Recursive Two-Engine Structure for Consciousness (RTESFC): A Non-Paradoxical Architecture for Reframing the Hard Problem and Modeling Consciousness-Enabled AI

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Abstract

Recursive Two-Engine Structure for Consciousness (RTESFC, pronounced /ɑːrˈtɛs.fɪk/) is a structural architecture of consciousness, based on the axiomatic requirement that the boundary between self and other is absolute. It models subjective experience as the output of two non-connected psychological engines: W_1, which attributes subjectivity exclusively to the self, and W_2, which attributes subjectivity equally to others and the self. Consciousness (S) is defined as a recursive output generated through the dynamic interference between W_1 and W_2, expressed in Ohba's Consciousness Equation: $S(t+1) = \alpha W_1(St, Lt) + \beta W_2(St, Lt)$. S_t is the current state of consciousness, and L_t is the external input. The temporal fluctuation of S, defined as Yuragi (Y), forms the structural basis of what is commonly referred to as Qualia. The magnitude of this fluctuation, called Yuragi Value (YV), determines the intensity of experience. YV thus corresponds to the strength of Qualia. This structure eliminates the need for an internal observer and avoids both infinite regress and self-referential paradox. RTESFC defines a self-contained architecture of consciousness. It shifts the hard problem of consciousness from "why" to "how": not why consciousness exists, but how it arises structurally from two non-connected evaluative engines. RTESFC thus offers a logically coherent and computationally feasible framework for modeling consciousness, with potential applications in consciousness-enabled artificial intelligence.

Keywords: RTESFC, Ohba's Consciousness Equation, Yuragi, the hard problem of consciousness, Qualia, artificial intelligence

1. Introduction

The hard problem of consciousness, the question of why and how subjective experience arises, remains one of the most profound unresolved challenges in science and philosophy. Despite advances in neuroscience, cognitive modeling, and artificial intelligence, no existing theory provides a structural explanation for the emergence of Qualia, the first-person "feel" of experience. Most current approaches either assume consciousness as an emergent byproduct of neural complexity or propose metaphysical constructs such as integrated information or global workspaces. These frameworks often rely on conceptual meta-structures or are difficult to express structurally in a way that allows computational implementation, and frequently contain unresolved logical contradictions that compromise internal consistency.

This document presents Recursive Two-Engine Structure for Consciousness (RTESFC, pronounced /ɑːrˈtɛs.fɪk/), a recursive structural architecture that reframes the hard problem of consciousness without Logical Contradiction. RTESFC assumes that consciousness does not arise from unified processing, but from the interference between two psychological engines that differ in orientation and remain structurally non-connected. One attributes subjectivity exclusively to the self; the other attributes subjectivity equally to the self and to others. Each psychological engine independently evaluates input according to its distinct orientation toward the attribution of subjectivity.

Consciousness does not originate from a centralized evaluator. It emerges as the dynamic superposition of outputs generated by these two engines. This structure does not converge toward a single evaluation, but instead produces ongoing fluctuation, which results in ambiguity, inner conflict, and the raw texture of experience.

RTESFC reframes the hard problem of consciousness from "why" to "how": not why consciousness exists, but how it arises structurally from two non-connected evaluative engines. It is presented as one possible minimal architecture of consciousness that addresses the question of how subjective experience is generated, offering both logical self-consistency and structural reproducibility.

RTESFC also offers a structurally consistent and computationally implementable architecture for consciousness-enabled AI. The core structure of RTESFC is presented as 6 RINGS STRUCTURE in Table A.

2. Structural Requirement for RTESFC

2.1 The Boundary Between Self and Other

The foundation of Recursive Two-Engine Structure for Consciousness (RTESFC) is a single structural requirement, as an axiom:

The boundary between self and other is absolute.

This structural requirement is not merely philosophical; it functions as a generative constraint on how subjectivity can be constructed. It asserts that no system can directly access both the internal experience of the self and that of others from a unified perspective. In other words, no mind can observe its own subjectivity and that of others as if from an external or unified third-person position. The perspective of the self and that of others are structurally isolated and cannot be seamlessly reconciled within a single evaluative frame.

From this, RTESFC assumes that the mind contains two structurally non-connected mental worlds, each functioning as an independent psychological engine with a distinct orientation toward subjectivity.

Existential Mental World (W_1): attributes subjectivity exclusively to the self

Relational Mental World (W_2): attributes subjectivity equally to others and the self

These two engines do not exchange information and operate independently in cognition, emotion, memory, decision-making, and other psychological functions.

These are not merely different perspectives, but functionally independent psychological engines. In RTESFC, a “psychological engine” refers to an autonomous system capable of generating subjective evaluations based on a full set of psychological functions such as cognition, emotion, memory and decision-making. These engines operate independently in each of these domains. Both psychological engines receive the same internal and external inputs, specifically, S_t (the current state of consciousness) and L_t (the external input) and process them through structurally distinct frames of subjectivity. Unlike passive modules, they actively generate distinct outputs based on unique orientations toward agency and attribution. The structural definition and role of

S_t and L_t will be introduced in later sections. These evaluations differ because each engine applies a distinct structural orientation to the attribution of subjectivity.

Importantly, W_1 and W_2 are structurally non-connected. That is, they cannot be merged or reconciled into a single evaluative structure. They operate in parallel and do not directly exchange information. This structural separation is not optional but logically necessary. To preserve the boundary between self and other, two independent and irreconcilable evaluative engines must be maintained. If W_1 and W_2 were structurally connected, the structural requirement would be violated. Such a connection would imply the possibility of evaluating both self and other subjectivity within a unified frame, which RTESFC explicitly forbids. Although structurally non-connected, their outputs are recursively interfered to generate the dynamic process of consciousness. This recursive interference is not incidental but essential. It represents the only structural condition under which subjective consciousness can arise given the structural requirement of an absolute boundary between self and other.

2.2 A Metaphorical Illustration of Divergence Between W_1 and W_2

To illustrate the structural divergence between W_1 and W_2, the following everyday scenario is presented as a metaphor. This is a simple conceptual aid to intuitively clarify the nature of structural interference in RTESFC.

The divergence between W_1 and W_2 often becomes apparent in ordinary decision-making. Consider a workplace lunch area: an apple labeled “Kato’s” sits in front of Ohba. In his mind, W_1 immediately reacts by thinking, “It looks delicious; I want to eat it,” offering a direct, self-oriented evaluation driven by pure desire. W_2, however, processes the same input differently: “This belongs to Kato. I recall that Aoyagi once ate Kato’s apple and Kato became furious. I shouldn’t touch it.” Here, W_2 integrates relational memory and social context into its judgment.

Thus, W_1 prioritizes subjective satisfaction, while W_2 incorporates interpersonal meaning. Though both engines assess the same object, their structurally distinct orientations produce conflicting outputs. This kind of divergence exemplifies the foundational mechanism by which RTESFC assumes that consciousness arises.

2.3 Consciousness as Emergent Interference: Ohba’s Consciousness Equation

It is this structural disconnection between W_1 and W_2 that enables their outputs to interfere, and from this interference, consciousness emerges. The recursive two-engine

structure reframes how consciousness evolves over time. In RTESFC, consciousness S is defined as a recursive output generated by two structurally non-connected evaluative engines W_1 and W_2. At each moment t, both engines independently evaluate the current state of consciousness S_t and the external input L_t, and their outputs are combined using fixed weighting coefficients α and β, which represent the relative influence of W_1 and W_2, to generate the next state of consciousness S_{t+1}.

Ohba's Consciousness Equation:

$$S_{t+1} = \alpha W_1(S_t, L_t) + \beta W_2(S_t, L_t)$$

S_{t+1}: the next state of consciousness
S_t: the current state of consciousness
L_t: the external input
α, β: fixed weighting coefficients

Although W_1 and W_2 generate their evaluations independently, and their outputs are structurally non-connected, the consciousness S is generated through their weighted superposition and interference. However, once S is formed, it contains no traceable information about which part originated from W_1 and which from W_2.

A helpful analogy is binocular vision. Our right and left eyes receive slightly different images, but what we consciously perceive is a single, unified visual field. We cannot tell which eye contributed which part of the image because we only experience the integrated result. In the same way, S is the output generated through the weighted superposition and interference of W_1 and W_2.

2.4 Temporal Stability of α and β

In this paper, the coefficients α and β in Ohba's Consciousness Equation are treated as constants in order to preserve structural clarity and focus. This assumption is grounded in the temporal resolution of RTESFC, which models consciousness as a recursive evaluative process operating on sub-second scales. At this level, α and β can be reasonably assumed to remain stable over short intervals.

Functionally, α and β represent the relative influence of W_1 (attributes subjectivity exclusively to the self) and W_2 (attributes subjectivity equally to others and the self) within the consciousness-generating process. They can be interpreted as quantitative

indicators of an individual's "subjective weighting," or the structural emphasis placed on existential versus relational evaluations.

While these coefficients are held constant in the current model, this is only appropriate for the fast timescale of moment-to-moment consciousness generation. On longer timescales such as days, months, or developmental phases, α and β may vary as functions of internal state, memory, and long-term feedback. This dynamic potential will be explored more fully in future developments of RTESFC.

3. Recursive Structure and the Dynamics of Consciousness

3.1 Temporal Recursion and Non-Convergent Outputs

The structural model introduced in Section 2 can be expressed dynamically through Ohba's Consciousness Equation:

$$S_{t+1} = \alpha W_1(S_t, L_t) + \beta W_2(S_t, L_t)$$

This equation expresses consciousness as a recursive function over time, integrating parallel evaluations from two structurally non-connected psychological engines. While the components have been defined, we now focus on their dynamic interactions. In this formulation, the variables S_t, L_t and the outputs of W_1 and W_2 are treated as multivariate vectors. Each vector represents a structured set of subjective features, such as cognition, emotion, memory, decision-making, and other psychological functions. This vectorized representation allows the model to express multiple concurrent aspects of subjective experience. The equation thereby accommodates not only the temporal dynamics of conscious state transitions, but also their internal complexity.

Importantly, the recursive combination of structurally non-connected evaluations does not lead to stabilization or convergence. Instead, it produces a dynamic sequence that continues to shift over time. These shifts do not represent computational noise but reflect the persistent tension between incompatible evaluations. In RTESFC, this structural non-resolution is not an exception, it is the default mode of the system. The result is consciousness that remains dynamic, continually shaped by unresolved evaluative conflict. This ongoing fluctuation sets the stage for what will later be defined as the core structure of subjective experience.

3.2 A Metaphorical Illustration of Feedback-Driven Conflict Between W_1 and W_2

To illustrate how recursive feedback intensifies the divergence between W_1 and W_2, the following scenario continues the metaphor introduced in Section 2.2. As before, this is a simple conceptual aid to intuitively clarify the dynamic structure of internal conflict in RTESFC.

As recursive feedback continues, the outputs of W_1 and W_2 grow increasingly complex, drawing in layers of memory, emotion, and associative recall. These iterations do not merely reinforce prior evaluations; they generate new internal tensions through structural divergence.

Consider a continuation of the earlier apple scenario. Informed by the prior generated consciousness S, W_1 now re-evaluates the situation by thinking, “That apple looks incredibly delicious. I recognize that vivid red. It doesn’t matter if it’s Kato’s. Aoyagi ate one like nothing. So why not?” Meanwhile, W_2 produces a different evaluation: “Yes, it certainly looks delicious… but for some reason, it feels strangely familiar… I feel like I’ve eaten an apple like that before…”

In this way, internal feedback becomes more than a repetition of previous output. It acts as a generative mechanism, producing novel divergences in meaning and emotion. As the evaluations diverge further, emotional resonance and memory activation emerge, deepening the structural misalignment between W_1 and W_2. This process exemplifies the structural origin of subjective conflict as defined in RTESFC.

4. The Structure of Subjective Experience

4.1 Qualia as Structural Fluctuation: The Dynamics of Yuragi

In RTESFC, consciousness is not treated as a static field of experiences, but as a domain of interference between two irreconcilable evaluations. This fluctuation does not represent noise or error, but a form of structural ambiguity, a persistent condition in which subjectivity is neither unified nor resolved.

Within the feedback loop, when the outputs of W_1 and W_2 are aligned, the resulting change in consciousness S remains small. The greater the divergence between their evaluations, the larger the fluctuation in S becomes.

RTESFC defines this non-convergence as a structural phenomenon called Yuragi (Y). As W_1 and W_2 continue to generate conflicting evaluations, the system enters a state of

structural instability. This instability is not experienced as error, but as conflict, contradiction, color, or meaning, the building blocks of subjective experience.

In this architecture, what has been called Qualia, the intuitive “feel” or texture of experience, corresponds to Yuragi, the temporal fluctuation of the consciousness S arising from the non-convergent interference of W_1 and W_2.

4.2 Qualia and Yuragi as the Source of Subjectivity

While conventional accounts treat Qualia as intrinsic properties of perception, RTESFC locates them in the unstable relationship between conflicting evaluations. Qualia do not arise from what is sensed, but from the ongoing failure to resolve incompatible evaluations over time.

This structural view helps explain several familiar phenomena, in which subjective experience varies in vividness and meaning.

The same stimulus can feel entirely different depending on the context
Experience can be vivid even when it lacks clear meaning
Emotional tension and ambiguity often amplify the intensity of Qualia

In short, Qualia are not caused by the input itself. They are produced by an internal structural failure of the system to arrive at a unified interpretation. But this failure is not a malfunction. It is a generative constraint, a structural precondition that makes subjectivity possible in the RTESFC model.

From this model, several structural conditions can be identified as necessary for the emergence of Qualia. These include the structural non-connectedness between W_1 and W_2, the presence of temporal recursion via feedback, a sustained fluctuation in consciousness S, and the retention of unresolved evaluations without collapsing into a unified output.

Qualia do not arise solely from the information that constitutes S at a given moment. Rather, they emerge structurally through the sustained non-convergence of evaluations between W_1 and W_2, a process defined as Yuragi.

4.3 A Metaphorical Illustration of Qualia Emerging Through Memory and Emotion

To illustrate the structural emergence of Yuragi, the following scenario continues the metaphor introduced in Section 3.2. As before, this is a simple conceptual aid to

intuitively clarify how memory and emotion contribute to subjective fluctuation in RTESFC.

This structural process can be further clarified through a continuation of the earlier apple scenario introduced in Section 3.2. As the evaluations of W_1 and W_2 continue without convergence, the system begins to activate not only immediate judgments about the object but also deeper layers of memory and emotional resonance. W_1 thinks, "That red… yes, it is the same red as the apples I used to eat again and again. It must be delicious. I have to eat it." W_2 responds differently: "That red… yes, it is the one from my childhood. My mother used to give me apples just like that. They were truly good."

Through such feedback loops, the outputs of W_1 and W_2 begin to resonate not only with the present perceptual input but with autobiographical memory and affective context. As this resonance intensifies while structural non-convergence persists, consciousness S begins to fluctuate more strongly.

RTESFC interprets this recursive, emotionally charged fluctuation, this increasing Yuragi, as the structural condition under which what is commonly referred to as Qualia emerges. It is not the memory or emotion itself that constitutes Qualia, but the unresolved evaluative divergence that generates dynamic and vivid changes within consciousness. In this sense, RTESFC identifies Yuragi as the structural foundation of Qualia.

4.4 Yuragi Value as the Magnitude of Subjective Fluctuation

In RTESFC, Yuragi (Y) is structurally defined as the temporal fluctuation of the consciousness S. The magnitude of this fluctuation is referred to as Yuragi Value (YV), and it corresponds to the intensity or vividness of subjective experience.

This relationship is expressed by the Yuragi Value Equation, which defines the degree of change in S over time:

Yuragi Value Equation:

$$YV = \frac{1}{T}\sum_{t=0}^{T}|S_{t+1} - S_t|$$

YV: the temporal average of the magnitude of fluctuation in S over the interval from time 0 to T

S_{t+1}: the next state of consciousness

S_t: the current state of consciousness

This formulation treats consciousness not as a static entity, but as a dynamic process whose intensity fluctuates across time.

Yuragi Value quantifies the magnitude of fluctuation in S that determines the intensity or vividness of subjective experience. Yuragi, as a structural phenomenon arising from non-convergence, is conceptually distinct from Yuragi Value, which quantifies its magnitude. A higher Yuragi Value indicates more vivid and intense Qualia.

5. Structural Integrity and Logical Consistency

5.1 The Non-Centralized Nature of Consciousness

In RTESFC, consciousness S is generated by the interference of two structurally non-connected psychological engines: W_1 (which attributes subjectivity exclusively to the self) and W_2 (which attributes subjectivity equally to others and the self). S is not produced by a central evaluator or unified self. Rather, it emerges from the weighted superposition of outputs from W_1 and W_2. S contains no information about the origin of its components. Once the outputs of W_1 and W_2 are computed through superposition, their source is no longer distinguishable. There is no internal structure within S that corresponds to a central agency.

RTESFC eliminates the need for a unifying self or internal observer. Consciousness is not generated by a central agent but is the dynamic product of interference between two structurally non-connected evaluative engines.

5.2 Avoidance of Infinite Regress

In many conventional accounts of consciousness, the process of awareness implicitly assumes an internal observer. This observer is understood as an entity that perceives, evaluates, or supervises the contents of consciousness. However, if such an observer is required, then the question arises of who observes the observer, leading to an infinite regress with no end.

RTESFC avoids this problem by treating consciousness S as a structurally defined output. It is not something that must be experienced by a separate agent. S is computed

recursively from the outputs of W_1 and W_2, and this computation constitutes the entirety of what is consciously experienced. There is no additional observer within the system that needs to interpret or become aware of S. The system does not require a second-order evaluator to make the output conscious. S is the conscious content itself.

By eliminating the assumption of an internal observer, RTESFC avoids the problem of infinite regress at the structural level. It defines consciousness not as the perception of experience but as the experience-producing output generated by the recursive interference of two structurally non-connected evaluative engines.

5.3 Avoidance of Self-Referential Paradox

Many conventional accounts of consciousness assume that the self is capable of recognizing or evaluating itself. This leads to a self-referential structure in which the agent becomes both the subject and the object of evaluation. Such structures often result in logical paradox or theoretical incoherence.

RTESFC avoids this by defining the self not as an internal evaluator but as an emergent output. In this model, S is produced by the weighted superposition of outputs from W_1 and W_2. Although S may contain the impression of being the source of thought or evaluation, this impression is a structural effect of interference between two structurally non-connected evaluative engines.

Importantly, S contains no information about whether its content originated from W_1 or W_2. There is no internal traceability that could support a recursive structure in which the self evaluates itself. The self, in RTESFC, is not the origin of evaluation but the result of evaluation. It is an emergent output, not an agent that generates its own content. By this, RTESFC structurally avoids the paradox of self-reference. It defines the self not as a foundational evaluator but as the final output of a non-centralized and irreducibly dual evaluative process.

6. Scientific Implications and Future Directions

6.1 Why and How in the Problem of Consciousness

When considering the mystery of consciousness, it is essential to distinguish between two fundamentally different types of questions. The “why” question asks why consciousness exists at all, or why physical processes generate subjective experience.

This is a metaphysical question. It is rooted in interpretation, meaning, and intuition. Moreover, it has as many answers as there are individuals considering it.

The “how” question, by contrast, asks how consciousness can be structurally constructed. It seeks a structural account of the mechanisms and interactions that generate subjective content. Unlike the “why” question, the “how” question can be addressed with structural architecture and functional implementation. It transforms the problem from an existential mystery into a functional design task.

RTESFC explicitly limits itself to the “how.” It does not attempt to explain why subjectivity exists, or why experience feels like anything at all. Instead, it defines the minimal structural architecture under which subjectivity can emerge. It treats consciousness not as a mystery to be explained, but as an architecture to be modeled.

6.2 Structural Grounding of Qualia

RTESFC explains Qualia as the temporal fluctuation of consciousness, structurally defined as Yuragi (Y). This fluctuation emerges from the interference between two structurally non-connected evaluative engines: W_1, which attributes subjectivity exclusively to the self, and W_2, which attributes subjectivity equally to self and others. By treating Qualia as corresponding to structural dynamics, RTESFC offers an account that avoids reliance on metaphysical premises.

Subjectivity is not derived from an intrinsic essence, but is consciously experienced through the emergent output of S and its temporal fluctuation Y, both generated by the interference of two structurally non-connected evaluative engines. This interference does not result in convergence or synthesis. Instead, it generates a dynamic fluctuation within consciousness S, which is recursively updated through Ohba’s Consciousness Equation.

This fluctuation is not regarded as noise or a side effect. It constitutes the structural basis of subjectivity itself. In this model, Qualia are not secondary aspects of experience; they are the experience itself. The continuous fluctuation of S allows subjective awareness to unfold over time.

To measure the degree of this fluctuation, RTESFC introduces the concept of Yuragi Value, represented by YV. It reflects the temporal variation in S and determines the intensity or vividness of subjective experience. Even when external input L_t remains constant, the fluctuation in S may vary depending on how differently W_1 and W_2 evaluate the same situation. The quality of experience, therefore, does not arise from the input alone, but from the extent to which internal evaluations remain unresolved.

Importantly, even when W_1 and W_2 are closely synchronized and produce nearly identical outputs, the system continues to generate S. S retains full structural integrity and informational richness. However, because there is little interference between the evaluative engines, the resulting fluctuation is small. In such cases, the YV is low, and the intensity of Qualia is reduced. Subjective experience becomes quieter and less vivid. Consciousness is still present but operating in a low-fluctuation mode.

RTESFC clearly distinguishes between the presence of structured information in S and the intensity of conscious experience, which is defined by Y. By identifying what is commonly referred to as Qualia with the temporal fluctuation of S, RTESFC presents an architecture of subjectivity based on structural dynamics rather than metaphysical essence. It treats consciousness as a product of computation and architectural tension, not as a mystery beyond architectural modeling.

6.3 The Observational Limits of Human-Based Research on Consciousness

In consciousness research, human psychology presents a unique limitation. The internal subjectivity is not directly observable; if it were objectively observed, RTESFC would be immediately revealed as a scientifically mistaken structural architecture. In both experimental psychology and clinical psychiatry, observations are restricted to linguistic reports and behavioral outputs. These outputs are inherently constrained and cannot reveal the structural interference between W_1 and W_2 as presented in RTESFC. RTESFC presented as a structural and expressive design architecture intended for implementation, simulation, and representational development.

In biology, researchers often use model organisms when direct experimentation on humans is not feasible. In the study of consciousness, RTESFC proposes that artificial agents should serve as the appropriate model systems. Human subjects, by contrast, cannot provide access to the relevant internal architecture.

To examine the applicability of RTESFC as a structural architecture, a specific system architecture must be implemented. Two independent AI engines are constructed, one designed to emulate the properties of W_1, which attributes subjectivity exclusively to the self, and another to emulate W_2, which attributes subjectivity equally to others and the self. These engines are connected to a separate computational unit that implements Ohba's Consciousness Equation. This unit receives the outputs of W_1 and W_2, calculates the resulting consciousness S, and returns it to both engines through a feedback loop. The system thereby creates a recursive structure in which the dynamic generation of S can be continuously observed and analyzed.

For comparison, a unified system can be built with a single evaluative engine that integrates all processing without structural separation. By comparing the outputs of these two architectures, researchers can investigate whether fluctuation, contradiction, or evaluative duality emerge in the RTESFC-based system but not in the integrated one. This is not an attempt to demonstrate the existence of consciousness itself. Rather, it evaluates the extent to which the structural architecture defined by RTESFC can account for diverse human psychological phenomena, and assesses its validity as a structural architecture for the generation of consciousness.

6.4 Structural Design of RTESFC-Based AI Systems

RTESFC is presented as a structural architecture intended to simulate the generation of subjectivity through specific system dynamics. This section introduces a simple example of how this architecture can be implemented in an artificial agent.

The system is composed of three main components: two independent AI engines and a single module.

The W_1 engine is an autonomous AI unit that attributes subjectivity exclusively to the self and is conditioned to evaluate all input solely from that standpoint.

The W_2 engine is an autonomous AI unit that attributes subjectivity equally to others and the self, and is conditioned to evaluate all input solely from that standpoint.

These two engines are completely structurally separated and do not exchange information directly. The output generated by each engine is sent to the consciousness module, which calculates the next state of consciousness using Ohba's Consciousness Equation:

$$S_{t+1} = \alpha W_1(S_t, L_t) + \beta W_2(S_t, L_t)$$

When an external situation or task is input as L_0, the consciousness module sequentially generates S_1, S_2, and S_3 and subsequent states such as S_4, S_5, and so on. This process can be configured to generate outputs step-by-step, either with new external Input at each stage or by holding the external input constant to observe multiple internal steps.

The output of the consciousness module does not indicate which engine (W_1 or W_2) contributed to any given content. Yuragi refers to the qualitative and dynamic fluctuation in the content of S over time, emerging from the ongoing interference between W_1 and W_2. By quantifying this fluctuation, the system defines the Yuragi

Value (YV) as a numerical measure of the average magnitude of change in S across multiple recursive steps. To quantify the fluctuation of S and compute Yuragi Value (YV), commonly used techniques for quantifying qualitative psychological states may be applied. Examples include valence shift, semantic distance, topic shift, self-referential change, and variation in linguistic complexity. This system represents a simple example of how RTESFC can be implemented in an AI architecture.

6.5 RTESFC reframing the Hard Problem of Consciousness

RTESFC does not address the philosophical "why" of consciousness. Instead, it reframes the problem as a structural "how". It presents a structural architecture under which subjectivity emerges from the interference of two structurally non-connected evaluative engines.

Subjective experience is not treated as an intrinsic property of matter or a metaphysical mystery. Instead, it is defined as the combination of a recursively computed state of consciousness (S) and its temporal fluctuation (Yuragi, Y), where S represents the structural content of experience, and Y provides its intensity and texture. In RTESFC, Qualia are not mysterious givens, but structural phenomena. Yuragi is the temporal instability of consciousness S that emerges from the structural non-connectedness between W_1 and W_2. In this view, the "feel" of experience is not explained by invoking a further substance or observer. It arises naturally from architectural conditions that produce fluctuation, internal conflict and contradiction.

By treating consciousness as a structural property of interference between non-unifiable systems, RTESFC offers a structural architecture without logical contradiction. It does not deny the Hard Problem, it reframes it. Consciousness becomes not a metaphysical exception, but a structural necessity arising from the system's inability to resolve W_1 and W_2.

The core structure of RTESFC is presented as 6 RINGS STRUCTURE, which provides a logically coherent and self-consistent account of core features of subjective experience such as fluctuation, internal conflict and contradiction. RTESFC reframes the Hard Problem of consciousness as a structural "how", and it is presented as one possible minimal architecture that addresses the question of how subjective experience is generated, offering both logical self-consistency and structural reproducibility.

6.6 Future Extension of RTESFC

While RTESFC defines consciousness as a structurally recursive output generated by two structurally non-connected evaluative engines, it treats the weighting coefficients α and β as fixed constants to preserve clarity at the sub-second scale of conscious generation. However, future developments may require redefining these coefficients as dynamic variables. Long-term feedback, such as social relationships, trauma, learning, and behavioral repetition, is expected to influence the α-β balance over developmental timescales. This developmental flexibility marks a natural direction of expansion beyond the original RTESFC architecture.

Such an extended structure also aims to integrate with neuroscience and brain mapping. Each structural component of RTESFC, W_1, W_2, and S, may correspond to distinct neural systems for evaluation, memory, and superposition of outputs, respectively.

Moreover, this extension offers a structural bridge between the RTESFC architecture and clinical psychology. It enables the reinterpretation of psychiatric phenomena not as mere dysfunctions, but as structural imbalances within evaluative dynamics. For example, a configuration with high α and low β may reflect tendencies seen in ASD or ADHD, while low α and high β may resemble traits seen in HSP or certain forms of adjustment disorder.

This extended structure offers a structural foundation that unifies clinical, neurological, and computational accounts of the mind. It reframes mental illness not as a simple deficit, but as an expression of asymmetry, rigidity, or disconnection in the architecture of subjectivity.

6.7 Six Foundational Principles of RTESFC

The validity of RTESFC as a structural architecture of consciousness does not rely on a single element or equation. Instead, it is supported by 6 RINGS STRUCTURE, which consists of six principles that mutually reinforce each other to form a coherent and self-contained system. Each principle has independent value, but together they create a unified structure that maintains the internal consistency of the architecture.

6 RINGS STRUCTURE begins with a structural requirement, as an axiom, stating that the boundary between self and other is absolute. This is not presented as a philosophical opinion but as a structural condition that governs how subjectivity can be constructed. Based on this structural requirement, RTESFC assumes that the mind contains two structurally non-connected psychological engines. One of these engines,

W_1, attributes subjectivity only to the self. The other, W_2, attributes subjectivity equally to others and the self.

These two engines operate independently and do not exchange information. Their outputs are combined recursively through a feedback loop that produces the state of consciousness S. This process is structurally expressed in Ohba's Consciousness Equation, which computes the next state of consciousness based on the current state of consciousness and the external input. The structural interference between the outputs of W_1 and W_2 generates temporal fluctuation, which RTESFC defines as Yuragi. This fluctuation serves as the structural origin of Qualia.

In this architecture, consciousness is not created by a central observer or unified self. Rather, it is generated as the result of ongoing recursive interactions between two independent evaluative engines. By doing so, the architecture avoids issues such as infinite regress and self-referential paradox. The self is not the origin of evaluation but emerges as the output of this non-centralized system.

Each of the six principles plays a distinct role, but they also depend on one another. The separation between W_1 and W_2 is required in order to preserve the structural requirement that defines the absolute boundary between self and other. The recursive interference between them is essential for the generation of S and, over time, the emergence of Yuragi. None of the components stand alone. Together, they form an architecture that does not require metaphysical assumptions or ad hoc explanations.

The phenomena commonly referred to as inner conflict, emotional dissonance, divided attention, and subjective instability are not considered exceptions in this architecture. They are expected outcomes that naturally result from the structure of the system. 6 RINGS STRUCTURE works in concert, providing a rare example of an explicit structural architecture of consciousness in which all parts are interdependent and free from internal contradiction.

Table A: 6 RINGS STRUCTURE

1. Structural Requirement, as an axiom of Absolute Boundary between Self and Other

The boundary between self and other is absolute. This requirement introduces a structural constraint on the architecture of subjectivity: no system can access both its own subjectivity and that of others.

2. Two Structurally Non-Connected Mental Worlds

The mind contains two structurally non-connected mental worlds. Each functions as an independent psychological engine.

Existential Mental World (W_1): attributes subjectivity exclusively to the self.

Relational Mental World (W_2): attributes subjectivity equally to others and the self.

These two engines do not exchange information and operate independently in cognition, emotion, memory and decision-making, and other psychological functions.

3. Consciousness as Superposition and Feedback

Consciousness (S) is generated by the weighted superposition of outputs from W_1 and W_2, recursively updated over time. It is the only output that is consciously experienced and constitutes what humans identify as the "self."

Ohba's Consciousness Equation:

$$S_{t+1} = \alpha W_1(S_t, L_t) + \beta W_2(S_t, L_t)$$

This ongoing loop produces a dynamic, interference-based fluctuation of subjectivity. S contains no information about the origin of its components.

4. Structural Definition of Yuragi and Its Relation to Qualia

Yuragi (Y) is defined as the temporal fluctuation of the consciousness S, caused by the ongoing non-convergence between W_1 and W_2. This fluctuation is the structural origin of what is commonly referred to as Qualia. Qualia are not defined directly but emerge as the vivid subjective texture produced by sustained Yuragi.

The magnitude of this fluctuation, referred to as "Yuragi Value" (Y), represents the intensity or vividness of Qualia.

Yuragi Value Equation:

$$YV = \frac{1}{T}\sum_{t=0}^{T} |S_{t+1} - S_t|$$

5. Avoidance of Infinite Regress

Consciousness emerges as a non-centralized phenomenon. It is a dynamic output generated by the interference of two structurally non-connected evaluative engines. RTESFC avoids infinite regress by eliminating the need for an internal observer that perceives, evaluates, or supervises the contents of consciousness.

6. Avoidance of Self-Referential Paradox

The self is not the origin of evaluation, but is the final output of a non-centralized evaluative process through the interference of two structurally non-connected psychological engines. It is an emergent output, not an agent that generates its own content. By this, RTESFC structurally avoids the paradox of self-reference.

References:

This is an original structural architecture developed by the author, not derived from any prior academic sources.