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Letter

Rendering aphantasia into the social realm

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Inspired by an analogy with 'game engines', the software modules that support animations and games, Balaban and Ullman propose that there is a deep-seated distinction between 'physical simulation' and 'graphical rendering' in the brain, broadly mapping onto the dorsal and ventral streams of visual processing [1]. The developmental pathway giving rise to *in silico* game engines is very different from the evolutionary history of the human brain, constrained by evolutionary forces. Nevertheless, the analogy is illuminating. Balaban and Ullman suggest that recent findings from people lacking wakeful visual imagery (i.e. with 'aphantasia'), can be explained with the help of this distinction: intact 'physical imagery' allows them to undertake the wide range of tasks that, perhaps surprisingly, are unaffected by aphantasia, for example, tasks involving spatial memory and spatial transformation, while their lack of conscious object imagery is explained by 'broken rendering'. The suggestion is thought-provoking, but it creates a puzzle. As Balaban and Ullman write, if the 'physics engine' can achieve so much, 'why bother? Why waste time and energy putting paint on a canvas that does not matter?'. We doubt that this elaborate 'rendering operation' is epiphenomenal. Nor is it likely to be as effortful as it might be in an artificial model with no evolutionary history. We propose instead that its key function may lie, unexpectedly, in a domain that Balaban and Ullman mention only in passing – the domain of social cognition.

A cluster of associations with aphantasia supports this possibility. The most consistent cognitive difference between people with and without imagery relates to the richness of autobiographical memory (AM): many people with aphantasia report a factual, semantic recollection of salient events from their past lives, with little if any capacity for the 'reliving' of past experiences known as 'autonoetic memory' [2]. The impoverishment of AM seen in aphantasia overlaps with the recently described syndrome of severely deficient AM [3]. The main impact of this variation in AM is likely to be social [4]. AM provides a personal narrative that nurtures our sense of personal identity over time and helps us to track events in the social world, enabling shared memories that add depth to our social connections [5].

In keeping with their relatively factual understanding of their own lives, people with aphantasia tend to be less absorbed by fictional accounts of the lives of others [2], experience less empathy in response to verbal descriptions (e.g., a friend telling me that he fell down the stairs) [6], have a diminished autonomic response to emotionally-charged narratives [2], and are slower to recognise emotions in others [7]. Relatedly, there is an association both between aphantasia and alexithymia, the difficulty in identifying and describing one's own feelings [7], and between aphantasia and autism [2], which is defined by challenges in social interaction. Finally, aphantasia has been associated with working in STEM professions, which focus on abstract computations and the workings of the physical world, while its converse, hyperphantasia, is associated with traditionally 'creative' occupations, which focus, broadly, on the evocation of human experience [2]. These findings suggest that, rather than being epiphenomenal, object imagery is linked to aspects of cognition that contribute to social interaction.

Extending Balaban and Ullman's hypothesis, we suggest that their dichotomy between 'physics' and 'graphics' maps loosely on to a family of proposed distinctions that in part reflect two key adaptive aspects of human lives, the instrumental and the collaborative: these include the distinctions between semantic (or factual) and episodic (or experiential) memory; between the 'physical stance', which we adopt when we make sense of events in terms of physical interactions, and the 'intentional stance', which we adopt when we think about events in terms of human beliefs and desires [8]; between 'systemising' and 'empathising' tendencies [9]. The former help us to operate effectively on the physical world, through the predictions and tools provided by science and technology, while the latter help us to revisit, share, and interpret our experience in ways that are conducive to affiliation and collaboration. The former are typically amodal and allocentric, while the latter are typically modal and egocentric: science aspires to a 'view from nowhere' [10] while artists 'put man at the centre of the universe, whether he belongs there or not'[i].

We do not mean to imply that fully intact imagery is necessary or sufficient for empathy or evocation: imagery provides just one ingredient in a suite of interrelated capacities for social cognition. Exceptions abound: there are many examples of artistic creativity among aphantasic individuals [11,12]. Nor do we mean to imply that imagery has no other roles: as Balaban and Ullman mention, it may well be linked to some higher order perceptual skills, such as attentional guidance in visual search [2]. However, rather than regarding imagery as an evolutionary spandrel, the possibility that it contributes importantly to our ability to recollect and share experience, with important social benefits, merits further thought and exploration.

Resources

[i]https://speakola.com/grad/kurt-vonnegut-bennington-college-1970

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References

1. Balaban, H. and Ullman, T.D. (2025) Physics versus graphics as an organizing dichotomy in cognition. *Trends Cogn. Sci.* 29, 985–996
2. Zeman, A. (2024) Aphantasia and hyperphantasia: exploring imagery vividness extremes. *Trends Cogn. Sci.* 28, 467–480
3. Palombo, D.J. *et al.* (2015) Severely deficient autobiographical memory (SDAM) in healthy adults: a new mnemonic syndrome. *Neuropsychologia* 72, 105–118
4. Monzel, M. *et al.* (2023) No general pathological significance of aphantasia: an evaluation based on criteria for mental disorders. *Scand. J. Psychol.* 64, 314–324
5. Zeman, A. *et al.* (2018) Touching the void – first and third person perspectives in two cases of autobiographical amnesia linked to temporal lobe epilepsy. *Neuropsychologia* 110, 55–64
6. Monzel, M. *et al.* (2023) Is it really empathy? The potentially confounding role of mental imagery in self-reports of empathy. *J. Res. Pers.* 103, 104354
7. Monzel, M. *et al.* (2024) Affective processing in aphantasia and potential overlaps with alexithymia: mental imagery facilitates the recognition of emotions in oneself and others. *Biomark. Neuropsychiatry* 11, 100106
8. Dennett, D.C. (1996) *Kinds of Minds: Toward an Understanding of Consciousness*, Basic Books
9. Baron-Cohen, S. (2003) *The Essential Difference: Men, Women and the Extreme Male Brain*, Penguin
10. Nagel, T. (1986) *The View from Nowwhere*, Oxford University Press
11. Aldworth, S., Mackisack, M., eds (2018) *Extreme Imagination - Inside the Mind's Eye*, University of Exeter
12. MacKisack, M. *et al.* (2022) Plural imagination: diversity in mind and making. *Art J.* 81, 70–87