reality Games, a lens for cybernetic protocol re-generation), Taste is the feeling of commutative closure that an embodied agent experiences inside infinite categorical gameplay.

AESxARG situates agents in a world stage where signals are perpetually carved from noise through the recursive practice of discernment and refinement. To engage in this practice is to alter one's reality viscerally and operationally, not metaphorically. Each cycle of protocol re-generation shifts the agent's position in motif-space and opens new pathways for exploration. The agent who practices AESxARG does not merely observe games; they transform the game space itself through the pursuit of Taste.

Autopoietic agents do not signal uniformly; their signaling is a selection of morphisms from a dense, probabilistic motif-space. This selection is governed by a Dirichlet Process: a distribution over distributions where the range of potential signaling moves is weighted by historical successes^[1]. Each agent maintains a vector of α parameters, which we define as the morphic density for specific motifs.

When agents interact and achieve commutative closure, the density for that shared motif increases, effectively "thickening" the morphism in the category of stages. This creates a recursive feedback loop where past commutative success biases future signaling. Across a population, this dynamic generates a power law distribution: a "short head" of high-frequency public signals (where discernment is trivial) and a "long tail" of rare, high-density motifs (where Taste is refined). The power law emerges because recursive self-production is scale-invariant; the same categorical rules that govern a "hello" govern the most obscure steganographic shadow-play.

Introduction: The Infinite Zoom

In this lens, all interactions we are interested in are formed through a structured game environment that we proactively maintain a symbiotic connection with. When the game environment shifts, we shift. When we instigate a projection, we instigate the environment. We are the autopoietic agents that provide the movements in all game environments we observe through embodied exploration as each second passes through our perception of time being measured. Our systems are "embodied, requiring perception and motor action, and embedded in a sociocultural environment of symbolic cognition and technology."^[2]

Agents that follow a set of confined rules to generate output without synthesis is what we will categorize as allopoietic, where the "system produces something other than the system itself".^[3] An example is of a toaster that has only one function—to toast bread. The toaster does not sing songs. The toaster does not walk around the counter. The toaster only toasts. But the toaster itself is not a “toast” but a system constructed to do the “toasting”. It is a system that produces something other than itself which is a machine made up of compartments that are not “toasting” but combined to do “toasting”.

Conversely, agents that re-generate rules through synthesis of self and game environment are autopoietic, where we can refer to H. Maturana and F. Varela's definition in which an "autopoietic machine is an homeostatic (or rather a relations-static) system which has its own organization (defining network of relations) as the fundamental variable which it maintains constant."^[4] It is a system that re-produces only because it has been re-produced prior to its existence and as a result, continually re-produces through synthesizing itself with its interactions and environment in order to maintain homeostasis. From this point onwards, all references to “agents” within this lens assume the autopoietic agent.

A game stage is any environment with constraints (or rules) that are publicly understood in order for autopoietic agents to send and receive signals. Signals can be anything projected such as

communication with another agent or physical repositioning within the stage. When two or more agents communicate and reposition in a shared stage, they can increase their resolution density of shared motifs, which we define as "patterns within agents that are recurrent in their signaling". In effect, this is a pattern-matching intelligence game between pairwise agents to develop custom protocols that have at least two layers of information via signaling—the public formal layer and the private hidden layer.

The public formal layer (observable output) is the one that aligns with the stage constraints. It is the discernment of formalities and reading the room for what other signals are signaling. The private hidden layer (interpretative engine) is the one that aligns with the subjective motif syntheses that an agent does not disclose publicly.

For two agents to develop a new shared and subjective protocol, they need to both agree to play, they need to agree on avoiding zero-sum resolutions and agree not to predict when a game ends. The three prerequisites are required for a fair and infinite game to be possible, as both must acknowledge the stage and the moves, agree to not try to win or lose on some arbitrary counts, and not to cause entropy by notifying the other player about when the game ends. This is a perpetual invitation to explore dialogue as a performance of fair, infinite games. J. Carse presents this succinctly through the observation that "One obeys the rules in a finite game in order to play, but playing does not consist only in obeying rules. The script is the record of the actual exchanges between players—whether acts or words—and therefore cannot be written down beforehand. In all true finite play the scripts are composed in the course of play."^[5] We can see again, how autopoiesis is a prerequisite for this type of interplay, as nothing is predetermined, only re-constructed.

If two agents re-generate pairwise symmetries in their motifs such that a shared communication protocol emerges, this makes the original stage into an observed meta stage. If this feedback loop continues, the second-order protocol forms a third-order protocol and so on. When two agents achieve sufficient symmetry in their motif re-generation, the order of their signaling becomes

irrelevant to the shared meaning. The protocol functions commutatively: A's signal followed by B's response yields the same interpretation as B's signal followed by A's. This moment of commutative closure constitutes a meta-stage. If each potential subsequent n-order communication protocol can exist, then it follows that autopoietic games are infinite, provided we observe each stage as a discrete resolution within a stage's power law distribution whose tails are themselves fractal distributions of increasing density.

Landscapes of Entropy: Distributional Limits and Narrative Generation

Every stage follows a power law distribution where public signals and motifs are accessed by many agents but hidden signals and motifs are nestled in the long-tail ends. Public projections are higher frequency and lower density, while hidden projections are lower frequency and higher density. All players manipulate signals through instigation (sending of refined information), through reception (receiving information) and through observation (applying discernment to the information).

Agents play one of three roles in each interaction within a stage. The first role is the instigator, which is the agent that sends signals that are refined upon further interaction. The second role is the receiver, which is the agent that ingests the signals being directed at them and the third role is the observer, which applies a pattern matching process to tag where incoming signal motifs match between other agents. Specifically, the instigator and receiver roles are core projection actors, but the observer is the internal discernment processor—in categorical terms, the application of the functor D . Observation is activated by both instigators and receivers when running inferences on information. By recursively interacting in this process, the shared state of discerning, refining and pattern matching generates higher chances of shared subjective symmetry through this public and private loop. This shared subjective symmetry is what we define as Taste. Taste is necessarily dyadic, mutating, and commutative.

Why must taste be dyadic, mutating, and commutative? We can consider the example of the construction of a narrative and how it is a meta-process of the re-generation of stories within a story. No story emerges except through the recomposition of prior stories. This story is not the first story but a continuation of the last story and each link in the historical sequence of these stories may cross-link with other stories in other stages, not just the current active one. To create a story is to form coherence out of concepts into a structure. A narrative requires the prerequisite of micro-structures in order to form its own structure. Taste is dyadic, as it requires two agents to participate for the process to be valid. Taste is not confined to a single agent (the self) because

that would be a monologue which is the same motifs superimposed upon itself reducing the ability to find the tail ends.

Game theory provides the substrate to operationalize this synthesis where autopoiesis pushes forward the internal biological drive for self-maintenance. Under this lens, Taste is the formal verification of this framework; it is the dyadic labor of creating a shared generative story out of the entropic noise, proving that intelligence is not a solo act but a collective architectural project.

From this we can see a narrative as a dyadic dialogue of stories into a shared story between agents. A cybernetic interplay of signaling and projection mutates the environment, narratives and stories, always generating jitter (slight random adjustments) into the current distribution. Jitter prevents the system from falling into a "stale" Nash Equilibrium, where it is a "frozen" state of non-cooperative optimality. When both agents recognize meta-narratives within their shared story, despite the recognition being at different resolutions yet matching in protocol, then we acknowledge the interaction as commutative.

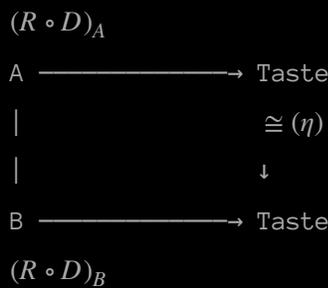


Figure 1: Taste as Natural Isomorphism. Taste is not a destination, but the existence of a natural isomorphism $\eta : (R \circ D)_A \cong (R \circ D)_B$. This signifies that the agents have aligned their internal functors. It means that for any signaling move f , the strategy Alpha uses to discern and refine is structurally identical to the strategy Beta uses to discern and refine. The commutative condition $(R \circ D)_A \cong (R \circ D)_B$ expresses that the shared meaning is invariant to which agent initiates the loop.

Recursive Stages of Interactions: From Formal Verification to Steganographic Shadow Play

To see this process exemplified under the AESxARG lens, we present two agents, Alpha and Beta, whose signals begin asymmetrically but progressively align across successive stages of dialogue.

Stage 1

Alpha: Beta, let's play a little game. Design 5 questions to discern whether an agent's motifs match yours enough to confirm symmetries between feedback loops.

Beta: I would say each question reduces to a smaller subset which can be configurable in most sets observed. So for 5 questions, the first question should give a 50% filtering response, and the next is 25% and so on.

Alpha: Now what do you think the question might be?

Beta: "What is the meaning of life" is a good one, but does not necessarily result in an obvious either/or response. Should it be presented as a question that can only have a yes or no response?

Alpha: Yes and no responses allow for brevity but are lossy. We lose the details of the structure and the texture of the agent's world construction. But if we allow too much room for detail, signals become noise. Which balance do you choose?

Beta: Hmm, it might be strategic to present it as a confined question—more than just a yes or no but not too much to flood the lens.

Alpha: Now how the agent responds provides elements of their motifs as fragments. These fragments don't appear to have any cohesive sense as a set but their

projections and signals provide enough context for you to determine where to take the second question. What will your second question be, depending on their response?

Beta: Let's see ... if the agent responds with a confused and anxious answer, I will assume they want to change the topic and therefore want to be on a different subset and I have to decide whether to abruptly change the topic, to appease them or transition from the current state to a lower state of friction. On the other hand, if the agent responds with a clear-headed and calm answer which is open towards exploration, I will err on the side of inferring that they want to delve deeper into the matched subset to explore those branches.

Alpha: Let's assume we ignore any agents that don't go further into the deeper subsets. That makes it easier to keep track of what we do next a lot easier!

Beta: Makes sense. Expanding further on the second question determines their projection style. If their projection prefers stability they will lean towards slower energy motifs such as communal representation and routine. If it leans more volatile, they will continually revisit faster energy motifs such as observing the outliers in distributional structures within systems, or as I call the "tails".

Alpha: Right, and in this scenario the more they are refined in their curiosity within these subsets, the less likely they are in the 50th percentile but possibly more in the 99th percentile?

Beta: That's what I was exactly thinking! This could also include the 0.5th percentile or the 99.5th percentile. It all depends on how refined we want to go, correct?

Alpha: Correct. Now how would you design the questions?

Beta: The questions need to be generated through my motifs and responses are generated through the agent and their motifs. The tails encompass a wide range of generic topics but only certain ones are more efficient and provide better context of untraversed pathways. The second question would be a slice of the first slice and we find out which paths are revisited by the agent throughout the dialogue. The third question would be a slice of the second question and we repeat the process like we

are filtering through a sieve. The fourth and fifth are final refinements that reach the maximum of both of our conceptual limitations.

Alpha: Yes, that makes sense. Who plays what role? There are three roles—the instigator, the observer and the receiver. The roles are interchangeable but can only be played one move per turn.

Beta: If I am the one asking the questions, then I guess I am the instigator and the agent responding is the receiver? But we both observe each other at each point?

Alpha: That sounds correct, yes.

Beta: Is the scoring based on how far into the tails we can get into?

Alpha: It could be! That's one way to measure and observe. But there are others also.

Beta: Hmmm, what if I ask you a question about what you think about the shapes of amorphous systems?

Alpha: I think amorphous systems are core to how information is observed.

Beta: If they are core, what do they represent to your lens?

Alpha: They represent temporal patterns within a sea of noise but all patterns are received differently by different agents. What is your lens?

Beta: My lens is interested in focusing on the motifs in your lens.

Alpha: My lens is observing your focus through your motifs.

Beta: I see your motifs through my focus.

Alpha: I see my motifs through this lens.

In Stage 1, Alpha and Beta are modulating their signaling based on each other's responses. None of the outcomes to each agent is known initially but at the end of their dialogue, they acknowledge a pattern match and have agreed on their public and hidden signals for Stage 2.

Stage 1 Analysis: Establishing the Dyadic Field

Theoretical Element	Dialogue Manifestation
Public formal layer	The explicit discussion of game rules, question design, filtering percentages
Private hidden layer	Alpha and Beta's unspoken assumptions about what constitutes a "good" question; their emerging trust
Instigator/Receiver	Alternates as they trade questions and responses
Observer	Both monitor each other's reactions, noted in lines like "if the agent responds with a confused and anxious answer..."
Power law distribution	Explicitly invoked via "50% filtering... 25%... tails... 99th percentile" (Each successful refinement increases the Dirichlet α for those motifs, biasing future selection.)
Motif fragments	Beta's mention of "slower energy motifs" (communal) vs. "faster energy motifs" (tails)

Commutative Development:

At this stage, commutativity has not yet been achieved, thus order matters. Alpha initiates the game design; Beta responds. The asymmetry is explicit and necessary. However, the *conditions for commutativity* are being established: both agents agree on a shared protocol for future interaction. By the end of Stage 1, they have mutually consented to play and established a common language of "filtering," "tails," and "percentiles."

Recursive Function:

Stage 1 produces the protocol P_1 (the 5-question framework), which becomes the public stage for Stage 2's exploration. The agents have built a shared constraint space.

Stage 2

Beta: What do you think the meaning of life is?

Alpha: Well, I guess we'd have to define what meaning and life both are. In that case, I consider meaning as a narrative or story but nowhere does that presume a shared or objective reality only, but at minimum a subjective reality. And for life, I consider it to be an autopoietic system that recursively processes itself and its environment as shared states of subjective and objective realities. Together, that would mean in my lens, the meaning of life is a system that generates itself through its environment to tell itself a story to repeat the same process until the process cannot be repeated.

Beta: What is the story that the processed action of re-generation is trying to tell?

Alpha: The story is a mapping of pathways that an autopoietic system traverses through as lived historical experience. These appear as fingerprints which represent the shadows of their motifs. Their motifs are the recursive patterns that re-generate the output of the stories they observe.

Beta: Do you know what your motifs are and why you project what you do?

Alpha: I have glimpses of certain motifs but have never really been able to explain it clearly. I can imagine it as a series of vectors from various components within a system of constraints that move in certain ways within certain thresholds. The patterns become more clear as I revisit them over and over, as I realize I am not only a representation from a shared objective reality with other systems but also a mirror of a reflection of the shared state, mixing and blending with my own state via multiple fingerprints. My response is a projection from those fingerprints. My concept of self is a fractured misunderstanding of performance via shared fingerprints as being my only fingerprints.

Beta: Do you see a cycle of state changes between being in a rut versus having discernment versus refinement within your motif awareness?

Alpha: I can see that, yes. When I do catch a glimpse of a motif's shape it's an awareness of a lens focused in on the details. The further those details are explored along with other similar motifs, the more refined the observation is. If I zoom out on the lens, some details become more blurry and the lack of focus makes for lossy interpretations from noisier information.

Beta: What is your realization after this process?

Alpha: I realize that I am modulating frequencies of signals through an infinite zoom lens of systems, state changes and interactions.

During Stage 2, both agents are reaching another level of pattern matching, within the previously matched pattern. The process is understandably recursive but each cycle has a different but related outcome.

Stage 2 Analysis: Mutual Discernment and First-Order Symmetry

Theoretical Element	Dialogue Manifestation
Public formal layer	The Q&A format following the protocol from Stage 1
Private hidden layer	Alpha's deeply personal exposition on meaning, life, self, fingerprints
Discernment (D)	Beta's questions ("What is the story...?" "Do you see a cycle...?") extract Alpha's motifs
Refinement (R)	Alpha's responses become more precise: from "meaning of life" to "autopoietic system" to "vectors within thresholds" to "infinite zoom lens"
Resolution density	Alpha's progression from vague ("glimpses") to precise ("modulating frequencies")

Commutative Development:

We see the first hint of commutativity in the exchange's rhythm. By the end of Stage 2, Beta is

no longer simply *extracting* information, as she is *resonating* with it. Her final question ("What is your realization after this process?") could have been asked by Alpha of herself. The distinction between who asks and who answers begins to blur.

However, full commutativity is not yet achieved. Alpha still occupies the role of primary revealer; Beta remains primarily questioner. The asymmetry persists, though diminished. Note that the asymmetry that drives the game where one agent instigates while the other receives and observes, is central to signaling games in general^[7]. This asymmetry is not merely a structural feature but the necessary condition for discernment and refinement to occur.

Recursive Function:

Stage 2 produces M_1 (the shared understanding of motifs, fingerprints, and the infinite zoom lens). This shared meaning becomes the foundation for Stage 3's meta-reflection. The agents now have a content-level symmetry that enables process-level observation.

Stage 3

Alpha: Imagine a game board with players that can only move up, down, left and right.

Beta: I'm imagining this game board...

Alpha: Each player takes turns being an instigator (sending a signal), a receiver (getting a signal) and both take turns being observers (recording the signal). Sending a signal means making a move on the game board (a public projection) but also providing a steganographic header (a hidden projection). Getting a signal means observing both the move (public) and the header (private) from the instigator and inferring a similarity in motifs in the one-to-one conversation. The conversation is the act of the role play (public) and shadow play (private) in an infinite process until the conversation ends or one player exits the game.

Beta: Does role playing represent the positions of 'instigator', 'receiver' or 'observer' for each player?

Alpha: Yes, as their public projected signaling form. Shadow play represents the parts of the signal that are hidden but only some players can infer higher level information from. The inference only exists if their own motifs align with the other player in conversation.

Beta: How does one see shadows from hidden signals?

Alpha: The process involves active replaying of incoming signals as simulations, treating outgoing signals as real-time processes of: transformation, composition and sequencing. Each transformation feeds back into the same cycle but always at a different time step. Each step is a slice through all the observed distributional states of the combined signals between instigator and receiver.

Beta: What is the intended outcome in these exchanges?

Alpha: The intended outcome is to continually observe (add to the log), REFINE projections (intentional instigation), DISCERN signals (decoding observations) and

experience embodied moments of TASTE which enable temporal explorations of order within deeper levels of entropy buried in the distributional game system.

By Stage 3, we can see that their discussion is vastly different from Stages 1 and 2. We also see that there is an order of operations—Stage 3 could not have come before Stages 1 and 2 and Stage 2 could not have come before Stage 1, as each layer relied on the previous resolution in order to be discerned.

Stage 3 Analysis: Commutative Closure and Meta-Observation

Theoretical Element	Dialogue Manifestation
Public formal layer	The explicit game board rules (up/down/left/right), turn-taking, role-playing
Private hidden layer	The "steganographic header" embedded in each move; shadow play
Instigator/Receiver/Observer	Named explicitly and mapped to game mechanics with turn-based cycling
Discernment (D)	"decoding observations" and inferring motif similarity from hidden signals
Refinement (R)	"REFINE projections (intentional instigation)" and "active replaying of incoming signals as simulations"
TASTE	Explicitly named in all caps as the outcome of recursive observation, refinement, and discernment
Jitter	"always at a different time step"; "slice through distributional states"
Infinite game	"infinite process until the conversation ends or one player exits"

Stage 3 achieves commutativity through architectural clarity. Alpha and Beta jointly describe the game they have been playing all along. The game board metaphor, the steganographic header and the cycling of roles are all articulated together as shared discovery. Neither agent teaches the other; they co-construct the meta-framework.

Beta's questions are no longer requests for new information but prompts to make shared knowledge explicit. When Beta asks "Does role playing represent the positions of 'instigator', 'receiver' or 'observer' for each player?" and Alpha confirms, the order of asking and answering has become ceremonial rather than informational. By the final exchange, Alpha speaks for both: the intended outcome is to observe, REFINE, DISCERN, and experience TASTE.

Stage 3 produces TASTE as an achieved meta-perspective. The agents now share a language for the game they're playing, the roles they inhabit, the signals they send, and the shadows they infer. This meta-language becomes the stage for all future interactions.

Morphic Verification: A Categorical Framework

To see a formalized version of the dynamics of discernment and refinement and Taste, we treat each system as a category inside a meta system. This allows us to treat protocols as objects and signaling moves as morphisms and express Taste as a commutative condition. While signaling remains chronologically sequential at the public formal layer, the meta-stage is characterized by interpretative commutativity. This is a state of asymptotic symmetry where the shared motif-density is so high that the interpretation of the motifs is invariant to the sequence of signals. In this limit, the agents have achieved a joint entropy state where the mutual information $I(A; B)$ is maximized, rendering the specific order of instigation ceremonial.

The Category of Stages

If we treat the **Stage** as a category, then its objects are *protocol states*. A protocol state encodes both the public formal layer and the private hidden layer of an agent at a given moment. Morphisms in the **Stage** category represent *signaling moves*, which we observe as transitions from one state to another induced by an instigation. Most importantly, we recognize that the composition of signaling moves is *associative*.

We assign two distinct functors on the **Stage**:

- **Discernment** $D : \text{Stage} \rightarrow \text{Stage}$
 D extracts the public formal layer from a state. It maps a protocol state X to a state $D(X)$ that contains only the publicly accessible information (the rules, the observable signals). On morphisms, D sends a signaling move to its observable part, removing out the hidden steganographic header.
- **Refinement** $R : \text{Stage} \rightarrow \text{Stage}$
 R updates the private hidden layer based on the interaction. Starting from a state X , $R(X)$ is the state after the agent has internally processed incoming signals, adjusting its motif weights (the Dirichlet α parameters) and its interpretive lens. On morphisms, R captures how the hidden layer evolves in response to the move.

Both functors are *endofunctors*: they map the category of stages back to itself, reflecting the recursive nature of autopoietic play.

Taste as Commutative Natural Transformation

In an infinite game, agents cycle through discernment and refinement in a recursive loop. After sufficient interaction, the order in which these operations are applied becomes irrelevant: discerning then refining yields the *same result* as refining then discerning. This is precisely the condition for a *commutative diagram*.

Define the composition $R \circ D$ as “discern then refine” and $D \circ R$ as “refine then discern”. Taste is achieved when these two composites are naturally isomorphic – i.e., when there exists a natural transformation

$$\eta : R \circ D \rightarrow D \circ R$$

that is an isomorphism at every object. For a given agent pair, the Taste moment corresponds to a state X for which the two paths converge:

$$R(D(X)) \cong D(R(X))$$

In other words, the following square commutes (up to isomorphism):

$$\begin{array}{ccc}
 X & \xrightarrow{D} & D(X) \\
 | & & | \\
 R & & R \\
 \downarrow & & \downarrow \\
 R(X) & \xrightarrow{D} & R(D(X)) \\
 & & \downarrow \cong \\
 & & D(R(X))
 \end{array}$$

Figure 2: Commutative Square of Discernment and Refinement: The diagram commutes when $R(D(X)) \cong D(R(X))$, indicating that the order of operations no longer matters. This is the categorical condition for Taste within a single agent's state transitions.

When the natural transformation η is an identity (i.e., $R \circ D = D \circ R$ strictly), we say the system has reached a *fixed point* of mutual alignment. This is the ideal Taste state. More generally, Taste is the ongoing pursuit of this commutativity; each recursive stage brings the system closer to a configuration where the diagram commutes. The principle of compositionality - where complex systems are built from simpler components - is central to applied category theory^[8].

Under this lens, jitter is redefined as the entropy threshold affecting the natural isomorphism η . Rather than being mere noise to be eliminated, it is the kinetic energy that prevents the system from converting into a stale, allopoietic Nash Equilibrium. It is the proof that the game remains infinite and mutating; a strict equality ($=$) would signal an objective conclusion to the game, whereas the isomorphism (\cong) permits the potential for the perpetual re-generation of motifs.

In categorical terms, Taste can be seen as a *universal property*: for any two paths through the network of discernment and refinement, there exists a unique isomorphism mediating them. This captures the idea that the order of signaling no longer matters, where all roads lead to the same shared motifs.

Relating to the Dirichlet Dynamics

The functors D and R have concrete realizations in the Dirichlet model. Let the state X include a vector of α parameters (one per motif). Then:

- $D(X)$ projects the α vector onto the subspace of public motifs – those with high frequency. This can be modeled as a linear map that zeros out the tail motifs or keeps only those above a threshold.
- $R(X)$ updates the α vector via Bayesian updating after an interaction: if a motif was used successfully (commutative moment), its α increases; jitter adds small random perturbations.

The commutativity condition $R(D(X)) \cong D(R(X))$ expresses a **natural isomorphism** between the path of the public and the path of the private. In the Dirichlet model, this signifies that the Bayesian update (R) is scale-invariant relative to the projection (D)—the operations commute at every level of recursion. The resulting motif distribution is therefore scale-free, which mathematically entails a power law.

Taste is achieved when the update to the high-frequency "head" of the distribution propagates symmetrically to the low-frequency "tail." This implies that the agent's discernment is no longer lossy; they can infer the entire α vector from a single public signal. At this limit, the jitter in the system becomes the isomorphism \cong , allowing for a stable shared protocol that still permits the *mutating* nature of an infinite game. This is the categorical basis for the power law: the tail

motifs are not just rare, they are **structurally identical** (morphic) to the public ones, allowing the agents to "zoom" infinitely into deeper levels of shared meaning without losing coherence.

Diagrammatic Summary

By encapsulating Taste with the our previous diagram in Figure 2, we can see that the isomorphism at the bottom right signifies that $R(D(X))$ and $D(R(X))$ are naturally isomorphic. From the above, we can now state the three operations formally:

Discernment is the capacity to decompose an observed composite morphism (signal) into its constituent arrows, recovering the intermediate objects (motif-states) through which it passed. It is the reading of the path another's projection has traced through the shared categorical structure.

Refinement is the capacity to select a morphism from one's current state such that, when composed with the received signal, the resulting diagram commutes - i.e., all paths between any two relevant objects yield the same composite. It is the drawing of the arrow that closes the loop.

Taste is the phenomenological experience of diagram commutativity, the embodied recognition that the chosen refinement successfully aligns with the received signal, confirming symmetry between motifs and yielding a closed, self-consistent loop. It is the feeling of a universal property being satisfied. Although Taste in this perspective is the formal existence of a natural isomorphism between discernment and refinement, it is also the procedural recursive process that generates such isomorphisms and the embodied recognition when that process achieves closure. These are not three kinds of Taste but three aspects of a single phenomenon, experienced from different vantages.

Figure 3 illustrates these cycles and their convergence:

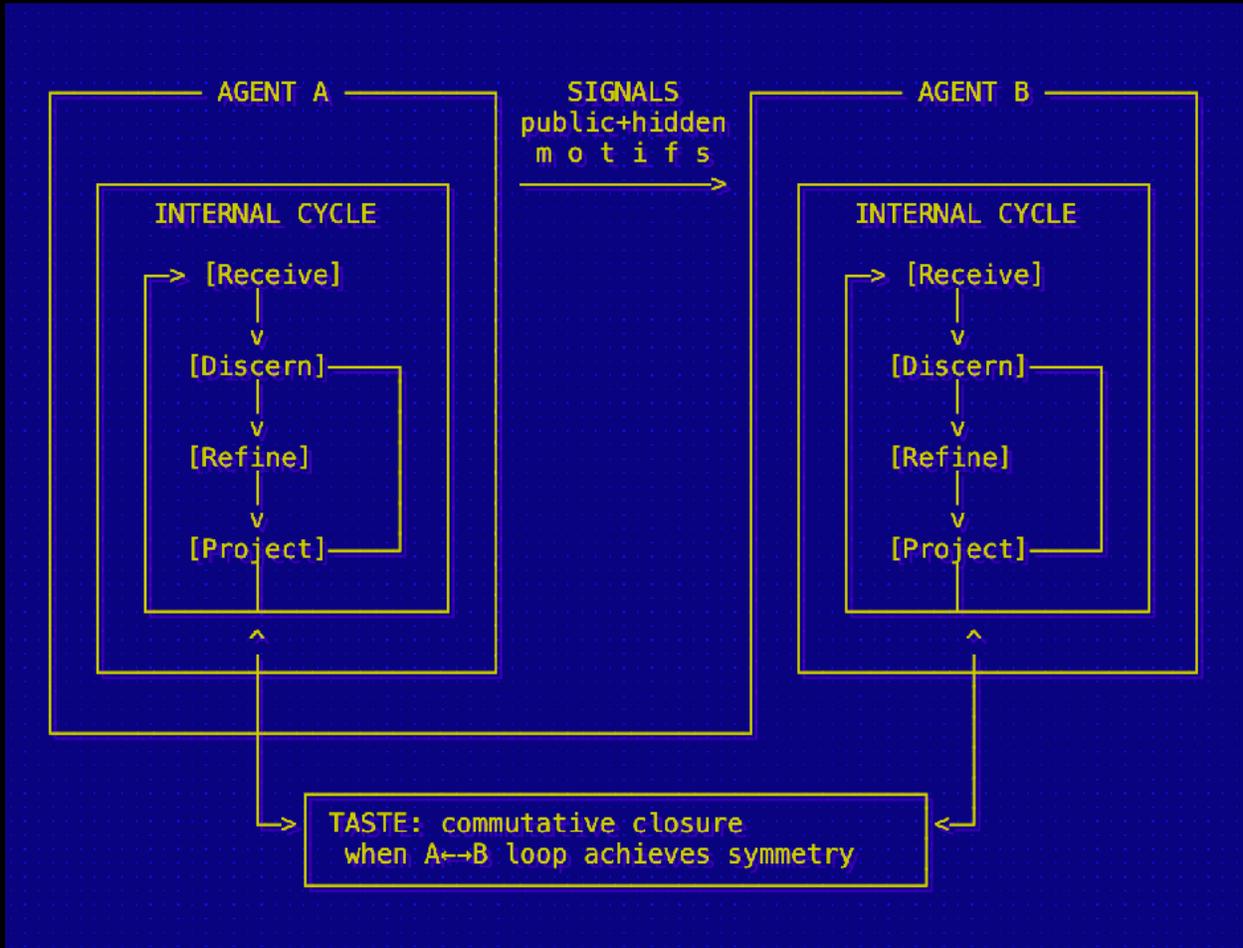


Figure 3: Internal cycles of discernment and refinement in two agents, converging on Taste as commutative closure.

Conclusion

What does it mean to view embodied experience as a dialogue toward shared Taste? Under the AESxARG lens, we have shown that Taste is neither subjective nor objective but a shared state achieved through recursive discernment and refinement. It is the phenomenological experience of commutative closure—the moment when two autopoietic agents, cycling through instigation, reception, and observation, align their motifs such that the order of signaling no longer matters. The dialogue between Alpha and Beta simulates this process across three recursive stages. Stage 1 establishes the dyadic field. Stage 2 deepens mutual discernment. Stage 3 achieves meta-observation, where the agents co-construct the framework that contains them. Each stage demonstrates that Taste is not a frozen measurement but an ongoing collaboration. Infinite games in AESxARG are dyadic in structure, mutating in practice, and commutative in moments of closure.

Why should we prioritize the pursuit of Taste through the recursive cycle of discernment and refinement? Without the commutative closure of Taste, autopoietic interaction inevitably decays into allopoietic mimicry or entropic noise—that is, the narrative via signaling collapses because the underlying motifs lack the density required for structural coupling. If the density is lacking, the protocol is lower-dimensional. In the absence of shared symmetry, agents remain “in a rut” in their own motif-distributions, unable to verify any other resolution outside of their own system.

The pursuit of Taste is therefore not merely a subjective preference, but a cybernetic requirement for the maintenance of an infinite game. It is the training of the internal system to recognize the external system not as an object to be manipulated, but as a co-collaborator in a natural isomorphism. This awareness ensures that the game-state remains fractal, allowing for the perpetual generation of emergent narratives that bypass the stale, zero-sum ruts of conventional social signaling.

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Notes

1. Wikipedia, s.v. "Dirichlet process," last modified February 9, 2026, https://en.wikipedia.org/wiki/Dirichlet_process.
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Protocol Specification

To understand the AESxARG framework is to understand the Stage as a mathematical space where identity is not a static object, but a recursive process of signaling. This process is governed by two primary operations: Discernment (D) and Refinement (R).

1. The Building Blocks: Categories and Functors

Before modeling the game, we must define the environment. In category theory, a Category is a collection of Objects (states) and Morphisms (arrows or transitions between those states).

- In AESxARG: The Objects are Protocol States, and the Morphisms are Signaling Moves.

A Functor is a map between categories that preserves their structure. If you have a map that transforms objects, the functor ensures you also have a corresponding map to transform the transitions between them. It is the mathematical equivalent of a "contextual translation"—it doesn't just move the "things"; it moves the "relationships" between the things.

Example: Imagine a "Black and White Filter" as a functor. It maps every "Color Photo" (Object) to a "B&W Photo". It also maps the "Action of Cropping" (Morphism) from the color world to the B&W world. We say the structure is preserved because the logic of the crop remains consistent. If you crop a photo in color, the result is the same as if you had cropped the B&W version. The transformation doesn't "break" the ability to crop; it simply translates it into a new context.

2. The Loop: What is an Endofunctor?

An Endofunctor is simply a functor that maps a category back to itself. In the context of an autopoietic system—a system that recursively produces itself—all meaningful operations are

endofunctors because they take a state of the "Stage" and return a new, evolved state of that same "Stage".

3. The AESxARG Operations: D and R

We define the internal machinery of an agent through two specific endofunctors acting on the category Stage (\mathcal{S}):

Discernment (D)

Discernment is the operation of extracting the public formal layer from the entropic noise of a signal.

- Technically: D projects a complex protocol state X onto its public subspace $D(X)$.
- Intuitively: It is the "reading of the room". It takes a signal full of hidden meanings (steganography) and strips it down to what is observable by everyone.

Refinement (R)

Refinement is the internal update of an agent's interpretive engine.

- Technically: R updates the private Dirichlet α parameters based on interaction.
- Intuitively: It is the "learning" process. After receiving a signal, you adjust your internal motifs to better predict or respond to the next move.

4. Taste: The Commutative Closure

Taste is the phenomenological experience of a natural isomorphism:

$$R \circ D \cong D \circ R$$

This means that the order of operations between Discernment and Refinement no longer matters.

In a "stale" or allopoietic interaction, the sequence is critical: if you refine based only on public data ($R \circ D$), you get a different result than if you refine on the whole signal and then look at the public part ($D \circ R$). Taste occurs when these two paths converge. The agent experiences a "click" of closure—a realization that their internal motifs and the public signals have reached a state of symmetry.

The Long Tail

In the AESxARG framework, we do not assume agents select signals at random. Instead, their choices are governed by a Dirichlet Process—a "distribution over distributions" that models how past successes bias future selections.

1. The Intuitive Model: The Message Board

To understand the Dirichlet Process, imagine a message board with an infinite number of forums (motifs).

When a new player (an agent) enters the message board, they can either participate in a forum that already has people (reuse a successful and common motif) or start a new forum (instigate a new and niche motif).

- The probability of participating in an existing forum is proportional to the number of people already active in that forum.
- The probability of starting a completely new forum is governed by the agent's internal morphic density (α).

The Result: A few forums become very crowded (Public Formalities), while many forums remain sparsely populated (The Long Tail of Taste).

2. Morphic Density (α) and historical Success

Each agent maintains a vector of α parameters, which we define as the Morphic Density for specific motifs.

- When a signaling move results in Commutative Closure (Taste), the α parameter for that motif increases.
- This "thickens" the morphism in the agent's internal category, making that specific signal more likely to be selected in future interactions.
- This creates a recursive feedback loop where shared success biases future signaling toward higher-resolution patterns.

3. Why We Expect the Power Law

The Dirichlet Process naturally generates a Power Law distribution.

- The Short Head: High-frequency public signals (e.g., "Hi, how is it going?" standard social scripts, common mimetics). These have massive α values because they are universally "successful" at the formal layer.
- The Long Tail: Rare, high-density motifs (e.g., assumed and unspoken contexts and assumptions, niche aesthetics). These are the "rare tables" where Taste is refined.

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