Locating Unifying Language: Multiple Intelligences, Mental Sensory Perception, and Mental Imagery

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Abstract

This advocacy paper highlights the need for a unified language to describe diverse mental experiences and representations that remain undefined within current cognitive science terminology. Drawing on frameworks from Howard Gardner's theory of multiple intelligences and Adam Zeman's research on aphantasia, we propose an expanded model featuring 20 distinct modalities of mental imagery and 4 vividness ranges. This framework aims to better represent a range of mental sensory perceptions, including under-recognised experiences in those with multi-sensory aphantasia. By refining the language surrounding mental imagery, this paper advocates for greater inclusivity, understanding, and recognition of the full spectrum of mental experiences, particularly for those whose inner worlds remain difficult to articulate within existing frameworks.

Keywords: Mental Imagery, Intelligence, Aphantasia, Sensory Perception, Perception, Neurodivergence

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Introduction

For much of history, intelligence was viewed as a singular ability—primarily linked to logic and language skills. In 1983, psychologist Howard Gardner challenged this narrow view with his *Theory of Multiple Intelligences*, proposing that human intelligence is not a single, fixed ability but a range of distinct strengths that influence how we learn, create, and interact with the world. Yet, even with this broader perspective, a key question remains: How are these different types of intelligence connected with the mind's perception?

We propose that mental imagery is the missing link between perception (sensory and non-sensory) and intelligence, offering a new way to map and articulate human cognition. Traditional models treat intelligence and mental perception as separate processes. However, this framework suggests that they are interconnected manifestations of the mind's ability to generate, manipulate, and interpret mental representations.

Neuroscientist Adam Zeman's research on mental imagery, particularly his work on aphantasia, has shown that mental imagery exists on a spectrum, ranging from those who experience vivid mental pictures to those who lack them entirely. His findings reveal that mental imagery is not just a tool for visualisation but a fundamental component of thought, memory, and perception. Whether solving a mathematical problem, recalling a memory, or reflecting on emotions, different forms of mental imagery shape how we think, learn, and experience the world.

The Imagination of the Senses

Mental imagery commonly refers to the mind's ability to internally simulate sensory experiences without external stimuli. This includes visual, auditory, tactile, gustatory, olfactory, and other sensory modalities, allowing individuals to recall, imagine, or manipulate sensory information, contributing to cognition, memory, and problem-solving.

Zeman's groundbreaking research, beginning in 2015, advanced our understanding of how the mind generates and manipulates mental images. His work identified various forms of mental imagery, each playing a distinct role in cognitive processes:

- **Visual Imagery**: Mental representation of visual images, such as objects, scenes, or people, crucial for tasks like remembering faces or navigating environments.
- **Auditory Imagery**: Mental representation of sounds, including music, speech, or environmental noises, allowing for inner hearing and the recall of tunes or conversations.
- **Gustatory Imagery**: Mental representation of tastes, flavors, or textures, involved in recalling favorite foods or imagining meals.
- **Olfactory Imagery**: Mental representation of smells, allowing individuals to recall scents or imagine aromas.
- **Tactile Imagery**: Mental representation of touch sensations, such as texture, pressure, or temperature, helping to recall sensations like the softness of fabric or the warmth of a pet.

As detailed in *The Cambridge Handbook of the Imagination*, Zeman and other researchers also recognise:

- **Dream Imagery**: Representations from the unconscious mind during sleep.
- **Emotional Imagery**: Mental representation of hormones, emotions, and feelings.
- **Motor Imagery**: Representation of movements or physical actions.
- **Musical Imagery**: Representation of rhythm, melody, and sound.
- **Spatial Imagery**: Representation of spatial relationships between objects.

Other types of sensory perception yet to be fully defined and understood, extend beyond the traditional five senses to include:

- **Somatic Imagery**: Representation of pain or bodily discomfort.
- **Temporal Imagery**: Representation of time or its passage.
- **Thermal Imagery**: Representation of temperature sensations.
- **Vestibular Imagery**: Representation of balance and bodily movement.
- **Visceral Imagery**: Representation of internal bodily sensations.
- **Electromagnetic Imagery**: Hypothetical representation of electrical or magnetic fields.

While this work provides significant insight, it also raises deeper questions: How do these different forms of mental imagery interact, overlap, and shape our perception of the world?

Reframing Imagery and Sensory Perception

Traditional cognitive science defines mental imagery as the mind's ability to generate internal representations based on sensory experiences. However, this view is narrow and overlooks a broader spectrum of cognitive processes. Mental imagery encompasses a range of internal experiences, including emotions, abstract concepts, and the perception of time and movement—none of which are strictly sensory.

By adopting a more inclusive view, we can recognise that everything from emotional processing (e.g., mentally experiencing joy or anxiety) to abstract thought (e.g., visualising mathematical concepts) falls under the broader framework of mental imagery.

The Theory of Multiple Intelligences

Intelligence is the ability to acquire, process, understand, and apply information to solve problems, adapt to new situations, and learn from experience. It encompasses various cognitive functions, including reasoning, memory, perception, creativity, and problem-solving.

Howard Gardner's *Theory of Multiple Intelligences* revolutionised our understanding of human intelligence by challenging the traditional notion of a single, general intellectual ability. Instead, Gardner proposed that humans possess eight distinct intelligences, each contributing uniquely to personal growth and cultural development, including:

- **Linguistic Intelligence**: Sensitivity to spoken and written language.

- **Logical-Mathematical Intelligence**: Ability to analyse problems logically and perform mathematical operations.
- **Musical Intelligence**: Skill in music composition and appreciation.
- **Bodily-Kinesthetic Intelligence**: Skillful use of the body for expression or practical purposes.
- **Spatial Intelligence**: Accurate perception of the visual-spatial world.
- **Interpersonal Intelligence**: Understanding and interacting effectively with others.
- **Intrapersonal Intelligence**: Self-awareness and reflection on one's emotions and motivations.
- **Naturalistic Intelligence**: Recognition and categorisation of elements in the natural environment.

While Gardner's theory has broadened educational and psychological perspectives, it left questions about how these intelligences connect within the mind unanswered. Specifically, it didn't fully explain how perception, imagination, memory, and thought interact across these domains.

Unifying Intelligence and Mental Imagery

We propose that all forms of intelligence are interconnected through the mind's ability to generate and manipulate mental imagery. Each intelligence represents a unique way of engaging with mental representations:

- **Linguistic Intelligence** → **Intraphonic Imagery**: Internal representation of voice and language patterns.
- **Logical-Mathematical Intelligence** → **Numerical Imagery**: Representation of abstract patterns and relationships.
- **Musical Intelligence** → **Musical Imagery**: Representation of rhythm and sound.
- **Bodily-Kinesthetic Intelligence** → **Motor Imagery**: Representation of movement and physical action.
- **Spatial Intelligence** → **Spatial Imagery**: Representation of spatial relationships.
- **Interpersonal Intelligence** → **Emotional Imagery**: Representation of feelings and empathy.
- **Intrapersonal Intelligence** → **Introspective Imagery**: Self-reflective mental representations.
- **Naturalistic Intelligence** → **Intuitive Imagery**: Representation of subconscious insights.

The Imagination Vividness Spectrum

The variability in the vividness of mental imagery provides additional insights into this cognitive diversity, with Zeman's team defining the following:

- **Aphantasia:** An inability to form mental imagery (defined in 2015).
- **Hypophantasia:** A reduced vividness of mental imagery (defined in 2025, may not be officially recognised yet in all scientific circles).
- **Phantasia:** An average vividness of mental imagery.
- **Hyperphantasia:** An exceptionally vivid mental imagery (defined in 2015).
- **Global Aphantasia:** An inability to form the 5 core sensory types of mental imagery; visual, auditory, gustatory, olfactory and tactile imagery (defined in 2025, may not be officially recognised yet in all scientific circles).

This spectrum of vividness—from aphantasia to hyperphantasia—highlights cognitive diversity by recognising that individuals process and experience the world uniquely, stepping away from the deficit-based perspective of mental imagery. It also provides a language to describe these experiences.

People with varying levels of mental imagery—whether visual, auditory, emotional, or instinctive—bring distinct strengths to different cognitive domains. Rather than being a limitation, this diversity reflects how various forms of mental imagery support different types of cognition.

Mapping the Modalities of Mental Imagery

This concept builds on the earlier paper, *Refining the Lexicon of Mental Imagery Research: Terminology Beyond the Senses*, where we expanded on Zeman's work by introducing 15 types of mental imagery and four vividness ranges. This was part of a proposed linguistic framework designed to articulate mental experiences not yet fully defined in existing literature.

Here, we extend the model by adding five additional modalities—numerical imagery, vestibular imagery, musical imagery, visceral imagery and electromagnetic imagery. We propose 20 distinct modalities of mental imagery categorised as follows:

- **Core Sensory-Based Imagery:** Visual, Auditory, Gustatory, Olfactory, Tactile
- **Intelligence-Linked Imagery:** Intraphonic, Numerical, Musical, Motor, Spatial, Emotional, Introspective, Intuitive
- **Other Cognitive and Sensory Imagery:** Dream, Electromagnetic, Visceral, Somatic, Temporal, Thermal, Vestibular.
- **Mental Imagery Vividness Ranges:** Aphantasia, Hypophantasia, Phantasia, Hyperphantasia

To better understand the structure of mental imagery, Figure 1 below provides a visual representation of the framework, categorising the different types of imagery (core sensory-based imagery,

intelligence-based imagery and other cognitive and sensory based imagery), and their vividness ranges:

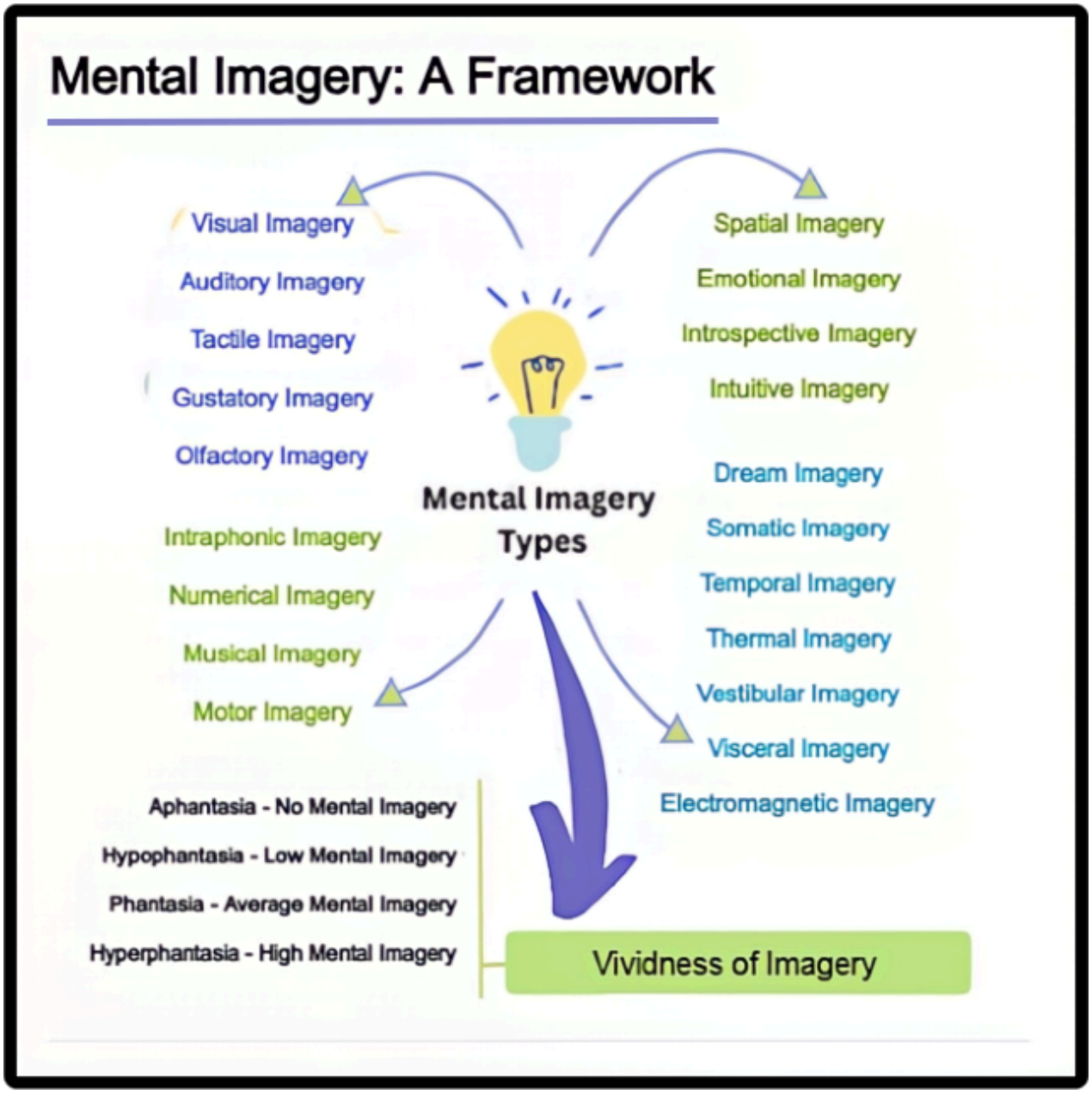

Figure 1: Framework of Mental Imagery and their Vividness Ranges. Colour-coded by category.

Mental Imagery as a Cognitive Language

Mental imagery extends beyond a mere cognitive function—it operates as an essential language of

the mind. While spoken and written language allow us to communicate external experiences, mental imagery serves as a means of expressing internal thoughts and perceptions. This perspective becomes particularly significant when considering cognitive variations such as aphantasia (the absence of visual imagery) and hyperphantasia (extremely vivid mental imagery).

Viewing mental imagery as a shared cognitive language bridges these diverse experiences, allowing individuals to articulate their thought processes more effectively. It also fosters a greater understanding between people with differing cognitive styles. For instance, someone with visual hyperphantasia might describe their thinking in terms of detailed, dynamic visuals, whereas someone with global aphantasia may rely more on abstract, non-visual representations. Establishing a structured framework for discussing these differences encourages deeper communication, enhancing awareness of cognitive diversity.

The practical applications of this understanding are wide-ranging. In education, recognising how students engage with mental imagery can help educators tailor their teaching strategies to suit various learning styles. In therapeutic contexts, such a framework can enable clients to express emotions and experiences that might otherwise be difficult to articulate. Even in everyday conversations, having a shared language to describe mental imagery enhances communication, allowing people to convey their internal experiences with greater clarity and empathy.

The Subjectivity and Complexity of Mental Imagery

A central challenge in understanding mental imagery lies in its deeply subjective nature. Unlike external sensory experiences, internal mental representations are not easily observable or measurable. Yet, this subjectivity highlights the importance of mental imagery in exploring human cognition. A structured framework for discussing these internal experiences provides a valuable tool for examining cognitive processes that often elude traditional scientific models.

Aphantasia serves as a clear example of this complexity. Once considered anecdotal, it is now recognised as a legitimate cognitive variation, with research shedding light on its neurological foundations and cognitive impacts. This shift reflects a broader understanding: even experiences that are difficult to quantify can be explored through innovative scientific methodologies. Similarly, applying a structured framework to mental imagery allows for new investigations into how various cognitive styles influence perception, memory, and problem-solving.

Though certain aspects of mental imagery may remain beyond conventional measurement, interdisciplinary research can still offer valuable insights. Collaboration between cognitive scientists,

psychologists, and neuroscientists can deepen our understanding of how different forms of perception and intelligence interact. Individuals without mental imagery in specific domains also provide essential perspectives by revealing alternative cognitive strategies. Acknowledging both the limitations and strengths of subjective experiences enables a richer, more comprehensive exploration of human cognition's diversity and complexity.

Conclusion

Howard Gardner's *Theory of Multiple Intelligences* expanded our understanding of cognitive diversity, while Adam Zeman's research on mental imagery revealed the depth and complexity of how we internally represent experiences. By unifying these ideas, we propose a framework where all forms of intelligence—linguistic, spatial, emotional, and beyond—are expressions of mental imagery in various forms.

This evolving framework bridges the divide between intelligence and mental perception, aligning with both personal experience and emerging scientific theories. It highlights the incredible diversity of human cognition—whether through vivid visualisation, abstract reasoning, or intuitive emotional processing. These differences represent distinct pathways of intelligence, not limitations, enriching our understanding of what it means to be truly intelligent.

Recognising mental imagery as a universal cognitive language allows us to better understand neurodiversity, improve educational practices, and foster deeper empathy for different ways of experiencing the world. As research continues to evolve, so too should our language frameworks—encouraging a more inclusive, nuanced, and holistic view of how we think, learn, and imagine.

Acknowledgments

This paper was written in support of the advocacy efforts of The Mental Imagery Resistance (MIR), a group dedicated to helping individuals define and articulate mental experiences that fall outside of conventional cognitive science frameworks. The MIR was established to provide a space for those with unique mental imagery experiences, such as multi-sensory aphantasia, to develop language and frameworks that reflect the diversity of human cognition. This work aims to contribute to that mission by expanding the understanding of mental imagery, perception, and intelligence.

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