

# The Question as the Engine of Consciousness: A Dual-Pathway Theory of Epistemic Growth Through Innate Curiosity and Survival-Driven Expansion

Sara Malik<sup>1</sup> · N.A. Ahmed<sup>1</sup>

<sup>1</sup> PakCrypt NPO, Research Division, Islamabad, Pakistan

Correspondence: Sara Malik <smk@pakcrypt.org>.

Published online: 23 March 2026

---

## Abstract

*What is the nature of a question, and why does consciousness expand? This paper advances a **Dual-Pathway Theory of Epistemic Growth**, proposing that human consciousness—and thereby the collective frontier of knowledge, invention, and discovery—can grow only when at least one of two conditions obtains: (1) **innate curiosity** that generates genuine questions, creating structured gaps in the field of awareness through which new understanding may enter; or (2) **extreme external pressure** from evolutionary forces—survival threat, trauma, existential crisis—that compels consciousness to expand or risk extinction, driven by what we term the **Survival Extent imperative**. Drawing on the Socratic tradition, Gadamer’s hermeneutics, Heidegger’s phenomenology, Loewenstein’s information gap theory, predictive processing neuroscience, constructivist developmental psychology, and research on post-traumatic growth, we argue that these two pathways are jointly exhaustive and individually sufficient for genuine epistemic expansion. We further contend that the question—whether explicit, implicit, or pre-linguistic—constitutes the common mechanism underlying both pathways, functioning as the necessary aperture through which consciousness opens to what it does not yet contain. The paper examines the philosophical, psychological, and neuroscientific evidence for this thesis, proposes a formal framework distinguishing ‘good questions’ (individually transformative) from ‘right questions’ (collectively significant), and considers the implications for understanding questioning as a species-defining characteristic that resists full algorithmic replication.*

**Keywords** Nature of the question · Consciousness expansion · Curiosity · Survival Extent · Dual-pathway theory · Epistemic growth · Hermeneutics · Predictive processing · Post-traumatic growth · Collective consciousness

---

## 1 Introduction

The question is the oldest and most neglected philosophical category. While propositions, judgments, and arguments have received centuries of systematic analysis, the question itself—what it is, how it functions, and why it matters—has been treated as philosophically transparent, a mere prelude to the answer that constitutes genuine knowledge. Michel Meyer (1995) diagnosed this as *propositionalism*: “Philosophy has always questioned what is first in thought, in many different ways. But in each case, it is questioning that is first” (p. 17). The suppression of the question in favour of the proposition, Meyer argued, has obscured the fundamental mechanism by which thought advances.

Yet scattered across two and a half millennia of intellectual history—from Socrates’ midwifery to Gadamer’s hermeneutics, from Heidegger’s *Seinsfrage* to the neuroscience of curiosity—lies a remarkable convergence of insight: *the question is the primary instrument through which consciousness expands its relationship with reality*. Without prior questioning—whether articulated in language, felt as curiosity, or registered as prediction error in the neural hierarchy—no genuinely new understanding can enter the field of awareness. The answer that arrives without a corresponding question passes through consciousness like light through glass: it leaves no trace.

This paper advances a thesis that, to our knowledge, has not been formally articulated in the existing literature. We propose a **Dual-Pathway Theory of Epistemic Growth**, holding that human consciousness—and consequently the collective frontier of knowledge, invention, and discovery—can expand only when at least one of two conditions is satisfied:

**Pathway I: Innate Curiosity.** The organism generates genuine questions—structured gaps in its field of awareness—through the intrinsic motivational system of epistemic curiosity, creating the apertures through which new understanding may be absorbed.

**Pathway II: Survival Extent.** Extreme external pressures—evolutionary threat, trauma, existential crisis, environmental catastrophe—force consciousness to expand beyond its current boundaries or face extinction. We term this the *Survival Extent imperative*: the organism’s fundamental drive to preserve and extend its existence, which, under sufficient pressure, generates the implicit questions necessary for adaptation.

We contend that these two pathways are *jointly exhaustive* (no third pathway exists for genuine epistemic expansion) and *individually sufficient* (either alone can produce growth). Crucially, the *question*—understood in its broadest sense as the creation of a structured gap in

the field of consciousness—constitutes the common mechanism underlying both pathways. Curiosity generates questions directly; survival pressure generates them indirectly, by forcing the organism into states of disequilibrium that function as implicit questions.

The paper proceeds as follows. Section 2 surveys the philosophical foundations of the question from Socratic *elenchus* through Gadamer's hermeneutic priority of the question. Section 3 examines how questions operate across the layers of mind—conscious, pre-conscious, emotional, and unconscious. Section 4 presents the Dual-Pathway Theory and its formal structure. Sections 5 and 6 develop each pathway in detail: innate curiosity (drawing on Loewenstein's information gap theory, predictive processing, and neuroscience of curiosity) and Survival Extent (drawing on evolutionary epistemology, post-traumatic growth, and Piagetian disequilibrium). Section 7 examines the relationship between personal and collective consciousness, the distinction between 'good' and 'right' questions, and their connection to subjective and objective reality. Section 8 addresses questioning as a species-defining characteristic. Section 9 discusses practical instruments for cultivating the questioning capacity. Section 10 concludes.

## **2 Philosophical Foundations: The Priority of the Question**

### **2.1 The Socratic Origin: Ignorance as Epistemic Virtue**

The systematic investigation of questioning begins with Socrates, whose *elenchus*—the method of cross-examination preserved in Plato's dialogues—remains the most influential model of philosophical inquiry in Western thought. Socrates described himself not as a teacher but as a *maieutikós* (midwife), assisting interlocutors in delivering knowledge already latent within them. The method proceeds dialectically: an interlocutor asserts a thesis; Socrates secures agreement on further premises; the premises are shown to contradict the original thesis; and the interlocutor is brought to *aporia*—a state of genuine puzzlement that is simultaneously a collapse of false confidence and the opening of authentic inquiry (Vlastos, 1983). In the *Apology* (21c–d), Socrates articulates the paradox of his distinctive wisdom: he is wiser than others only because he recognises what he does not know. This recognition is not a deficiency but the *precondition for all genuine inquiry*—the first structured gap in consciousness.

Plato deepened this insight through his theory of *anamnesis* (recollection). In the *Meno* (80d), Meno poses the paradox that would haunt epistemology for millennia: how can one search for what one does not know? Socrates' response—that learning is recollection,

demonstrated through the slave boy's geometric discovery under questioning alone (82b–86c)—establishes a principle of enduring significance: *questioning does not merely seek external information but activates internal cognitive structures that make understanding possible*. The slave boy possessed no prior geometry instruction, yet through the structured gaps created by Socratic questions, he arrived at genuine mathematical insight. Aristotle subsequently transformed *aporia* from a dramatic endpoint into a methodological starting point. In *Metaphysics* Beta (995a24–995b4), he writes: “For those who wish to get clear of difficulties, it is advantageous to go through the *aporai* well; for the subsequent release from the *aporai* is a release from the bonds of ignorance.” Every investigation must begin with a systematic catalogue of genuine puzzles.

## **2.2 Heidegger: The Question of Being and the Mood of Angst**

Heidegger's *Being and Time* (1927) opens with the *Seinsfrage*—the question of Being—and immediately performs a reflexive turn: the entity that asks about Being is itself constituted by its questioning. *Dasein* (human existence) is “ontically distinguished by the fact that, in its very Being, that Being is an issue for it” (§4). For Heidegger, questioning is not an occasional intellectual activity but the fundamental mode of human existence. The mood of *Angst* (anxiety)—unlike ordinary fear, which has a determinate object—confronts *Dasein* with being-in-the-world as such, stripping away the comfortable familiarity of everyday absorption and opening the space for authentic self-questioning (Withy, 2012). This is the phenomenological correlate of what we will identify as a key mechanism in our Dual-Pathway Theory: survival-proximate existential pressure that forces consciousness beyond its current horizon.

## **2.3 Gadamer: The Hermeneutic Priority of the Question**

Hans-Georg Gadamer's *Truth and Method* (1960/2004) contains the most systematic philosophical account of the question in the Western canon. Drawing on and extending R.G. Collingwood's logic of question and answer, Gadamer argues that the question possesses *logical, temporal, and epistemic priority* over the answer. “The essence of the question is to have sense,” Gadamer writes. “Now sense involves a sense of direction. Hence the sense of the question is the only direction from which the answer can be given if it is to make sense” (p. 362). A question “breaks open the being of the object” by placing it within a determinate perspective—the *horizon of the question*—within which meaningful answers become possible. His decisive claim, central to our thesis, is that “we cannot have experiences without asking

questions” (p. 356) and, still more forcefully, that “it is opinion that suppresses questions” (p. 359). Without questioning, the mind remains sealed within its existing presuppositions, unable to receive genuinely new understanding.

Collingwood himself, in *An Essay on Metaphysics* (1940), developed the concept of “absolute presuppositions”—foundational, unquestioned assumptions grounding entire frameworks of inquiry—arguing that metaphysics is the science of excavating these presuppositions. Meyer’s *problematology* (1995) extended this programme to its logical conclusion, proposing that questioning is the first principle of all philosophy and that Western thought’s “propositionalism” has systematically obscured this primacy. Together, these thinkers establish the philosophical warrant for our central claim: *the question is the aperture through which consciousness opens to what it does not yet contain.*

### **3 The Architecture of Questioning Across Layers of Mind**

#### **3.1 Conscious, Linguistic Questions**

The most familiar form of questioning is the explicit, linguistically formulated interrogative—the sentence with a question mark. Yet even at this level, the question is more than a grammatical form. As Gadamer observed, a genuine question must possess a *horizon*: it must be bounded enough to give direction but open enough to permit genuinely new answers. Questions that lack this horizon are “floating”—too vague to generate meaningful inquiry. Questions with false presuppositions are “slanted”—they predetermine their answers and thus cannot expand understanding. Luciano Floridi (2013) defined philosophical questions as those “whose answers are in principle open to informed, rational, and honest disagreement,” requiring noetic resources—intellectual effort and genuine insight—rather than mere empirical observation or formal computation. The conscious, linguistic question is the most visible form of the epistemic gap, but it is far from the only one.

#### **3.2 Pre-linguistic and Implicit Questions**

Peter Carruthers (2018) argued persuasively that questioning attitudes constitute a *sui generis* mental attitude—a foundational, prelinguistic orientation not constructed from other attitudes during development. Evidence from developmental psychology supports this: pre-verbal infants demonstrate interrogative behaviour through steady gazes directed alternately between novel objects and trusted information sources, rising intonation vocalisations, and pointing

behaviours that Begus and Southgate (2012) showed serve an explicitly “interrogative function.” These behaviours emerge at 15–18 months, well before the grammatical machinery of question-formation is available, suggesting that the capacity for questioning is more primitive than language itself.

At the neural level, the brain’s predictive processing machinery generates what we term *proto-questions* continuously. Friston’s free energy principle (2010) and Clark’s surfing uncertainty framework (2015) describe the brain as a hierarchical prediction machine: top-down predictions about incoming sensory data are compared with bottom-up signals, and mismatches generate *prediction errors* that propagate up the cortical hierarchy, driving model updating. These prediction errors are, in our framework, the neural substrate of implicit questioning—the brain’s continuous interrogation of the environment that operates entirely below the threshold of conscious awareness. Seth’s (2021) characterisation of consciousness as “controlled hallucination” reinforces this point: what we consciously experience is the brain’s best-guess answer to its own predictive questions, and without the prediction (the implicit question), the error signal never forms and the model never updates.

### 3.3 Emotional and Unconscious Questions

The emotional brain—centred on the limbic system, particularly the amygdala and insula—generates its own form of questioning, distinct from both linguistic interrogation and cortical prediction. The experience of *unease*, of “something being wrong” without being able to articulate what, is an emotional question—a felt gap that drives information-seeking behaviour through affective rather than cognitive channels. Antonio Damasio’s somatic marker hypothesis (1994) describes how bodily feelings guide decision-making by marking options with positive or negative valence, functioning as implicit questions: “Is this safe? Is this good for me?” Heidegger’s phenomenological analysis of *Angst* captures a deeper stratum still—an existential questioning that has no determinate object, directed at being-in-the-world as such.

Psychoanalytic theory posits yet another layer. Freud’s concept of the unconscious as a “powerful mental system that continually seeks expression for its contents” (*Repression*, 1915) can be reinterpreted through our framework: repressed material exerts continuous pressure toward consciousness, functioning as unformulated questions that the ego refuses to acknowledge. The *return of the repressed*—material surfacing in disguised forms through dreams, parapraxes, and symptoms—represents the psyche’s persistent, unvoiced questioning of what consciousness has excluded. Jung’s collective unconscious deepens this to an

archetypal level: the Shadow poses the question “What am I refusing to see?”; the process of individuation is itself the psyche’s fundamental self-interrogation (Jung, CW 9.1). These are not conscious questions, but they function as structured gaps—apertures of incompleteness—that drive psychic development when engaged, and produce pathology when suppressed.

#### **4 The Dual-Pathway Theory of Epistemic Growth**

We are now in a position to state our central thesis formally. Let  $C(t)$  represent the field of an individual’s (or a collective’s) consciousness at time  $t$ , understood as the total structured understanding—the integrated network of concepts, schemas, beliefs, felt meanings, and practical capacities—available to the agent. Let  $\Delta C$  represent a genuine expansion of this field: not mere information addition, but the structural reorganisation that constitutes new understanding.

**The Dual-Pathway Thesis.** *A genuine expansion of consciousness ( $\Delta C > 0$ ) occurs if and only if the agent generates, or is forced to generate, at least one structured gap—a question, whether explicit, implicit, or proto-cognitive—in the existing field  $C(t)$ . This generation proceeds through exactly two pathways:*

**Pathway I—Curiosity-Driven Questioning (CQ).** The agent’s intrinsic epistemic motivation generates questions directly, through the recognition of knowledge gaps (Loewenstein, 1994), the experience of wonder (Aristotle, *Metaphysics* I.2; Heidegger, 1927), or the deliberate exercise of Socratic, hermeneutic, or scientific inquiry.

**Pathway II—Survival Extent Questioning (SQ).** External pressures—evolutionary threat, physical danger, psychological trauma, social catastrophe, existential crisis—generate questions indirectly, by forcing the organism into states of radical disequilibrium (Piaget, 1952) that function as implicit questions: “How do I survive?” “What must I now understand that I previously did not?” “What has my world become?” We term the underlying drive the *Survival Extent imperative*: the organism’s fundamental orientation toward preserving and extending its existence, which, under sufficient pressure, overrides the homeostatic tendency to remain within existing frameworks.

The thesis claims that these pathways are *jointly exhaustive*: there exists no third mechanism by which consciousness genuinely expands. Information may enter the perceptual system without prior questioning—as in subliminal priming or implicit learning of statistical

regularities (Reber, 1967)—but such information does not constitute genuine epistemic growth until it generates or answers a structured question. The thesis further claims that each pathway is *individually sufficient*: innate curiosity can drive knowledge expansion in the complete absence of survival pressure (as in pure mathematics or contemplative philosophy), and survival pressure can force epistemic expansion in the complete absence of intrinsic curiosity (as in the forced adaptations of traumatised populations or species under selection pressure).

Crucially, the common mechanism is the *question itself*, understood as the creation of a structured gap in the field of consciousness. Curiosity creates these gaps through intrinsic motivation; survival pressure creates them through extrinsic force. But without the gap—without the question in some form—no genuine expansion is possible. This is why, as we shall argue in Section 7, an answer can be “in front of our eyes” yet remain invisible to consciousness: without a corresponding question, there is no aperture through which it can enter.

## **5 Pathway I: Innate Curiosity and the Generative Gap**

### **5.1 The Information Gap and the Neuroscience of Curiosity**

George Loewenstein’s information gap theory (1994) provides the foundational psychological framework for Pathway I. Curiosity, Loewenstein argued, is “a cognitive-induced deprivation that arises from the perception of a gap in knowledge and understanding.” This formulation is striking for its alignment with our thesis: curiosity is not merely an emotion but a *structured perception of absence*—the felt registration of a gap in consciousness. A small amount of information serves as a “priming dose” that dramatically increases curiosity; the intensity depends on the perceived importance and size of the gap. Golman and Loewenstein (2018) demonstrated that information gaps simultaneously trigger cognitive processing (the desire to know) and negative affect (the deprivation of not knowing)—curiosity is at once pleasurable and painful, a motivational state that drives resolution.

Neuroscientific evidence reveals that curiosity activates the same dopaminergic reward circuits as hunger, thirst, and monetary reward. Kang, Hsu, and colleagues (2009) showed through fMRI that high curiosity states activate the caudate nucleus and inferior frontal gyrus. Gruber, Gelman, and Ranganath (2014) demonstrated that curiosity states enhance learning even for incidental material unrelated to the curiosity-inducing question: faces presented during high-curiosity trials were remembered significantly better, with activity in the substantia

nigra/ventral tegmental area, nucleus accumbens, and hippocampus mediating these effects. The Gottlieb Lab at Columbia University (2024) identified the ventromedial prefrontal cortex as the neural bridge between perceptual uncertainty and subjective curiosity—the point where the implicit question becomes felt experience. The brain, it appears, treats the resolution of epistemic gaps with the same motivational urgency as the satisfaction of biological needs.

## 5.2 Predictive Processing: The Brain as Question-Generator

Karl Friston’s free energy principle (2010) offers what may be the most fundamental account of Pathway I. On this view, the brain is a hierarchical prediction machine whose fundamental operation is the generation of top-down predictions about incoming sensory data. When reality violates these predictions, prediction errors propagate up the cortical hierarchy, driving the revision of generative models. This process is, in our framework, *continuous implicit questioning*: the brain perpetually interrogates its environment, asking “Does reality match my model?” at every level of the processing hierarchy. Consciousness, on this view, is not a passive receptacle for information but an active, questioning engagement with the world—an insight that provides unexpected empirical support for Gadamer’s hermeneutic philosophy.

The connection between predictive processing and curiosity has been made explicit by Gottlieb, Oudeyer, Lopes, and Baranes (2013), who proposed that curiosity is the affective label for a specific regime of prediction error: errors that are large enough to signal a meaningful gap but not so overwhelming as to trigger defensive withdrawal. This “Goldilocks zone” of prediction error—intermediate complexity, optimal information gain—maps directly onto Loewenstein’s inverted-U function of curiosity relative to knowledge. The organism is maximally curious when it knows enough to recognise a gap but not enough to close it. Berlyne’s (1960) earlier distinction between “diversive curiosity” (seeking novel stimulation) and “specific curiosity” (seeking resolution of particular uncertainties) captures two modes of this questioning: open exploration and targeted inquiry.

## 5.3 Wonder, Aporia, and the Opening of the Horizon

Beyond the cognitive mechanics of information gaps lies the phenomenological dimension of curiosity: the experience of *wonder*. Aristotle identified wonder (*thaumazein*) as the origin of philosophy: “It must have been wonder that led the first philosophers to philosophy, since puzzled people think of themselves as ignorant” (*Metaphysics* I.2, 982b12–15). Heylighen (2025) distinguished curiosity (directed at local information gaps), wonder (an intermediate

state triggered by local mysteries extending into global unknowns), and awe (the confrontation with something so vast it challenges the entire framework of understanding). These three epistemic emotions represent increasing depths of Pathway I questioning—from surface-level information-seeking to the profound reorientation of consciousness that occurs when one confronts what utterly exceeds one's current horizon.

## **6 Pathway II: Survival Extent and the Forced Expansion of Consciousness**

### **6.1 The Survival Extent Imperative**

We introduce the term *Survival Extent* to denote the organism's fundamental drive not merely to survive in the minimal sense (homeostasis, threat avoidance) but to *extend the boundary of its viable existence*—to expand the conditions under which it can persist, reproduce, and flourish. This drive, we argue, constitutes a second, independent pathway to epistemic expansion, operating through mechanisms that are complementary to but distinct from innate curiosity.

The evolutionary logic is straightforward. An organism whose consciousness—whose integrated model of its environment—is adequate to current conditions faces no pressure to expand. But when conditions change radically—climate shift, predator arrival, resource depletion, social upheaval—the existing model becomes inadequate, and the organism faces a stark choice: expand consciousness or perish. This is the mechanism underlying what Kuhn (1962) described at the collective level as paradigm crisis: accumulated anomalies force the scientific community to abandon its current question-space and generate fundamentally new questions. At the individual level, the same mechanism operates through what Piaget (1952) called *disequilibrium*: the uncomfortable cognitive state produced when reality violates existing schemas, driving the organism toward accommodation—the restructuring of schemas to incorporate what does not fit.

### **6.2 Post-Traumatic Growth: Consciousness Expansion Through Shattering**

The most dramatic evidence for Pathway II comes from research on post-traumatic growth (PTG). Tedeschi and Calhoun (1996, 2004) documented that individuals who experience severe trauma—life-threatening illness, violent assault, the death of a child, war, natural disaster—frequently report profound positive changes: deepened appreciation for life, improved interpersonal relationships, enhanced sense of personal strength, recognition of new

possibilities, and spiritual or existential development. Crucially, these changes do not occur *despite* the trauma but *through* it—through the shattering of what Janoff-Bulman (1992) called “assumptive worlds”: the foundational schemas about the benevolence of the world, the meaningfulness of events, and the worthiness of the self.

In our framework, trauma operates as a radical and involuntary question-generator. The traumatic event shatters existing schemas so thoroughly that the organism can no longer assimilate experience into its current model. The resultant state—what Tedeschi and Calhoun term the “seismic” disruption of fundamental assumptions—is a forced *aporia* of existential proportions: “What is the world, if this can happen?” “Who am I, now that everything I assumed has been destroyed?” “How do I continue?” These implicit questions, generated not by curiosity but by survival necessity, force the kind of fundamental restructuring that constitutes genuine expansion of consciousness. The organism does not choose to question; it is compelled to question by the insufficiency of its existing model to sustain existence.

### **6.3 Evolutionary Pressures and the Collective Survival Extent**

At the species level, the Survival Extent imperative has driven the most consequential expansions of collective knowledge. The development of agriculture was not the product of idle curiosity but of environmental pressure: the end of the last Ice Age, population growth, and the depletion of hunter-gatherer resources forced communities to ask—implicitly, over generations—“How can we ensure food supply beyond what nature provides?” The development of writing emerged from the administrative complexity of early agricultural civilisations: “How do we track surplus, debt, and obligation beyond the capacity of memory?” The development of modern science arose, in significant part, from the existential threats of plague, famine, and war that medieval frameworks could not address: “Why do plagues spread, and what can stop them?”

Popper’s evolutionary epistemology (1972) formalised this dynamic: knowledge grows through the elimination of unfit hypotheses, in direct analogy with natural selection’s elimination of unfit organisms. The cycle Problem<sub>1</sub> → Tentative Theory → Error Elimination → Problem<sub>2</sub> operates at both individual and collective levels. Each “Problem” is a question; each “Error Elimination” is a selection pressure that kills unfit answers. The boldness of the conjecture—the daring of the question—determines the potential for knowledge growth. Kuhn’s insight complements Popper’s: most scientific work occurs within established paradigms (Pathway I, curiosity-driven puzzle-solving), but paradigm shifts—the truly

revolutionary expansions of collective consciousness—occur under the accumulated pressure of anomalies that the paradigm cannot absorb (Pathway II, crisis-driven questioning).

## **6.4 The Interaction of Pathways**

While we have presented the two pathways as analytically distinct, they frequently interact. The scientist driven by curiosity (Pathway I) may encounter anomalies that generate survival-proximate anxiety about the viability of their entire theoretical framework (Pathway II). The trauma survivor compelled into existential questioning (Pathway II) may discover a new capacity for wonder and curiosity (Pathway I) in the reconstructed world. Heidegger's *Angst* sits precisely at the intersection: it is an existential mood (Pathway II—confrontation with finitude) that opens the space for authentic questioning (Pathway I—genuine philosophical inquiry). The two pathways are not sealed compartments but mutually catalysing processes, unified by their common product: the structured gap—the question—through which consciousness expands.

## **7 Consciousness, Reality, and the Taxonomy of Questions**

### **7.1 The Aperture Thesis: Why Unasked Answers Are Invisible**

The Dual-Pathway Theory entails a corollary of considerable philosophical significance, which we term the *Aperture Thesis*: an answer that arrives without a corresponding question—whether explicit, implicit, or proto-cognitive—cannot become part of structured understanding. The answer passes through consciousness without integration, precisely because there is no gap (no question) into which it can fit.

The most dramatic empirical demonstration is provided by inattentional blindness research. In Simons and Chabris's (1999) celebrated experiment, 50% of participants failed to notice a person in a gorilla suit walking through a basketball-passing scene because their attentional set was directed by a different implicit question ("How many passes?" rather than "What else is happening?"). Drew, Võ, and Wolfe (2013) extended this to expert radiologists: 83% failed to notice a gorilla image 48 times larger than average lung nodules inserted into CT scans—and eye-tracking revealed that the majority who missed it *looked directly at its location*. The radiologists were implicitly asking "Are there lung nodules?"—not "Is there anything unexpected?" Their attentional set—their implicit question—determined what could enter

consciousness. The answer (gorilla present) was literally before their eyes, but without the corresponding question, it could not be absorbed.

This finding has profound implications for the relationship between consciousness and reality. It suggests that *consciousness does not passively receive reality but actively interrogates it*, and the scope of this interrogation determines the scope of what is perceived. Gadamer's philosophical claim—that “the essence of the question is to open up possibilities and keep them open”—receives its strongest empirical confirmation from the neuroscience of attention: the questions we ask, consciously or unconsciously, constitute the boundaries of our experienced world.

## 7.2 Personal Consciousness and Collective Consciousness

The expansion of consciousness through questioning operates at both individual and collective levels, but these operate by different mechanisms and relate differently to what we might call “objective reality.” Personal consciousness is the individual's integrated field of understanding—their unique horizon (Gadamer), their Umwelt (von Uexküll), their manifold of experience. Personal consciousness expands through individual questioning, through both pathways of our model. What we term a ‘*good question*’ is one that expands the individual's consciousness—that opens a productive gap in *their* field of understanding, relative to their current horizon. A question that is ‘good’ for a novice may be trivial for an expert; what matters is the question's capacity to generate genuine *aporia* in the specific individual.

Collective consciousness is more complex. Durkheim's *conscience collective* (1893)—the totality of beliefs and sentiments common to the average members of a society—describes a sociological reality: shared frameworks of meaning that transcend individual minds. Jung's collective unconscious posits a deeper, inherited layer of shared psychic structures—archetypes that shape how all humans confront fundamental challenges. Whether one adopts the sociological or the Jungian version, the collective dimension introduces the concept of a ‘*right question*’: a question whose answer advances the collective frontier of knowledge—one that is “right” not relative to an individual horizon but relative to the objective structure of reality that the collective is attempting to map. Popper's bold conjectures, Kuhn's paradigm-shifting questions, and Floridi's open questions all instantiate this category. The ‘right question’ is one that, when answered, shifts the collective horizon—expanding what humanity as a whole can understand.

The distinction between good questions and right questions maps onto the distinction between subjective and objective reality. A ‘good question’ expands perceived reality—the individual’s conscious model of the world. A ‘right question’ expands our collective approximation of objective reality—the mind-independent structure of the world that constrains but does not determine our models. Neither personal nor collective consciousness has direct, unmediated access to the Kantian *Ding an sich*; both operate through the mediating structure of questions. But intersubjective corroboration—the process by which individual questions and answers are tested against the questions and answers of others—provides the epistemic bridge between personal experience and collective knowledge (Habermas, 1970; Mascolo, 2019).

### **7.3 Can Consciousness and Reality Exist Without Each Other?**

The question of whether consciousness and reality can exist independently is among the deepest in philosophy. Scientific realism holds that an objective reality exists independently of any consciousness—the universe preceded observers by billions of years. Idealism (Berkeley, 1710) holds that reality is constituted by perception—*esse est percipi*. Kant’s transcendental idealism occupies a middle position: an objective reality exists (the noumenal world), but our experience of it is always structured by the categories and forms of intuition that consciousness brings. Phenomenology (Husserl, Heidegger, Merleau-Ponty) brackets the question of mind-independent reality to focus on the structures of experience as lived.

For our purposes, the question admits a functional answer. Whether or not reality exists independently of consciousness, *reality-as-known*—reality as it enters the field of understanding—cannot exist without the questioning activity of consciousness. And consciousness, insofar as it is always *consciousness of something* (Husserl’s intentionality), cannot exist without a reality to interrogate. The question mediates between them: it is the act by which consciousness reaches beyond itself toward what it does not yet contain, and it is the structure through which reality becomes available to understanding. In this sense, consciousness and known-reality are co-constituted through the act of questioning—a position that resonates with both phenomenological and predictive processing frameworks.

## **8 Questioning as a Species-Defining Characteristic**

One of the most philosophically significant findings in comparative cognition is that, despite decades of intensive language training, no great ape has ever spontaneously asked a human a

question. Washoe (chimpanzee, ~350 ASL signs), Koko (gorilla, reportedly 1,000+ signs), and Kanzi (bonobo, 3,000+ understood English words) all learned to make requests, respond to questions, and in Kanzi's case understand complex grammatical constructions—but none ever positioned itself as a questioner (Goldin-Meadow, 2008). The sole documented exception comes from Alex the African Grey parrot, who, looking at his reflection, asked “What colour?” and thereby learned the word “grey”—widely regarded as the only authenticated instance of a non-human animal generating a genuine question (Pepperberg, 1999).

The developmental contrast is stark. Human children begin producing proto-questions at 15–18 months and may ask as many as 40,000 questions between ages 2 and 5 (Chouinard, 2007). The prerequisites for genuine questioning illuminate why it is so rare across species: it requires metacognition (knowing that one does not know), theory of mind (knowing that others might know), communicative competence (the ability to formulate the request), and epistemic motivation (caring about the gap). Corballis (2011) proposed that recursion—the ability to embed structures within structures—is the primary characteristic distinguishing the human mind, and questions naturally involve recursion: embedding a knowledge gap within a communicative frame directed at another mind modelled as possessing knowledge states.

Can questioning be automated by algorithms? The distinction between *functional* and *genuine* questioning is crucial. Current large language models generate syntactically and pragmatically appropriate questions with remarkable fluency, but Mitchell and Krakauer (2023) argue that such systems are complex statistical models of how words correlate, lacking understanding of the situations language encodes. Searle's (1980) Chinese Room argument applies: an AI generating “Why is the sky blue?” has no phenomenal experience of sky, no experience of blue, no felt puzzlement. It possesses what Searle terms “derived intentionality”—its outputs are meaningful only through human interpretation—rather than the “original intentionality” that characterises genuine mental states. The *hard problem of questioning*—why asking a question *feels like something* to the questioner—parallels Chalmers's (1996) hard problem of consciousness and remains untouched by computational approaches. Our thesis implies that genuine questioning requires genuine consciousness—the creation of a *felt* gap, not merely a computational one—and that this constitutes a principled limit on the automation of epistemic growth.

## **9 Practical Instruments for Cultivating the Questioning Capacity**

If questioning is the engine of consciousness expansion, then the cultivation of questioning capacity becomes an imperative of the highest order. Several evidence-based frameworks deserve attention.

The *Question Formulation Technique* (QFT), developed by Rothstein and Santana at the Right Question Institute, provides a rigorous protocol engaging divergent, convergent, and metacognitive thinking. Participants receive a “Question Focus” (a stimulus statement), then generate questions following four rules: ask as many as possible; do not discuss, judge, or answer; write every question exactly as stated; convert statements into questions. They then classify questions as open or closed, prioritise the three most important, plan next steps, and reflect on what they learned. Deployed in over one million classrooms worldwide and supported by National Science Foundation funding, the QFT has demonstrated increases in student curiosity, divergent thinking, and academic engagement (Rothstein & Santana, 2011).

Socratic questioning in Cognitive Behavioural Therapy (CBT) builds on Beck’s (1976) foundational insight that questioning—not confrontation—should guide therapeutic discovery. Padesky (1993) established four criteria: Socratic questions should ask what the client has knowledge to answer; draw attention to relevant information outside their current focus; move from concrete to abstract; and allow the client to synthesise new ideas. The critical therapeutic distinction is between questioning that aims to *change* the patient’s mind (where the therapist has a predetermined answer) and questioning that aims to *guide discovery* (where the therapist is genuinely curious about what the patient will discover). Richard Paul and Linda Elder’s six types of Socratic questions—clarification, assumptions, evidence, viewpoints, implications, and meta-questions about the question itself—provide a systematic taxonomy applicable far beyond the therapeutic context.

Design thinking (d.school, IDEO) centres on “How Might We” (HMW) questions—broad enough for creative solutions, narrow enough to be actionable. Revans’s (1982) Action Learning formalises the principle as  $L = P + Q$  (Learning = Programmed knowledge + Questioning insight). Cooperrider’s (1990) Appreciative Inquiry inverts the questioning direction: instead of “What is wrong?”, organisations ask “What gives life?”—based on the principle that systems grow in the direction of what they repeatedly inquire about. Berger’s (2014) Why → What If → How framework provides a practical innovation cycle. These converging approaches share a fundamental insight: *the capacity for genuine questioning is a*

*learnable, cultivable skill*, and its systematic development may be the single most consequential educational intervention available.

## 10 Discussion

Our Dual-Pathway Theory faces several potential objections that merit consideration. First, one might argue that implicit learning (Reber, 1967) represents a third pathway—information absorbed without any form of questioning. We respond that implicit learning acquires statistical regularities without producing structured understanding; the patterns learned implicitly do not expand consciousness until they are brought into some relation with an interrogative gap, even if that gap is the proto-cognitive prediction error of the free energy framework. Second, one might object that traumatic expansion (Pathway II) is not genuinely “expansion” but rather destruction and rebuilding—that post-traumatic growth is growth only from the perspective of a subsequent, restructured consciousness. We grant the phenomenological complexity but maintain that the structural outcome—a more encompassing, more differentiated field of awareness—constitutes genuine expansion, regardless of the violence of the process.

Third, one might question the joint exhaustiveness claim: are there not experiences—mystical states, aesthetic encounters, moments of grace—that expand consciousness without either curiosity or survival pressure? We respond that such experiences, on closer phenomenological analysis, involve one or both pathways. Aesthetic experience involves wonder (Pathway I); mystical states often arise from existential crisis or extreme practice regimes (Pathway II); and both generate the structured gaps—the shattering of ordinary conceptual frameworks—that we identify as the question in its broadest sense.

The theory generates several testable predictions. Individuals with higher trait curiosity (as measured by the Curiosity and Exploration Inventory; Kashdan et al., 2009) should show greater epistemic growth over time, controlling for environmental pressures. Populations exposed to survival-level threats should show measurable expansion of collective knowledge frameworks, controlling for baseline curiosity. The interaction should be multiplicative: curious individuals under moderate pressure should show the greatest epistemic growth. These predictions are amenable to longitudinal, cross-cultural investigation.

## 11 Conclusion

This paper has argued that the question—understood not merely as a grammatical form but as the creation of a structured gap in the field of consciousness—is the fundamental engine of epistemic growth. We have proposed a Dual-Pathway Theory holding that consciousness expands through exactly two mechanisms: innate curiosity, which generates questions directly through intrinsic epistemic motivation; and the Survival Extent imperative, which generates questions indirectly through the force of existential pressure. These pathways are jointly exhaustive and individually sufficient, unified by their common product: the structured gap through which new understanding enters.

The convergence of evidence—from Socratic *elenchus* to predictive processing, from Gadamer’s hermeneutics to inattentional blindness research, from Piaget’s disequilibrium to post-traumatic growth—points to a single, fundamental insight: *consciousness is not a container that passively receives information but an active, questioning engagement with reality, and the scope of its questioning determines the scope of its world.* The answer that arrives without a corresponding question remains invisible. The paradigm that is never challenged remains unquestioned. The consciousness that never encounters what it cannot contain never grows.

That questioning appears to be a genuinely species-defining characteristic—present in human infants before language, absent in even the most linguistically trained non-human primates—suggests that the capacity to create structured epistemic gaps may be among the deepest features of human cognition. Whether this capacity can be replicated in artificial systems remains, in the strong sense proposed here, an open question—one that, fittingly, only genuine questioning can resolve. As Gadamer concluded, in a formulation that serves equally well as our own: “The art of questioning is the art of questioning ever further—i.e., the art of thinking.”

---

## **Declarations**

**Funding** This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

**Conflict of interest** The authors declare that they have no conflicts of interest.

**Data availability** This is a theoretical paper. No empirical data were generated or analysed.

## References

- Anderson, L. W., & Krathwohl, D. R. (Eds.). (2001). *A taxonomy for learning, teaching, and assessing: A revision of Bloom's taxonomy of educational objectives*. Longman.
- Beck, A. T. (1976). *Cognitive therapy and the emotional disorders*. International Universities Press.
- Begus, K., & Southgate, V. (2012). Infant pointing serves an interrogative function. *Developmental Science*, *15*(5), 611–617.
- Berger, W. (2014). *A more beautiful question: The power of inquiry to spark breakthrough ideas*. Bloomsbury.
- Berlyne, D. E. (1960). *Conflict, arousal, and curiosity*. McGraw-Hill.
- Carruthers, P. (2018). Basic questions. *Mind & Language*, *33*(2), 130–147.
- Chalmers, D. J. (1996). *The conscious mind: In search of a fundamental theory*. Oxford University Press.
- Chouinard, M. M. (2007). Children's questions: A mechanism for cognitive development. *Monographs of the Society for Research in Child Development*, *72*(1), vii–ix, 1–112.
- Clark, A. (2015). *Surfing uncertainty: Prediction, action, and the embodied mind*. Oxford University Press.
- Collingwood, R. G. (1940). *An essay on metaphysics*. Clarendon Press.
- Cooperrider, D. L., & Srivastva, S. (1987). Appreciative inquiry in organizational life. In R. W. Woodman & W. A. Pasmore (Eds.), *Research in organizational change and development* (Vol. 1, pp. 129–169). JAI Press.
- Corballis, M. C. (2011). *The recursive mind: The origins of human language, thought, and civilization*. Princeton University Press.
- Damasio, A. R. (1994). *Descartes' error: Emotion, reason, and the human brain*. Putnam.
- Drew, T., Vő, M. L.-H., & Wolfe, J. M. (2013). The invisible gorilla strikes again: Sustained inattentional blindness in expert observers. *Psychological Science*, *24*(9), 1848–1853.
- Durkheim, É. (1893/1984). *The division of labor in society* (W. D. Halls, Trans.). Free Press.
- Floridi, L. (2013). What is a philosophical question? *Metaphilosophy*, *44*(3), 195–221.
- Freud, S. (1915). Repression. In *The standard edition of the complete psychological works of Sigmund Freud* (Vol. 14, pp. 141–158). Hogarth Press.
- Friston, K. (2010). The free-energy principle: A unified brain theory? *Nature Reviews Neuroscience*, *11*(2), 127–138.
- Gadamer, H.-G. (1960/2004). *Truth and method* (2nd rev. ed.; J. Weinsheimer & D. G. Marshall, Trans.). Continuum.
- Golman, R., & Loewenstein, G. (2018). Information gaps: A theory of preferences regarding the presence and absence of information. *Decision*, *5*(3), 143–164.
- Gottlieb, J., Oudeyer, P.-Y., Lopes, M., & Baranes, A. (2013). Information-seeking, curiosity, and attention: Computational and neural mechanisms. *Trends in Cognitive Sciences*, *17*(11), 585–593.
- Gruber, M. J., Gelman, B. D., & Ranganath, C. (2014). States of curiosity modulate hippocampus-dependent learning via the dopaminergic circuit. *Neuron*, *84*(2), 486–496.
- Habermas, J. (1970). Towards a theory of communicative competence. *Inquiry*, *13*(1–4), 360–375.
- Heidegger, M. (1927/1962). *Being and time* (J. Macquarrie & E. Robinson, Trans.). Harper & Row.
- Heylighen, F. (2025). Curiosity, awe and wonder: The emotions that open our mind. *Foundations of Science*. Advance online publication.
- Janoff-Bulman, R. (1992). *Shattered assumptions: Towards a new psychology of trauma*. Free Press.

- Jung, C. G. (1959). *The archetypes and the collective unconscious* (Collected Works, Vol. 9, Part 1). Princeton University Press.
- Kang, M. J., Hsu, M., Krajbich, I. M., Loewenstein, G., McClure, S. M., Wang, J. T., & Camerer, C. F. (2009). The wick in the candle of learning: Epistemic curiosity activates reward circuitry and enhances memory. *Psychological Science*, *20*(8), 963–973.
- Kashdan, T. B., Gallagher, M. W., Silvia, P. J., Winterstein, B. P., Breen, W. E., Terhar, D., & Steger, M. F. (2009). The Curiosity and Exploration Inventory–II. *Journal of Research in Personality*, *43*(6), 987–998.
- Kuhn, T. S. (1962). *The structure of scientific revolutions*. University of Chicago Press.
- Loewenstein, G. (1994). The psychology of curiosity: A review and reinterpretation. *Psychological Bulletin*, *116*(1), 75–98.
- Mascolo, M. F. (2019). The intersubjective construction of objectivity. *Journal of Constructivist Psychology*, *32*(4), 382–400.
- Metcalf, J., & Schwartz, B. L. (2017). The tip-of-the-tongue state and curiosity. *Cognitive Research: Principles and Implications*, *2*, 31.
- Meyer, M. (1995). *Of problematology: Philosophy, science, and language* (D. Jamison, Trans.). University of Chicago Press.
- Mitchell, M., & Krakauer, D. C. (2023). The debate over understanding in AI's large language models. *Proceedings of the National Academy of Sciences*, *120*(13), e2215907120.
- Padesky, C. A. (1993). Socratic questioning: Changing minds or guiding discovery? Keynote address, European Congress of Behavioural and Cognitive Therapies, London.
- Pepperberg, I. M. (1999). *The Alex studies: Cognitive and communicative abilities of grey parrots*. Harvard University Press.
- Piaget, J. (1952). *The origins of intelligence in children* (M. Cook, Trans.). International Universities Press.
- Popper, K. R. (1963). *Conjectures and refutations: The growth of scientific knowledge*. Routledge & Kegan Paul.
- Popper, K. R. (1972). *Objective knowledge: An evolutionary approach*. Clarendon Press.
- Reber, A. S. (1967). Implicit learning of artificial grammars. *Journal of Verbal Learning and Verbal Behavior*, *6*(6), 855–863.
- Revans, R. W. (1982). *The origins and growth of action learning*. Chartwell-Bratt.
- Rothstein, D., & Santana, L. (2011). *Make just one change: Teach students to ask their own questions*. Harvard Education Press.
- Searle, J. R. (1980). Minds, brains, and programs. *Behavioral and Brain Sciences*, *3*(3), 417–424.
- Seth, A. K. (2021). *Being you: A new science of consciousness*. Dutton.
- Simons, D. J., & Chabris, C. F. (1999). Gorillas in our midst: Sustained inattention blindness for dynamic events. *Perception*, *28*(9), 1059–1074.
- Tedeschi, R. G., & Calhoun, L. G. (1996). The Posttraumatic Growth Inventory: Measuring the positive legacy of trauma. *Journal of Traumatic Stress*, *9*(3), 455–471.
- Tedeschi, R. G., & Calhoun, L. G. (2004). Posttraumatic growth: Conceptual foundations and empirical evidence. *Psychological Inquiry*, *15*(1), 1–18.
- Vlastos, G. (1983). The Socratic elenchus. *Oxford Studies in Ancient Philosophy*, *1*, 27–58.
- Withy, K. (2012). The methodological role of Angst in *Being and Time*. *Journal of the British Society for Phenomenology*, *43*(2), 195–211.