Cognitive Sight Theory: A Resolution-Based Model of Human Cognition

Abstract

Cognitive Sight Theory models human cognition as a field of resolution rather than a scalar capacity. Individuals operate with a focal cognitive center, a finite range of direct perception (*cognitive sight*), a wider but limited range of reconstructable understanding (*cognitive sound*), and an outer region where cognition and communication collapse into noise. This framework explains persistent miscommunication, coordination failure, and the structural isolation observed at higher sigma (σ) distances by reframing these phenomena as signal-propagation limits rather than individual deficiencies.

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1. Introduction

Attempts to formalize cognitive differences have historically been constrained by sociopolitical resistance to measurement and comparison. As a result, miscommunication is often misattributed to effort, pedagogy, or intent. Cognitive Sight Theory introduces a neutral, operational vocabulary focused on resolution, enabling analysis of communication and coordination as signal-transmission problems under finite capacity constraints.

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2. Core Definitions

2.1 Cognitive Sight

Cognitive sight is the ability to directly perceive, manipulate, and reason over a structure without external scaffolding. It implies internal availability of variables, constraints, relationships, and consequence simulation.

Loss of cognitive sight results in:

- collapse of structure into stepwise procedures or examples,
- reliance on authority, imitation, or rote execution,
- inability to adapt when constraints change.

2.2 Cognitive Sound

Cognitive sound is the ability to reconstruct a structure that cannot be directly operated on, using language, analogy, or scaffolding. It enables comprehension without immediate execution and supports approximate internal modeling.

Loss of cognitive sound results in:

- explanations arriving as noise,
- inability to distinguish signal from verbosity,
- learning failure despite motivation.

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3. Degradation Order

As cognitive distance increases, degradation follows a fixed order:

1. Loss of cognitive sight — *“I can’t see how this works.”*
2. Loss of cognitive sound — *“I can’t understand what you’re saying.”*

This ordering explains why individuals can often understand systems they cannot yet operate, but only up to a finite limit.

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4. Sigma Reference Bands

Sigma (σ) bands describe observable operational capabilities. They are capability-based and make no claims about subjective experience beyond the author’s own cognitive sight.

4.1 0σ — Local Operator

- Stable operation within a narrow, familiar domain.
- Executes known actions under familiar conditions.
- Performance degrades rapidly outside prior experience.

4.2 1σ — Procedural Operator

- Reliable execution of established procedures.
- Can combine and modestly optimize known processes.
- Requires externally defined rules and success criteria.

4.3 2σ — Structural Operator

- Models systems, constraints, and relationships.
- Reframes problems and adapts to changing conditions.
- Operates under ambiguity with limited external guidance.

4.4 3σ — Generative Operator

- Derives or redefines objective functions, axioms, or system boundaries.
- Constructs new frames of operation.
- Often operates outside commonly shared communication ranges.

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5. Cognitive Depth of Field

For an individual with focal center at σ_0:

- **Sight range:** approximately $\sigma_0 \pm 1$
  Direct manipulation and operation are possible.

- **Sound range:** approximately $\sigma_0 \pm 2$
  Indirect reconstruction via explanation is possible.

- **Beyond ±2σ:**
  Neither operation nor reconstruction is reliable. Communication collapses into noise.

This is a resolution falloff, not error, ignorance, or lack of intelligence.

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6. The Hollingworth–Towers Communication Gap

The Hollingworth–Towers gap corresponds to the boundary where cognitive sight is absent, cognitive sound exists briefly, and then collapses entirely.

6.1 Predictions

- 2σ operators can learn from 3σ operators with sufficient scaffolding.
- 3σ operators are understood episodically rather than continuously.
- Explanation quality ceases to matter beyond the ±2σ cognitive sound horizon.

6.2 Information-Theoretic Formalization

Communication across cognitive distance can be modeled as transmission over a noisy channel in the sense of Shannon information theory.

- The sender emits structured content shaped by their cognitive sight.
- The channel consists of shared primitives, vocabulary, and compression schemes.
- The receiver attempts reconstruction using their internal decoders.

As cognitive distance ($\Delta\sigma$) increases:

- representational mismatch rises,

- effective entropy increases from the receiver's perspective,
- usable channel capacity decreases.

When $\Delta\sigma \leq 1$, shared grounding allows error correction. Near $\Delta\sigma \approx 2$, communication enters a critical regime requiring maximal scaffolding. Beyond $\Delta\sigma \approx 2$, the receiver's noise floor exceeds the effective signal, rendering the message non-decodable regardless of explanation quality.

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7. Institutional Alignment and Value Preservation

Integrating high-resolution operators into lower-resolution institutional environments without structural mediation leads to signal collapse and systemic value loss. This is a failure of topological alignment, not agency.

7.1 Mitigation Strategies

- **Resolution Cascading:** Position 2σ operators as relay nodes between 3σ generative output and 1σ executable procedures.
- **Neutral Scaffolding:** Replace pedagogical effort with structural relays designed to preserve signal integrity.

The objective is proximity, not hierarchy. Cognitive ergonomics seeks to minimize friction by aligning agents within mutual resolution reach.

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8. Unknown Space

Beyond the cognitive sound boundary lies an inaccessible region characterized by:

- no sight,
- no sound,
- only indirect inference via artifacts, tools, or collective systems.

This region cannot be accessed through pedagogy alone.

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9. Conclusion

Cognitive sight defines what an individual can operate on.
Cognitive sound defines what an individual can learn from others.
Beyond sound, meaning does not fail—transmission does.

Addendum A: Epistemic Zones

- **Sight zone (≈ ±1σ):** direct observation valid.
- **Sound-only zone (≈ ±2σ):** reconstruction plausible; treat as provisional.
- **Beyond sound (> ±2σ):** treat as unknown; restrict claims to behavioral outcomes.

Addendum B: Methodological Note

- First-person claims are restricted to the author’s sight and sound zones.
- Outside these zones, only capability descriptions are permitted.
- Phenomenological claims require external validation.