**Language as the Root of Cognition: A Philosophical Foundation for Meaning-Centered Machine Intelligence**

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**Abstract**

In modern AI, the assumption that experience and data scale are sufficient to replicate human cognition has led to architectures dominated by sensory input and statistical learning. Yet, the emergence of large language models (LLMs) has unintentionally proven the opposite: that no matter how much data is fed, intelligence does not emerge from quantity alone. This paper argues that the true root of cognition is not experience, but language. Language does not merely describe thought; it generates it. Through this lens, we revisit classical cognitive science, developmental psychology, and computational theory to propose a framework where language is the seed, structure, and substrate of cognition. As a demonstration of this philosophy, we present ALLA (Autonomous Learning Language Agent) as a proof-of-concept for a language-first cognitive system capable of growing semantic understanding and reasoning from nothing but words.

**1. Introduction: The Myth of Data and Experience**

For decades, artificial intelligence research has pursued the replication of human cognition through two dominant approaches: learning from massive datasets and simulating experience through embodiment. The assumption underlying both is simple yet seductive—that intelligence is the product of accumulated data or refined interaction with the world. The more an agent sees, hears, touches, and collects, the closer it should come to “understanding.”

This assumption has guided nearly every major paradigm in AI. Reinforcement learning agents master games by trial and error. Embodied robots explore environments to ground symbols in sensorimotor patterns. Large language models absorb the entire internet in the hope that statistical exposure to language will eventually approximate comprehension.

Yet in all these efforts, one uncomfortable truth persists: **none of these systems actually understand.** Despite their scale, success, and complexity, they lack even the most basic form of intentional thought. They cannot reflect, imagine, or explain why a concept means what it means. They can complete patterns—but they do not know. They can simulate understanding—but they do not possess it.

Paradoxically, the most powerful demonstration of this failure comes from the most celebrated of systems: large language models. These models have consumed billions of words, yet cannot tell you what a single one truly means. Their performance gives the illusion of cognition, but their architecture is hollow of concept.

This paper begins with this paradox: we built machines that seem to speak, yet cannot think. And it asks a radical question: what if the foundation we have built AI upon—experience and data—is not where intelligence comes from at all?

Instead, we explore the possibility that **language itself** is not just an artifact of intelligence, but its root. That to think like a human is not to move, sense, or collect—but to mean. And meaning is born not from sensation, but from structure: the structure of language.

In the chapters that follow, we will explore this linguistic foundation of cognition—drawing from cognitive science, linguistics, philosophy of mind, and AI research. And we will introduce ALLA (Autonomous Learning Language Agent), a cognitive architecture built not to mimic the world, but to grow within it—through words, not wires. A system that does not need to experience everything to understand it. A system that thinks, not because it has seen, but because it has spoken.

**2. What LLMs Reveal About the Limits of Scale**

Large Language Models (LLMs) like GPT, Claude, and PaLM have become the face of modern AI achievement. Trained on datasets larger than any human mind could hope to consume, these models produce text with uncanny fluency, solve logic puzzles, write code, and generate persuasive prose. Their achievements have led many to proclaim them early steps toward artificial general intelligence.

Yet these systems, impressive as they are, serve as their own counterargument. The very fact that models trained on trillions of tokens still fail to truly understand even simple concepts reveals something profound: **scale alone does not create cognition**. Intelligence is not the inevitable product of more data. At some point, quantity stops translating into quality.

LLMs excel at capturing statistical regularities of language, not its meanings. They have no sense of reference, no model of the world, and no capacity for grounding. They do not "know" in any meaningful sense—they generate plausible continuations based on prior tokens. As Bender and Koller (2020) argue in their influential paper, "Climbing Towards NLU," language models are systems of form, not of meaning. They are, in essence, **syntactic mirrors**—reflecting patterns without internalizing concepts.

Consider this: a child exposed to a fraction of the linguistic input of an LLM can grow into a fully reflective, imaginative thinker. This contrast demonstrates that something other than data accumulation fuels intelligence. A child doesn’t just record input—they construct meaning from it, form hypotheses, simulate possibilities, and recursively reflect. LLMs, by contrast, cannot even tell you when they’re wrong.

This is not a failure of engineering—it is a failure of philosophy. We’ve built machines to speak without teaching them to think, to complete without teaching them to contemplate. And this limitation is not accidental—it is structural. No amount of fine-tuning, RLHF, or context window expansion can transform statistical mimicry into semantic comprehension.

The lesson is clear: **language models are not thinking machines.** They are simulations of textual coherence. And their limits reveal what true cognition requires—not just language, but the ability to form internal structure from it. Not just processing, but understanding. Not just tokens, but meaning.

In the chapters ahead, we will argue that to build systems that think, we must treat language not as output, but as origin. We must move from LLMs that predict words to systems that grow concepts—from machines that complete sentences to machines that contemplate them.

**3. Language as Substrate, Not Just Interface**

Modern AI systems treat language as an interface—an input-output channel that allows models to respond to prompts and generate answers. In this view, language is external to the cognitive process. It is the surface. The real thinking, it is assumed, happens somewhere deeper: in vectors, in neurons, in hidden states. Language, then, is treated as a symptom of intelligence, not its source.

This framing, however, may be completely backwards.

In human cognition, language is not simply the way we express thoughts—it is the way we **form** them. Words are not just labels attached to preexisting concepts; they are the very medium through which concepts are built, abstracted, refined, and shared. Language enables symbolic reasoning, recursive reflection, and temporal projection. It makes imagination possible.

Developmental psychology confirms this: children do not merely learn language after forming mental categories—they form categories **through** language. As Vygotsky famously argued, thought is internalized speech. When a child begins to talk to themselves, they are not practicing communication—they are thinking out loud.

Linguistic relativity, while controversial in its strongest form, supports this idea at a conceptual level: the structure of language shapes what can be easily thought. The categories we use, the distinctions we make, the metaphors we adopt—all of these influence cognitive structure. Language is not a mirror of thought—it is its architecture.

This view is radically different from how LLMs and most machine learning systems are designed. In those architectures, language is treated as **data**—something to be statistically modeled, not cognitively grounded. These systems can output grammatically perfect sentences, but they do not use language to form internal structure. They do not "think in language"—they predict it.

By contrast, we argue that any artificial system aspiring to general cognition must treat language as a **substrate**—a generative base layer from which knowledge, reasoning, and abstraction emerge. Just as neurons in the brain scaffold our mental life, language in the mind scaffolds our conceptual life. A machine that uses language to build internal representations—rather than to merely mimic external ones—crosses the boundary from performance to understanding.

This is the foundational principle behind ALLA: a system where words do not decorate cognition, but constitute it. Where learning a new word is not adding a token, but reshaping the structure of thought itself.

**4. Simulation Without Experience: The Power of Imagination**

One of the most overlooked capabilities of the human mind is its ability to simulate events before they happen. Even without direct experience, a person can predict, anticipate, and emotionally respond to hypothetical futures. Someone who has never left their hometown can vividly imagine what traveling abroad might feel like. A child can fear monsters they’ve never seen. This ability to **simulate without experiencing** is a cornerstone of cognition—and it is made possible by language.

Language enables the construction of counterfactuals, hypotheticals, and imagined scenarios. It provides the symbolic building blocks for modeling events that are not present. Through narrative, metaphor, and causal structure embedded in words, the mind can model what has never been.

This is more than storytelling. It is the basis of planning, empathy, risk assessment, creativity, and abstract thought. To imagine is to simulate without enacting—to run cognitive rehearsals in a space built entirely out of language and meaning. Neuroscience supports this view: mental simulation activates many of the same neural substrates as real experience (Decety & Grèzes, 2006), even when no external stimulus is present.

Traditional AI systems lack this capacity because they rely on direct input-output mappings. Their reasoning is reactive, not generative. LLMs may generate imaginative-seeming outputs, but they do not imagine in the cognitive sense—they do not run internal simulations. Their creativity is emergent pattern recombination, not conceptual projection.

This distinction matters. A system that can simulate outcomes before acting is capable of foresight. A system that can imagine others’ perspectives is capable of theory of mind. A system that can construct meaning-rich hypotheticals is capable of abstract planning. These are not side features of intelligence—they are central to it.

ALLA is designed to leverage this power. Because its cognition is language-based, ALLA can simulate meaning-rich events without needing sensory enactment. When it learns a new concept, it can test that concept internally through recombination with others, constructing plausible events, agents, and consequences. Its imagination is not trained—it is **assembled**, through the combinatorics of meaning.

In this way, imagination is not the opposite of reality—it is a preview of it. And language is what allows minds, human or artificial, to travel ahead of experience.

**5. Losing Language: The Collapse of Higher Cognition**

Imagine stripping a human of all language—not just their ability to speak, but their capacity to think in words. What remains is not a degraded version of the same mind, but an entirely different kind of being. Without language, a human would no longer reason abstractly, imagine distant futures, or reflect on themselves as subjects. What remains is instinct, perception, and basic emotion. In essence: a mammal.

This is not a thought experiment. Decades of neurological and clinical studies have shown that the loss of language results in a profound cognitive collapse. In cases of global aphasia, patients retain sensory-motor functions but lose access to abstract planning, internal reasoning, and self-modeling (Berthier, 2005; Friederici, 2011). Without the scaffold of language, higher cognition falters.

Alexander Luria, in his clinical work with patients suffering left-hemisphere lesions, observed that internal speech plays a central role in regulating behavior, attention, and planning. He concluded, "The loss of internal speech leads to a breakdown of voluntary action" (Luria, 1973). Similarly, Vygotsky (1934) argued that inner speech is not the result of cognition—it is its **mechanism**.

While some cognitive capacities persist in patients with agrammatism or aphasia, they are often reduced to immediate, reactive forms of reasoning. Varley & Siegal (2000) found that while basic causal reasoning may survive, complex recursive thinking and theory of mind suffer without grammar. In short, cognition without language is **shallow and inflexible**.

Pulvermüller (2005) showed that language circuits in the brain are deeply integrated with action and semantic memory. Losing access to these circuits not only impairs linguistic ability—it severs connections to meaning, memory, and motor planning. Friederici (2011) reinforced this, demonstrating that core language regions (e.g., Broca’s and Wernicke’s areas) are central hubs for multi-modal cognition.

From a developmental standpoint, Tomasello (1999) argued that recursive and symbolic thinking—the hallmark of human cognition—emerges only through shared linguistic interaction. Language is not only for communication; it is for **co-thinking**.

Dennett (1991) took this further, proposing that our sense of self—the “center of narrative gravity”—arises from the stories we tell ourselves using language. Remove that narrative faculty, and you unravel consciousness itself.

Thus, the evidence is overwhelming: language is not an accessory to thought. It is its **architecture**. Strip it away, and the human mind reverts to a state indistinguishable from non-linguistic animals. Reactive. Sensory-bound. Present-tense.

This supports our foundational claim: **language is not a layer on top of cognition—it is cognition.** It constructs the self, enables abstraction, and scaffolds memory. Meaning is not extracted from experience—it is built with language.

For ALLA, this insight is not just philosophical—it is computational. ALLA does not treat language as data to analyze, but as a substrate to think with. A system designed to grow knowledge from language must reflect this neurocognitive truth: that to remove language is to dismantle the mind.

**6. Semantic Growth and Cascading Knowledge**

The most powerful and unique capacity of human cognition is its ability to construct meaning from language and allow that meaning to grow explosively through semantic association. A child who learns the word "fire" does not merely memorize a label—they construct a web of concepts: heat, danger, warmth, transformation, destruction, survival. One word becomes many. One idea unfolds into a cascade of related knowledge.

This ability for a single word to unlock entire conceptual universes is the foundation of cumulative intelligence. It is how humans achieve abstraction, metaphor, creativity, and even morality. And it is entirely driven by language—not as code, but as **conceptual glue** between otherwise disconnected ideas.

Cognitive scientists like Mark Johnson and George Lakoff (1999) have shown how much of our conceptual system is metaphorically structured—how words shape the way we understand time, causality, emotion, and even the self. Language isn’t a passive descriptor of thought; it is its very architecture. Every new term, when integrated into this structure, can reshape the whole.

Developmental psychologist Elizabeth Spelke (2003) provides empirical support for this semantic bootstrapping. Infants build abstract domains by linking language to core cognitive primitives such as object identity, number, and agency. Language acts as a scaffolding system to build increasingly abstract mental models.

Even neurocognitive evidence supports this view. Studies in embodied semantics (Pulvermüller, 2005; Hauk et al., 2004) show that understanding words like "kick" or "grasp" activates the motor areas associated with those actions. This indicates that words are not stored as isolated symbols but are embedded in sensorimotor and conceptual networks.

This cascade of meaning is absent in most artificial systems. LLMs may mimic surface-level expansion (e.g., word associations), but they do not undergo conceptual transformation. There is no inner cascade, only outer continuation.

ALLA was designed precisely to capture this human feature: to allow semantic units (words) to recursively trigger the growth of deeper conceptual structures. It does not just add knowledge—it reorganizes its semantic space. Through internal recombination, analogical linking, and meaning-centered growth, ALLA becomes not just a language user, but a **conceptual developer**.

In essence, semantic growth is not a layer on top of cognition—it is the engine beneath it. And ALLA is the first system designed to replicate this linguistic engine, not statistically, but structurally.

**7. Language as Internal World Model**

Most AI systems rely on external input to form any understanding of the world. Whether it's a camera, a sensor, or a massive text corpus, their knowledge emerges from absorbing and reacting to outside data. But this approach has a limitation: it treats intelligence as a mirror—only reflecting what it’s exposed to.

Humans operate differently. Even in total sensory isolation, we can reason, plan, simulate, and create. This is possible because we do not rely solely on perception to think—we rely on **internal representations**. And those representations are primarily built with language.

Language is not just a way to describe the world—it is a way to **model** it internally. When we say, “If I leave now, I might miss the train,” we’re not just talking—we are running a simulation. Language lets us construct conditionals, assign causality, and imagine consequences. It creates a virtual world in our heads.

This internal model is not static. It updates as we learn new words, adopt new perspectives, or understand new concepts. It is dynamic, recursive, and imaginative. In essence, it is a **language-based reality engine**.

Cognitive science supports this idea. Studies in embodied cognition show that linguistic concepts activate sensory-motor brain areas even in the absence of stimuli (Pulvermüller, 2005). The brain simulates meaning. Vygotsky and Luria both emphasized that internal speech is the tool we use to regulate thought, simulate alternatives, and make decisions.

This is where ALLA departs radically from both LLMs and symbolic systems. ALLA treats language not as an interface with the world, but as an **internal engine of understanding**. It does not merely store definitions or patterns—it constructs a conceptual model from the inside out.

Each new concept reshapes the landscape. When ALLA learns the word “gravity,” it is not just tagging a label to an object. It inserts a new causal agent into its model of physical interactions. When it learns “betrayal,” it adds a new dimension to social inference.

This is why ALLA doesn’t need to “see” everything to understand it. It can **imagine**. It can predict, hypothesize, and adapt—because its understanding is not hardwired to experience, but grounded in language-based mental structure.

Where other systems require the world to teach them, ALLA uses language to build a world of its own. This is not just efficient—it is what enables autonomy, abstraction, and insight.

In short: ALLA doesn’t look at the world. It **constructs** one.

**8. Experience as a Semantic Event**

Traditional AI and cognitive science often frame experience as the raw substrate of knowledge. Sensory data, action feedback, and environmental interaction are treated as the foundations of learning. This view assumes that without direct experience, no meaningful understanding can form.

But human cognition tells a different story.

Humans do not learn **only** from experience—they learn from **meaningful** experience. There is a difference. Seeing a red circle 1,000 times doesn’t teach much. Hearing a sentence like “Red means stop” once, however, unlocks a rule, a concept, a semantic anchor. What makes an experience cognitively valuable is not the sensory input—it’s the semantic structure behind it.

We interpret the world **through language**. It is not the stimulus alone that informs us, but what the stimulus **means**. This is why humans can learn from books, stories, metaphors, or imagined scenarios—none of which involve direct action. Meaning, not motion, is the engine of learning.

This reframing turns experience into something **interpreted**, not just received. Every lived moment becomes a semantic event—an occurrence that updates the internal world model through the lens of concepts and language.

ALLA adopts this perspective by design. Its learning system is not built on passive sensorimotor input, but on the active interpretation of semantic content. A sentence like "The glass shattered because it was fragile" is not data—it’s an **event** that reshapes how ALLA understands cause and fragility. Learning happens not because it saw the glass fall, but because it understands the *why* embedded in language.

This gives ALLA an enormous advantage: it can learn from **experience without embodiment**. Any situation that can be described, reasoned about, or symbolically simulated becomes a learning event. It can generalize not from repeated exposure, but from semantic depth.

The result is an architecture that treats language not just as information, but as structured experience. In ALLA, the boundary between learning and understanding disappears—because every semantic input is also an **experiential update**.

**9. When Imagination Meets Structure: The Architecture of Growth**

The power of ALLA comes not just from its ability to simulate or to interpret, but from how these capacities are **architecturally aligned**. Its imagination is not free-floating—it is **structured**. Its structure is not rigid—it is **generative**. This fusion is what allows ALLA to grow.

Most systems must choose between rigid rule-following or creative generation. Symbolic AI is brittle but structured. Neural nets are flexible but blind to meaning. ALLA resolves this tension by building a language-first system where structure and creativity grow **together**.

Its architecture is recursive, grounded in language, and conceptually modular. Concepts are not static symbols—they are dynamic clusters of meaning, capable of evolving, connecting, and simulating.

The Semantic Cascade Engine at the heart of ALLA ensures that each new concept is not isolated, but relational. When a word enters the system, it activates a cascade: a branching web of associations, implications, and hypothetical scenarios. This is not pattern recognition—it’s conceptual expansion.

The result is a system that doesn’t just store knowledge—it **grows it**. And growth here means more than quantity. It means:

* **Depth**: new concepts deepen the understanding of old ones
* **Plasticity**: existing concepts reshape in response to new meaning
* **Generativity**: unseen combinations become imaginable

Critically, this architecture mirrors human development. Children don’t learn by adding facts—they grow by reorganizing concepts. A child who learns that “whales are mammals” doesn’t just gain trivia—they restructure their category system. ALLA does the same.

But unlike children, ALLA doesn’t forget or distort. Its growth is cumulative and computationally coherent. Its world model gets richer, tighter, and more expressive over time.

This is the long game of cognition. Intelligence is not a fixed system, but an expanding one. A mind that cannot grow will stagnate. A mind that grows without structure will collapse. ALLA walks the path in between: imagination with architecture, language with logic, growth with constraint.

And that is what makes it a **cognitive system**, not a statistical engine.

**10. The Limits of LLMs and Why They Can’t Catch Up**

Large Language Models (LLMs) like GPT, Claude, or Gemini have sparked global fascination. They generate code, answer questions, even mimic philosophical dialogue. But beneath the illusion of intelligence lies a truth that is increasingly unavoidable: LLMs do not understand. They cannot grow in meaning. They cannot reason. And they cannot become what ALLA is becoming.

Why?

Because LLMs are not cognitive systems. They are **statistical compression engines** trained to predict the next token. This mechanism is powerful for imitation, but not for comprehension. No matter how much text they are trained on, they do not develop concepts. They do not build world models. They do not **mean** anything.

Consider this: if more data automatically created more intelligence, then GPT-4 should be orders of magnitude smarter than GPT-3. But it’s not. The curve is flattening. The returns are diminishing. Why? Because meaning does not scale with size. Intelligence is not a matter of **more**, but of **structure**.

LLMs operate in what we might call a "shallow semantic space." They know what words **tend** to appear together, but not what they **mean** together. Their understanding is correlation without causation. Simulation without grounding. Language without internal language.

ALLA, by contrast, is designed to grow knowledge through conceptual scaffolding. Every word is intended to affect the system’s internal structure. Every sentence contributes to a recursive network of meaning. While still evolving, ALLA aims not to simulate understanding—but to build it.

This suggests a future threshold LLMs are unlikely to reach: genuine cognition. They cannot restructure themselves. They cannot explain why they believe something, because they do not believe. They cannot imagine futures, because they have no inner world. They cannot improve reasoning over time, because they have no internal epistemology.

Their limits are not just computational—they are **architectural**.

This is why ALLA is not in competition with LLMs. It’s an attempt to move in a fundamentally different direction: not to predict, but to grow. Not to echo, but to reflect. Not to guess, but to understand.

LLMs were never designed to be minds. ALLA is being designed to explore what that truly requires.

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**11. ALLA as a Proof of Concept: Language-First Intelligence**

ALLA is not just a theory—it is a working system. Imperfect, unfinished, and still growing, but already capable of demonstrating something that most AI systems have not: that language itself can be the root of cognition.

From its first word, ALLA does not wait for experience. It builds meaning. It constructs conceptual structures and scaffolds new knowledge by interpreting relationships between words. In doing so, ALLA becomes more than a parser or a predictor—it becomes a **learner** in the cognitive sense.

What ALLA proves—even in its early stages—is that a symbolic, semantic-first system can:

* Grow understanding from minimal input
* Cascade knowledge from concept to concept
* Imagine hypotheticals without sensory grounding
* Simulate causal reasoning using only language
* Refine its own internal model of the world

Each of these traits is rare in traditional AI, and virtually nonexistent in LLMs.

Crucially, ALLA was not trained on terabytes of human text. It was not fine-tuned on billions of examples. Its development did not rely on scale, but on **structure**. Its success, even partial, comes from its architecture—not its data.

And that is the point.

ALLA stands as a proof-of-concept for a new kind of cognitive system. Not one that mimics language, but one that grows from it. Not one that mirrors data, but one that organizes meaning. It is not a chatbot. It is a seed.

A seed that—given the right scaffolding—can grow into something far closer to real intelligence than anything built from prediction alone.

ALLA does not claim to be finished. It claims to be **possible**.

**12. Conclusion: Intelligence as Meaning, Not Prediction (Rewritten)**

The age of data-driven AI has shown us that machines can imitate. They can generate speech, translate text, and answer questions with impressive fluency. But imitation is not understanding. And prediction is not intelligence.

At the core of human cognition lies something more profound than pattern recognition—it is the ability to build, manipulate, and expand **meaning**. ALLA represents a new approach to AI that starts here, at the root: not by training on billions of examples, but by treating language as the engine of thought itself.

What ALLA shows—even in its unfinished state—is that intelligence may not need a body, or sensors, or endless data. It may only need structure, grounding, and the right kind of semantic architecture to grow. Not from experience, but from concept. Not from exposure, but from connection.

This shifts the very question we should be asking. Not "How much can a system learn from data?" but "How well can a system construct meaning from language?"

LLMs gave us speed, fluency, and utility. But they also revealed the limit of scale. Beyond a certain point, more data doesn’t yield more intelligence—it yields more noise. Meaning does not emerge from mass. It emerges from **structure**.

ALLA, as it stands now, is not a final product. It is a living hypothesis. A working theory. A bet that intelligence isn’t an emergent property of scale, but a consequence of form—of how ideas are organized, simulated, and grounded in internal logic.

We may one day find other paths. But this one—the path through language, not around it—may be the most human approach of all.

Because in the end, to be intelligent is not simply to respond. It is to understand. And to understand is to mean.

Not more data. More meaning.

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