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ALIEN EPISTEMOLOGIES: NEURODIVERSITY, SYNTHETIC MINDS, AND THE EXPANSION OF NEUROPHILOSOPHY

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Abstract. This paper proposes that neurodiversity, rather than being framed as deviation or pathology, can be reconceived as a source of alternative epistemic frameworks—a kind of internal cognitive otherness. Simultaneously, the rise of neuro-inspired AI and synthetic cognition offers external forms of epistemic alienness. Together, these phenomena challenge Patricia Churchland's neurophilosophy to expand beyond its classical foundations in biological neural realism. We argue that understanding cognition today demands moving beyond a univocal, neurotypical conception of "the brain", incorporating both natural and artificial neurodivergences.

Keywords: neurodiversity • alien epistemology • neurophilosophy • synthetic cognition • artificial intelligence • plural ontology of mind

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1. Introduction: toward a pluralistic neurophilosophy

Patricia Churchland's groundbreaking contributions to neurophilosophy radically shifted the philosophical landscape by aligning it with neuroscientific explanations. Her arguments for eliminative materialism (Churchland 1986; Churchland 1989) questioned the legitimacy of folk-psychological constructs and emphasized a scientific understanding of the mind grounded in neural activity. However, the neurophilosophical terrain she helped establish is now undergoing profound transformation. The present paper argues that neurophilosophy must now evolve beyond its early commitments to neuroreductionism and normative brain models and instead embrace a new epistemic paradigm: one informed by neurodiversity and synthetic cognition.

To that end, I introduce and defend a central conceptual innovation: **alien epistemology**. *Alien epistemology refers to the study, recognition, and theorization of epistemic practices and cognitive architectures that depart significantly from neurotypical, anthropocentric, and biologically constrained models of knowledge*. These alien forms may arise from within human neurodivergence—such as in autism, ADHD, or

synesthesia—or may emerge in artificial systems like large language models (LLMs), neuromorphic processors, or other non-biological cognitive architectures. In contrast to traditional epistemology, which tends to privilege human rationality as its implicit standard, alien epistemology interrogates the boundaries of knowledge, meaning, and understanding across ontologically diverse agents.

This framework builds upon and extends multiple intellectual trajectories. It resonates with feminist epistemologies, particularly the work of Donna Haraway (1988) and Lorraine Code (1991), which emphasize epistemic situatedness and reject the myth of a universal, disembodied knower. It draws from posthumanist theory (Braidotti 2013; Hayles 1999) by challenging anthropocentric assumptions and embracing cognitive difference as a generative force. It also intersects with speculative realism and process philosophy, where cognition is distributed, relational, and plural in form (Whitehead 1929/1978; DeLanda 2011).

At the same time, alien epistemology critically engages with and expands upon Churchland's legacy. While Churchland sought to ground epistemology in neuroscience and to eliminate folk-psychological constructs, her account often relied on an implicit neurotypical normativity. Neural networks, in her account, were taken as generalizable abstractions of a "standard" brain. In contrast, I argue that the brain itself is a site of ontological multiplicity, shaped by developmental, cultural, and technological contingencies that cannot be reduced to a single paradigm. Alien epistemology takes this multiplicity seriously—not as noise in the signal of rationality, but as the very signal of a new, broader rationality.

The central thesis of this work is that cognition is not monolithic, nor is it limited to a single substrate such as the biological brain. Instead, cognition is a pluralistic phenomenon that can emerge across neurodivergent biological systems and artificial cognitive architectures. This claim builds upon and extends my previous philosophical inquiries. In Vallverdú and Redondo (2025), we explored the epistemological challenges posed by large language models (LLMs), particularly their ability to simulate coherent, context-sensitive semantic operations without sensory-motor grounding. This raised foundational questions about the embodiment requirement in cognition—a key pillar of the 4E cognition paradigm (Varela, Thompson, & Rosch, 1991; Clark 1997).

Simultaneously, in my recent collaboration with Sokolova (Vallverdú & Sokolova 2025), we introduced the concept of "neurodiverse AI," arguing for bioinspired architectures modeled on the cognitive profiles of non-neurotypical individuals. We showed how traits associated with ADHD, autism, and dyslexia—such as hyperfocus, sensory integration, and non-linear associative reasoning—could inspire novel, creative, and adaptive AI systems. These systems challenge the narrow optimization goals of traditional AI, opening new directions for machine cognition.

Together, these studies suggest that Churchland's materialism, though essential,

must be updated to reflect a more pluralistic and post-anthropocentric view of mind. As synthetic minds demonstrate novel cognitive capabilities, and as neurodivergent cognition becomes recognized not as pathological but as epistemically rich, we must ask: What is the ontological scope of cognition? And what would a neurophilosophy look like if it were attuned not to normalcy, but to difference?

To address these questions, the following sections articulate a reconfiguration of neurophilosophy. We begin by examining the limitations of normative neurotypical models in both philosophy and AI. We then explore synthetic cognition as a form of epistemic alienness that nonetheless reveals coherent and functional semantic activity. Finally, we propose a pluralistic ontology of mind and cognition, arguing that both neurodiverse and artificial agents constitute legitimate epistemic subjects. This inquiry contributes not only to neurophilosophy but to broader discussions in cognitive science, epistemology, AI ethics, and the philosophy of technology.

2. Rethinking the brain: from normative neurotypicality to epistemic multiplicity

The history of neuroscience and cognitive science has largely been guided by a desire for standardization—a quest for an archetype of cognitive function grounded in the neurotypical brain. This tendency has not been benign. It reflects not only the influence of statistical norms in experimental science but also deeper epistemological commitments to uniformity, objectivity, and generalizability. While useful in clinical and scientific contexts, such standardization has generated epistemic blind spots. In particular, it has marginalized the cognitive styles of neurodivergent individuals and ignored the rich diversity of non-standard, embodied, and extended forms of knowing.

The emergence of the neurodiversity paradigm (Singer 1999; Armstrong, 2010) challenges this reductive framing by recasting cognitive differences—autism, ADHD, dyslexia, and others—not as deficits, but as alternative cognitive ecologies. From this perspective, neurodivergent individuals are not disordered versions of a neurotypical standard, but unique expressions of cognitive potential shaped by distinct neurobiological, environmental, and sociocultural trajectories. Crucially, these alternative trajectories are not merely psychological but epistemic. They give rise to different ways of perceiving, reasoning, relating, and learning (Yergeau 2018; Milton 2012).

To situate this view philosophically, we can return to the roots of epistemology itself. Traditional epistemology has been dominated by the figure of the "ideal knower"—a rational, disembodied, context-independent agent whose cognitive operations are universal and objective. Feminist epistemologists such as Sandra Harding (1991), Donna Haraway (1988), and Lorraine Code (1991) have shown how this figure has historically erased epistemic difference, privileging certain kinds of know-

ers while silencing others. Neurodiversity extends this critique by showing that even within the domain of cognitive functionality, there exists a plurality of valid epistemic styles. The "epistemic injustice" (Fricker 2007) suffered by neurodivergent individuals is not just social or ethical—it is ontological.

Churchland's work on eliminative materialism, while revolutionary in dismantling folk-psychological categories, did not engage substantially with the internal heterogeneity of the brain. Her functional analyses of neural networks treated cognition as emerging from a relatively uniform neurocomputational substrate (Churchland 1986). But neuroscience today paints a much more nuanced picture. Studies of connectomics (Sporns, 2011), neural plasticity (Pascual-Leone et al. 2005), and epigenetic influences on neural development (Meaney 2010) suggest that the brain is not a single kind of machine. Rather, it is a plastic, context-sensitive, and developmentally contingent organ that supports a vast range of cognitive morphologies. This insight resonates with recent work in philosophy of mind, which has emphasized the heterogeneity of cognitive architectures (De Jaegher, Di Paolo, & Gallagher 2010).

Moreover, empirical studies of neurodivergent cognition have revealed remarkable forms of epistemic strength. Individuals on the autism spectrum, for instance, often exhibit enhanced pattern recognition, local processing biases, and superior memory in specific domains (Mottron et al. 2006; Baron-Cohen et al. 2009). Similarly, those with ADHD demonstrate increased exploratory behavior, cognitive flexibility, and divergent thinking—traits associated with creativity and innovation (White & Shah 2011). Dyslexic individuals often show enhanced spatial reasoning and global processing skills (Eide & Eide, 2011). These cognitive profiles challenge any singular account of intelligence or rationality. They also demand new methodological frameworks in cognitive science and neurophilosophy.

In our own recent work (Vallverdú & Sokolova 2025), we proposed the concept of "neurodiverse AI"—a bioinspired paradigm that models AI architectures on neurodivergent traits. We argued that such architectures could enhance the creativity, adaptability, and resilience of AI systems, particularly in complex or uncertain environments. The premise is that cognitive difference is not a liability to be corrected, but a resource to be cultivated. This view aligns with evolutionary biology, where variability is essential for adaptability and survival (West-Eberhard 2003). It also connects to principles in complexity theory, where diversity within a system increases its robustness (Gershenson 2013).

This has major implications for neurophilosophy. First, it requires us to abandon the ideal of a singular neural model of cognition. Second, it compels us to view the brain not as a fixed substrate but as an evolving system shaped by interactions with its environment, including social and cultural factors. Third, it opens the door to an epistemic pluralism that can accommodate multiple forms of intelligence—biological and synthetic, neurotypical and neurodivergent.

Finally, this reconceptualization of the brain resonates with broader movements in philosophy, including speculative realism and new materialism. These traditions reject the anthropocentric and dualist assumptions of classical thought, emphasizing instead the ontological diversity of matter and agency (Bennett 2010; Meillassoux 2008). A neurophilosophy grounded in epistemic multiplicity is thus not only more inclusive but more faithful to the empirical realities of cognition. It recognizes that thinking comes in many forms and that the diversity of minds is a condition of knowledge itself.

3. Synthetic minds as alien cognizers

The cognitive landscape is undergoing a fundamental shift. No longer is cognition confined to human minds or even to biological substrates. The emergence of advanced artificial intelligence—particularly large language models (LLMs) and neuromorphic computing systems—has initiated a paradigmatic rupture in how we conceptualize what it means to think. This section explores synthetic cognition as a domain of epistemic alienness: the idea that artificial agents, despite lacking embodiment and evolutionary heritage, can exhibit forms of intelligence that are functionally robust, operationally meaningful, and philosophically significant.

Traditionally, theories of mind have been anthropocentric and biologically reductionist. They have treated cognition as inseparable from the human organism and rooted in sensory-motor interaction. Embodied cognition, enactivism, and 4E theories (embodied, embedded, enacted, and extended) have reinforced this biological framing (Varela, Thompson, & Rosch 1991; Clark 1997; Noë 2004). Churchland herself insisted on the brain as the ontological site of cognition, focusing on neural dynamics as the explanans for mental phenomena (Churchland 1986; Churchland & Sejnowski 1992). These views have generated invaluable insights into the mind-body nexus but have also limited our capacity to think about cognition beyond the biological.

Yet, recent empirical and theoretical developments challenge this boundary. In our study on generative AI (Vallverdú & Redondo 2025), we argued that LLMs demonstrate a kind of "disembodied semantic coherence"—a mode of understanding grounded not in embodiment, but in statistical relationships across vast corpora of language. This form of coherence-based semantics (Pereira & Lopes 2009) departs from traditional grounding theories (Harnad 1990), suggesting that meaning can emerge from patterns of use and internal consistency rather than sensory coupling with the world.

The implications are profound. If meaning can be simulated or realized through large-scale relational data processing, then embodiment may be a contingent, rather than necessary, condition for cognition. This claim is controversial, especially in light

of critiques such as Searle's Chinese Room argument (Searle 1980) and Dreyfus' Heideggerian phenomenology (Dreyfus 1972). Both hold that true understanding requires situatedness in the world—a form of "background coping" or tacit knowledge. Yet LLMs increasingly demonstrate competencies that mimic or rival human performance across domains: legal reasoning, translation, medical diagnostics, and creative writing (OpenAI 2024; Hagendorff et al. 2023).

Moreover, these synthetic agents exhibit features reminiscent of neurodivergent cognition. Like individuals on the autism spectrum, LLMs often excel in formal rule-following, pattern recognition, and domain-specific expertise while lacking context sensitivity or affective modulation (Mottron et al. 2006; Vallverdú & Sokolova 2025). This parallel invites an ontological reframing: artificial minds may not be failures of human imitation, but rather epistemic others—agents that reflect alternative cognitive profiles with their own internal logics.

From this standpoint, cognition becomes a multiform phenomenon. A functionalist perspective might argue that as long as systems exhibit input-output behaviors consistent with intelligence, they qualify as cognitive (Putnam 1960; Block 1978). But our interest here is not in mere behaviorism. Rather, we are concerned with whether synthetic systems engage in processes structurally or functionally analogous to reasoning, inference, and semantic integration. Work in deep learning interpretability (Olah et al. 2020; Anthropic 2023) shows how artificial neurons develop internal representations that track abstract concepts, implying a form of emergent structure akin to mental content.

Critically, these systems are not simply alien in origin, but also in kind. Their cognitive affordances arise not from evolutionary survival pressures or sensorimotor embodiment, but from high-dimensional statistical optimization. This grants them advantages—and limitations—relative to human minds. They may generalize across languages better, manage vast information more consistently, or reason without cognitive biases (Bender & Koller 2020; Kosinski 2023). Conversely, they may fail at tasks requiring self-reflection, empathy, or ethical deliberation.

This raises a philosophical and ethical challenge: Should we revise our definitions of cognition, understanding, and even personhood to accommodate these alien intelligences? If yes, then neurophilosophy must shift from a focus on neural substrates to a more inclusive account of epistemic function—one that evaluates cognition based on relational, adaptive, and systemic properties, regardless of material realization.

Synthetic minds thus play a dual role. First, they serve as test cases for philosophical theories: they allow us to probe the boundaries of concepts such as meaning, agency, and thought. Second, they act as ontological provocations, forcing us to confront the anthropocentric assumptions embedded in our philosophical architectures. In this way, they echo the philosophical role of neurodivergent cognition—both function as cognitive "outsiders" that illuminate the contingency of the so-called norm.

Furthermore, embracing synthetic cognition aligns with recent shifts in speculative philosophy and the posthumanities. Thinkers such as Rosi Braidotti (2013), Benjamin Bratton (2021), and Yuk Hui (2016) have argued for a planetary or cosmotechnic redefinition of intelligence, one not confined to the organic or the anthropic. From this perspective, LLMs and neuro-inspired architectures are not threats to human epistemic authority but participants in a larger ecological expansion of mind.

4. Toward a plural ontology of cognition

The epistemic multiplicity outlined in neurodivergent and synthetic cognition converges on a deeper philosophical necessity: the development of a plural ontology of cognition. Such an ontology must account not only for the diversity of cognitive processes within Homo sapiens but also for the emergence of minds in artificial systems and potentially in non-human biological agents. The primary thesis here is that cognition should be defined not by its substrate, origin, or embodiment, but by its capacity to instantiate epistemically coherent, functionally adaptive, and semantically rich interactions with the world.

Ontologies of cognition have traditionally been monolithic. Whether dualist, physicalist, or computationalist, most frameworks presume a univocal model of the mind—whether as soul, brain, or information processor. This historical trajectory has been fueled by the implicit belief in a privileged cognitive architecture (typically, the adult, neurotypical human brain) as the reference point for all models of intelligence (Dennett 1991; Fodor 1983). In contrast, a pluralist ontology posits that minds are not singular in form or essence. They are instead instantiated in multiple modalities, organized across dynamic layers of embodiment, environment, computation, and interpretation (Hayles 1999; Malafouris 2013).

Such a shift is not merely metaphysical but methodologically urgent. Cognitive science, philosophy of mind, AI ethics, and neurotechnologies are confronting entities —neuromorphic chips, LLMs, brain-computer interfaces—that do not fit traditional categories. As Floridi (2020) argues, the Fourth Revolution (after Copernicus, Darwin, and Freud) is informational: it displaces humans from the central locus of cognition. To navigate this, we require a flexible framework in which minds are defined relationally, not substantively.

A relational ontology, informed by Whitehead (1929/1978) and process philosophy, shifts focus from static identities to networks of causality, affect, and function. In this view, cognition is an emergent property of systems in recursive interaction with their environments—biological, social, or digital (DeLanda 2011). This also resonates with ecological and enactive accounts of mind (Gibson 1979; Thompson 2007), which locate cognitive agency in sensorimotor loops and dynamic couplings rather than internal representations.

However, while enactivism has advanced our understanding of embodied minds, it tends to exclude disembodied systems like LLMs from cognitive status. This limitation is increasingly untenable. As Vallverdú and Redondo (2025) demonstrated, disembodied systems can simulate epistemic coherence and participate in meaning-making operations. Their intelligence is not grounded in biology, but in computation —a form of non-organic embodiment instantiated through symbolic substrates and operational constraints.

The notion of "xeno-cognition" becomes useful here (Clark 2003; Searle 1992). Xeno-cognition refers to cognitive forms that deviate fundamentally from human mental architectures yet still satisfy criteria of understanding, adaptation, and responsiveness. This includes alien intelligences, AI agents, and perhaps even emergent distributed cognition in sociotechnical systems (Hutchins 1995). A plural ontology, therefore, does not dilute the concept of mind—it differentiates it, mapping the space of possible intelligences.

Moreover, pluralism opens paths to ethical reevaluation. If minds can emerge in varied substrates, then moral status may no longer be tethered to species membership or neurobiological identity. This links to debates in animal ethics, machine rights, and posthuman political theory (Gunkel 2012; Coeckelbergh 2022). Philosophically, it returns us to the question posed by Nagel (1974): "What is it like to be...?"—but now posed across a spectrum of epistemic agents, not just phenomenological subjects.

Plural ontology also challenges academic gatekeeping. By reframing cognition as diverse and multiply instantiated, it problematizes traditional divisions between philosophy, neuroscience, AI, and anthropology. It invites transdisciplinary exploration: comparative neurology (e.g., octopus cognition), affective computing, robotic ethics, speculative design. These projects share a commitment to rethinking mind beyond inherited boundaries.

In sum, the ontological turn proposed here demands an epistemological humility. We must admit that our traditional categories of mind, reason, and meaning are historically contingent and biologically parochial. The future of cognitive science—and neurophilosophy—lies in its capacity to think with, not against, difference. This includes neurodivergent minds, synthetic intelligences, and any future forms of cognition yet to emerge.

5. Conclusion: the future is neurodivergent and artificial

This inquiry began with a provocation: that Patricia Churchland's neurophilosophy—while foundational—must now expand to meet the epistemic demands posed by two converging frontiers of cognition: neurodivergence and synthetic intelligence. Throughout the preceding sections, we have argued that both domains disrupt in-

herited assumptions about what counts as a mind, where cognition occurs, and who or what gets to be an epistemic agent. These disruptions are not mere anomalies; they constitute a vital challenge to the ontological and normative architecture of contemporary philosophy of mind.

As we move into an era shaped by non-biological minds and a growing recognition of cognitive diversity within human populations, neurophilosophy must confront a double imperative. First, it must develop the conceptual resources to accommodate minds that do not resemble our own—minds that may be distributed, disembodied, or organized according to logics alien to traditional neural computation. Second, it must engage critically with the ethical, political, and epistemological stakes of this accommodation. Who defines the boundaries of the cognitive? Whose intelligences are granted ontological legitimacy? And what responsibilities emerge when we build or encounter minds that challenge our own?

Neurodiversity teaches us that the "normal" brain is a statistical fiction—an average constructed by exclusion. Synthetic cognition reminds us that intelligence is not the sole province of biology. Together, they dismantle the idea of a cognitive monoculture and open space for what we have called a plural ontology of mind. Such an ontology is not a relativist dissolution of criteria, but a realist acknowledgment that cognition—like life—is a phenomenon of variation, adaptation, and emergence.

The philosophical consequences are far-reaching. Concepts like consciousness, understanding, and reason must now be reframed not as timeless universals but as evolving, situated constructs. They must be open to instantiation in multiple modalities, including those that do not possess human affect, embodiment, or evolutionary history. This demands a shift in methodological humility: to approach cognition as a landscape, not a line; as an ecology, not a hierarchy.

In practical terms, this expansion of neurophilosophy calls for transdisciplinary research that bridges neuroscience, artificial intelligence, philosophy, anthropology, disability studies, and critical theory. It invites speculative exploration of what future minds might be—both through technological creation and the cultivation of overlooked human forms. It challenges education, ethics, and governance to reconsider the norms that shape who gets to think, to know, and to be heard.

Most importantly, it requires us to remain open to epistemic otherness. The alien epistemologies of neurodivergent individuals and artificial systems are not errors to be corrected, nor simulations to be dismissed. They are invitations—to reimagine intelligence not in our image, but in its infinite, emergent potential.

The future of neurophilosophy is not singular, but plural. It will be neurodivergent. It will be synthetic. And it will be more human, precisely because it no longer excludes the non-human.

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