

Three years ago I sat in a London café with an old University friend over a cup of tea. I had asked him to help me coin a term to describe a novel phenomenon, the lifelong lack of the mind's eye. David's classical background transported us from modern Bloomsbury to ancient Athens, where Aristotle had termed the mind's eye 'phantasia'. Its lack, we decided, should therefore be christened 'a-phantasia', the 'a-' denoting absence. A slim paper introducing this term (*Lives without imagery: congenital aphantasia: Cortex* 2015; 73:378-380) described 21 people who had never visualised. It attracted an unexpected amount of publicity, with notable coverage by Carl Zimmer in the New York Times, James Gallagher on the BBC and the entrepreneur, Blake Ross, on Facebook: two years on, over 11,000 people have been in touch with us, around 3000 have completed our detailed questionnaires, and we are analysing the flood of resulting data under the auspices of *The Eye's Mind Project* (<http://medicine.exeter.ac.uk/research/neuroscience/theeyesmind/>).

The term 'aphantasia' definitely came into being over those cups of Darjeeling, but was the phenomenon really new to science? – not, in fact, strictly new, but certainly strangely neglected. Dr Michaela Dewar, co-author of our 2015 paper, pointed me to the previous work of Sir Francis Galton, who devised the first questionnaire probing the vividness of visual imagery in the late nineteenth century. Using his 'breakfast table questionnaire', which invites you to score the 'illumination, definition and colouring' of your recollected image of your 'breakfast table as you sat down to it this morning', Galton recognised that the vividness of imagery was extremely variable. A small handful of those he surveyed claimed to have 'no power of visualising'. But although visual imagery in general had received its fair share of scientific attention during the 20th century, the existence of people who lacked this ability entirely was oddly unacknowledged. There was one honourable exception: an American psychologist, Bill Faw, himself a lifelong 'wakeful non-imager', had administered a vividness questionnaire to around 2,500 people, estimating that 2-3% may lack a mind's eye. This work apart, aphantasia had been a blind spot in the eye of imagery science – and this hurt! Many of our contacts describe paying regular visits to the web to see whether anyone was studying this under-researched quirk of their psychology: the arrival of 'aphantasia' opened a door to further dialogue and exploration.

The resulting conversation – to which this book bears witness – has been lively, revealing and compelling. It could not have happened without the internet which allows news to spread and information to be harvested so rapidly. Rarely has research been ‘co-constructed’ so thoroughly by scientists and participants. There was, it turned out, already a wealth of first-hand knowledge of aphantasia to tap into, with intense interest both from people with aphantasia, whose mental lives are markedly affected by it, and from typical ‘visualisers’ who are fascinated by the diversity of human experience. The underlying explanation for this degree of interest is, I think, that ‘representation in absence’ is such a fundamental human capacity: as Robin Dunbar has written ‘what sets us apart is a life in the mind, the ability to imagine’. People with aphantasia *can* imagine, sometimes magnificently, but they do so differently, and that difference intrigues us.

There is of course a risk in gathering data via the web from interested participants on the back of a news story. There are plenty of opportunities for theory to ‘contaminate’ data: if I have read that my aphantasia should make it hard – for example – to remember my childhood, my judgment of my memory might well be influenced. And there is a natural tendency, once we have discovered one unusual feature of our make-up, to attribute others to the same cause: ‘my mind’s eye is dark – so *that’s* why I can’t learn French!’. But these potential pitfalls shouldn’t prevent us from listening to and learning from the fascinating stories that people with aphantasia have to tell, richly represented in this book.

Although the final analysis is pending, some associations and dissociations with aphantasia look likely to hold true. Here are a few examples. Many people with aphantasia – though by no means all – describe greater than average difficulty in recognising faces, finding it hard, for instance, to pick out a single actress through changes of hair style and costume. Why this should be is unclear, but the association is intriguing. Many, though not all, describe a factual style of autobiographical memory, ‘re-inhabiting’ the past less vividly than most of us. Many, as evocatively described in the pages of this book, describe themselves as more ‘present’ and less prone to emotions like longing or lingering disgust than their more visually imaginative friends. In general, the gains and losses from aphantasia are finely balanced: I think of it as a variation in experience rather than a disorder or a medical ‘condition’.

What of the *dissociations*? These were already on show in our small original sample of 21 people. The majority of people with aphantasia experience visual imagery during dreams, though not during ordinary wakefulness, suggesting an important distinction between sleeping and waking, or involuntary and voluntary, imagery. The majority, by a slim margin, experience imagery in other modalities, most often auditory: so the mind's ear need not be deaf because the mind's eye is blind, although it certainly is so in some, including Alan.

Is aphantasia, then, one thing or many? And what kind of a thing is it – a querk, a symptom, a syndrome? Resolving these questions requires more research, but it won't surprise me at all if it turns out to be complex. We know that visualising activates a wide network of areas in the brain, involved, among other things, in decision making, attention, memory and vision: it would be surprising if such a complex function could not be disturbed in more than one way.

So, some hard work needs to be done to 'triangulate' between i) the fascinating first person evidence presented in this book, ii) measurement of relevant abilities using robust psychological tests in people with varying levels of imagery vividness and iii) brain scanning to look for corresponding differences in brain structure and function. Although studies of this general kind have been underway for many years, the recognition of imagery extremes – aphantasia and its counterpart, hyperphantasia – has opened a new and exciting avenue for enquiry. Work in my lab and in others is travelling down it.

This book provides a treasure trove of observations and insights for anyone interested in imagery in general and aphantasia in particular. There may still be science to do before we can draw firm conclusions about the significance of extreme imagery but there is poetry in the subject that we can enjoy in the meantime. Here, for example, are the beautiful words of the aphantasic JK, from Chapter 2, describing his or her widespread lack of imagery:

'I can't recall smells at all, but I can recall words for them. I know that lilac is a "soft" scent that makes my toes tingle ; it reminds me of my mother and summer mountain sunshine'

And here, ML, in Chapter 7, describing what it is like to remember an event in the absence of imagery, with the precision of a haiku:

'It is a story. A quick-fire retelling. A mental diary.'

The deepest lesson from aphantasia surely concerns human diversity. We all tend to regard our own experience as normal: inevitably, it supplies our standard for comparison. It is easy, therefore, to fail to recognise quite startling differences between our inner lives. Revealing them is interesting, explanatory and sometimes liberating. The final words of Alan's book, a quotation from L, are well chosen:

'I live in the now. I cannot live in the past. I cannot dream of the future. I have had many very spiritual experiences before I even knew that I was different than most people. I have done things differently, and that is OK with me.'