

The Recruitment and Termination Threshold (RTT) Framework:

A Threshold-Based Model of Neurodivergent Cognitive Variation

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Part I: Introduction to the RTT Framework

The Architecture of Cognitive Resource Management

Human cognition is traditionally modeled through Dual Process Theory (DPT), which suggests a binary operation: a fast, automatic *intuitive mind* (System 1) and a slow, effortful *deliberate mind* (System 2) (Kahneman, 2011). In this view, the intuitive mind relies on an internal predictive model to navigate the world with minimal energy expenditure (Clark, 2016). Deliberate thought is recruited only when this predictive model is perceived as insufficient, specifically when predictions are violated, errors are suspected, or a problem lacks a satisfactory automated answer.

Notably, these triggers are subjective. While DPT explains why an individual thinks differently across various situations, it does not address why different individuals deploy resources differently when faced with the same situation. To bridge this gap, this framework utilizes an Opportunity Cost Model (OCM) as its structural foundation. While the OCM defines the inherent constraints of Subjective Effort and Task Performance (Kurzban et al., 2013), the **Recruitment and Termination Threshold (RTT) Framework** proposes a set of control parameters governing how a finite quantity of cognition is occupied and vacated:

- Recruitment Threshold (RT): Represents the constitutional sensitivity of the gate. When predictive error or environmental entropy exceeds this threshold, an audit is started, moving data from automatic processing into a **Cognitive Load**—the active contents of deliberate thought.
- Termination Threshold (TT): Governs the persistence of the audit. It dictates the *clearing requirements* for a Cognitive Load, the point at which the deliberate audit is satisfied and released back into the background predictive model.

This framework makes three primary contributions: (1) it identifies Recruitment and Termination Thresholds as candidate control parameters governing transitions into and out of deliberative processing; (2) it reframes neurodivergent phenotypes as emergent outcomes of threshold–environment mismatches rather than intrinsic deficits; and (3) it predicts a symmetric, under-recruited cognitive profile as the counterpart to established over-recruited profiles.

Within this framework, neurodivergence is not a failure of intelligence or *will*, but a predictable byproduct of a system where a finite quantity of cognition is occupied by thresholds for entry (RT) and exit (TT) that are misaligned with the ambient entropy of the environment. I postulate that when high-variance settings for RT and TT are mismatched with **Environmental Demands**, the resulting chronic strain manifests as the clinical disorders of **Autism Spectrum Disorder (ASD)**, **Cognitive Disengagement Syndrome (CDS)**, and **Attention Deficit Hyperactivity Disorder (ADHD)**. These are not the structure itself, but the state of a system forced into persistent resource inadequacy.

Metabolic Friction, Insolvency and the Biological Ledger

A secondary prediction of the RTT framework is the concept of a **Biological Ledger**. Metabolic terminology is used here as a functional and computational analogy rather than a direct physiological measurement, intended to capture the resource constraints associated with sustained deliberative processing.

Deliberate thought is not merely effortful; it is biophysically expensive. In the OCM, every recruitment event represents a metabolic transaction that diverts energy from systemic maintenance to **Active Auditing**. This creates **Metabolic Friction**—a physical tax on the Biological Ledger. If the RT recruits too often, or the TT is set too high, the resulting friction may become chronic, preventing the system from maintaining a state of automation. This framework suggests that neurodivergence may be characterized not just by how a brain processes information, but largely by the frequency and persistence of this *metabolic tax*.

This model proposes a unified account of acute and chronic *failure states* through the concept of **Metabolic Insolvency**. Within this framework, Metabolic Insolvency is a functional description of the point at which sustained cognitive demand exceeds available processing capacity, resulting in breakdown of effective regulation. While this condition is expected to have physiological correlates, this framework treats it at a descriptive and computational level.

The system maintains a **Reserve Capacity**—a metabolic buffer for high-intensity processing—which is replenished by the system's **Recharge Rate**—the velocity at which the system restores balance and clears metabolic byproducts. Failure States are a result of **Metabolic Friction**, which occurs when the **Metabolic Load**—the metabolic cost of cognitive demand—exceeds the Recharge Rate and drains the Reserve Capacity.

Metabolic Insolvency represents the point at which the Reserve Capacity is exhausted. Depending on intensity and duration, this may manifest via two distinct processes:

- **Systemic Friction (Acute):** Persistent audits deplete Reserve Capacity beyond immediate recovery, eventually producing **Systemic Insolvency**—a state of metabolic exhaustion requiring an emergency cessation of processing (Wiehler et al., 2022). This may provide a computational account of behaviors described clinically as **Meltdown** or **Shutdown**, functioning as a protective safety mechanism (Porges, 2011).
- **Operational Friction (Chronic):** Chronic strain arises when deliberate processing is applied to tasks typically handled intuitively, including **Social Masking**. These behaviors appear stiff because they are constructed rather than predicted. Sustained friction creates an imbalance between load and recovery, potentially resulting in **Operational Insolvency**—a duration-driven state aligned with the progression toward **Burnout** (Maslach & Leiter, 2016; Higgins et al., 2021).

By treating RT and TT as control parameters, the RTT framework provides a link between moment-to-moment cognitive dynamics with large-scale functional outcomes.

Part II: Logical Construction of the Framework

1) **Bimodal Cognition exists.**

Human cognition operates across a spectrum from automatic, low-cost predictive processing to slow, effortful deliberative processing. This distinction, formalized in Dual Process Theory (Kahneman, 2011) and supported by predictive processing accounts (Clark, 2016), provides the operational foundation for the present framework.

2) **Deliberation is scarce.**

Deliberate thought utilizes an Opportunity Cost Model. Occupying a Cognitive Capacity with an Active Audit reduces Cognitive Reserve available for intuitive tasks (Kurzban et al., 2013).

3) **Recruitment requires an a priori structural gate.**

Because deliberation is metabolically expensive, the system requires a mechanism to determine when intuitive processing has failed and an Active Audit is required. This trigger cannot itself be deliberate; initiating a search for an answer requires the deliberative system to already be active, which is circular. A constitutional Recruitment Threshold (RT) must therefore exist as an a priori structural setting, governing the transition from intuitive to deliberative processing independent of conscious intent.

4) **Threshold variance is a population necessity.**

Genetic diversity in cognitive styles increases population-level fitness. RT and TT are not monolithic; they should form a distribution with distinctive tails (Plomin et al., 2016).

5) **A distinct Termination Threshold (TT) governs release.**

A Recruitment Threshold governs entry but cannot govern exit — a system without a distinct release mechanism would either run indefinitely or terminate arbitrarily. A separate Termination Threshold is therefore logically required: the satisfaction criteria that must be met before a Cognitive Load is released.

6) **Thresholds are imperfect heuristics.**

RT and TT are biological approximations optimized for fitness rather than accuracy. A threshold calibrated too conservatively wastes metabolic resources by failing to recruit when needed; one set too sensitively wastes them by recruiting unnecessarily. This imprecision is the primary reason the distribution exists at all, and the logical prerequisite for Metabolic Insolvency to occur. A perfect threshold would produce no clinical tails.

7) **Tails emerge as recognized neurotypes.**

Extreme threshold settings produce distinctive logistical trajectories:

- **LRT:** Low Cognitive Reserve; aligns with **Autistic** traits and **ASD**.
- **HRT:** High Cognitive Reserve; aligns with **Intuitistic** traits and **CDS**.
- **LTT:** Hypo-persistence; aligns with the **Inattentive** profile of **ADHD**.
- **HTT:** Hyper-persistence; aligns with the **Hyperactive** profile **ADHD**.

8) **Disorder is an environmental mismatch.**

Thresholds are structural settings, not pathologies. A *disorder* is the functional consequence of an environmental mismatch. This represents the gap between a system's RT or TT and the demands of its surroundings. When the environment falls outside a system's *operational range*, the resulting metabolic exhaustion is labeled a disorder, though the underlying neurology remains technically sound.

Part III: Theoretical Integration and Synthesis

The RTT Framework proposes a logistical unification of established cognitive models by identifying the control parameters that govern them. Utilizing the Opportunity Cost Model (OCM) as its metabolic foundation (Kurzban et al., 2013), RTT identifies the specific thresholds that trigger the allocation of finite metabolic resources toward deliberate processing.

1. Refinement of Dual-Process Theory (DPT)

Traditional DPT identifies the existence of two distinct modes: a fast, automatic *intuitive mind* (System 1) and a slow, effortful *deliberate mind* (System 2). While this binary model explains how we think across different situations, it offers no mechanism for why individuals vary so significantly in their deployment of these resources. RTT can be interpreted as specifying the candidate control parameters absent from standard formulations: the Recruitment Threshold (RT) is the specific *gate* governing the transition into deliberation, while the Termination Threshold (TT) dictates the clearing requirements for the deliberate mind to release its *grip*.

2. Alignment with Predictive Processing

In the predictive model of cognition, the brain seeks to minimize prediction error by relying on internal models of the world. Deliberate thought is only recruited when these models fail. RTT aligns with this perspective by framing recruitment as a threshold response to a prediction error that exceeds a specific structural threshold. This allows us to view neurodivergence not as a failure of prediction, but as a variation in *error-tolerance settings*.

3. Reinterpretation of Executive Function

Traditional models view executive dysfunction as a deficit of willpower or capacity. RTT reframes executive function as a dynamic of Resource Recruitment. What appears as an inability to focus is often a failure to hit the RT (in high-entropy environments) or an inability to clear the TT (leading to *locking* or persistence). By interpreting executive function as a logistical management problem of the Biological Ledger, we can account for how *disorder* is often context-dependent.

4. Mechanistic Modeling of Autism Literature

Current research identifies a *deliberative bias* in individuals on the Autism spectrum, noting a greater readiness to utilize deliberate thought compared to the general population (Brosnan et al., 2016). The RTT framework translates this behavioral observation into a structural mechanism: a low RT ensures that the activation of high-cost deliberation is a statistically more frequent event. By lowering the *entry cost* for recruitment, the system defaults to high-fidelity auditing rather than intuitive heuristics.

5. Symmetry and the Intuitistic Pole

RTT provides the structural symmetry missing from Baron-Cohen's (2002) E-S Theory by identifying the **Intuitistic** (HRT) as the inverse of the Autistic (LRT) mechanism. This Intuitistic profile defaults to low-cost heuristics and resists deliberative recruitment. Its predicted clinical expression produces *quiet* internal fail-states, often remaining masked until the **Independence Trap** of adulthood, and matches the profile of Cognitive Disengagement Syndrome (CDS).

Part IV: The Taxonomy of the Tails

Logical Trajectories of Threshold Variance

To evaluate the impact of these thresholds, we must address the biological reality of their distribution. Diversity in cognitive styles increases overall population fitness; a community benefits from a mix of *hyper-vigilant auditors* and *rapid intuitors*. Therefore, Recruitment Thresholds (RT) and Termination Thresholds (TT) are not errors in code, but the structural settings that define the cognitive spectrum; these configurations should naturally form a distribution (Plomin et al., 2016). Within this framework, clinical labels are the names given to threshold configurations that fall outside the environment's operational tolerance.

While RT and TT are functional abstractions, the RTT Framework models the net logistical pressure on a brain's resource budget, much like an economic model uses *inflation* to represent millions of individual price changes. In reality, an individual possesses a *distribution of distributions*, and may have a low threshold for social prediction errors but a high threshold for sensory data. Because deliberative and intuitive processing compete for the same finite metabolic resources, this framework tracks the systemic shift in these averages rather than domain-specific settings. Aggregating specific sensitivities into a global threshold models the *metabolic climate* and the systems probability of Insolvency. This global view still allows for situational variance, as an individual can maintain significantly different thresholds for different triggers depending on the specific Environmental Demand.

The Dynamic Bank: Defining Functional Capacity

Functional Capacity represents the net internal resources available to offset Environmental Demand. It operates as a dynamic *internal bank* composed of three layers:

- Structural Infrastructure: The system's fixed architecture, including processing bandwidth (e.g., IQ) and baseline biological constraints. This defines the absolute ceiling of the *bank*.
- Physiological State: Time-varying regulators of Reserve Capacity and Recharge Rate, such as sleep, nutrition, and autonomic stress.
- Predictive Models: The system's *software efficiency*. Accurate models allow the brain to automate tasks, lowering the *metabolic tax* and effectively increasing the *purchasing power* of the existing reserves.

True dysfunction occurs when constitutional settings are mismatched with environmental variables. When the metabolic cost of maintaining RT and TT consistently produces Metabolic Friction, it enters a state of persistent resource inadequacy. By viewing RT and TT as the primary axes of cognitive navigation, we can predict four distinct logistical trajectories where the structural settings become the defining factor of the lived experience:

The Low Recruitment Threshold (LRT)

The Low Recruitment Threshold profile describes individuals who recruit deliberate thought at comparatively slight environmental triggers, including situations where automaticity would be more efficient. Within the OCM model, this results in a frequently high Cognitive Load. This occupancy directly reduces the **Cognitive Reserve**—the real-time processing space available for intuitive operations—which typically manages the fluid, multi-channel processing required for casual social interaction, non-verbal context, and rapid linguistic inference.

Consequently, the LRT individual may be perceived as literal or stiff, as they are essentially auditing social data through deliberation that the general population processes automatically. This suggests a potential trade-off: while the LRT architecture may struggle with high-entropy social environments, it likely excels in sustained, deep focus. When Cognitive Capacity is fully aligned toward a single task—a state conceptualized as *Monotropism*—the result is a profound depth and efficiency known as hyper-focus or flow (Murray et al., 2005).

The LRT profile may create a significant developmental bottleneck. While a sensitive threshold facilitates high-resolution modeling in stable environments—creating *islands of excellence* where precision reduces RT triggers—it may inhibit the transition to automaticity in high-entropy domains. Learning a complex task is predicted to require sufficient Cognitive Reserve to process patterns intuitively; however, a hyper-sensitive RT treats minor environmental noise as a recruitment event. This forces the individual into a perpetual, high-cost audit, where the metabolic tax of constant deliberation effectively blocks the system from automating the task. The system is so busy *checking the work* that it never learns to do the work subconsciously.

Importantly, this does not imply they would experience a global disruption of intuitive processing; it should remain functional, but systematically possesses less Cognitive Reserve to work with. In response to this high-cost architecture, individuals may aim to create lifestyles light on mental triggers, prioritizing predictable structures, routines, and activities that allow the mind to more easily maintain Cognitive Reserve.

Clinical Correlate: Autism Spectrum Condition (ASC)

It is likely apparent to any reader familiar with the **Autism Spectrum Condition** that this description is neither novel nor random. This correspondence is precisely what the framework predicts, as research shows that individuals on the spectrum utilize deliberate thought more readily than the general population (Brosnan et al., 2016). While prevailing wisdom suggests this is a response to a deficit of intuition, empirical data shows that when autistic individuals do use intuitive thought, it functions correctly (Brown et al., 2010). They simply dedicate fewer resources to it (Brosnan et al., 2016).

Therefore, I propose that *disorder* is not an inherent quality of the structure (ASC), but a secondary consequence of resource mismanagement within that architecture. Whether an LRT individual experiences Autism Spectrum Disorder (ASD) is a function of the relationship between their thresholds, their Environmental Demand, and their Functional Capacity.

Explanation of Common Autistic Behaviours

This framework, describing LRTs operating within an OCM, offers candidate mechanistic interpretations for commonly observed autistic behaviors. Some hypothesized answers include:

- **Hyper-focus & Overload:** In an LRT brain, Cognitive Capacity is easily filled. If it is filled by a singular interest, the individual achieves profound depth and efficiency. However, if they are filled by competing sensory triggers, such as noise, lights, or social anxiety, they can produce a Metabolic Load that produces Systemic Friction and draws on Reserve Capacity, eventually leading to Slowdown, Shutdown, and Meltdown.
- **Stimming & Hyperactivity :** Repetitive behaviors may be viewed as the intentional *locking* of Cognitive Capacity with a predictable, rhythmic loop. This effectively reduces systemic noise, preventing unpredictable environmental triggers from recruiting additional Cognitive Load. Stimming & hyperactivity may also offer a form of energy discharge necessitated by the high Metabolic Load of continual auditing.
- **Masking and Burnout:** Masking—the effortful simulation of intuitive behavior using deliberate processing—produces a consistent drain on the Reserve Capacity. It involves using Cognitive Capacity to perform tasks that should be intuitive. In addition to raising one's Metabolic Load, this persistent draw likely contributes directly to the long-term depletion of executive function, characterized in this framework as Burnout.
- **Echolalia:** The action of repeating what someone else says—Echolalia—may be an attempt to produce socially expected output via deliberate mimicry rather than intuitive generation. This helps to explain the well-documented differences in conversation style and atypical speech patterns found in the Autistic population (Tager-Flusberg, 1999).

The High Recruitment Threshold (HRT)

The High Recruitment Threshold (HRT) profile represents the opposite tail of the recruitment spectrum. Whereas an LRT individual is constitutionally primed to audit, an HRT individual is constitutionally resistant to it. Such a profile would be expected to operate primarily within fast, automatic, and context-sensitive intuitive processing, with a comparatively high activation energy required to engage deliberation. Because explicit audits are infrequently recruited, Cognitive Capacity would remain largely unoccupied, producing a profile characterized by a high Cognitive Reserve.

An individual with this profile—the **Intuitistic** (intuition-dominant)—would be expected to appear socially fluid and attuned to the ambient character of their environment. With minimal cognitive resources drained by sustained analytical processing, they would navigate social contexts with apparent ease, reading the room quickly, responding naturally, and rarely appearing stiff or overloaded. In many environments, this would register simply as social competence.

However, this architecture carries distinct trade-offs. In contexts requiring deliberate evaluation, such an individual may be perceived as rash or insufficiently rigorous, their lack of spontaneous recruitment potentially coming off as a lack of capacity. The Cognitive Capacity is available; it simply does not fire without sufficient activation energy. This distinction is important: the HRT

profile does not predict a deficit in deliberative ability, but a deficit in deliberative initiation. Observed performance gaps are predicted as a *disuse* deficit, functional atrophy resulting from a high recruitment threshold rather than a lack of innate faculty.

Where LRT profiles experience Operational Friction through over-recruitment, an Intuitistic (HRT) individual would be expected to experience strain through two primary mechanical failures:

- **Operational Blindness (Under-Recruitment):** The system defaults to low-resolution processing even when precision is required. Because higher-resolution auditing is not spontaneously triggered, the individual may miss subtle signals or fail to perform necessary error correction. Crucially, a sufficiently high HRT can create a global initiation bottleneck; if the activation gate is set too high, even intuitive or automatic actions fail to launch, leaving the system in a state of persistent operational latency.
- **Systemic Drift (Model Misalignment):** Over time, repeated under-recruitment leads to a divergence between internal models and external reality. This results in an accumulated *entropy debt*—unresolved cognitive demands that are never actively audited. While manageable in structured environments, this debt becomes consequential in complex or high-stakes contexts requiring constant calibration.

Why This Profile Goes Undetected

An LRT profile tends to announce itself. The acute, externally visible failure states associated with frequent over-recruitment, like sensory overload, social rigidity, behavioral disruption, generate clinical attention early. The HRT profile produces no equivalent signal. Its failure mode is not an explosion but an absence: a quiet, gradual accumulation of unresolved complexity that remains invisible so long as the environment compensates for it.

In childhood, this compensation is nearly total. The demands of planning, task initiation, and sustained attention are almost entirely externalized. School schedules dictate when to start and stop. Teachers prompt transitions. Parents manage logistics. For an Intuitistic child, these structures function as surrogate recruitment triggers; the external environment does the initiating that the internal threshold fails to do spontaneously. The child may appear slightly dreamy, a little slow to get started, perhaps described as a daydreamer or *in their own world*. But they function. There is no crisis, no referral, no flag.

Adolescence extends this scaffolding in a different form. Social expectation, peer pressure, and institutional structure continue to provide enough external activation energy to keep the system broadly functional. If the individual is bright, they may compensate further through learned heuristics, developing routines, relying on others for planning, and gravitating toward structured environments that do the recruiting for them. From the outside, nothing looks wrong. From the inside, there may be a persistent, low-grade sense of operating just behind the flow of events, never quite catching up and never quite sure why.

The failure typically becomes visible only at what this framework calls the Independence Trap—the transition into unstructured adult life. Independent living, autonomous professional roles, and complex long-term planning all require sustained internal recruitment that external scaffolding can no longer provide. Without the implicit triggers of institutional structure, the system has nothing to initiate against. The resulting deterioration appears not as an acute crisis but as a slow collapse into inefficiency and inconsistency, such as missed deadlines, abandoned projects, and a widening gap between capacity and output that the individual cannot explain and others struggle to understand.

By this point, the diagnostic window has often closed. The person is an adult. The childhood data is unremarkable. The failure looks like a character issue—laziness, lack of motivation, poor follow-through—rather than a structural one. This is the predictable endpoint of a profile that was never designed to be visible.

Clinical Correlate: Cognitive Disengagement Syndrome (CDS)

The profile described above was derived from structural symmetry prior to any literature review. The predicted characteristics—high Cognitive Reserve, low spontaneous recruitment, gradual failure modes, and diagnostic invisibility until environmental scaffolding is removed—would be expected to present clinically as inattentive and hypoactive, placing it within or adjacent to the inattentive ADHD literature, and potentially obscured by it. **Cognitive Disengagement Syndrome** was identified through exactly this route: a construct historically conflated with inattentive ADHD, distinguished primarily by reduced stimulant response and a relative absence of executive functioning deficits, and only recently recognized as a discrete clinical category (Barkley, 2014).

Characterized by mental fog, sluggish task initiation, and internal withdrawal from Environmental Demands, CDS has been distinguished from ADHD since at least the early nineteenth century, when Crichton identified two distinct disorders of attention: one of distractibility and poor inhibition, and one of diminished attentional power and arousal, the latter aligning closely with the Intuitistic profile predicted here (Barkley, 2014). While CDS is associated with some executive functioning difficulties, research consistently shows these deficits are substantially smaller in magnitude than those seen in ADHD, primarily centered around self-organization and problem-solving, with most of the overlap attributable to comorbid ADHD symptoms rather than CDS itself (Barkley, 2013; Burns & Becker, 2021).

This pattern is consistent with intact deliberative capacity operating under a high initiation threshold; the system can audit, it simply does not spontaneously recruit. Stimulants function by increasing the salience of an already-recruited thought; in an HRT profile, where the primary deficit is failure to initiate the audit, no such transaction exists to subsidize. The medication amplifies a signal that was never generated. Elevated CDS symptoms have been found to predict reduced methylphenidate response in children with ADHD, with higher CDS scores linked to both non-response classification and diminished dose-response effects (Froehlich et al., 2018; Becker et al., 2023).

Explanation of Common CDS Behaviours

The Intuitistic profile offers possible mechanical explanations for the core symptoms of Cognitive Disengagement Syndrome:

- **Mental Fog & Daydreaming:** The system's default state in the absence of a recruited audit. Because the HRT prevents spontaneous deliberative engagement, the Cognitive Load remains largely empty. The system isn't necessarily overwhelmed, as in the LRT profile, but nothing has met the threshold required to occupy it. The fog is not confusion; it is vacancy.
- **Sluggish Initiation:** The mechanical delay of a system attempting to generate sufficient activation energy to move a thought from ambient background into an Active Audit. The task is visible to the individual; the threshold to engage it simply hasn't been met. This produces the characteristic experience of knowing what needs to be done while remaining unable to start.
- **Low Physical Energy & Lethargy:** In this framework, lethargy is not a motivational deficit but a *recruitment deficit*. A system that rarely initiates high-cost deliberate audits does not prime the metabolic pump for high-intensity action. The body follows the processing state, and if recruitment is low, motor output remains in a low-power state by default. This reframes what is frequently misread as laziness as a downstream consequence of constitutional threshold settings.
- **Inconsistent Performance:** The HRT individual can perform well when sufficient external activation energy is provided, such as a deadline, a crisis, a topic of genuine interest that spontaneously clears the threshold. This produces a confusing profile where capacity is clearly present but output is wildly variable. The system isn't unreliable; it's threshold-dependent. Performance tracks activation source rather than ability, which is why the profile is so frequently misread as motivational rather than structural.

Crucially, documented cases of comorbid Autism and CDS reinforce that these thresholds are not always global. An individual may possess a Low RT for sensory inputs or specific interests while maintaining a High RT for social cues or executive navigation. This *distribution of distributions* supports the idea that RT settings can act as independent variables across different cognitive domains.

The relative scarcity of CDS research compared to autism is itself consistent with the framework's prediction. An HRT profile produces few acute, externally visible failure states, generating less clinical urgency and therefore less research attention. That this predicted population was characterized before the literature was searched, and subsequently located within an emerging but historically underrecognized clinical construct, represents a notable alignment between the framework's predictions and existing observations.

The Termination Threshold (TT)

While the Recruitment Threshold determines the initiation of audits, the Termination Threshold governs their closure. This represents the second innate mechanism of the RTT Framework: the

satisfaction criteria required for a Cognitive Load to be released back into the intuitive background. If the RT provides the basis for the proposed **Autistic–Intuitistic Spectrum** by governing sensitivity, the TT governs persistence.

It dictates the internal standard of resolution or certainty that must be achieved before a deliberate audit is terminated. In this framework, an audit is not simply finished; it is released only when the system determines that the residual uncertainty of a problem no longer justifies the metabolic opportunity cost of continued auditing (Kurzban et al., 2013). This exit calculation is shaped by three primary factors operating in parallel.

- **Epistemic Resolution (Completion Standard):** The constitutional threshold of certainty the system requires before an audit can close. A high resolution standard produces thoroughness and resistance to premature closure; a low standard permits early release at the cost of leaving the audit underresolved (Webster & Kruglanski, 1994).
- **Motivational Subsidy (Interest Bonus):** The degree to which intrinsic interest or reward reduces the perceived metabolic cost of continued deliberation, allowing audits to run longer without generating termination pressure (Milyavskaya, Galla, Inzlicht & Duckworth, 2021).
- **Insolvency Protection (Safety Shut-off):** An emergency override that forces audit closure when Reserve Capacity falls below a critical floor, prioritizing metabolic survival over epistemic resolution. The system shuts-off not because the audit is complete, but because continued processing risks Metabolic Insolvency (Wiehler et al., 2022; Boksem & Tops, 2008).

A high TT does not merely reflect a desire for thoroughness; it represents a mechanical requirement to clear a specific Cognitive Load to a specific standard before release is permitted. The following clinical profiles represent stable, constitutional settings at the tails of the TT distribution:

Low Termination Threshold (LTT):

This population experiences difficulty maintaining deliberate focus on any single target. Because the threshold for release is low, the Cognitive Load may be cleared at the first sign of a *good enough* answer or a competing internal distraction. They would be prone to losing the thread of a complex thought, multitasking, and jumping rapidly between disparate ideas. Maintaining a Cognitive Load for longer periods may require a continuous, high-intensity stimulus, implying that this group may only achieve sustained focus under sufficient external pressure or crisis conditions that keep the *gate* open.

Additionally, this group would share many behavioral attributes with the Intuitistic (HRT) population, as both configurations would lead naturally to spending relatively low amounts of time sustaining focused attention, albeit for different mechanical reasons. Under excessive demand, this system may undergo a passive collapse; the weak *grip* on deliberation causing it

to fragment or drop prematurely, likely manifesting as brain fog or dissociation rather than an explosive discharge.

High Termination Threshold (HTT):

This population is characterized by a reluctance to release individual Cognitive Loads once they are engaged. Because the threshold for terminating a thought is high, these individuals may require a relatively exhaustive degree of certainty or completion before the Cognitive Load can be terminated. This could present as a capacity for intense, deep focus. It may also manifest as an inability to change focus when Cognitive Capacity is *locked* into an internal audit, potentially perceived as inattentiveness in specific contexts. HTT individuals may be quite fluid at switching between ideas they are currently maintaining, but would struggle to drop those ideas in favor of new, unrelated triggers.

Similarly to the LRT population, this population's chronically high Metabolic Friction may necessitate hyperactivity. The TT architecture suggests a predictable *lag* in resource deallocation. Because a HTT resists releasing Cognitive Loads, the metabolic energy mobilized for an audit may remain active even after the task has concluded. If the system cannot immediately *cool down* or reallocate these resources, it could create a state of internal pressure. Physical movement may serve as a functional steam vent, allowing the system to discharge the metabolic surplus that is still being generated. When the system cannot find a resolution signal to clear the Cognitive Load, this *pressure-cooker* effect eventually reaches Systemic Insolvency, potentially expressed in a *hot* executive failure where the system must violently discharge the energy it cannot deallocate.

Clinical Correlate: Attention Deficit Hyperactivity Disorder (ADHD)

I propose that ADHD may be interpretable as a clinical manifestation of Termination Threshold (TT) instability. While LTT and HTT represent constitutional structural settings, referred to herein as the Persistence Spectrum, ADHD only emerges when these settings prove incompatible with Environmental Demands, creating a chronic, unsustainable friction between the system's deallocation logic and its required tasks.

Explanation of Common ADHD Behaviours

This framework, describing ADHD through the lens of TT instability, offers a mechanical interpretation for the disorder's primary symptoms. Some hypothesized answers include:

- **Hyper-focus & Perseveration (HTT):** ADHD is frequently characterized by Termination Failure. When a task provides sufficient salience to engage a High TT standard, the system cannot successfully decommission the Cognitive Load. The individual remains *locked* in a high-resolution audit, unable to reallocate bandwidth to competing physiological or Environmental Demands. This represents a mechanical inability to terminate a high-cost processing loop once a certain resolution is reached.

- **Impulsivity as Audit Bypass (HTT):** Impulsivity may be viewed as a logistical heuristic designed to bypass the TT *tax*. Because a full audit in an HTT system is metabolically expensive and difficult to terminate, the system favors *direct-to-action* pathways. By acting or speaking before an internal audit is fully recruited, the system avoids the potential for a persistent, high-cost processing clog.
- **Hyperactivity & Kinetic Discharge (HTT):** In an HTT system, the Cognitive Reserve is prone to saturation by persistent, unterminated audits. This creates chronic Systemic Friction. Physical hyperactivity, such as fidgeting, pacing, or excessive talking, may serve as a mandatory discharge of the high Metabolic Load generated by these unresolved loops.
- **Environmental Inattentiveness (HTT):** Clinically observed inattentiveness in an HTT profile is often a byproduct of low Cognitive Reserve. Because existing audits are difficult to decommission, the system lacks the Cognitive Reserve to recruit new external stimuli. The individual appears inattentive to the environment not because they cannot focus, but because their Cognitive Capacity is fully occupied by persistent, unresolved loops.
- **Distractibility & Working Memory Gaps (LTT):** Conversely, a LTT prevents the system from *holding* a thought long enough to achieve resolution. In an LTT state, the system deallocates Cognitive Loads prematurely in response to minor entropy or new incoming data. This results in the *in-sight*, *in-mind* deficiency and the frequent loss of task-relevant data before it can be encoded.

Pharmacological Validation: Stimulants as Threshold Stabilizers

The observed efficacy of stimulant medication is consistent with the involvement of TT-related mechanisms. By enhancing the *signal-to-noise* ratio in the prefrontal cortex, stimulants function as *threshold stabilizers*, artificially *weighting* the primary audit to provide a *persistence subsidy*.

Stimulants act as a salience spotlight, increasing the *weight* of the primary thought at the metabolic expense of peripheral audits. This produces two distinct logistical outcomes:

- **Inattentive Profile:** The increased salience *weights* the primary audit, preventing the system from prematurely dropping it due to minor entropy. The medication effectively raises the TT, enabling the individual to maintain focus until the audit is resolved.
- **Hyperactive Profile:** In a cluttered system, the sharpened signal allows the brain to finally distinguish the primary audit from background noise. By prioritizing the central audit, the system can successfully identify and decommission the secondary, persistent loops. This frees up Cognitive Reserve and reduces the need for physical discharge.

The Interaction of Thresholds

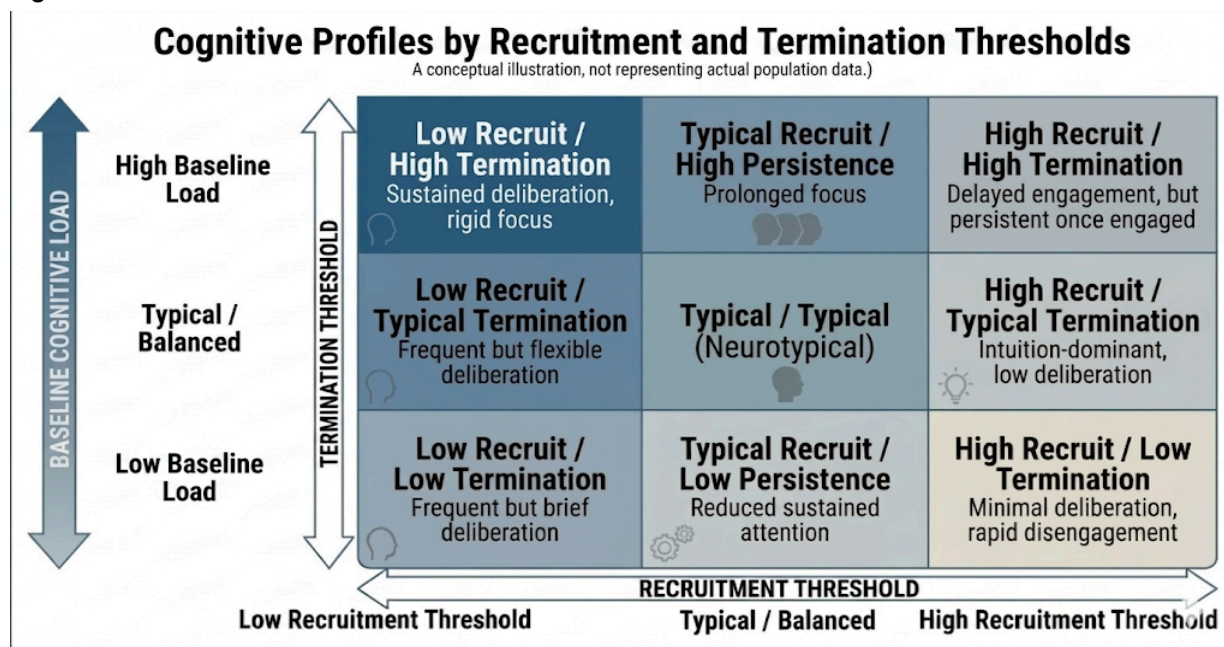
The RTT Framework suggests that human cognitive styles are not shaped by a single variable, but by the interplay between the entry and exit conditions of deliberate thought. While the Recruitment Threshold (RT) governs the frequency of deliberate engagement, the Termination Threshold (TT) governs its persistence. The interaction of these two mechanisms offers a

candidate mechanistic explanation for the high degree of phenotypic overlap and comorbidity seen in neurodivergent populations.

The Cognitive Grid

When the recruitment axis is crossed with the termination axis, isolated diagnoses dissolve into a multidimensional map of human cognition. Every individual occupies a coordinate on this grid, where their position dictates their baseline metabolic operating costs and specific failure modes.

Figure 1: The Threshold Matrix.



By examining the corners of this architecture, we can outline theoretical extremes of this configuration space:

- **Maximum Metabolic Load (LRT / HTT):** This is the most expensive configuration, with both the *gate* and the *grip* pushing towards deliberate thought. Because the system is triggered frequently and resists deallocating Cognitive Loads, it exists in a state of permanent metabolic pressure. This profile faces the highest risk of Metabolic Insolvency and chronically low Cognitive Reserve.
- **Minimum Metabolic Load (HRT / LTT):** The *gate* is heavy and the *grip* is weak. These individuals navigate the world almost entirely through intuition. While they conserve immense amounts of energy, they are prone to Operational Blindness, failing to recruit audits even when environmental entropy becomes dangerous or complex.
- **The Fragmented Profiles:** The LRT / LTT profile creates a high-frequency, low-duration cycle that favors rapid iterative sampling. While the constant reset may impede linear procedural depth, the high density of *snapshots* allows for a broad, high-resolution mosaic of pattern recognition. Conversely, the HRT / HTT profile struggles with spontaneous engagement, but once the recruitment threshold is cleared, the high grip allows for immersive synthesis. This architecture is optimized for singular, long-form

processing, though it appears as a state of inattentiveness until a sufficient trigger *locks* the system into a task.

The Mapping Mechanism: Expression vs. Constitution

This matrix provides a new lens for the high comorbidity between Autism and ADHD (AuDHD). Phenotypical expression is influenced by whether thresholds compound or cancel one another. An individual with a moderately low RT (frequent audits) and a moderately low TT (brief audits) may experience a canceling effect, where the brevity of the audits offsets their frequency, potentially keeping the system below the threshold of clinical impairment. Conversely, when a moderately low RT compounds with a moderately high TT, the mechanisms synchronize to minimize Cognitive Reserve. In this state, the system is forced to audit frequently and hold those audits indefinitely, a configuration that leads to intense Systemic Friction and rapid exhaustion characteristic of the AuDHD profile.

Autistic individuals with ADHD show a combined presentation at substantially higher rates than the general ADHD population (Rong et al., 2021). This is consistent with the framework's prediction that a low recruitment threshold would express more visibly when combined with a HTT than it would with a LTT.

It is critical to distinguish between constitutional structural settings and observed operational states. An LRT individual may appear functionally neurotypical if they occupy a highly predictable environment or have developed a particularly robust predictive model. By successfully mapping their world to minimize entropy, they avoid triggering their sensitive RT, effectively bypassing the metabolic tax through environmental engineering and model calibration. In this view, Masking is re-conceptualized not merely as a social performance, but as a proactive metabolic strategy to maintain systemic solvency.

Ultimately, while this paper utilizes neurodivergent phenotypes as primary case studies, the RTT Framework is not a *disorder-specific* model; it proposes a fundamental architecture for the human mind. By identifying the universal thresholds that govern the transition from intuition to deliberation, this model aims to provide a unified lens through which aspects of human cognitive diversity may be interpreted. It frames disorder from a baseline deficit to a predictable mechanical consequence of the mismatch between a specific structural configuration and its Environmental Demands.

Part V: Extensions and Implications

Gender Dimorphism and Clinical Visibility

The gender distribution of neurodivergence presents a mechanical puzzle. Autism and Hyperactive ADHD show a heavy male skew, often cited at a 3:1 ratio (Loomes, Hull, & Mandy, 2017). However, Cognitive Disengagement Syndrome (CDS) and Inattentive ADHD exhibit significant gender parity, possibly because these *quiet* phenotypes lack the externalizing behaviors that trigger pediatric referrals (Arnett et al., 2015). As individuals reach adulthood, diagnostic rates for all conditions shift toward equilibrium (Rucklidge, 2010). This suggests that RT configurations are more equally distributed than childhood data implies. *Visibility*—defined by the degree to which a structural setting disrupts the external environment—acts as a diagnostic filter, though it is likely only one of several factors. To account for these shifts, this framework identifies four potential primary drivers:

1) Structural Drivers (Biological Distribution)

- **The Variance Hypothesis:** Derived from the **Greater Male Variability Hypothesis** (Lehre et al., 2009), this suggests that males possess a wider statistical distribution of RT settings. This would produce more outliers at poles: the hyper-recruited (LRT/ASD) and the under-recruited (HRT/CDS). If valid, this predicts that the most extreme profiles at either end of the spectrum will lean male, once the environmental drivers are accurately accounted for.
- **The Baseline Hypothesis:** This proposes a biological shift in the *factory setting* of thresholds. A lower male baseline RT would predispose the population toward both chronic hyper-auditing (LRT) males and Intuitistic (HRT) females. This would provide a metabolic substrate for the **Extreme Male Brain Hypothesis**, suggesting that the drive to systemize is an emergent result of a structural gate that is easily triggered.

2) Environmental Drivers (Sociological Interaction)

- **The Threshold-to-Disorder Transition:** This proposes that structural settings are only categorized as a disorder when it generates enough friction to breach a specific social threshold. If environmental expectations are lower or different for a certain group, the same structure may never manifest as a disorder in the first place, remaining a sub-clinical or manageable trait. In this view, the environment dictates whether the structure becomes a functional asset or a clinical failure.
- **The Masking Buffer:** This suggests that a disorder may be present, but is effectively masked by aggressive acquired efficiency. Individuals use superior resource management and predictive modeling to automate navigation, hiding the visible symptoms of the disorder from external observation. This *hidden* state resists detection until the metabolic cost of maintaining the buffer leads to Operational Insolvency, finally revealing the underlying clinical reality.

The environmental drivers alone cannot account for the full pattern of gender distribution observed across neurodivergent conditions. If masking and social expectation were sufficient explanations, diagnostic rates would be expected to converge more completely in adulthood than the data shows. This suggests at least one structural driver is likely operative, though whether this reflects threshold variance, baseline shift, or some combination remains an open empirical question, one that may be resolved as population-level data on HRT profiles becomes available.

Pathways of Threshold Configuration

The RTT Framework identifies phenotypes by their structural thresholds, recognizing that while these configurations are primarily innate, the system may remain subject to situational and chronic shifts. These settings function as a reactive budget that adjusts in real-time based on Metabolic Load and available Reserve Capacity. While this allows for survival in high-demand environments, extreme or prolonged pressure forces the system into failure states, manifesting as either Collapse or Recalibration:

- **Acute Threshold Collapse:** Under conditions of extreme trauma, sleep deprivation, or illness, the Reserve Capacity is depleted, leading to a collapse of neuro-distinction. To halt further expenditure, the system adopts an emergency LRT state. Because sensory filtering is energy-dependent, a system with low metabolic resources loses the ability to selectively ignore stimuli (Talsma, 2015). This forces a state of global hyper-recruitment to ensure survival, producing behavioral shifts, such as sensory avoidance and a reliance on sameness, that mirror constitutional Autism (Liss et al., 2008).
- **Long-Term Baseline Recalibration (Chronic):** Extended environmental pressures can lead to a semi-permanent shift in *factory settings*, moving the baseline thresholds through two contrasting pathways:
 - **Acquired LRT (The Traumatic Pathway):** In response to chronic threat (e.g., **CPTSD**), the system may physically lower its RT to prioritize signal detection over conservation. This persistent *audit mode* mimics constitutional Autism by ensuring the system is always *on*, which inevitably leads to rapid depletion and Metabolic Insolvency (Lanius et al., 2010).
 - **Intentional Optimization (The Meditative Pathway):** Long-term mindfulness can lead to a *trait-like shift* toward threshold efficiency. By reducing background metabolic noise, practitioners can decouple emotional recruitment from sensory input, reducing Operational Friction (Lazar et al., 2005; Slagter et al., 2007).

The RTT Perspective on Disability

By defining thresholds as plastic, disability is conceptualized not as a static identity, but as a state of Metabolic Friction. This helps to explain why clinical support needs are seen as dynamic:

- **Transient Disability:** A normally *compensated* individual may experience a state of functional disability during a temporary resource deficit (e.g., sleep debt or illness). Their Functional Capacity becomes insufficient to manage their Metabolic Load, causing the system to stall, fragment, or enter Systemic Insolvency. In this state, an individual who typically requires minimal support may temporarily mirror the profile of someone with much higher clinical support needs.
- **Functional Solvency:** Conversely, an individual may shift their clinical presentation not by changing their underlying structure, but by building higher-resolution Predictive Models. By accurately predicting environmental inputs, they trigger their sensitive RT less frequently. They have not *cured* their neurology; they have simply moved from chronic insolvency to functional solvency by reducing their average Metabolic Load.

Anxiety: Anticipatory Dread, Perseverative Rumination, and Post-Hoc Uncertainty

In clinical psychology and neuropsychology, anxiety is increasingly viewed not as a singular condition, but as a transdiagnostic symptom with at least three distinct phenotypic expressions: Anticipatory Dread, Perseverative Rumination, and Post-hoc Uncertainty. Current research indicates that these forms of anxiety are highly prevalent across neurodivergent populations, appearing in roughly 50% of Autistic adults (Lever & Geurts, 2016) and nearly 47% of adults with ADHD (Underwood et al., 2021). The RTT framework predicts that these three expressions are the direct result of specific structural configurations on the RT and TT axes.

1. Anticipatory Dread (LRT)

- **Prediction:** Anticipatory Dread is the anxious rehearsal of future unpredictability, a forward-projection of threat designed to pre-process environmental variables before they arrive. The mechanism is driven by a hyper-reactive *gate* that treats low-entropy environmental changes as mandatory audits. Because the system is biologically primed to recruit for almost every stimulus, the individual experiences chronic sensory and cognitive vigilance. The anxiety felt is a protective metabolic reflex, a *pre-payment* of stress intended to prevent the Systemic Insolvency that would occur if the individual were forced to audit an unpredictable environment in real-time.
- **Evidence - Intolerance of Uncertainty:** Autistic populations show a massive statistical correlation with high Intolerance of Uncertainty. The brain interprets un-audited variables as high-cost threats, leading to avoidant dread behaviors to preserve bandwidth (Boulter et al., 2014).

- **Evidence - Sensory Processing Sensitivity:** Individuals with High Sensory Processing Sensitivity—characterized by a low threshold for sensory input—exhibit significantly higher baseline cortisol levels than the general population. Clinical data suggests this elevation is a physiological response to the continuous processing of environmental stimuli (Hofman & Bitran, 2007).

2. Perseverative Rumination (HTT)

- **Prediction:** Perseverative Rumination is the physiological consequence of a HTT. The mechanism here is the *anxiety of the unclosed audit*. Unlike the reactive gateway issue of LRT, this is a failure of the *grip*. Once a thought or stressor has entered active thought, the system fails to generate the satiety signal required to decommission the Cognitive Load. The alarm sounds because the system is trapped in a high-metabolic state long after the external stimulus has disappeared, resulting in a *metabolic drain* that the individual cannot biologically switch off.
- **Evidence - Inhibitory Deficits:** The Hyperactive ADHD phenotype is characterized by a failure of top-down inhibition. Studies show this failure is directly linked to chronic ruminative anxiety; the brain lacks the inhibitory *brakes* to release a cognitive task once it has started (Abramovitch et al., 2015).

3. Post-hoc Uncertainty (LTT/HRT)

- **Prediction:** Post-hoc uncertainty is the consequence of frequent *audit misses* caused by either a LTT or a HRT, and matches the concept of Systemic Drift. The mechanism is the anxiety of having processed too little. In LTT profiles, the system *drops* a thought before it is fully audited; in HRT profiles, the system refuses to recruit the audit at all. This creates a *certainty gap* where the individual's internal model of the world diverges from reality. The resulting anxiety is a persistent, uneasy feeling that a missed detail will eventually cause a *systemic collision*.
- **Evidence - Social Anxiety & Inattentive ADHD:** Research indicates that individuals with the Inattentive ADHD profile exhibit high rates of social anxiety and self-consciousness. Clinically, this is linked to a lack of confidence in their own cognitive saves; the individual is aware of frequent, premature drops in focus, leading to a state of chronic self-doubt regarding their internal record of events (Barkley, 2014).
- **Evidence - Passive Anxiety & CDS:** In contrast, individuals with CDS exhibit a passive form of internalized stress characterized by low self-efficacy and a sense of *being behind* the environment. This anxiety correlates with a failure to initiate cognitive engagement, resulting in a foggy state where the individual feels disconnected from the real-time flow of information (Barkley, 2014).
- **Evidence - Metacognitive Memory Distrust:** Studies on the *certainty gap* are consistent with the claim that anxiety stems from metacognitive awareness rather than actual memory loss. When a system fails to finalize or maintain a robust audit, the brain generates a signal of *memory distrust*. This distrust triggers a post-hoc worry because the internal model of a completed task is perceived as incomplete or missing (Hermans et al., 2008).

Addiction: Satiation and Arousal

In clinical literature, addiction is bifurcated into Type 1 Satiation and Type 2 Arousal. The RTT framework posits these are not *pleasure-seeking* behaviors, but threshold calibrations designed to manage Functional Capacity. When innate thresholds create a state where thoughts are perpetually *stuck* or *unreachable*, the individual seeks external subsidies to manually adjust their structural settings.

1. Satiation Addiction (LRT & HTT)

- **Prediction:** Individuals with a LRT or HTT suffer from Audit Congestion. Because the gate is too sensitive or the grip is too strong, the Cognitive Reserve is crowded by expensive, high-friction audits. Type 1 addiction is a Release Strategy; the goal is to manually raise the RT or lower the TT to clear the *cognitive debris* and free up Cognitive Reserve. Individuals use depressants or dissociatives to increase the inertia or loosen the grip. By raising the RT, they reduce the number of incoming *sparks* that turn into audits. By lowering the TT, they allow the system to finally decommission persistent loops.
- **Evidence - Depressants & Autism:** Individuals on the Autism spectrum are 3.3 times more likely to use high-dose opioids and significantly more likely to develop alcohol dependency than the general population (Butwicka et al., 2017).
- **Evidence - Gambling & Hyperactive ADHD:** Hyperactive-Impulsive ADHD traits are the strongest clinical predictor of severe gambling problems. These behaviors are characterized by high-intensity dopaminergic signals that override existing cognitive focus (Faregh & Derevensky, 2011).

2. Arousal Addiction (HRT & LTT)

- **Prediction:** Individuals with a High Recruitment Threshold (HRT) or Low Termination Threshold (LTT) suffer from Systemic Drift. Constitutional structural settings fail to keep a Cognitive Load active long enough to resolve an audit, or require excessive energy to spark a thought. Type 2 addiction is a Scaffolding Strategy; the goal is to provide external batteries to keep the system *online* and focused. These individuals gravitate toward stimulants or high-frequency feedback loops because these substances artificially lower the RT (making thoughts easier to spark) or raise the TT (making thoughts harder to drop). This stabilizes the *gate*, allowing the system to maintain task engagement without the Metabolic Friction of re-recruiting the same objective.
- **Evidence - Chemical Scaffolding & ADHD:** Adults with ADHD are significantly more likely to be chronic nicotine users (Pomerleau et al., 1995). While clinical data indicates nicotine improves general task-oriented persistence, later research suggests this effect is specifically potent for attentional deficits, helping to reduce the rapid decay of focus (Lerman et al., 2001).
- **Evidence - Algorithmic Recruiting & CDS:** Problematic smartphone use and compulsive *infinite scroll* behaviors correlate strongly with the inattentive traits of Cognitive Disengagement Syndrome. These behaviors utilize external, algorithmically curated cues to maintain states of alertness (Montag et al., 2015).

OCD: Reactive and Autogenous

The RTT Framework proposes that Obsessive-Compulsive Disorder (OCD) is not a monolithic structural failure, but a disruption of the recruitment-termination cycle manifest at either the Gateway (RT) or the Grip (TT). This distinction aligns with the clinical categorization of Reactive and Autogenous obsessions (Lee & Kwon, 2003).

1. Reactive OCD (Specific LRT & LTT)

- **Prediction:** The *check-release* cycle is driven by a context-specific LRT. Unlike the global LRT of Autism, Reactive OCD may function as a *modular divot* in the threshold, hyper-sensitizing the system to specific environmental triggers (e.g., asymmetry). This is compounded by a LTT, where the system *drops* the Cognitive Load before a *satiety signal* has registered. This creates a Certainty Gap: the task is never internally finalized, and the persistent external trigger immediately hits the sensitive RT gate again, forcing constant re-entry.
- **Evidence - Symmetry & Autism:** Symmetry and ordering compulsions occur in approximately 80% of Autistic populations, a 3x increase over the general OCD population (Wikramanayake et al., 2018).
- **Evidence - Inattentive Checking & Inattentive ADHD:** Individuals with Inattentive ADHD traits show a distinct spike in *checking compulsions*. This is clinically linked to a distrust of memory, where the individual feels the *record* of a completed action (like locking a door) has vanished (Mazzone et al., 2010).
- **Evidence - Failure of Yedasentience & OCD:** A core feature of OCD is the disturbance of *yedasentience*—the internal, subjective feeling of knowing that a task is complete and can be terminated (Szechtman & Woody, 2004).

2. Autogenous OCD (HTT)

- **Prediction:** Rumination-heavy OCD matches the HTT axis. Here, the issue is not a sensitive *gate* but a high-inertia *grip*. Once an intrusive thought enters the mind, the HTT individual cannot generate the endogenous signal required to release the Cognitive Load. This creates a catastrophic feedback loop: the system allocates more metabolic resources to solve the ego-dystonic thought, which in turn raises the TT. The thought becomes a permanent resident, exhausting the Cognitive Reserve.
- **Evidence - Impulsivity-Compulsivity:** Research identifies a shared Inhibitory Control deficit between Hyperactive ADHD and OCD (Abramovitch et al., 2012). In individuals with Hyperactive traits, once a *high-entropy* intrusive thought is recruited, the brain lacks the inhibitory *brakes* to decommission the Cognitive Load. This transforms an impulsive thought into a compulsive rumination.
- **Evidence - Obsessionality:** Research identifies a shared inhibitory control deficit between Hyperactive ADHD and *obsessionality*. In these profiles, the brain demonstrates a diminished ability to stop an active cognitive process once it has been initiated (Abramovitch et al., 2012; Mazzone et al., 2010).

Part VI: Further Evidence

Recruitment threshold variation is in principle directly measurable as an individual variable, making the core claims of this framework empirically tractable rather than merely theoretical, as it allows for direct testing of the proposed Autistic-Intuitistic spectrum. Furthermore, while formal empirical testing of the framework itself remains to be done, the existing literature contains data broadly consistent with its predictions, and no clear contradictions were identified within the reviewed literature.

- 1) The prevalence of Autism remains remarkably consistent at approximately 1% across diverse cultures and geographies (Zeidan et al., 2022). This global stability suggests that the phenotype is not a localized or modern byproduct, but a persistent feature of human cognitive variance. This framework provides a candidate mechanistic explanation for this stability: in any large population, a minority recruitment-threshold setting may be maintained to provide a high-fidelity check against the intuitive heuristics of the majority. The existence of this 1% indicates a stable biological trade-off between intuitive efficiency and deliberate precision.
- 2) People with Autism show increased reactivity without increased sensitivity (Vermeulen, 2022). This implies a more conscious response to and awareness of stimuli, consistent with audit recruitment. This is also consistent with the evidence that Autism is not a result of an enhanced sensory capacity.
- 3) People with Autism show dramatically reduced susceptibility to the framing effect (De Martino et al., 2008). This is consistent with heightened engagement predicted by the recruitment threshold hypothesis, with deliberate processing firing in situations where most people rely on intuitive processing.
- 4) People with Autism have been demonstrated, across both clinical and non-clinical samples, to respond deliberately twice as often as neurotypical controls, yet still respond intuitively approximately half as often (Brosnan et al., 2016). This is further supported by studies showing intact implicit learning in autistic individuals across multiple task types (Brown et al., 2010). This pattern supports the hypothesis that System 1 is intact but bypassed in autistic individuals, consistent with a lower recruitment threshold.
- 5) Recent research has found that the relationship between autistic traits and deliberative reasoning is fully mediated by intolerance of uncertainty, specifically a desire for predictability, while the direct relationship between autistic traits and reduced intuition remains significant (Brosnan et al., 2025). This aligns with the idea that heightened deliberation is a downstream effect of threshold variation rather than its cause.
- 6) The prediction that failure modes are threshold-dependent is supported by the distinct *externalizing* vs. *internalizing* presentations of ADHD. The Epstein et al. (2001) data showed that Combined ADHD performance deteriorates over time due to *Accumulative Overload*, while Inattentive ADHD is consistently lower due to *Systemic Fragmentation*. This matches the structural profiles of HTT and LTT, respectively. This suggests that a Meltdown is not merely a behavioral outburst, but a metabolic necessity of a system that cannot clear its Cognitive Load, whereas a Shutdown is the inevitable result of a system that cannot hold them.

- 7) IQ testing of people with Autism shows a distinctive pattern, with significantly above-average scores in certain subtests—Abstract pattern recognition, verbal reasoning, etc.—and significantly below average scores in others - processing speed, symbol search (Wilson, 2024), while scoring similarly overall. This is consistent with heavy deliberate processing and greater comfort using it for extended periods of deep thought, combined with a tendency to recruit it suboptimally. Importantly, increased deliberate engagement does not necessarily imply optimal reasoning, as deliberation may be misapplied or inefficient depending on context.

Scope and Limitations

This framework is not intended to replace existing accounts of autism or cognitive variation, but to complement them by proposing a candidate mechanism governing when deliberative processing is engaged. Alternative models, including predictive processing and executive function accounts, offer explanations for differences in perception, attention, and control. The present approach instead focuses on the conditions under which audits are started. It may reflect a core underlying mechanism, a downstream consequence of other processes, or a complementary dimension that interacts with established models.

Furthermore, while the framework categorizes structural thresholds (RT and TT), it does not assume these are the sole determinants of behavior. The model explicitly accounts for the mediating roles of Functional Capacity and Environmental Demand. A specific threshold setting should not be viewed as a fixed predictor of outcome, but as one variable in a dynamic metabolic equation. The degree to which these thresholds are plastic, or can be effectively mitigated through learned heuristics, remains a primary area for future investigation. Similarly, while the Termination Threshold is treated here as a logically necessary complement to the Recruitment Threshold, governing exit where RT governs entry, its behavioral expressions currently rest on convergent inference rather than direct measurement, and direct empirical validation of the TT axis represents a primary target for future work.

While the existing literature provides support consistent with this framework, the core hypothesis remains to be directly tested. The following section outlines specific, empirically falsifiable predictions that would confirm or challenge the proposed RTT model.

Part VII: Testable Predictions and Falsifiability

1) **Continuous Correlation Between Recruitment and Autistic Traits:**

- **Prediction:** Frequency of deliberative engagement (e.g., increased response times, explicit reasoning strategies, reduced reliance on heuristics) will positively correlate with autistic trait measures across the general population.
- **Falsification Condition:** No correlation, a negative correlation, or a relationship entirely accounted for by general cognitive ability (e.g., IQ or working memory capacity), would challenge the claim that RT is a distinct and underlying axis.

2) **Continuous Correlation Between Recruitment and CDS Traits:**

- **Prediction:** Frequency of deliberative engagement (e.g., increased response times, explicit reasoning strategies, reduced reliance on heuristics) will negatively correlate with CDS trait measures across the general population.
- **Falsification Condition:** No correlation, a positive correlation, or a relationship entirely accounted for by general cognitive ability (e.g., IQ or working memory capacity), would challenge the claim that CDS represents the HRT profile.

3) **Independence between Recruitment, Persistence, and Capacity:**

- **Prediction:** Recruitment frequency (RT), deliberation persistence (TT), and cognitive capacity (CC) are three independent axes of variation. An individual's RT and TT settings are not dictated by their IQ or working memory, nor is a low RT (frequent recruitment) necessarily linked to a high TT (persistent auditing).
- **Falsification Condition:** If RT and TT correlate so strongly with each other—or with CC (IQ/Working Memory)—that they cannot be statistically isolated, the model is invalidated. A finding that recruitment frequency and persistence are simply functions of general cognitive ability would prove these thresholds are not independent structural axes, but merely symptoms of processing capacity.

4) **The Temporal Signature (Neural Dynamics & Response Time):**

- **Prediction:** The Recruitment Threshold (RT) acts as a temporal gate for deliberative processing. Individuals with a lower RT (Autistic profile) will exhibit an earlier onset of Prefrontal Cortex (PFC) activation during tasks that neurotypical controls typically resolve via intuitive, posterior-driven heuristics. This neural shift will manifest behaviorally as systematically longer response times on low-ambiguity tasks, even when such deliberation does not yield proportional gains in accuracy.
- **Falsification Condition:** If neural differences reflect only increased activation magnitude (intensity of effort) without a corresponding shift in onset timing (earlier recruitment), it would suggest the deliberation is a response to perceived difficulty rather than a threshold-triggered audit. Additionally, if response time delays are found to be fully attributable to general motor or processing speed deficits—rather than being specific to the recruitment of deliberative strategies—the interpretation of RT as a distinct gatekeeping mechanism would be invalidated.

5) Under-Deployment vs. Capacity Deficit:

- **Prediction:** Cognitive differences in both LRT and HRT individuals arise from the conditions under which systems are recruited, rather than a lack of innate capacity. Specifically, LRT individuals will demonstrate intact intuitive processing, and HRT individuals will demonstrate intact deliberative reasoning, when environments explicitly scaffold the required mode. However, a functional performance gap is expected: prolonged under-recruitment of a specific mode often leads to secondary *disuse* deficits, where the capacity exists but lacks the refinement seen in profiles where that mode is the default.
- **Falsification Condition:** This claim would be challenged if, upon bridging the recruitment gap (through high-salience or explicit scaffolding), the individual fails to demonstrate the underlying logic or intuitive resonance of the mode in question. Performance may lack the fluidity of habituated use, but the structural capacity must be present.

6) Deliberation-Automation Interference

- **Prediction:** If LRT is a core mechanism of the autistic phenotype, individuals with ASD will show a significantly slower transition from effortful, explicit processing to automatic, intuitive performance during skill acquisition. This *bottleneck* occurs because the persistent engagement of the deliberative audit system, triggered by a LRT, prevents or delays the consolidation of intuitive heuristics.
- **Falsification Condition:** If individuals with ASD demonstrate equal or faster rates of skill automatization compared to neurotypical controls, it would challenge the claim that LRT interferes with intuitive consolidation. Such a finding would suggest that the deliberative and intuitive systems are not procedurally competitive, or that the autistic phenotype is not driven by an obligatory recruitment threshold.

Part VIII: Glossary of Terms

- **Active Audit:** The process of deliberate, high-cost cognitive engagement initiated when the Recruitment Threshold is exceeded. An Active Audit occupies Cognitive Capacity and reduces Cognitive Reserve for the duration of its operation. It is terminated when the Termination Threshold is satisfied or when Insolvency Protection forces an emergency closure.
- **Biological Ledger:** The metabolic account governing the system's cognitive economy. Recruitment events function as debits, drawing on Reserve Capacity to fund Active Audits. Automation and rest function as credits, replenishing reserves at the system's Recharge Rate. Chronic imbalance between debits and credits, where Metabolic Friction persistently exceeds the Recharge Rate, produces the conditions for Metabolic Insolvency.
- **Cognitive Capacity:** The maximum potential processing capacity at any moment.
- **Cognitive Disengagement Syndrome (CDS):** A neurodevelopmental condition manifesting as mental fog and sluggish task initiation (Barkley, 2020). Within the RTT Framework, CDS is the clinical disorder occurring when a High Recruitment Threshold (HRT) profile encounters an environment with insufficient activation energy.
- **Cognitive Load:** The processing capacity currently occupied by deliberate audits.
- **Cognitive Reserve:** The available processing capacity not currently occupied by deliberative audits.
- **Environmental Demand:** The aggregate cognitive and metabolic pressure imposed by an individual's external context. Environmental Demand interacts with Functional Capacity to determine whether a given threshold configuration produces functional solvency or Metabolic Insolvency. The same structural setting may be adaptive in one environment and disabling in another.
- **Functional Capacity:** The aggregate internal resource pool available for cognitive work at any given moment. Distinct from Cognitive Capacity, which represents the structural ceiling, Functional Capacity is a dynamic variable composed of three layers: Structural Infrastructure (fixed processing bandwidth), Physiological State (sleep, nutrition, autonomic regulation), and Predictive Models (software efficiency gained through accurate world-modeling). True dysfunction emerges when Functional Capacity becomes chronically insufficient to offset Environmental Demand.
- **Independence Trap:** The point at which environmental scaffolding—school schedules, parental logistics, institutional structure—is removed and internal recruitment must replace it. For High Recruitment Threshold profiles, this transition frequently marks the first point of visible functional deterioration, as the external triggers that previously substituted for spontaneous recruitment are no longer present.
- **Intuitistic:** A theorized cognitive profile characterized by a High Recruitment Threshold (HRT), also described as intuition-dominant to reflect the profile's constitutional preference for fast, automatic processing over deliberate auditing. This structural configuration carries a high tolerance for environmental entropy. While metabolically efficient, the Intuitistic profile is prone to Operational Blindness and Systemic Drift in complex or high-stakes environments.

- **Masking / Social Masking:** The effortful simulation of intuitive social behavior using deliberate processing. Because the output is hand-crafted by the deliberate mind rather than generated by the predictive model, it may appear stiff or slightly miscalibrated. Within the RTT Framework, Masking is reframed not merely as a social performance but as a proactive metabolic strategy, an attempt to reduce environmental entropy and thereby avoid triggering the Recruitment Threshold. Its metabolic cost is a primary contributor to Operational Insolvency and Burnout.
- **Metabolic Load:** The metabolic costs of a given Cognitive Load.
- **Metabolic Friction:** The biophysical energy cost and heat-load generated when the system transitions from automatic background processing to Active Auditing. Made up of Systemic Friction and Operational Friction.
- **Operational Blindness:** A state characteristic of Intuitistic profiles where environmental cues or errors fail to trigger recruitment, leading to a loss of logistical detail.
- **Operational Friction:** A chronic friction between the individual's internal resolution and external expectations, caused by over-recruitment.
- **Operational Insolvency:** The result of chronic Operational Friction. May present as Burnout.
- **Persistence Spectrum:** The distribution of Termination Threshold settings across the population. As the Recruitment Threshold defines the Autistic–Intuitistic Spectrum, the Persistence Spectrum describes the axis from low TT to high TT.
- **Reserve Capacity:** The metabolic buffer existing between current Metabolic Load and the point of Systemic Insolvency. It represents the system's ability to absorb unexpected spikes in entropy without triggering a total shutdown or *fuse-blow* event.
- **Recharge Rate:** The velocity at which the system restores Reserve Capacity and clears the metabolic byproducts of Metabolic Friction. It is the recovery speed of the Biological Ledger, determining how quickly an individual can return to a functional baseline after a high-demand recruitment event.
- **Recruitment Threshold (RT):** The sensitivity of the system to environmental entropy or prediction error; determines when data is moved into a deliberative processing.
- **Systemic Drift:** A progressive divergence between an individual's internal predictive models and external reality. When Active Audits are rarely initiated or easily terminated, prediction errors accumulate without correction, creating an entropy debt. While manageable in structured or low-complexity environments, this debt becomes consequential when the gap between model and reality reaches a critical threshold.
- **Systemic Friction:** The cumulative cost incurred when Metabolic Load exceeds the system's effective Recharge Rate.
- **Systemic Insolvency:** The result of acute Systemic Friction. A state of disorder where the metabolic cost of maintaining thresholds exceeds the system's recharge rate. Possibly expressed as meltdowns, shutdowns, or total cognitive collapse.
- **Termination Threshold (TT):** The *clearing requirement* for deliberative processing; determines how much evidence or certainty is required before a Cognitive Load is released back to the background model.

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