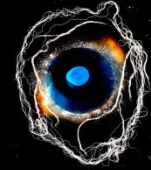


The Eye's Mind - The story of aphantasia

Adam Zeman

University of Exeter Medical School

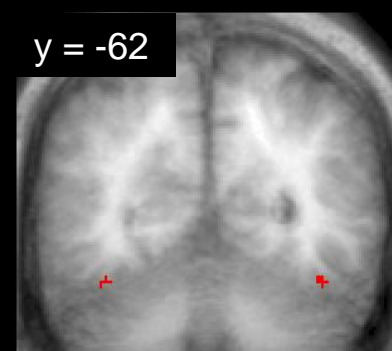
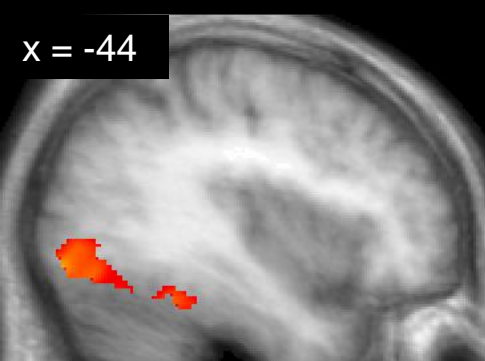
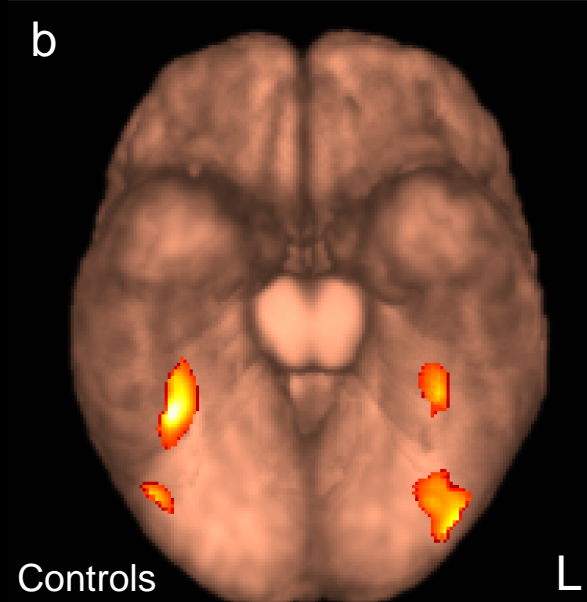
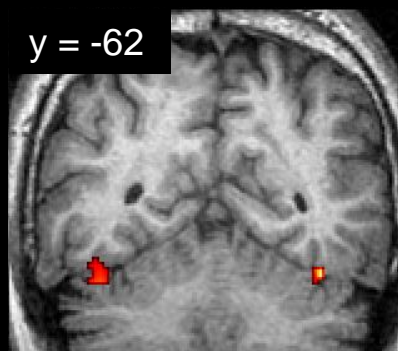
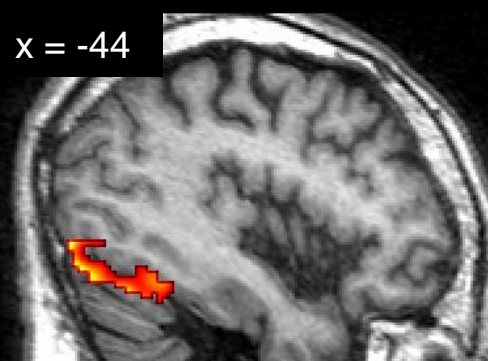
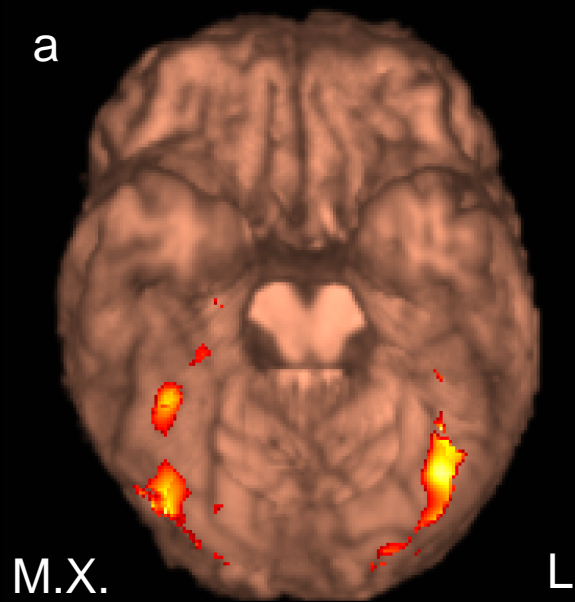




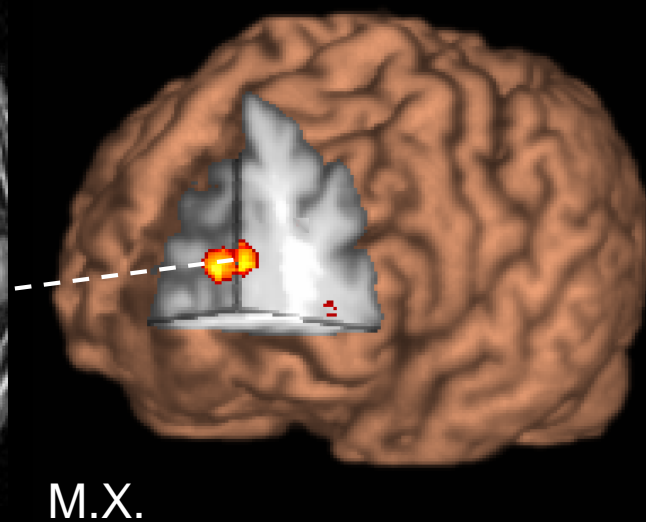
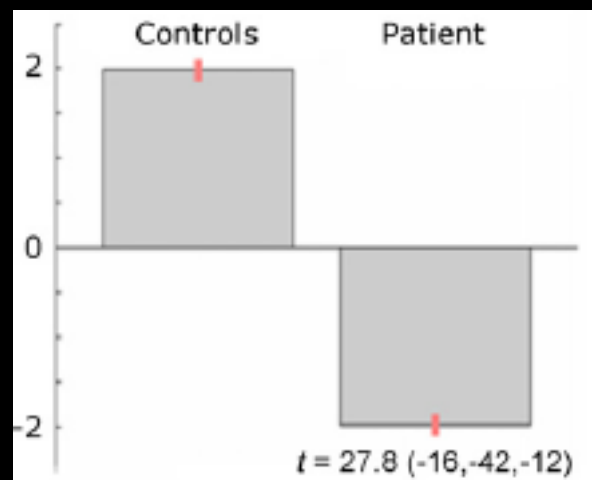
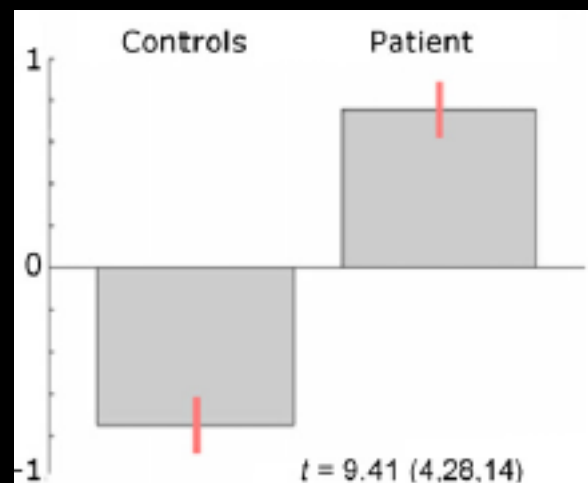
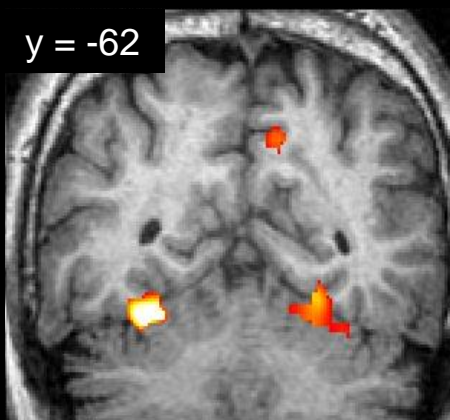
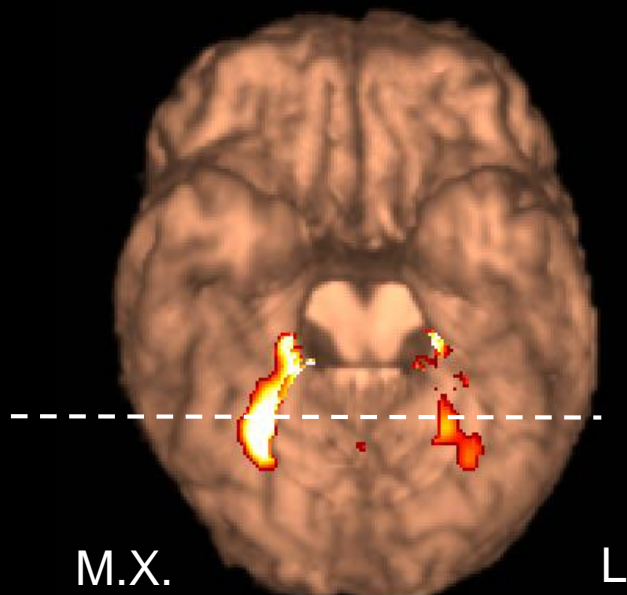
‘What sets us apart is a life in the mind, the ability to imagine’

Robin Dunbar, The Human Story,
2004



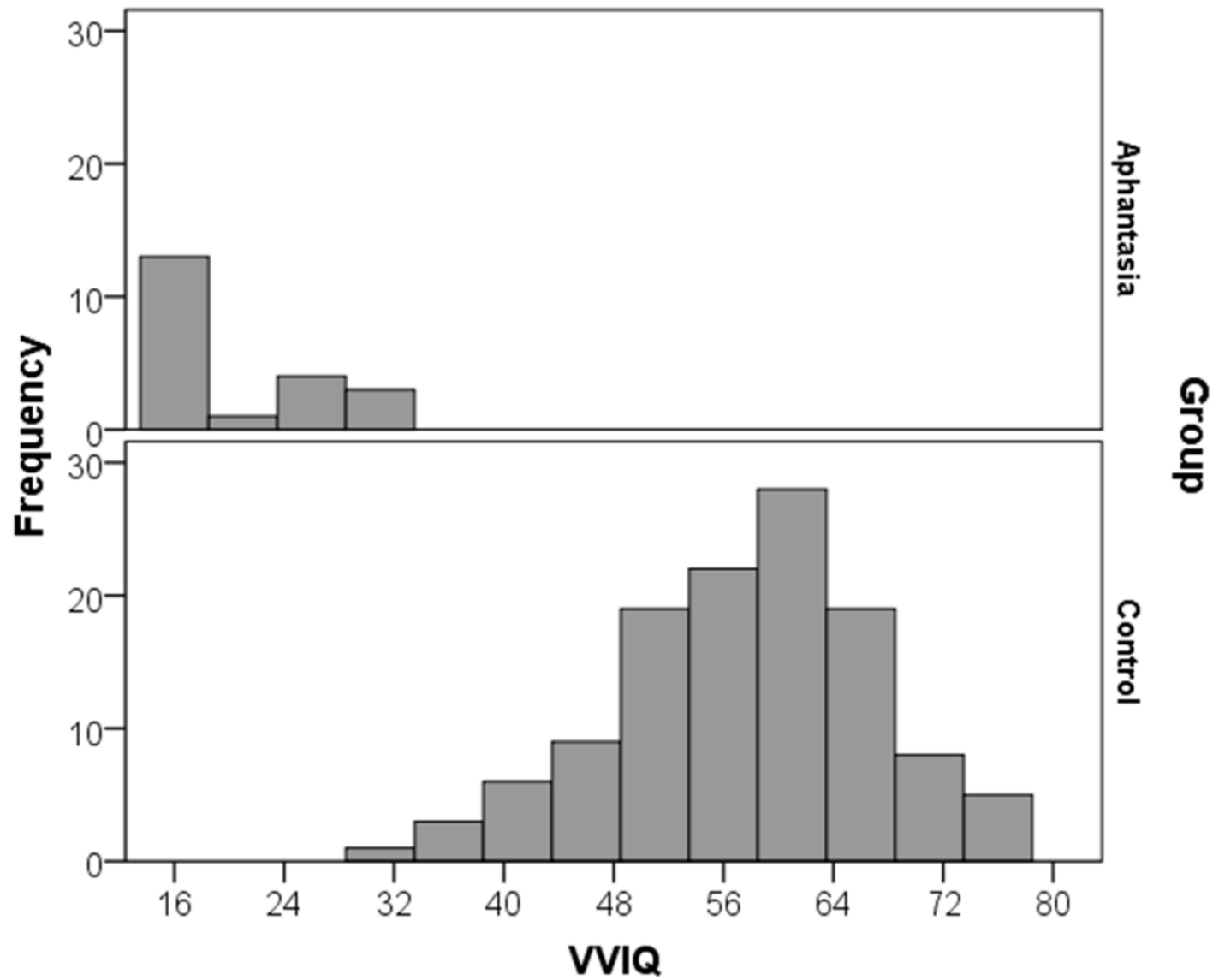


c





Karl Zimmer The Brain in *Discover* March 2010



Zeman, Dewar, Della Sala Cortex, Cortex 2015

Lives without imagery- congenital aphantasia

Zeman, Dewar, Della Sala Cortex 2015

- 21 individuals, 19 male, 5 family history
- Early adult life
- Conversation, article, class – real ‘seeing’, not metaphor!
- Modest emotional impact
- Circa half all modalities
- 17/21 visual dreams
- 2/3 autobiographical memory poor
- Verbal, analytical, mathematical strengths
- How many windows?
 - Thinking, knowing, understanding, remembering
 - Mental models or maps
 - pantomime

‘Five windows. I remember them but I don't see them. My thought is still intentional and object-orientated though and I still consider the windows to be 'in mind’

‘I sort of fly through the house and inspect every room if the 'idea' of a window is present and where. It's definitely not an image, it's more like understanding the idea of a window being there. I “know” it's there’

Aphantasia

- Galton (1880) The Statistics of Mental Imagery
- Cotard (1882/4)
- Charcot (1883)
- Faw (2009)
- Congenital prosopagnosia (Gruter et al 2009)
- Synaesthesia (Barnett, 2008)



The Eye's Mind



- John Onians, Art History, UEA
- Fiona Macpherson, Philosophy, Glasgow
- Susan Aldworth, Artist, London
- Crawford Winlove, Physiology, Exeter
- Matthew Mackisack, Art History, London



Arts & Humanities
Research Council

The Eye's Mind



- Motivation
 - ‘The history of a subject is the subject’
 - A ‘cascade of knowledge’
 - Look back...
 - Framing the old in the light of the new
 - Challenges for neuroscience?
 - Insights for neuroscience?

The Eye's Mind



- **Hume**

When I shut my eyes and think of my study, the ideas I form are exact representations of the impressions I felt when I was in my study; every detail in one is to be found in the other.

- **Watson**

When a person “closes his eyes” and says “I see the house where I was born, the trundle bed in my mother’s room where I used to sleep – I can even see my mother as she comes to tuck me in”, that person is “merely dramatizing”: the behaviourist “finds no proof of imagery in all this. We have put all these things in words, long, long ago

Enthusiasts and denigrators...

- *Contra*

Plato

‘ideas, moving on through ideas to ideas’

Watson

‘...in words, long, long ago’

Wittgenstein

‘A verbal description ...can take the place of the image’

Pylyshyn ‘conceptual and propositional ...structures’

- *Pro*

Aristotle

‘phantasia’

Aquinas

‘phantasms within oneself’

Hume

‘exact representations of impressions...’

Kosslyn

‘depictive representation’

Cf Reisberg D Intuitions and introspections about Imagery: the role of imagery experience

Appl Cognit Psychol 2003 17 1147-60

Enthusiasts and denigrators...

- *Contra*

Plato

‘ideas, moving on through ideas to ideas’

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‘A verbal description ...can take the place

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Aristotle

‘phantasia’

Aquinas

‘phantasms within oneself’

Hume

‘exact representations of impressions...’

On Picturing a Candle: The Prehistory of Imagery Science

Matthew MacKisack^{1*}, Susan Aldworth², Fiona Macpherson³, John Onians⁴,
Crawford Winlove¹ and Adam Zeman¹

representation’

D Intuitions and introspections
y: the role of imagery

Psychol 2003 17 1147-60

The Eye's Mind



- The choice of task
 - Object-based tasks
 - Spatial tasks
 - Transformative tasks...
- The choice of control condition
 - Perception - simple or complex stimulus
 - Rest - an imaginative state!
 - Active task – eg decision making
- Other variables
 - Eyes open vs eyes closed
 - Auditory vs visual presentation
 - Short term or long term retrieval

The Eye's Mind



- and more...
 - Control task involving language or not?
 - Item-to-be-imagined general, specific or familiar?
- Eventually...
 - 40 studies, 464 participants, 634 foci
 - ALE metanalysis



ELSEVIER

Available online at www.sciencedirect.com

ScienceDirect

Journal homepage: www.elsevier.com/locate/cortex



Special issue: Research report

The neural correlates of visual imagery: A co-ordinate-based meta-analysis

Crawford I.P. Winlove ^{a,*}, Fraser Milton ^b, Jake Ranson ^c, Jon Fulford ^a,
Matthew MacKisack ^a, Fiona Macpherson ^d and Adam Zeman ^a

^a Medical School, University of Exeter, UK

^b School of Psychology, University of Exeter, UK

^c St George's Medical School, London, UK

^d Department of Philosophy, University of Glasgow, UK



Le Monde

Le cas étrange des aveugles de l'imagination

The New York Times



Thank you!

‘..the greatest mystery of my life explained...’

‘...it was the first time I had heard the word, but I cried when I read it: I had always thought there was something a bit wrong with me...’

‘...I feel like my mind has been blown! I have always wondered what was wrong with my brain because I can't visualize or meditate the way other people can...’

Thank you!

prosopagnosia



Thank you!

SDAM

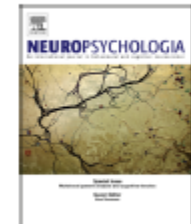
prosopagnosia



Contents lists available at ScienceDirect

Neuropsychologia

journal homepage: www.elsevier.com/locate/neuropsychologia



Severely deficient autobiographical memory (SDAM) in healthy adults: A new mnemonic syndrome

Daniela J. Palombo^{a,b,1}, Claude Alain^{a,b}, Hedvig Söderlund^c,
Wayne Khuu^{a,b}, Brian Levine^{a,b,d,*}

^a Rotman Research Institute, Baycrest Health Sciences, Toronto, ON, Canada M6A 2E1

^b Department of Psychology, University of Toronto, Toronto, ON, Canada M5S 1A1

^c Department of Psychology, Uppsala University, Uppsala 751 42, Sweden

^d Department of Medicine (Neurology), University of Toronto, Toronto, ON, Canada M5S 1A1





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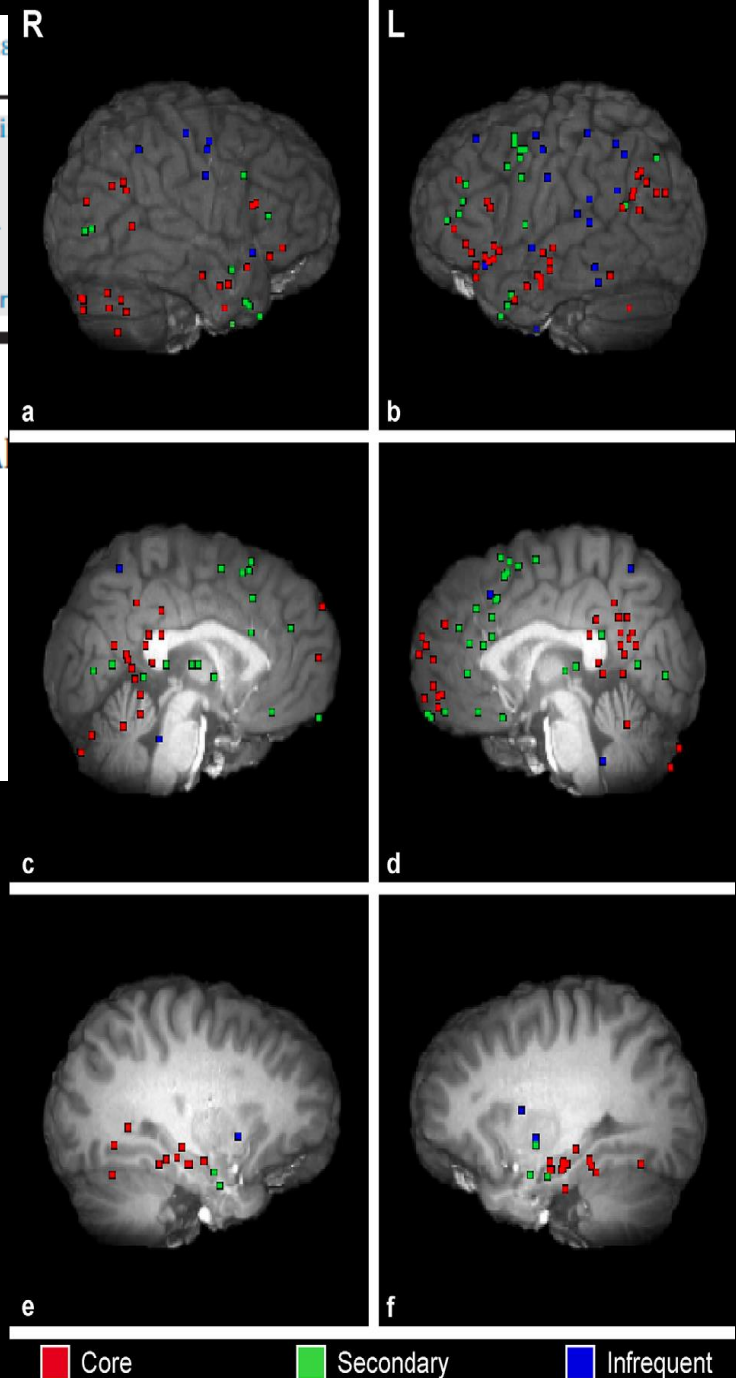
^a Rotman Research Institute, Baycrest Health Sciences, Toronto, ON, Canada M6A 2E1

^b Department of Psychology, University of Toronto, Toronto, ON, Canada M5S 1A1

^c Department of Psychology, Uppsala University, Uppsala 751 42, Sweden

^d Department of Medicine (Neurology), University of Toronto, Toronto, ON, Canada M5S 1A1

Svoboda et al Neuropsychologia
2006;44: 2189–08



Thank you!

SDAM

prosopagnosia

ASD

DSM 5

Autism Spectrum Disorder	299.00
(F84.0) Diagnostic Criteria	

‘.... difficulties in sharing imaginative play’

Thank you!

SDAM

ASD

prosopagnosia

fiction

fiction...

...The figures in this boat were those of a strong man with ragged grizzled hair and a sun-browed face, and a dark girl of nineteen or twenty, sufficiently like him to be recognizable as his daughter. The girl rowed, pulling a pair of sculls very easily...

Thank you!

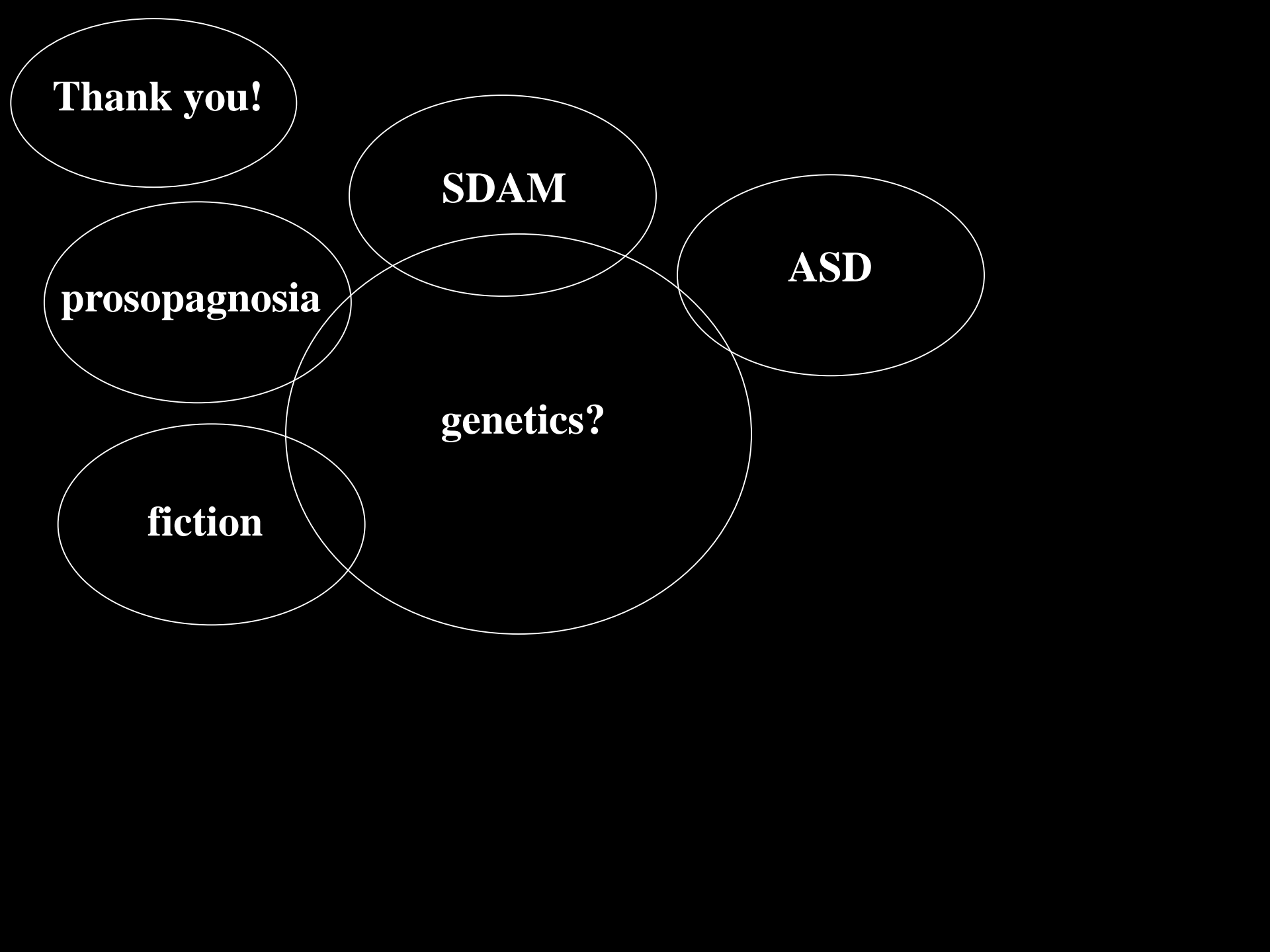
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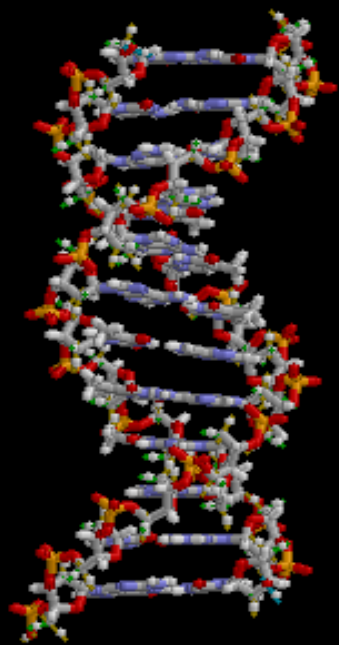
ASD

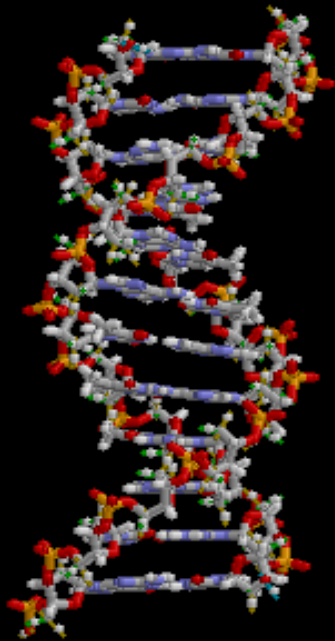
prosopagnosia

genetics?

fiction







Thank you!

SDAM

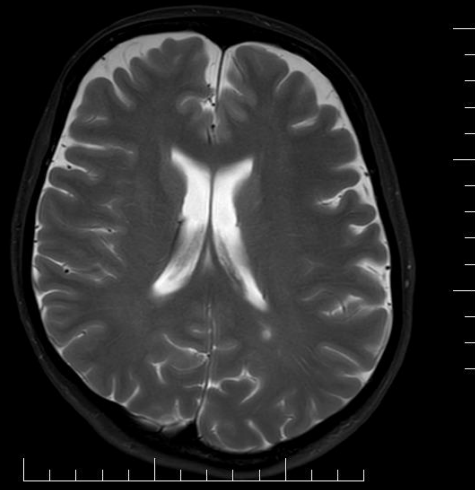
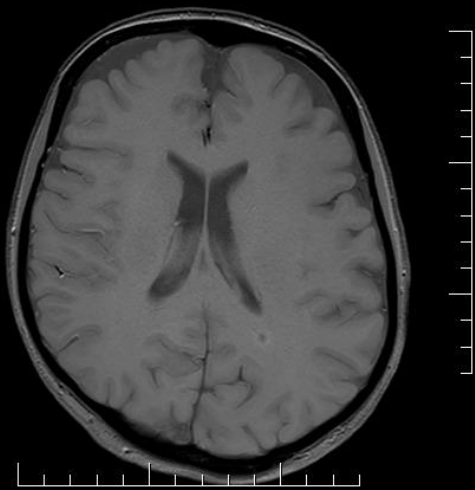
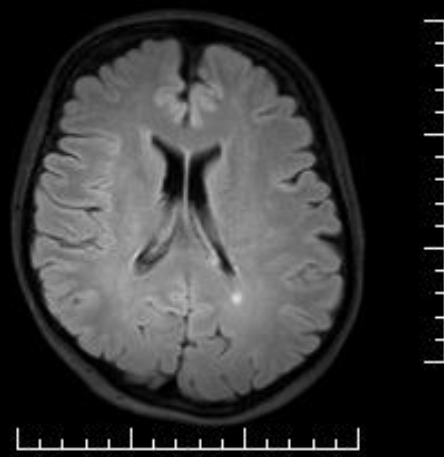
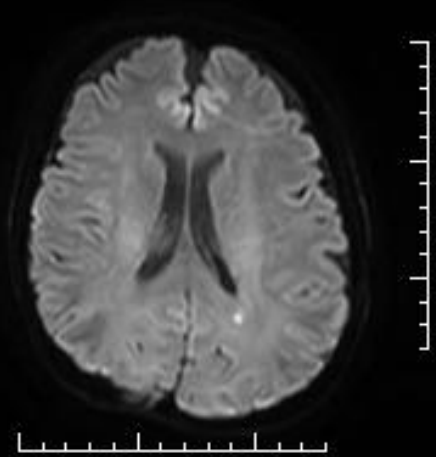
ASD

prosopagnosia

genetics?

fiction

**Neurogenic
forms**



Thank you!

SDAM

ASD

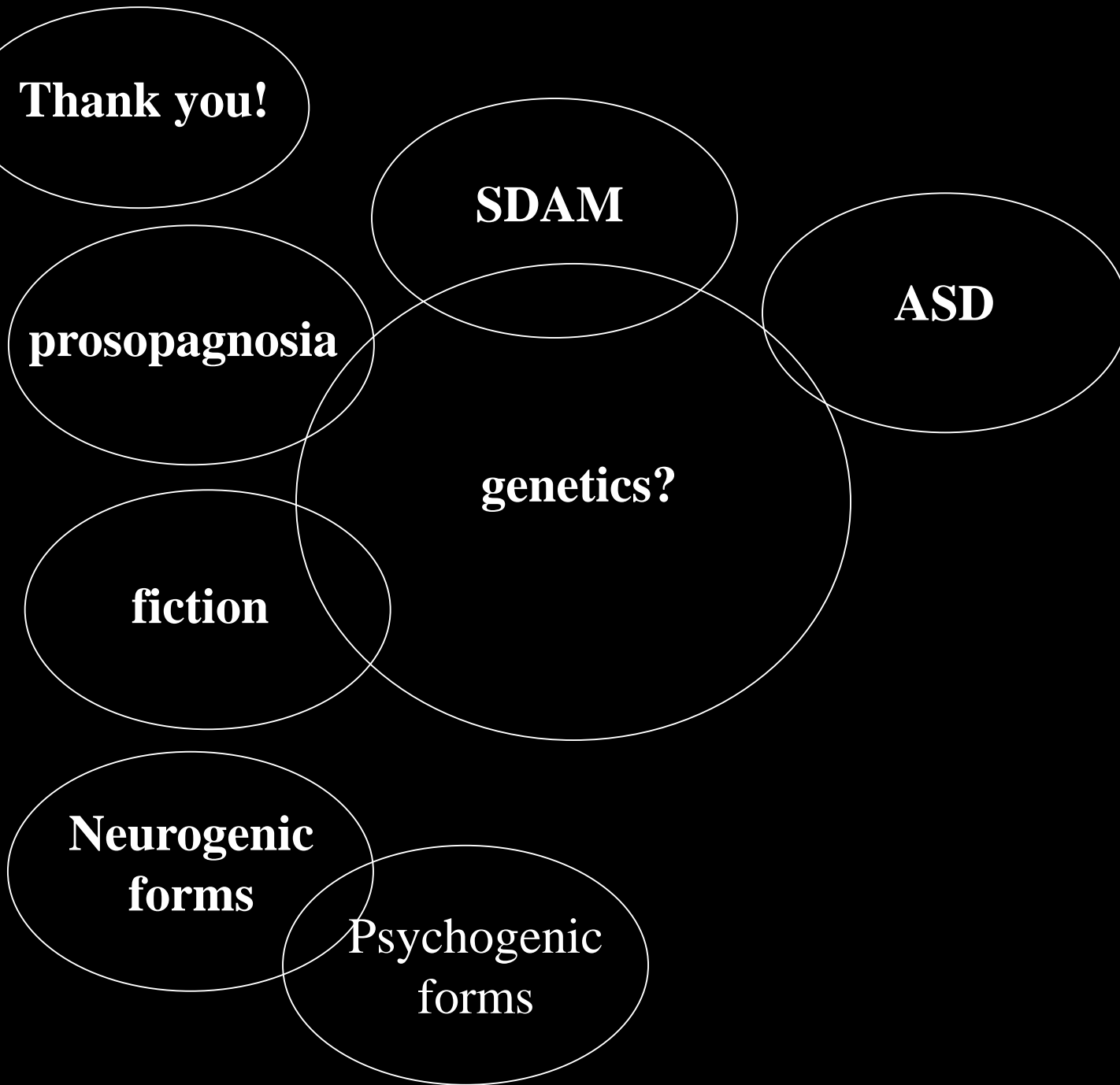
prosopagnosia

genetics?

fiction

**Neurogenic
forms**

**Psychogenic
forms**





Available online at www.sciencedirect.com

ScienceDirect

Journal homepage: www.elsevier.com/locate/cortex



Commentary

Refusing to imagine? On the possibility of psychogenic aphantasia. A commentary on Zeman et al. (2015)



Stefania de Vito ^{a,b,*} and Paolo Bartolomeo ^{a,b}

^a INSERM U 1127, CNRS UMR 7225, Sorbonne Universités, and Université Pierre et Marie Curie-Paris 6, UMR S 1127, Institut du Cerveau et de la Moelle épinière (ICM), Paris, France

^b Department of Psychology, Catholic University, Milan, Italy

Thank you!

SDAM

ASD

prosopagnosia

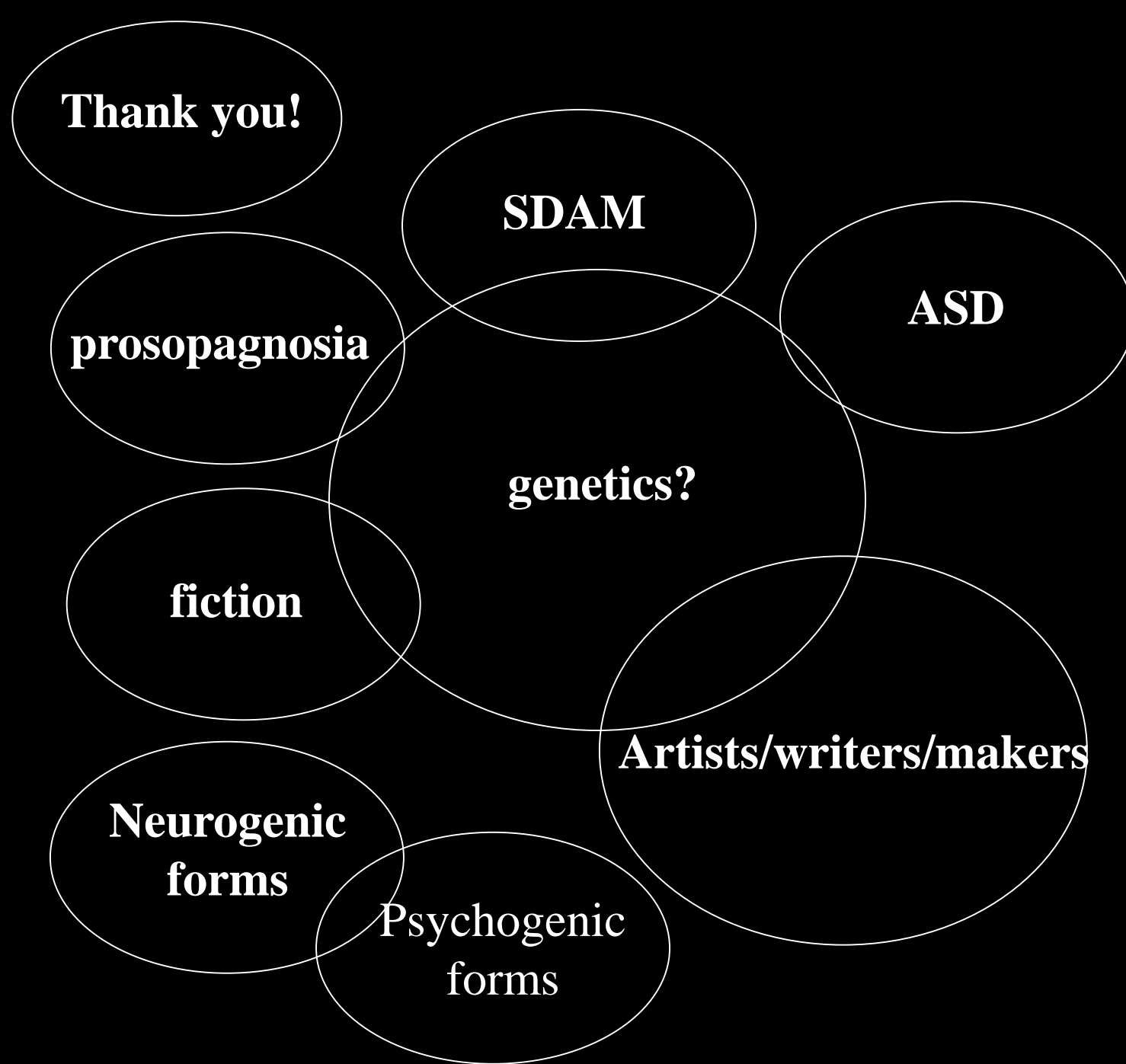
genetics?

fiction

Artists/writers/makers

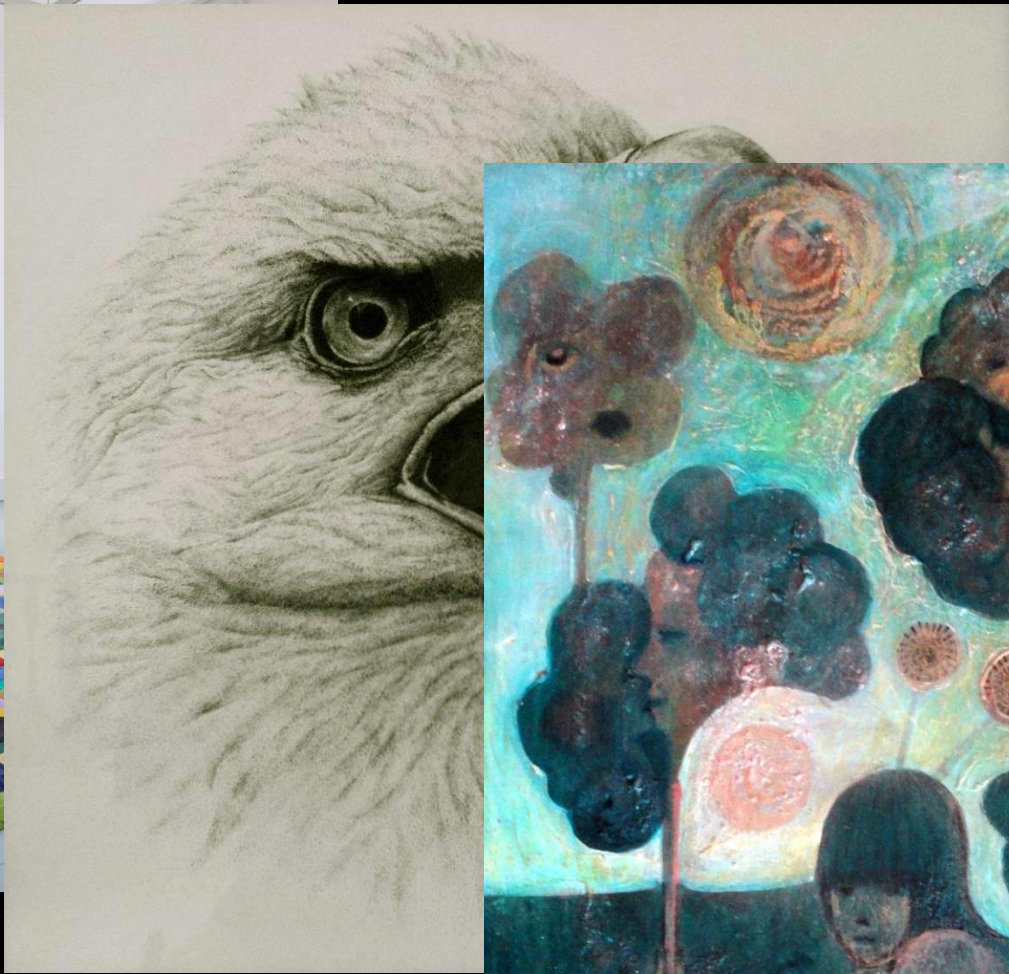
**Neurogenic
forms**

**Psychogenic
forms**









Thank you!

SDAM

ASD

vol/invol

prosopagnosia

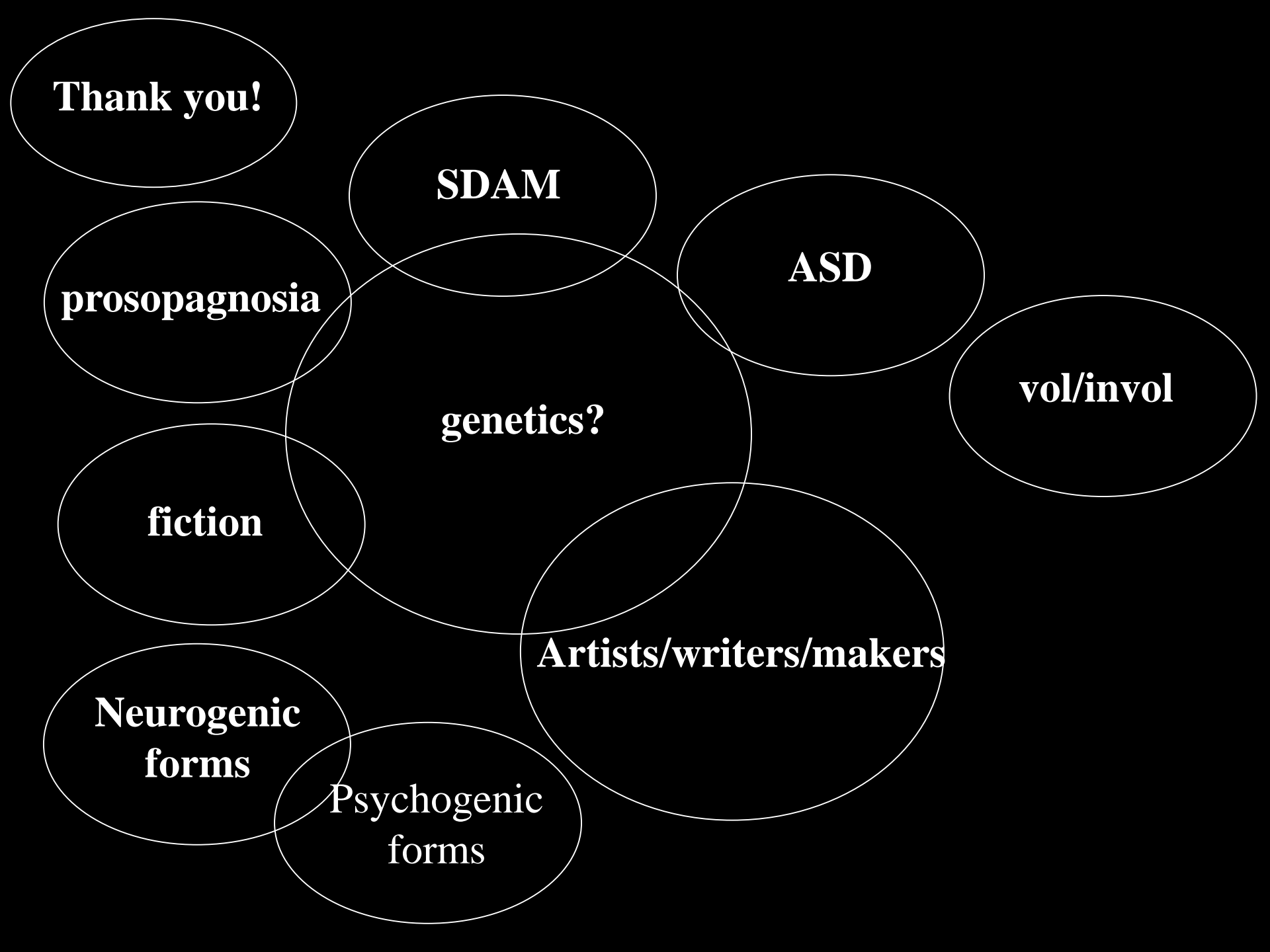
genetics?

fiction

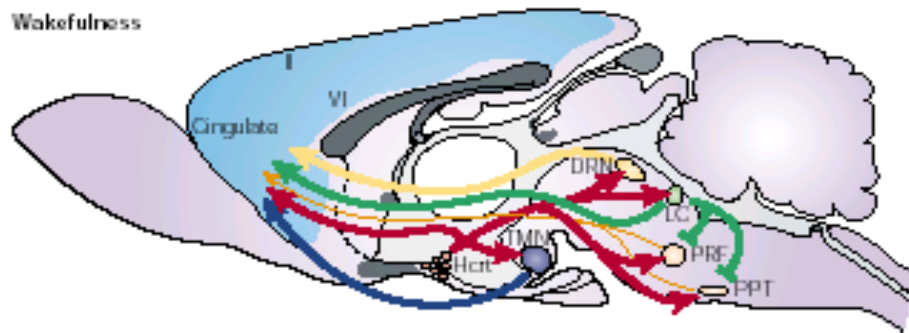
Artists/writers/makers

**Neurogenic
forms**

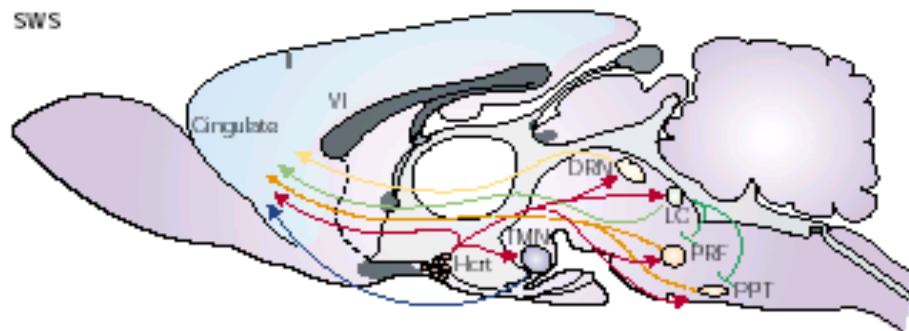
**Psychogenic
forms**



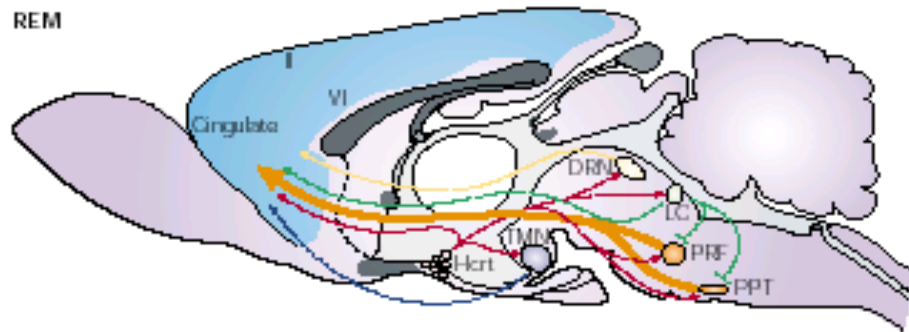
Wakefulness



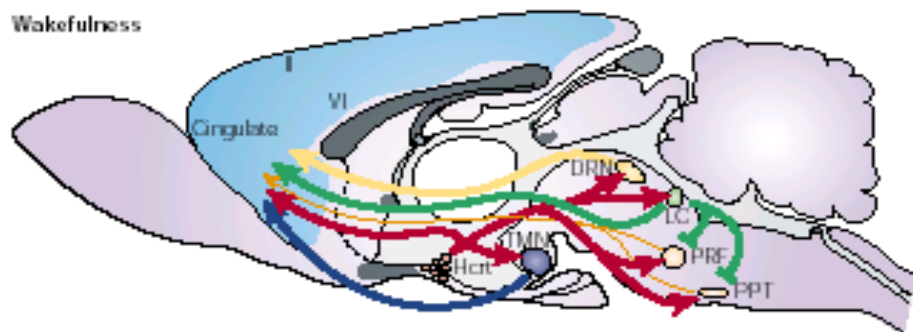
SWS



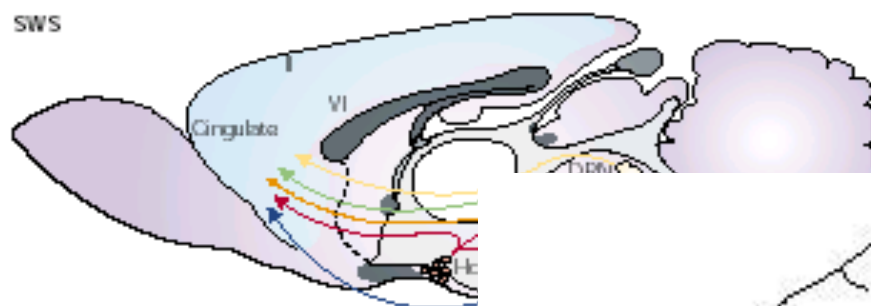
REM



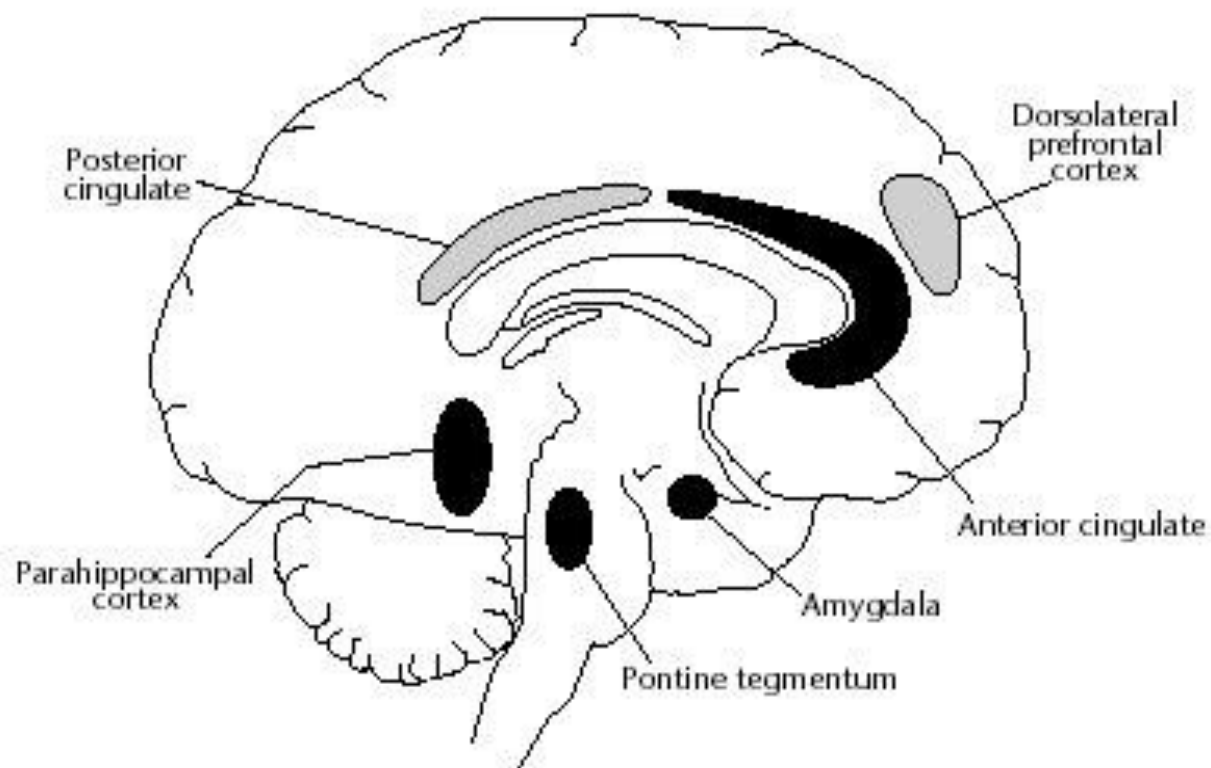
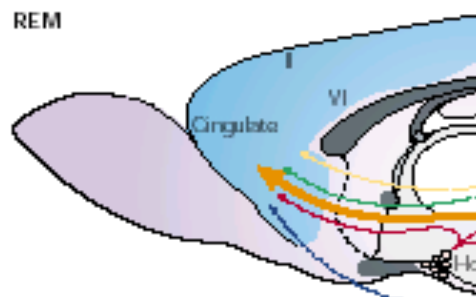
Wakefulness



SWS



REM



Thank you!

SDAM

ASD

prosopagnosia

vol/invol

genetics?

fiction

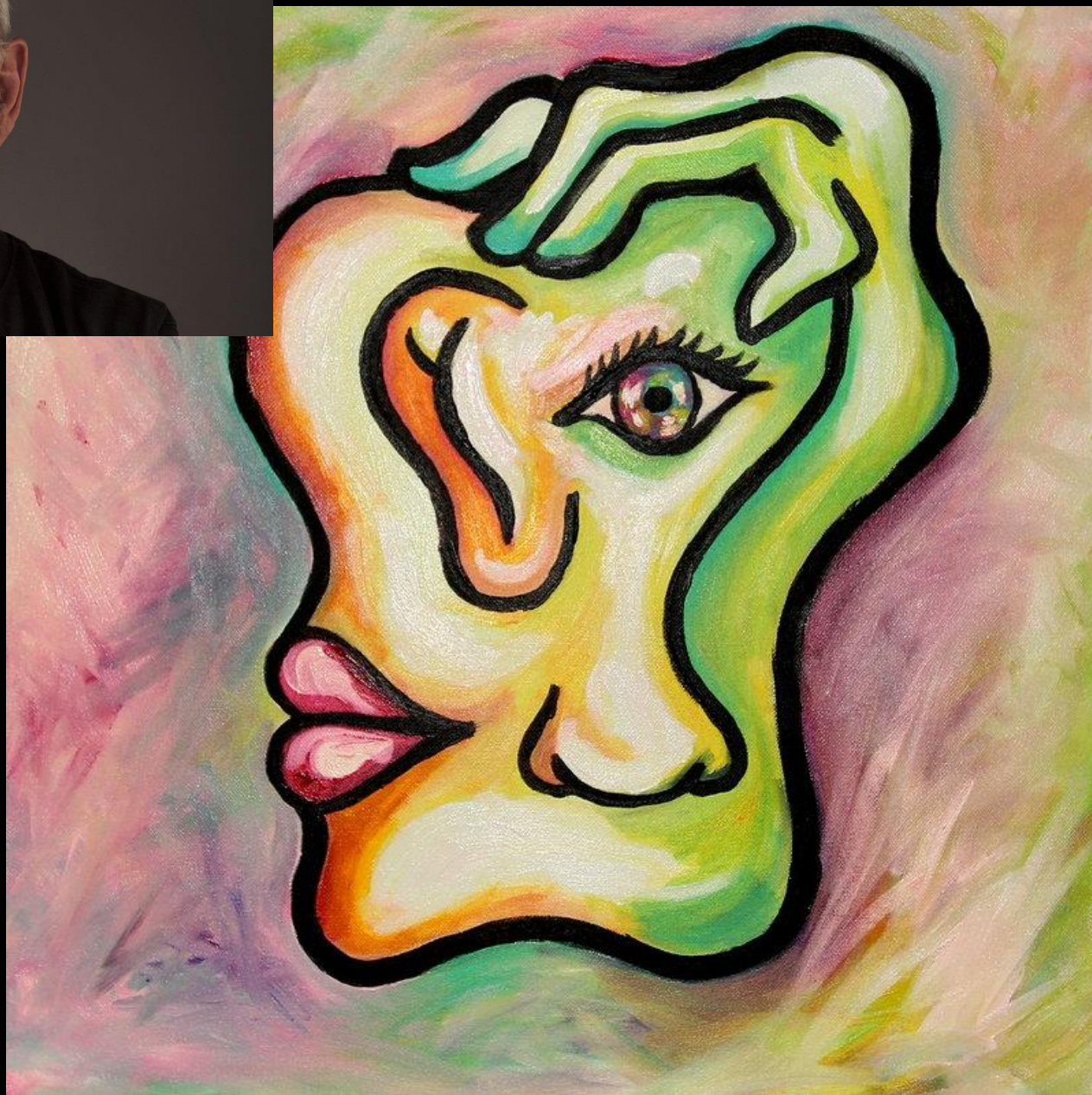
Uni/multimodal

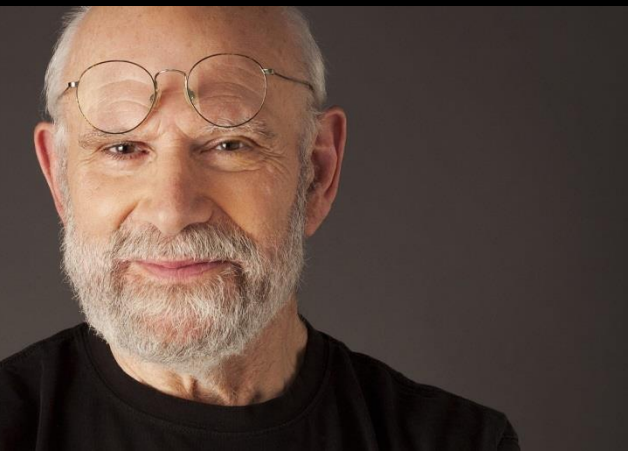
**Neurogenic
forms**

**Psychogenic
forms**

Artists/writers/makers







Thank you!

SDAM

prosopagnosia

ASD

genetics?

vol/invol

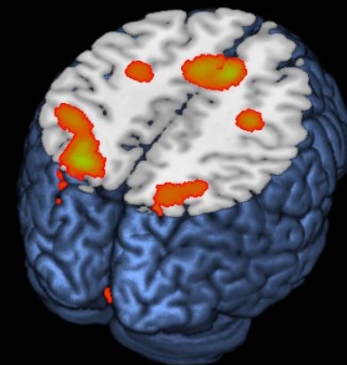
fiction

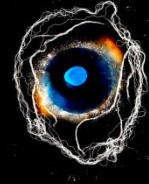
Uni/multimodal

**Neurogenic
forms**

**Psychogenic
forms**

Artists/writers/makers





- *Why does this topic touch a chord?*
 - *Deliberate imagination (representation in absence) is such a fundamental human act*
 - *It is an intimate and emotional act – we compare our dreams and daydreams, reminisce with those close to us*
 - *Visualisation is a salient component – for most of us*
 - *If 2% prevalence - friends will probably be puzzled or disbelieving: hence gratitude*
 - *98% will be intrigued by this unexpected dimension of individual difference*



The Eye's Mind

- MX
- Congenital aphantasia
- The Eye's Mind Project
 - The pre-history of imagery science
 - The visualising brain
 - Aphantasia & hyperphantasia
- Next steps

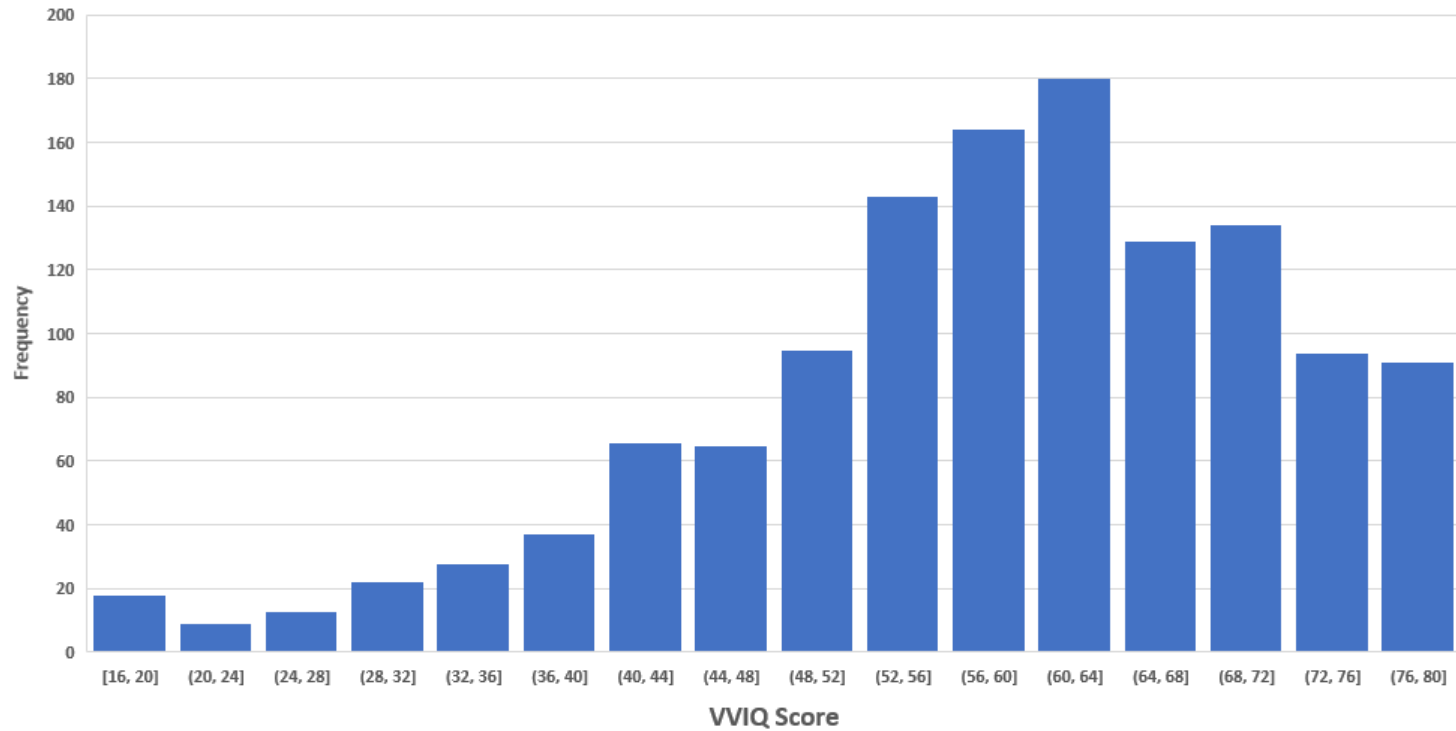


Next steps

- Questionnaire data
 - Family histories
- aphantasia – hyperphantasia study:
 - 20 aphantasia – 20 average – 20 hyperphantasia
 - Neuropsychological profile
 - Autobiographical memory
 - Imaginative & future thinking
 - Face recognition
 - AQ questionnaire
 - Brain imaging
 - Structural
 - DTI
 - Task-evoked fMRI
 - Resting state fMRI

VVIQ data from *Extend* sample

Distribution of VVIQ scores in X10K



Next steps

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Conclusions

- MX – acquired aphantasia
- Galton revisited - congenital aphantasia
- The Eye's Mind Project
 - The pre-history of imagery science
 - The intellectual impact of imagery vividness
 - The visualising brain
 - An imagery network; vividness correlates
 - Aphantasia & hyperphantasia
 - The significance of imagery extremes





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close your eyes and picture it: it's a sunny day, but you're in the pleasant shade of a large tree. Are you seeing it right now?



Because if not, you may have aphantasia!



People with aphantasia don't SEE things when they imagine them. They can THINK of things, obviously, but summoning a lifelike image of something real or, uh, imaginary - it doesn't happen for them! And the most amazing part is that many don't even REALIZE they have aphantasia, because they've always assumed phrases like "picture it in your mind's eye" are purely metaphorical.



what does it mean if you're aphantasical?

Nothing, really!



It doesn't really impact your life except when you find out you have it, and then you're like, "WAIT, OTHER PEOPLE CAN ACTUALLY SEE THINGS WHEN THEY CLOSE THEIR EYES AND WE ALL ACT LIKE THIS IS NORMAL??" Beyond that: s'all good.

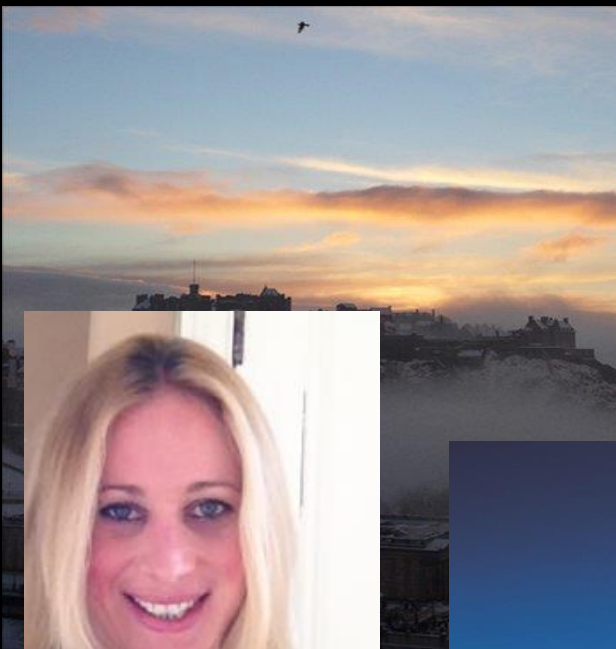
Not just with eyes closed. You can also imagine things with your eyes OPEN.



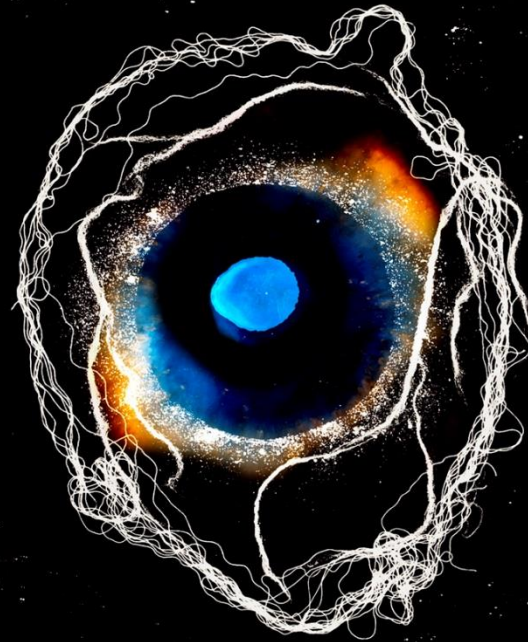
...



what



Arts & Humanities
Research Council



<http://medicine.exeter.ac.uk/research/neuroscience/theeyesmind/>