

Dementia-related visual loss:

Considerations for support, environmental and device accessibility



Keir Yong

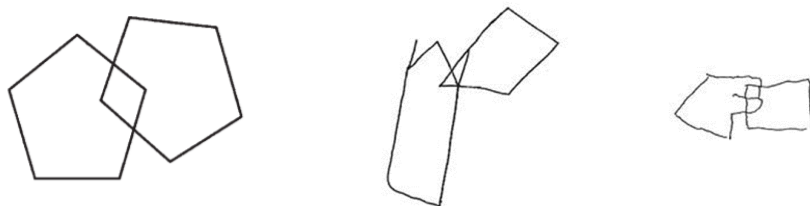
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- Background
 - Dementia-related visual loss (diminished ‘brainsight’)
 - Posterior Cortical Atrophy (“visual variant of Alzheimer’s”)
- Informing support strategies
 - Environmental accessibility supporting navigation
 - Assistive technology facilitating reading

Visual dysfunction in dementia

- Higher order visual impairment in AD (29-40%; Mendola et al., OVS, 1995)
 - Including diminished depth perception, face perception, restricted attentional window, visuospatial impairment
 - 10-16% of 4,050 ‘typical’ late onset AD patients considered to have visuospatial, rather than memory-led presentation (Mukherjee et al., Mol. Psychiatry, 2018)
- Core features of several dementias include visual symptoms
- Visual deficits arising following initial impairment in memory or language
- Critical to living well with dementia



A	E	E	B	A	C	C
E	D	E	A	B	E	A
B	D	B	C	B	E	A
B	A	C	D	D	B	B
C	D	A	A	A	B	D

Posterior cortical atrophy

- Progressive visual impairment in absence of ocular disorder
- Prominent atrophy of posterior brain regions
- AD most common cause despite initial sparing of memory
- Estimated 4-5% of patients in specialist clinics

Cortex thinner
in PCA

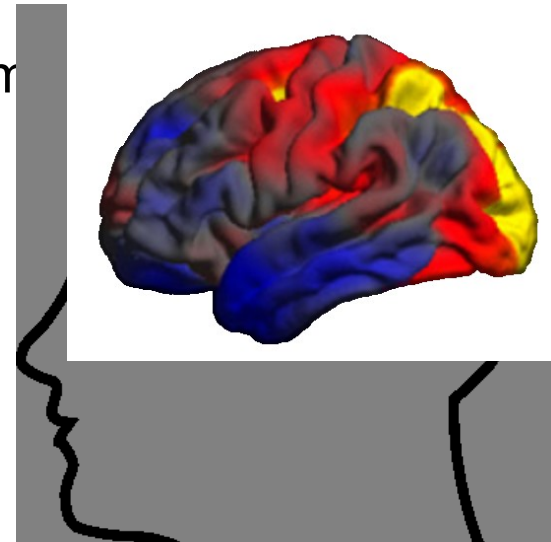
-20%



Cortex thinner
in typical AD

0%

20%



Hear clip: <https://www.bbc.co.uk/programmes/p03tqgg3>



It looks like a park...

Or a station

Or a building site

Looks a bit like the thing they're trying to elect (*sic*) for the Olympics

Or it could be the beach

Down here looks a bit sandy

Looks like Brighton or somewhere like that.

Diminished vision and spatial awareness

- Visual disorientation

- Misperceiving objects in clutter

ZNH Z N H

∇N◁ ∇ N ◁

5N6 5 N 6

- Difficulty perceiving large objects

word

word

Visual disorientation

Video clip removed

Misperceiving objects in clutter



“If things are very close together then they, sort of, combine and become unrecognisable unless I really concentrate on them. I just look at them as being a blob.”

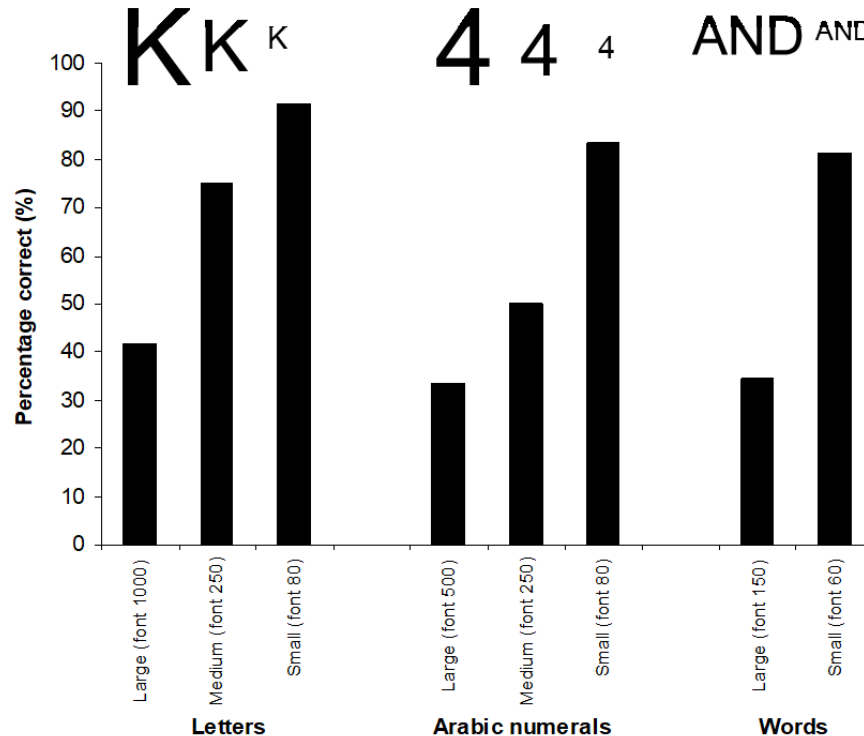
ZNH Z N H

▽ ▮ ▽ N ◁
 5 6 5 N 6

ZNH

ZNH

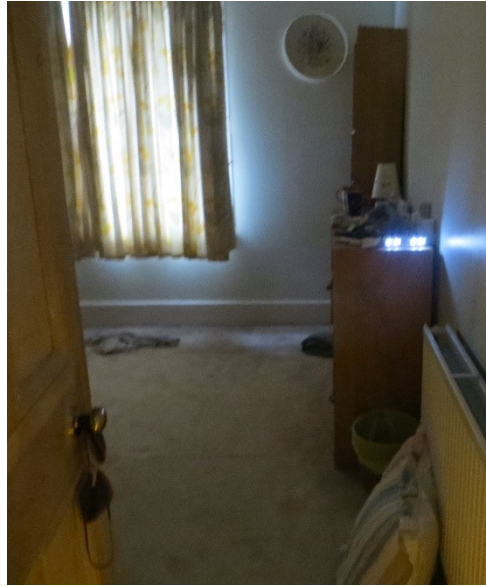
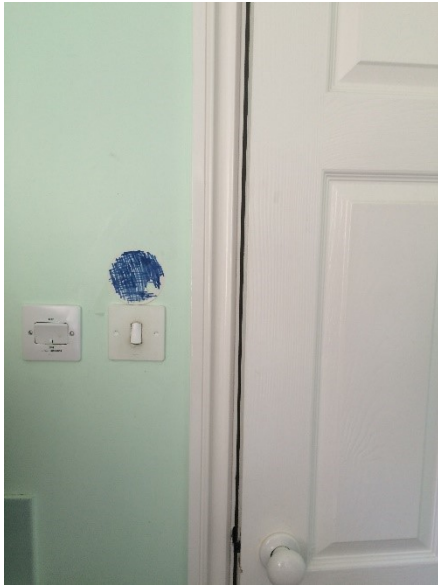
Difficulty perceiving large vs small objects

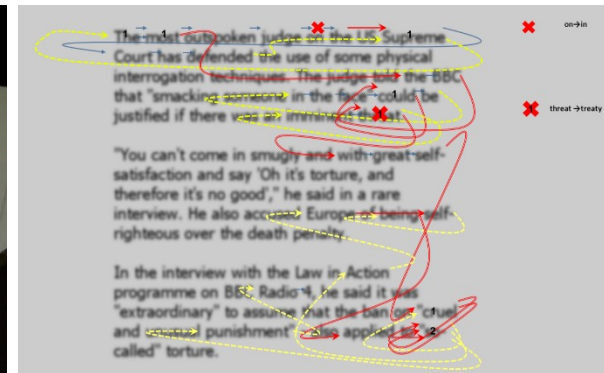


- Informing support strategies
 - Environmental accessibility supporting navigation
 - Assistive technology facilitating reading

Aims

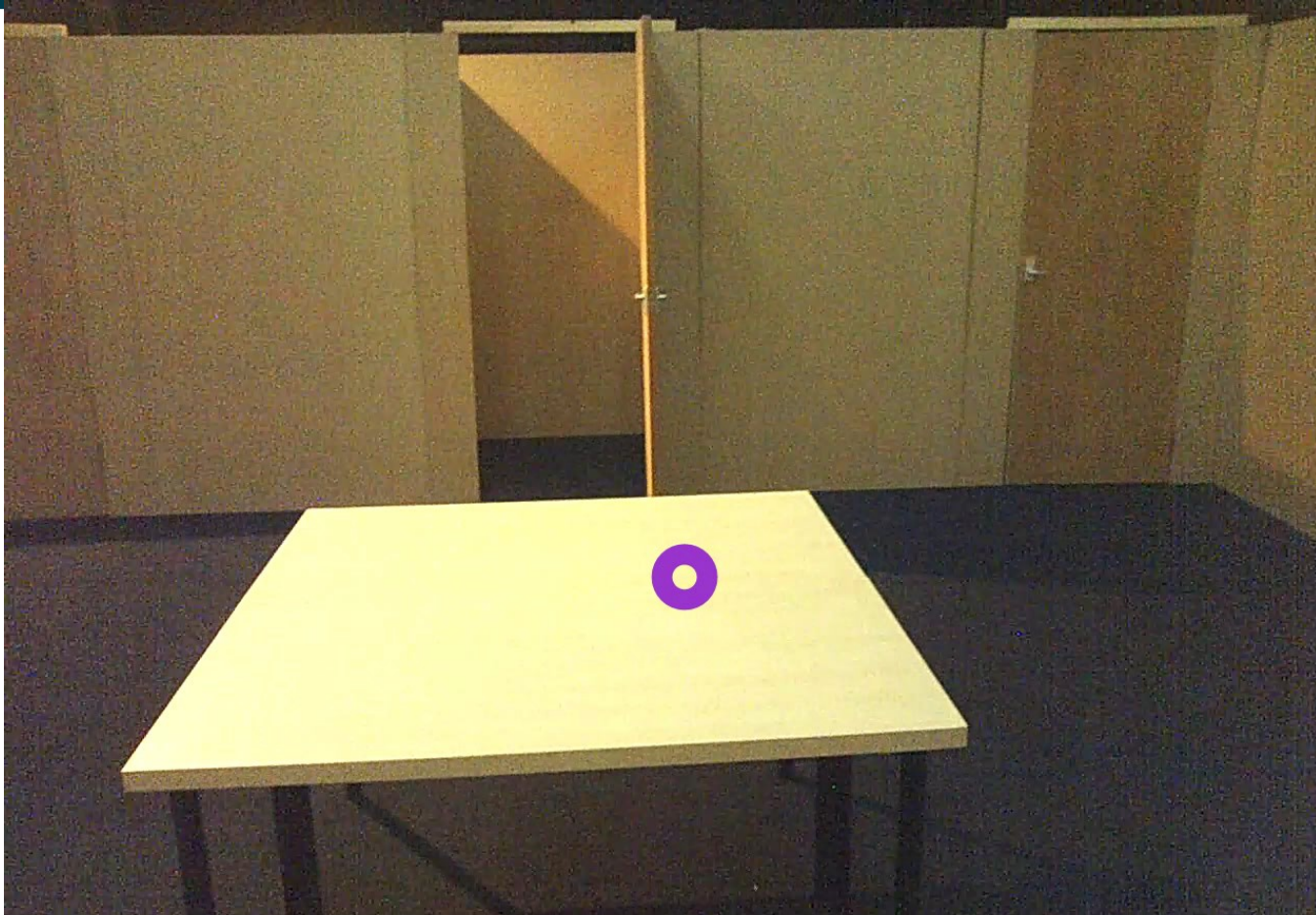
- Harness the perspectives of individuals with PCA to consider dementia-related visual impairment in typical AD
- Understand effects of visual environment on function in patients with PCA and typical AD
- Develop aids and strategies that compensate for the effects of dementia-related visual loss

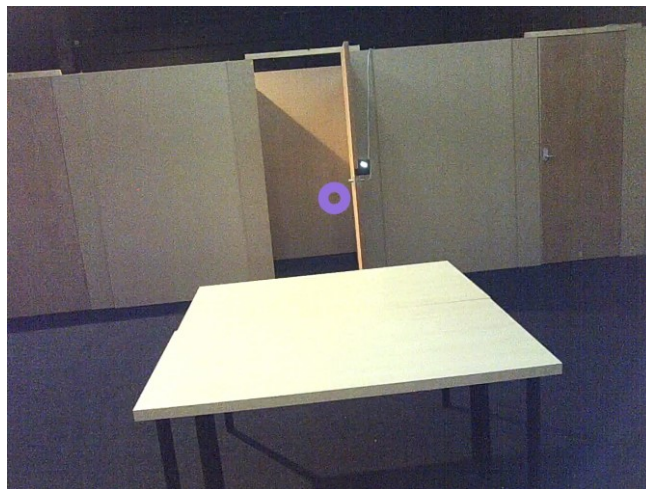
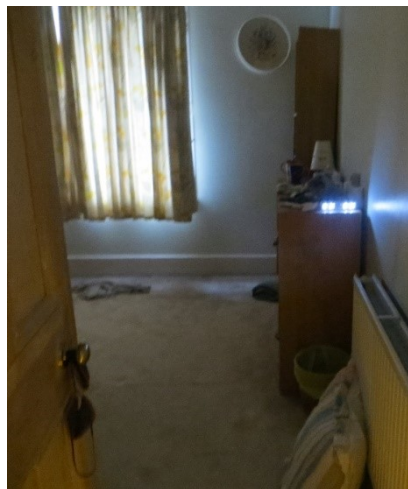
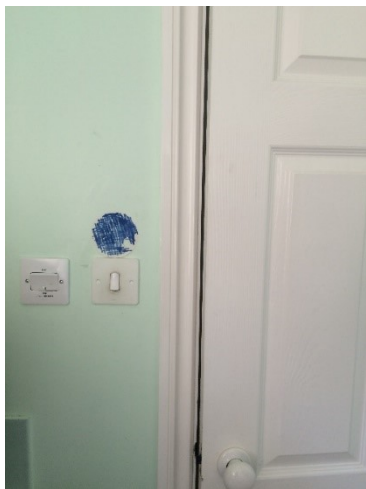




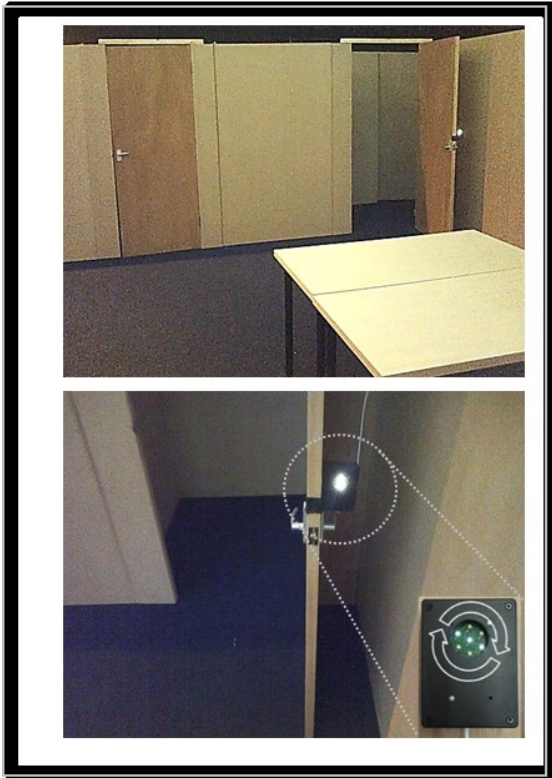
Adaptations to support navigation and reading

- Repeated measures studies featuring N trials per participant:
 - Navigation 1: 36 trials; Navigation 2: 32 trials; Reading: 18 trials
- Adaptation conditions counterbalanced within- and varying randomly between-participants for control for order effects





Navigation 1: Visual Cue effects

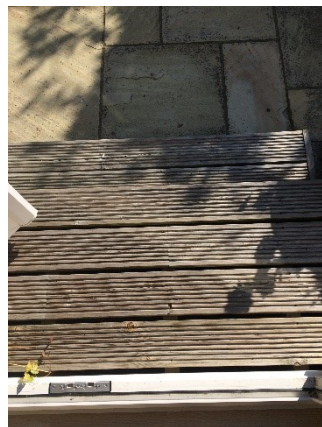


PCA/tAD (N=18; 36 trials per participant) reduced time to reach destinations [95%CI]:

- No Cue vs Contrast Cue: 12% [3, 20]
- No Cue vs Contrast+Motion Cue: 7% [-3, 15]



Shadow conditions



Navigation 2: Shadow effects

Yong et al., *A&D TRCI*, in press

PCA (N=10; 32 trials per participant)

reduced time to reach destinations,

Global $p=0.01$

[95%CI]:

(tAD/Con Global $p=.77/.33$)

Medium vs High:

5% [-1, 10]

No vs High:

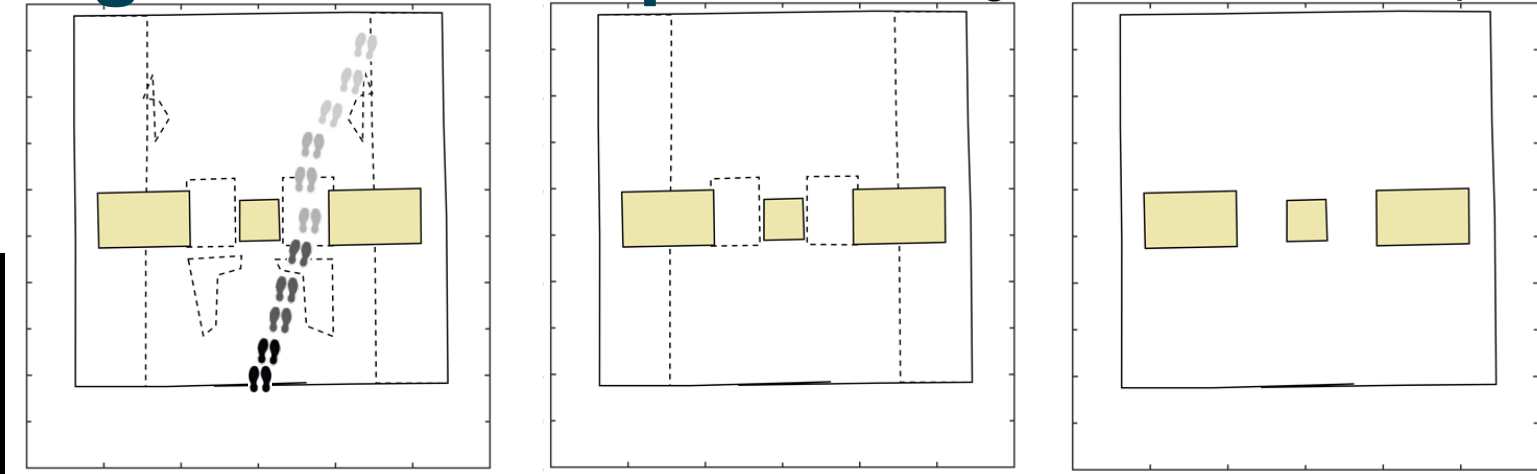
7% [2, 11]

Shadow conditions



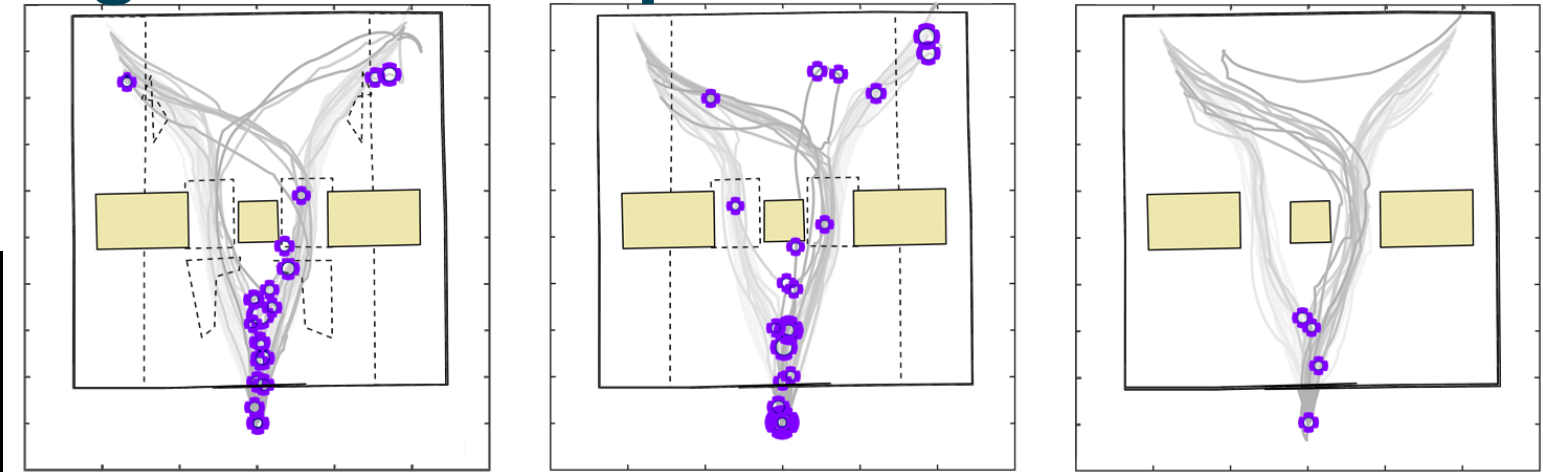
Detecting hesitant steps

Yong et al., *A&D TRCI*, in press



Detecting hesitant steps

Yong et al., *A&D TRCI*, in press



The most outspoken judge on the US Supreme Court has defended the use of some physical interrogation techniques. The judge told the BBC that "smacking someone in the face" could be justified if there was an imminent threat.

"You can't come in smugly and with great self-satisfaction and say 'Oh it's torture, and therefore it's no good'," he said in a rare interview. He also accused Europe of being self-righteous over the death penalty.

In the interview with the Law in Action programme on BBC Radio 4, he said it was "extraordinary" to assume that the ban on "cruel and unusual punishment" - also applied to "so-called" torture.

Reading loss in PCA

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✗ on → in
✗ threat → treaty

The diagram illustrates reading loss in PCA using a sample text. Red 'X' marks indicate errors: 'on' is crossed out and corrected to 'in', and 'threat' is crossed out and corrected to 'treaty'. Blue arrows show the original reading path, while red arrows show the path after corrections. Yellow dashed lines and red scribbles highlight areas of confusion or loss. Numbers '1' and '2' are placed at various points in the text to mark specific locations.

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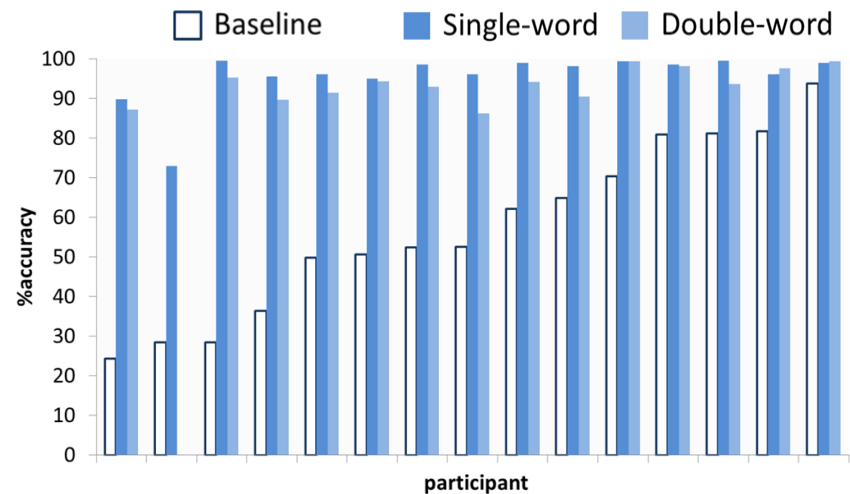
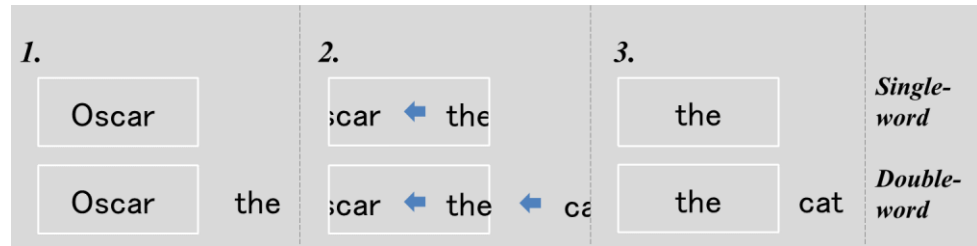
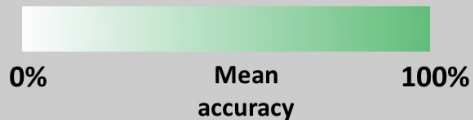
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Reading aids

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Co-design of assistive technology



Rare dementia support (www.raredementiasupport.org)

Our vision is for all individuals in England and Wales with or at risk of one of these rarer forms of dementia to have access to specialist information and support, and contact with other individuals affected by similar conditions.

posterior cortical atrophy

[PCA] SUPPORT GROUP

www.pcasupport.ucl.ac.uk



[PCA] SUPPORT GROUP

newsletter

Welcome to the [PCA] Support Group

The PCA Support Group met on February 1st in Wilkins Old Ballroom, at UCL, Gower Street site. As per the agenda, Dr Jonathan Schott presented on updates of the possibilities surrounding future treatments followed by a question and answer session co-hosted with Dr Seb Cruth.

After lunch, Mr Steve Unwin, head teacher at London Bennett School, described the day's activities programme he had facilitated there, before drawing out comparable associations with the needs of our group. He consisted members of the group in small group workshops during which we began to work towards a similar set of principles for our group members.

The work is ongoing, and you are warmly invited to contribute your thoughts or suggestions to helping.org.uk by the end of April 2012.

We welcomed several new members, attending for the first time. It can be so rewarding just how difficult it can be to attend this group for the first time. Perhaps this is offered this group for the first time.

PLEASE: We are currently seeking conscious volunteers to help with our activities.

Frontotemporal Dementia Support Group

(formerly Pick's Disease Support Group)

primary progressive aphasia

[PPA] SUPPORT GROUP

familial frontotemporal dementia

[fFTD] SUPPORT GROUP

www.ftdsupport.org

familial alzheimer's disease

[FAD] SUPPORT GROUP

Queen Square IoN

Sebastian Crutch

Aida Suarez Gonzalez

Amelia Carton

Emma Harding

Dilek Ocal

Ivanna Pavisic

Ashley Peacock

Brian Day

Diego Kaski

Charlie Harrison

Amy Peters

Matthew Bancroft

UCL Engineering

Nick Tyler

Catherine Holloway

Tatsuto Suzuki

Ayako Suzuki

Biao Yang

Derrick Boampong

Nikolaos Papadosifos

Karen Hayrapetyan

Daniel Alexander

Nicholas Firth

Neil Oxtoby

Kyriaki Mengoudi

Brunel University

Mary Gilhooly

Ken Gilhooly

Mary Pat Sullivan

Anne McIntyre

Rachel Woodbridge

London School of Hygiene and Tropical Medicine

Chris Frost

Julia Langham

Teresa Poole

Citizen researchers

Gaynor Hulme (1948-2018)

Andrew Brown (1955-2017)

Pam Hulme

Isabel Phillips

Lu Brown

Peter Riley

Lynn Ramsey



**Improving
Dementia Care**
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