Assistive Technology Across The Neurodisability Spectrum

Thursday July 18, 2019, 3-4pm
Elysium Conference, Northampton

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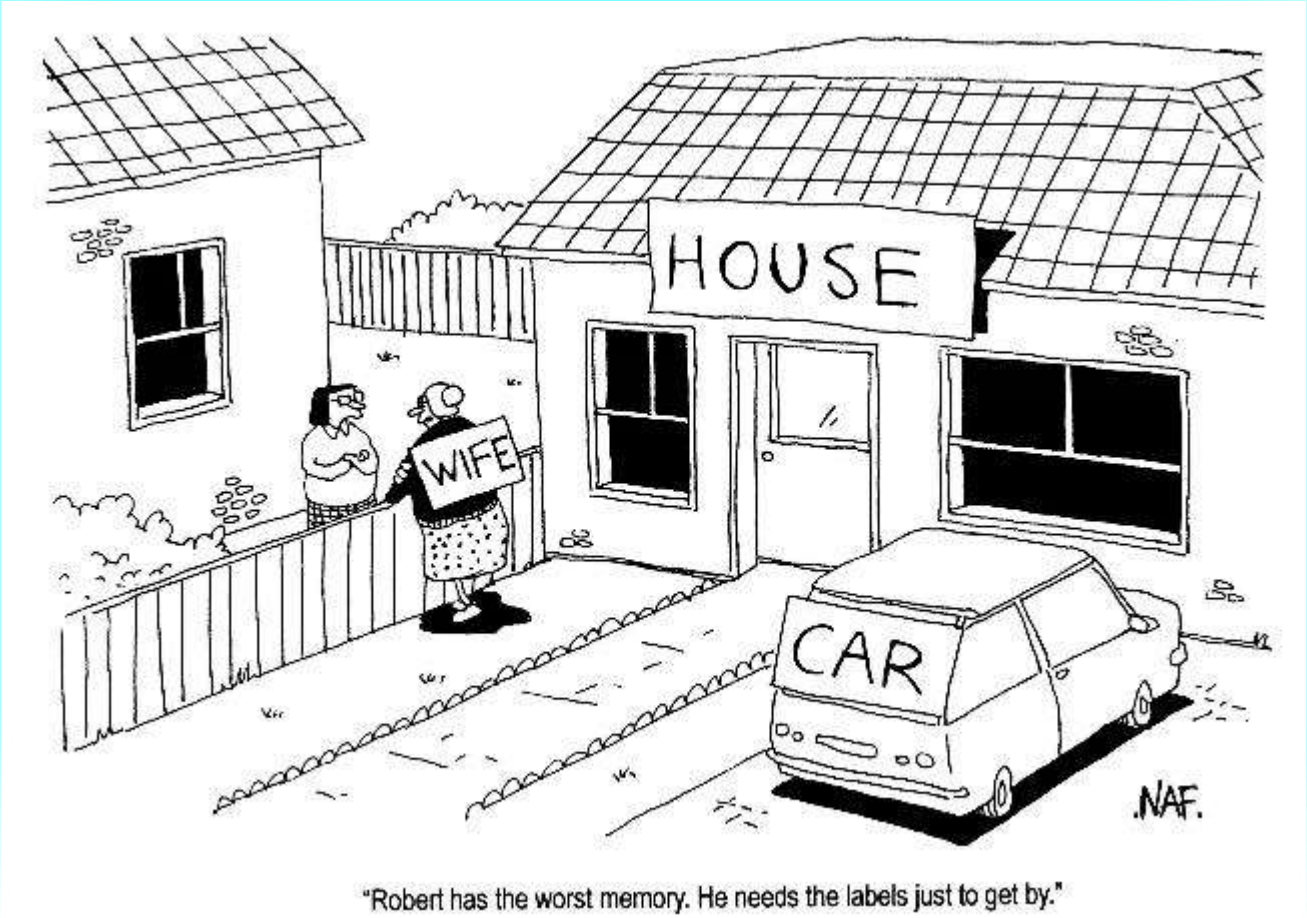


"Robert has the worst memory. He needs the labels just to get by."

Hard-working super Elysium Badby Park Psychology Assistants

Heena Parmar

Callum Watson

Amy Watts

Question 1

Who said this?

A wise man deliberately forgets many things

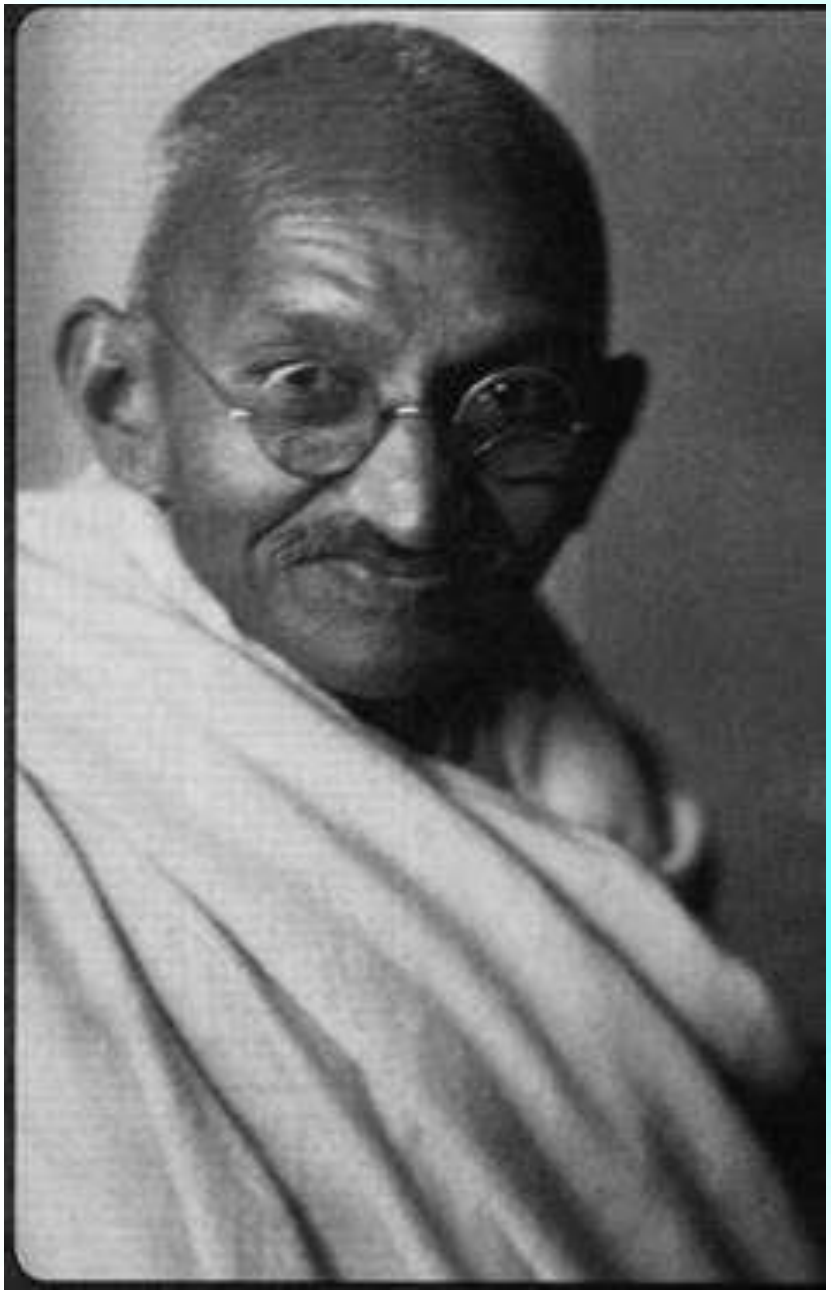
A. J F Kennedy

B. Mahatma Gandhi

C. William Shakespeare

D. Winston Churchill

Question 1



A wise man deliberately forgets many things

Mahatma Gandhi

Question 2

Who said this?

No man has a good enough memory to be a successful liar

A. John Lennon

B. Abraham Lincoln

C. Winston Churchill

D. Albert Einstein

Question 2

No man has a good enough memory to be a successful liar

Abraham Lincoln

Overview of Talk

1. Assistive Technologies in NeuroRehab: Overview
2. Applications at Elysium Badby Park NeuroCare Centre

Overview of Talk

1. **Assistive Technologies in NeuroRehab: Overview (Focus on Memory)**
2. **Applications at Elysium Badby Park NeuroCare Centre**

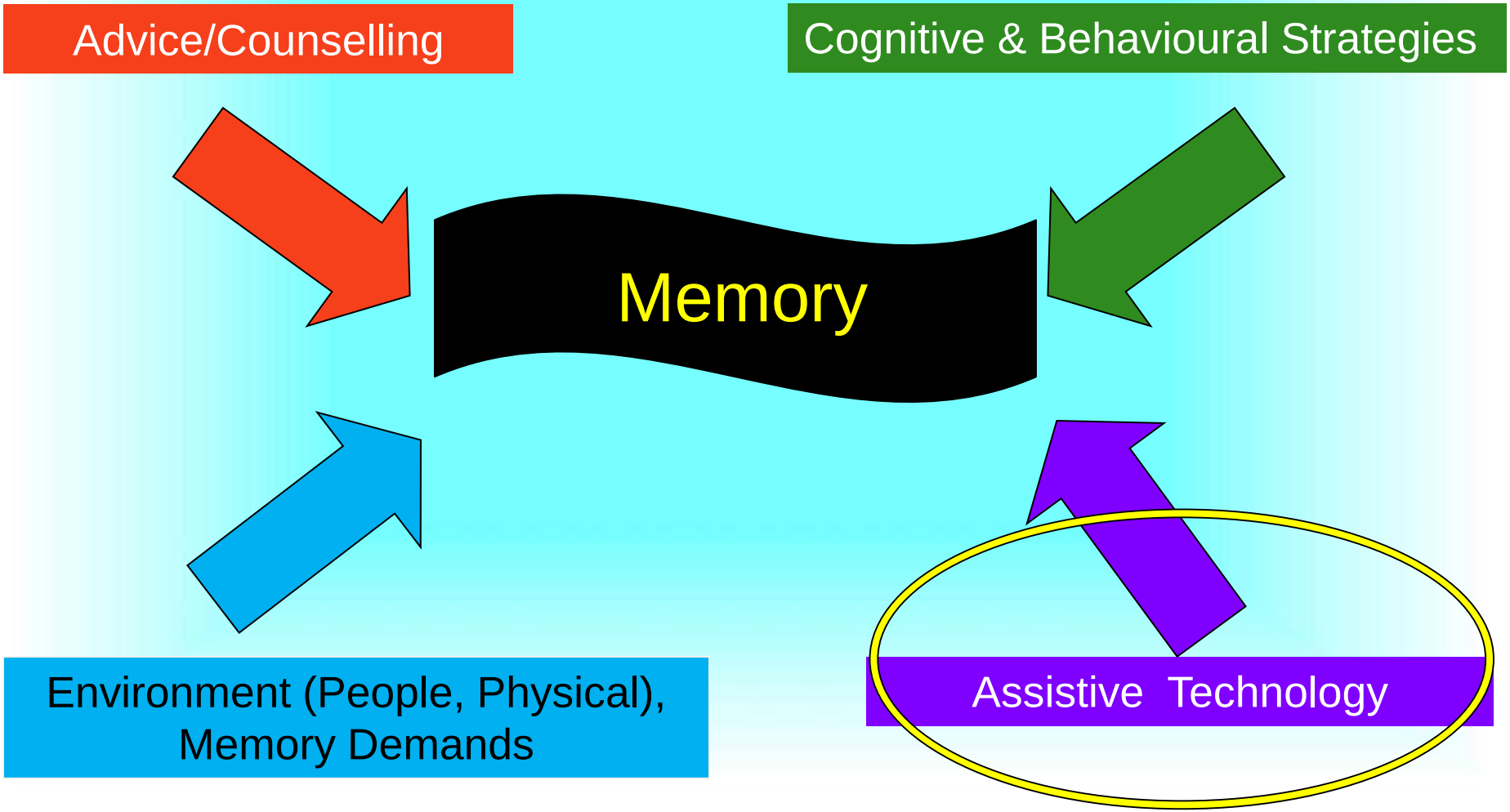
WHAT IS ASSISTIVE TECHNOLOGY?

Assistive technology devices are identified in the IDEA (Individuals with Disabilities Education Act) 2004 as:

Any item, piece of equipment or product system, whether acquired commercially off the shelf, modified, or customized, that is used to increase, maintain, or improve the functional capabilities of individuals with disabilities.

The term does not include a medical device that is surgically implanted, or the replacement of such device.

WAYS TO IMPROVE MEMORY




TO DO SOON
REMINDERS
2080
MESSAGES
APPOINTMENTS


May
Wed
PM
5
12
3
6
9

Connect mobile phone with smart watch through bluetooth function,
It can sync the phone notification of call and messages with smart watch

- Reminders to do something
- Store knowledge
- Navigate & Process Environment
- Record Personal Experience

Use bluetooth to connect your mobile phone and the watch

SmartWatches as a Tool in Memory Rehabilitation

Narinder Kapur*, Dalia Levi+, Jasmine Halvey§

* University College London; Imperial College NHS Trust
+ Great Ormond Street Hospital, London
§ Royal College of Psychiatrists

1 Introduction & Aims

Assistive Technology

Assistive technology is a commonly used tool in memory rehabilitation (Kapur et al., 2003; O'Neill and Gillespie, 2016). Two studies in particular have shown the efficacy of using a smartphone system to help domains such as prospective memory and remembering to do things in a routine (Wilson et al., 2001). As opposed to the use of paper-based strategies, which often require effort, concentration and learning, assistive technology may offer benefits as it is more accessible, both to facilitate individuals and users in everyday settings.

Wearable Devices

Even with the vast uptake by all sectors of society of technologies such as smartphones, one issue of some concern is a tendency to forget where we left our mobile phone, or we may forget to take our diary. Thus, when we leave home, we may simply choose to ignore this reminder. Wearable technology is more likely to lead to compliance in the case of such issues.

SmartWatches

While watches with such sophisticated features have been available for some time, the recent introduction of SmartWatches with Bluetooth capability has transformed the scene in the field of assistive technology. This is because of their connectivity to smartphones, and the availability of dedicated apps which further enhance the capabilities of SmartWatches.

Aims

We sought to evaluate the use, as part of a memory rehabilitation intervention in a Memory Aids Clinic, the introduction of SmartWatches would be acceptable to patients and would contribute to improvements in everyday memory functioning. The two patients were both persons with amnesia: patient 1 who had closed head injury damage to the hippocampus and was left with significant memory problems.

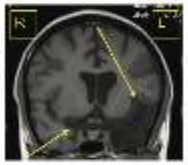
2 Clinical Cases

Patient 1

A man in his 40s who was now his own pharmacy retired, had surgery for removal of a colloid cyst around a year earlier. Structures such as the fornix which feed into the hippocampus were compromised as a result of the illness and the subsequent surgery to remove the cyst.

On neuropsychological testing, story recall and word list retention were markedly impaired, with delayed recall and recognition of a complex figure. Apart from a few scores on tests of verbal fluency, cognitive processes were well-preserved within normal limits.

Patient 2



A lady in her mid-30s suffered an encephalitic illness 7-8 years prior to the study. She was left with bilateral temporal lobe damage, more marked on the left than on the right, and with involvement of the hippocampus on each side.

On neuropsychological testing, story recall and word list retention were markedly impaired, with poor recognition memory and delayed recall and recognition of a complex figure. All other cognitive tests were performed within normal limits.

3 Intervention

General Memory Aids

Both participants had general memory aids in the form of diaries and notebooks that were considered to be their particular memory 'Save-Save' aids. Essential events such as shopping lists were also entered by a member of the rehabilitation team and a wall calendar system that allowed for medication reminders.

SmartWatch – Patient 1

Patient 1 was provided with a Pebble SmartWatch that was synchronised to Bluetooth on his iPhone. He used his SmartWatch every day. Thus, calendar reminders as well as text messages and emails that became activated on his iPhone were automatically displayed on his SmartWatch.

Pebble Watch

SmartWatch – Patient 2

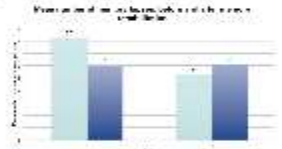
Patient 2 was provided with a Samsung Gear 2 SmartWatch that was synchronised to Bluetooth on her Samsung Galaxy phone. She used the SmartWatch in a similar way to Patient 1. Thus, calendar reminders as well as text messages and emails that became activated on her iPhone were automatically displayed on her SmartWatch.

Samsung Gear 2 watch

4 Outcomes

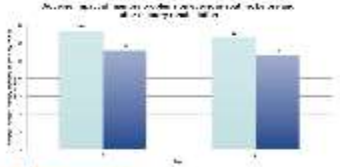
Number of Memory Lapses

Using an electronically recorded diary, each patient kept a record of number of memory lapses over a two-day period, before and after the programme of memory rehabilitation. One patient showed a significant reduction in number of memory lapses, while for the other patient there was a slight increase in lapses, which may have been due in part to her becoming more aware of her everyday memory lapses.



Rating of Memory Improvement

Both patients and their partners completed daily scales relating to overload, everyday memory assistance, how it was affected socially, as well as overall satisfaction with treatment. Both patients showed an improvement in how they were coping with their memory difficulties –



Functional Improvements

Patient 1 was able to hold down and assume many productive roles in the community. In the month before the rehabilitation, he processed 40 orders. After rehabilitation, this had increased to 60 orders per month. He personally felt much more confident about being able to work independently, and no longer needed to rely on his partner as much as previously. He was also able to resume his driving.

Patient 2 felt more confident in engaging in activities with domestic and leisure activities.

Benefits of SmartWatch

We gave both patients a questionnaire to evaluate their views on the usefulness of the SmartWatch and how helpful it was.

Patient 1 used it daily, and found it very beneficial. He found it helpful in domestic and work settings, and found it helpful to a lesser extent in social settings or travelling about.

Patient 2 used the SmartWatch frequently, though, as a single lady, has fewer reminders uploaded with a Goal Statement, and found it more useful in social settings and travelling about than in home.

5 Conclusions

SmartWatches hold significant promise as novel, hi-tech memory aids which can help people with memory problems. Our key conclusions are –

- Both patients found the SmartWatch easy to use and were satisfied with the device.
- Patient 1 found the SmartWatch particularly helpful in domestic and work settings, and Patient 2 found it helpful in social settings.
- Using a SmartWatch as an assistive technology device may be a cost-effective intervention for people with memory problems.
- Larger-scale studies, with more patients and using more rigorous methodology, are now needed to evaluate the effectiveness of SmartWatches as memory aids.

6 References

Kapur N et al. (2003). External memory aids for people with memory deficits. *Neuropsychological Rehabilitation*, 13: 41-52.

He C et al. (2014). Assessing the attention allocation ability of patients with schizophrenia. *Acta Psychologica Sinica*, 7: 86-94.

O'Neill B, Gillespie A. (2016). Assistive Technology & Cognitive Rehabilitation. Psychology Press.

Wilson B et al. (2001). Assessing everyday memory and planning problems by means of a pager system: A randomised crossover study. *Journal of Neurology, Neurosurgery and Psychiatry*, 70: 477-82.

NEUROPSYCHOLOGICAL REHABILITATION, 2017
http://dx.doi.org/10.1080/09602011.2017.1310658

Routledge
Taylor & Francis Group

The use of a smartwatch as a prompting device for people with acquired brain injury: a single case experimental design study

Matthew Jamieson[a,b], Mattia Monastra[c], Graeme Gillies[c], Rumen Manolov[d], Breda Cullen[a], Marilyn McGee-Lennon[e], Stephen Brewster[b] and Jonathan Evans[a]

[a]Institute of Health and Wellbeing, University of Glasgow, Glasgow, Scotland; [b]Human Computer Interaction, Department of Computing Science, University of Glasgow, Glasgow, Scotland; [c]Acquired Brain Injury Team, West Dunbartonshire, Glasgow, Scotland; [d]Faculty of Psychology, University of Barcelona, Barcelona, Spain; [e]Computer and Information Science, University of Strathclyde, Glasgow,

NEUROCASE
https://doi.org/10.1080/13554794.2019.1602145

Routledge
Taylor & Francis Group

Smartwatch aids time-based prospective memory in Korsakoff syndrome: a case study

Beth Lloyd[a,b], Erik Oudman[a,b], Mareike Altgassen[c] and Albert Postma[a,b]

[a]Helmhotz Institute, Experimental Psychology, Utrecht University, Utrecht, The Netherlands; [b]Slingedael Korsakoff Center, Rotterdam, The Netherlands; [c]Donders Institute for Brain, Cognition and Behaviour, Radboud University, Nijmegen, The Netherlands

ABSTRACT

Prospective memory (PM) is the ability to remember to carry out an intention in the future. PM is particularly impaired in Korsakoff syndrome (KS). We investigated the benefit of a smartwatch and smartphone compared to no aid in supporting time accuracy and PM task performance in KS. Time accuracy was improved with a smartwatch compared to the other conditions. Furthermore, the smartwatch and phone conditions were more effective than no aid in assisting memory for task content. Together these results suggest that using an external memory aid is beneficial for successful PM in KS.

ARTICLE HISTORY
Received 25 January 2019
Accepted 26 March 2019

KEYWORDS
Prospective memory; Korsakoff; external memory; memory aid; smart watch

Background Information: Patient CC

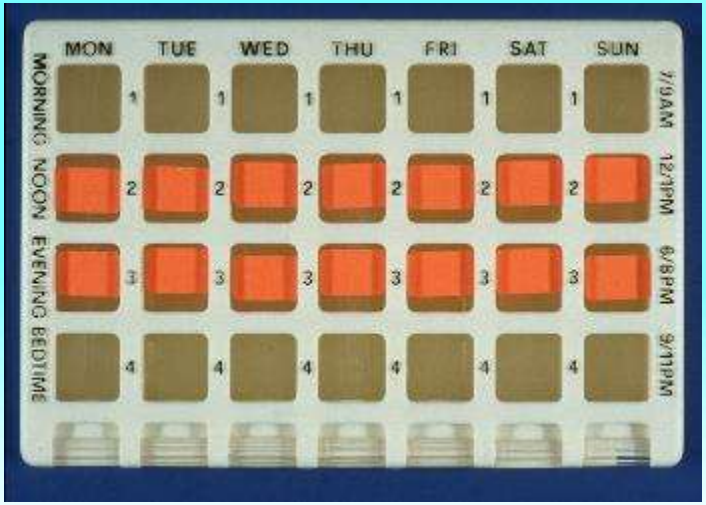
- 42 year-old man, working in senior position in local government
- 22 years history of Multiple Sclerosis
- One year history of memory difficulties, affecting both work and domestic situations
- VIDEO – 5 minutes where he describes his use of various memory aids

In-car voice message reminder

Memo Recorder

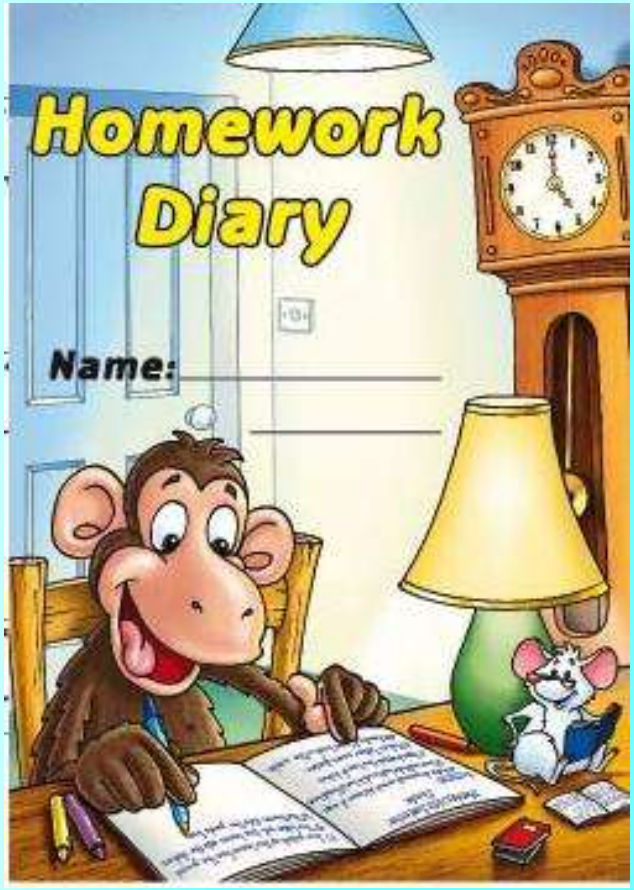
Memo Pad for Car

Vibrating Cue



Pill Box Organizer

How can we help autobiographical memory?



Written Diary

Photographs

SenseCam

Video clip (4 mins) of patient with memory loss following encephalitis describing how using a wearable camera, ‘Sensecam’, that automatically took pictures helped her memory.

Memory, 2014
http://dx.doi.org/10.1080/09658211.2014.886703

Routledge
Taylor & Francis Group

The use of a wearable camera improves autobiographical memory in patients with Alzheimer's disease

Emma Woodberry[1], Georgina Browne[1], Steve Hodges[2], Peter Watson[3], Narinder Kapur[4], and Ken Woodberry[2]

[1]Neuropsychology Department, R3 Neurosciences, Addenbrooke's Hospital, Cambridge, UK
[2]Microsoft Research Cambridge, Cambridge, UK
[3]MRC Cognition and Brain Sciences Unit, Cambridge, UK
[4]Department of Clinical, Educational and Health Psychology, University College London, London, UK

(*Received 30 September 2013; accepted 20 January 2014*)

Despite the marked impairment of recent episodic memories in Alzheimer's disease, there have been few attempts to rehabilitate these deficits. We used a novel external memory aid to promote recall of episodic memories in patients with mild to moderate Alzheimer's disease. SenseCam, a small wearable camera, recorded significant events in the lives of six Alzheimer's disease patients. Every two days for two weeks each patient's memory for an event was assessed, followed by a structured review of the SenseCam images. Longer-term recall was tested one and three months later. A written diary control condition followed the same procedure. Across 40 events the SenseCam review method resulted in significantly more details of an event being recalled over two weeks than the written diary method in five out of the six patients. At three months post event, four out of five patients (one had dropped out) recalled significantly more details of events in the SenseCam condition while the other patient showed no significant difference. Viewing SenseCam images of personally experienced events may significantly improve autobiographical memory in patients with even moderate Alzheimer's disease.

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Overview of Talk

1. Assistive Technologies in NeuroRehab: Overview
2. Applications at Elysium Badby Park NeuroCare Centre

APPLICATIONS AT ELYSIUM BADBY PARK CENTRE

a) Robot Pets

b) Music on Demand

c) Voice Assistants

d) Exergames

e) Apps for NeuroRehab

f) Intelligent Clock Displays

g) Virtual Reality

h) Multisensory Mindfulness

i) Vibrating Reminder Prompts

APPLICATIONS AT ELYSIUM BADBY PARK CENTRE

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Animal robots comfort dementia patients

25 Jul 18

Teenager takes footage of 9ft shark in Cornwall

18 Jul 18

Gary Barlow meets anti-ticket tout fan

07 Jun 18

Too many toys to fit in one house

31 May 18

Meet the Poldark superfans from the US

30 May 18

Deer takes on river swim

26 Apr 18

Dolphins play by monument

08 Jan 18

Animal robots comfort Cornwall dementia patients

Robotic animals that respond to touch are being used in trials at care homes.

Hannah Bradwell, a PhD student from the University of Plymouth, is researching whether they can help reduce agitation in people with dementia and reduce the amount of medication they need.

She is working with a design company to develop cheaper robotic pets than those currently available.

25 Jul 2018

Psychiatry Research 271 (2019) 516–525

Contents lists available at ScienceDirect

Psychiatry Research

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

Pet robot intervention for people with dementia: A systematic review and meta-analysis of randomized controlled trials☆

Leng Minmin[a,1], Liu Peng[b,1], Zhang Ping[c], Hu Mingyue[a], Zhou Haiyan[d], Li Guichen[a], Yin Huiru[a], Chen Li[a,e,*]

[a] School of Nursing, Jilin University, Changchun, China
[b] School of Mechanical Science and Engineering, Jilin University, Changchun, China
[c] School of Nursing, Southern Medical University, Guangzhou, China
[d] The First Hospital of Jilin University, Changchun, China
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ARTICLE INFO

ABSTRACT

This study aims to systematically evaluate the efficacy of Pet robot intervention (PRI) for people with dementia. Two waves of electronic searches of the PubMed, EMBASE, Web of Science, Cochrane library, IEEE Digital Library and PsycINFO databases were conducted. In total, eight articles from six randomized controlled trials (RCTs) met the eligibility criteria and were included in this systematic review. The results of the meta-analysis showed a statistically significant decrease in behavioral and psychological symptoms of dementia (BPSD), especially agitation and depression, in people with dementia who were treated with PRI. Both individual and group format PRI significantly ameliorated BPSD. However, there were no significant improvements in cognitive function or quality of life. The results of the meta-analysis suggest that PRI may be suitable as a treatment option for BPSD in people with dementia and should be considered as a useful tool in clinical practice.

We have –

- Two large robot pet dogs, and one baby robot dog
- One large robot pet cat, and one baby robot cat
- One robot pet horse [move around on trolley]
- One baby robot monkey
- A robot pet parrot which talks back
- A robot pet panda which talks back

Most of the robot pets respond to touch command and one to voice command, most carry out movements and vocalise. We use them in both individual and group settings. For selected patients who have favourite smells, in individual sessions we can spray specific odours on the pets, so that all of the sensory modalities are engaged for a pleasant experience.

The robot pets are primarily used to –

- Encourage pleasant feelings which help set patients in a good mood to engage with staff and participate in therapy
- Bring back happy memories
- As a possible source of distraction should the patient start engaging in disruptive behaviours
- Two short videos, 70s and 12s

PET THERAPY GROUP

- Meets once a fortnight for 30 mins
- One Pet Therapy Group for the **Acquired Brain Injury Ward**
- One Pet Therapy Group for the **Dementia Ward**
- Usually 5-8 residents take part. Held in lounge.

- Accessories include brushes, carrot for horse, doggie bone, doggie treats and trolley for horse.

- Format is relatively informal, but we always have ‘animal theme’ video songs playing on a Smart TV in the background, with remote wireless link from an iPad.

- Some patients will prefer to brush pets, some may interact with pets, some may just watch baby robopets moving round on floor and some may just sing along with animal theme songs.

PET THERAPY GROUP

Value

- Encourage residents to have positive reactions with robot pets by interacting with them, and engaging in nurturing behaviours such as grooming and feeding.
- Initiates meaningful activities and interactions with pets.
- Engagement with animal-themed video songs.
- Encourages informal engagement between residents.
- Helps improve anxiety and mood levels.

Comments from Patients

- ✓ *Awesome. Love the pets and cats. It is really relaxing.*
- ✓ *I love the cat, it's almost real. It reminds me of my cat. It soothes me. It cuddles into my arm.*
- ✓ *I really like them. It's good practise to have them before real pets because you can cuddle them. It makes me feel relaxed….they're lovely.*

APPLICATIONS AT ELYSIUM BADBY PARK CENTRE

a) Robot Pets

b) **Music on Demand**

c) Voice Assistants

d) Exergames

e) Apps for NeuroRehab

f) Intelligent Clock Displays

g) Virtual Reality

h) Multisensory Mindfulness

i) Vibrating Reminder Prompts

Stories

The power of music: Vicky McClure's dementia choir

2 May 2019 Share

A million people in the UK are expected to be living with dementia by 2025. While there is no cure, there's growing evidence that music can help ameliorate symptoms such as depression and agitation, writes Kelly Oakes - and also bring these people and their families some much-needed moments of joy.

Prescribe music and gardening for dementia, NICE recommends

28 JUNE, 2019

BY JO STEPHENSON
Reporter

COMMENT

People with dementia should be offered activities such as exercise, aromatherapy, gardening and mindfulness to help them stay well and independent, according to new standards for dementia care.

The Gerontologist
Cite journal as: The Gerontologist Vol. 54, No. 4, 634–650
doi:10.1093/geront/gnt100

Advance Access publication September 5, 2013

Cognitive, Emotional, and Social Benefits of Regular Musical Activities in Early Dementia: Randomized Controlled Study

Teppo Särkämö, PhD, MA,[*,1,2] Mari Tervaniemi, PhD, MA,[1,2] Sari Laitinen, LicPhil,[3] Ava Numminen, PhD, MA,[4] Merja Kurki, PhD, MA,[3] Julene K. Johnson, PhD,[5] and Pekka Rantanen, PhD, MD[6]

- We use Spotify and Apple iTunes on an iPad / Smart Phone to deliver songs / music that is specifically enjoyed by an individual patient. This can be useful as a means of engaging the patient at the start of a session, improving mood and encouraging recall of pleasant autobiographical memories which may be associated with or triggered by the music.

- We can combine this music with relaxation media, such as sounds of waves, odours, etc

- For the (robot) Pet Therapy Group, we have animal-themed songs playing in the background.

APPLICATIONS AT ELYSIUM BADBY PARK CENTRE

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c) **Voice Assistants**

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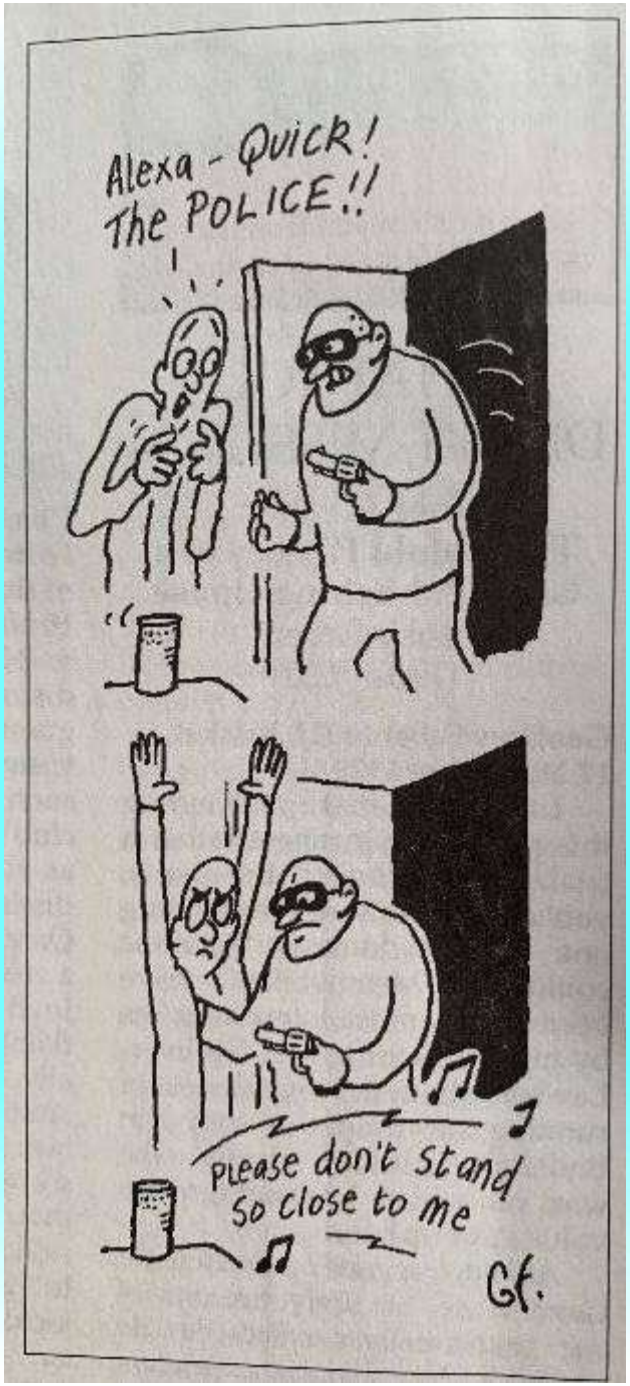
Alexa - QUICK!
The POLICE!!
Please don't stand
so close to me
Gt.


WHY IS THE ELECTRIC BILL SO HIGH?
offthemark.com
ALEXA, TURN ON THE LIGHTS ... ALEXA, TURN ON THE TV... ALEXA, PLAY MUSIC... ALEXA...
MARK PARISI
MarkParisi@aol.com
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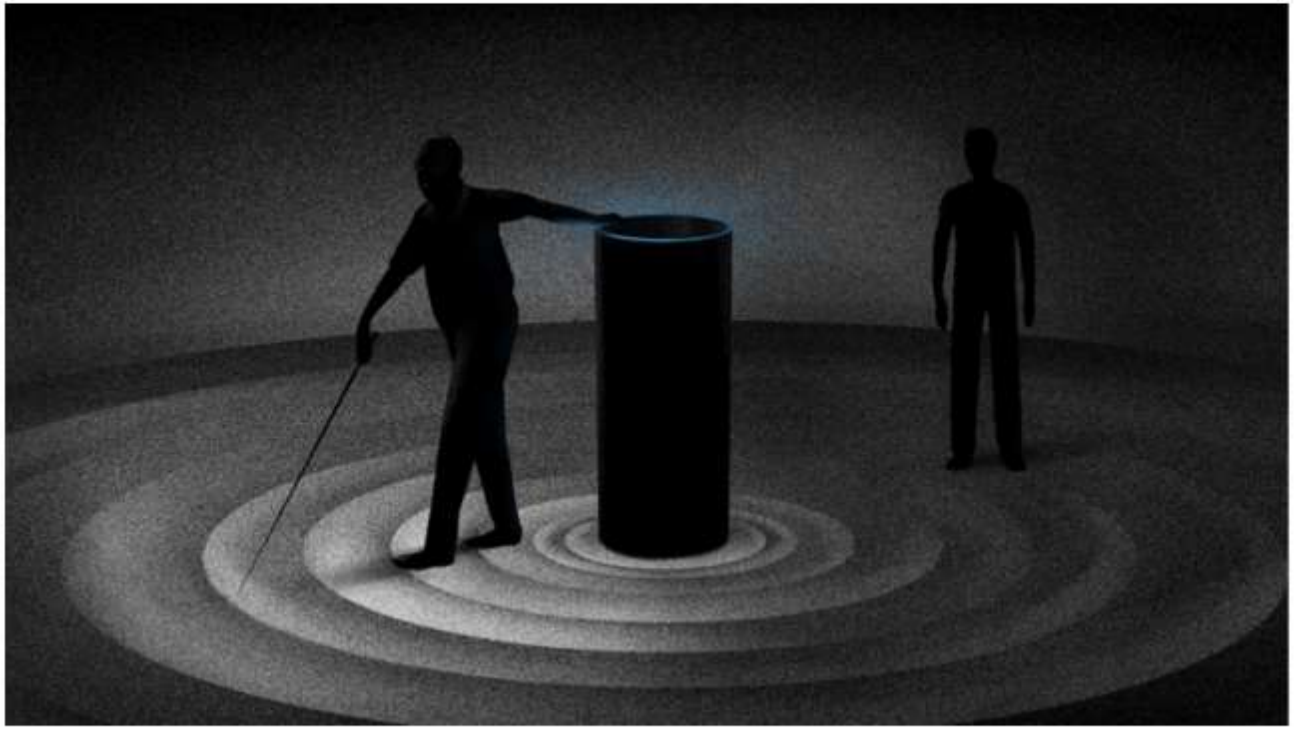
TECHNOLOGY

Alexa Is a Revelation for the Blind

Legally blind since age 18, my father missed out on the first digital revolution.

IAN BOGOST MAY 2018 ISSUE



DANIEL STOLLE

"Is it 'ELECTRA?'" my father asks, leaning in close to the Amazon Echo my mother has just installed. Leaning in close is his trademark maneuver: Dad has been legally blind since age 18, the result of a horrible car crash in 1954. He has lived, mostly successfully, with limited vision for the 64 years since.

Amazon Alexa offering NHS health advice

6 hours ago

People will be able to get expert health advice using Amazon Alexa devices under a partnership with the NHS, the government has announced.

Overview of Voice Assistant Technology

1. Game-changer for many patients, especially those with visual impairment and those with major motor disability
2. Empowers patients…gives them greater independence and control
3. Reduces burden on healthcare staff and carers, with less likelihood of ‘burnout’
4. On the basis of evidence so far, Amazon Alexa is by far the better resource, though Google Home appears to have a more intelligent voice comprehension system. Apple also has a system, but it is more expensive and less developed than Alexa.

1. Reminders

Schedules – A personal calendar and therapy schedule can be entered into the device, allowing for prompts and reminders for therapy sessions, appointments, planned events, take medication at set times, etc. to be emitted spontaneously or to voice command.

Prompts – Reminders to stick to certain rules, etc.

2. Information Retrieval

Knowledge Retrieval – Voice-access to information from websites e.g. Wikipedia, news websites, social media.

Orientation – The default screen can display time and place information, and this can also be as speech output at set times or to command.

Weather Forecast – Voice access to current weather forecast for the local area.

Guides – Guidance for carrying out certain tasks, e.g. cooking a particular dish.

3. Communication

Phone & Video calls – Can use voice control to make audio and video calls to mobile contacts. Both text and voice messages can be sent between other Alexa devices connected on the same Wi-Fi network.

4. Shopping

Products can be ordered through voice-control, delivered to a preferred address and paid for. A taxi can be ordered, and a Virgin train ticket can be booked.

5. Leisure Activities

Games – Various puzzles and games can be played.
Multimedia – Music, Photographs, Videos can be voice-selected and displayed on the device screen or television. Talking books can be activated.

6. Environmental Control

Television – Voice control for turning TV on/off, volume control and selecting channels.
Lights – Voice control for turning lights on/off, changing luminance level and changing the lighting colour.

CLINICAL CASE

Clinical History

Man in mid 50s. Underwent brain surgery in 2008 for left occipital intraventricular meningioma. This was followed by severe obstructive hydrocephalus. Left with marked visual loss, executive function deficits and poor memory. Disinhibition, which includes frequently asking for food, wanting to smoke, and making demands on staff. Well over-weight. Has wife and son. Pre-illness, ran a bookshop.

1. Reminders

Schedules – His therapy time-table is entered into the Alexa app, and he can ask for this schedule at any time of the day. At the time of an event, it will also cue him with a reminder.

2. Information Retrieval

Knowledge Retrieval – He may occasionally ask general knowledge questions of Alexa, e.g. how many books Charles Dickens has written.

Orientation – He will ask Alexa the time and date.

3. Communication

Phone & Video calls – Due to his behavioural problems, his phone access is restricted, so he does not use Alexa to make phone calls or video calls (His uses Echo Dot which does not have a screen).

4. Shopping

Because of his impulsivity, we do not allow him to use Alexa for shopping.

5. Leisure Activities

Games – He has played a quiz game on Alexa.

Multimedia – He uses it frequently to play music and listen to audio books. He keeps the music constantly on as an auditory orientation to help him locate his room in the unit, which can be problematic due to his marked visual problems and also memory loss.

6. Environmental Control

Television – Because of his poor vision he does not watch TV.

Lights – He does not use it to control lighting his room.

20s video clip where he asks Alexa the time and what he is due to do next (Alexa replies, '*Vape in 15 minutes*')

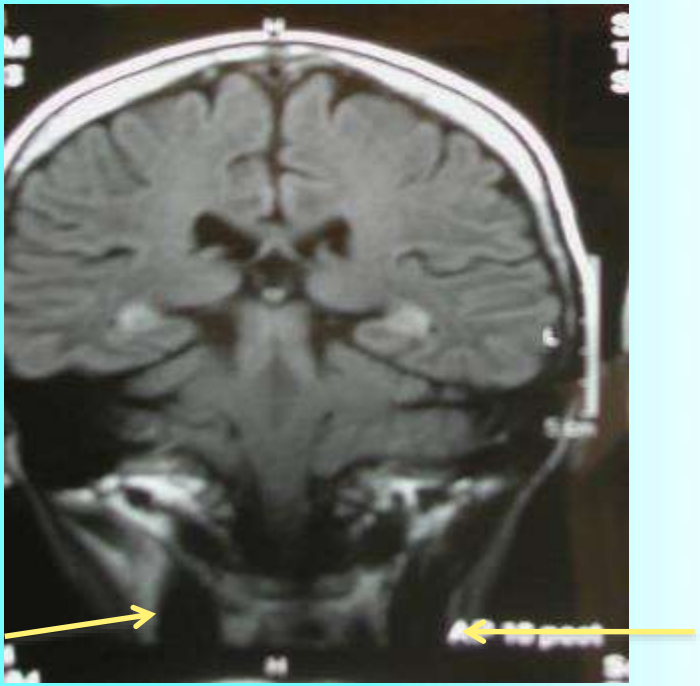
CLINICAL CASE

Clinical History

Lady in her early 40s. Multiple cerebral and spinal cavernomas. Tetraplegia. Epilepsy, with last seizure in 2013. Thyroidectomy.

40s video clip where patient describes her use of Alexa, and how it may be useful in the future

- 77 year old, well educated woman.
- Limbic encephalitis 2002. Bilateral hippocampal lesions.
- Marked episodic memory impairment.
- 60s video clip where she talks about having Google Voice Assistant to play her music, and asks it who is the US President. [Note the issue of teaching the patient how to effectively give commands to the Google Voice Assistant]



(Berry et al., *Neuropsychological Rehabilitation*, 2007)

Tips for Using Voice Assistants

1. Check how familiar the patient is with technology
2. Ensure they have a SmartPhone / Tablet for downloading control App & Wifi connectivity
3. Be with them when device is set up
4. (For visually impaired, have these on a portable audio recorder)
5. Have regular practice / learning sessions to check that the individual is comfortable using it and can use it efficiently
6. Keep uptodate with web resources on the device, software/hardware updates, etc
7. Ensure written instructions and tips for using device, ideally on wall poster next to device

B – ALEXA TIPS

1. Say a request in a loud, clear voice. Speak slowly.

2. Always start a request with ‘ALEXA’

3. If you want Alexa to stop talking or stop playing music, say ‘ALEXA, STOP’

4. Some of the things you can ask of Alexa
   - Weather – **ALEXA, WHAT IS THE WEATHER LIKE TODAY**
   - Time – **ALEXA, TELL ME THE TIME**
   - Day/Date – **ALEXA, TELL ME THE DATE**
   - Lights – **ALEXA, TURN OFF THE LIGHTS**
   - Schedule – **ALEXA, WHAT IS MY SCHEDULE**
   - Doing Next – **ALEXA, WHAT AM I DOING NEXT**
   - Games – **ALEXA, PLAY TRUE OR FALSE**
   - News – **ALEXA, TELL ME THE NEWS**
   - Music – **ALEXA, PLAY RADIO 1 / KERRANG RADIO / RADIO UCB2**
   - Jokes – **ALEXA, TELL ME A JOKE**

APPLICATIONS AT ELYSIUM BADBY PARK CENTRE

a) Robot Pets

b) Music on Demand

c) Voice Assistants

d) **Exergames**

e) Apps for NeuroRehab

f) Intelligent Clock Displays

g) Virtual Reality

h) Multisensory Mindfulness

i) Vibrating Reminder Prompts

Nintendo Wii

Microsoft Kinect

Online version at http://www.minervamedica.it

European Journal of Physical and Rehabilitation Medicine 2018 June;54(3):450-62
DOI: 10.23736/S1973-9087.17.04680-9

SYSTEMATIC REVIEW

Active exergames to improve cognitive functioning in neurological disabilities: a systematic review and meta-analysis

Gioia MURA [1] *, Mauro G. CARTA [1], Federica SANCASSIANI [1], Sergio MACHADO [2, 3, 4], Luca PROSPERINI [5, 6]

The use of commercial video games in rehabilitation: a systematic review

Bruno Bonnechère[a,b,c], Bart Jansen[b,c], Lubos Omelina[b,c,d] and Serge Van Sint Jan[a]

The aim of this paper was to investigate the effect of commercial video games (VGs) in physical rehabilitation of motor functions. Several databases were screened (Medline, SAGE Journals Online, and ScienceDirect) using combinations of the following free-text terms: commercial games, video games, exergames, serious gaming, rehabilitation games, PlayStation, Nintendo, Wii, Wii Fit, Xbox, and Kinect. The search was limited to peer-reviewed English journals. The beginning of the search time frame was not restricted and the end of the search time frame was 31 December 2015. Only randomized controlled trial, cohort, sessions, intervention duration, outcome measures, and sample size). The results of this review show that in most cases, the introduction of VG training in physical rehabilitation offered similar results as conventional therapy. Therefore, VGs could be added as an adjunct treatment in rehabilitation for various pathologies to stimulate patient motivation. VGs could also be used at home to maintain rehabilitation benefits. *International Journal of Rehabilitation Research* **39:277–290**

International Journal of Rehabilitation Research 2016, 39:277–290

CLINICAL CASE

Clinical History

Lady in late 40s. Traumatic brain injury in 2015 with diffuse axonal injury and diffuse subarachnoid haemorrhage. Wheelchair bound. Blind in one eye. Dysphagia and dysarthria.

40s video of her playing a tennis game on Nintendo Wii

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Pinterest
Pinterest
Appetizing

The Neuropsychologist, October 2018

neuropsychological rehabilitation and the creation of an 'apps' hub

Giulia Bellesi & Robin G. Morris

Smartphone applications ('apps') are increasingly popular and widely used. Emerging research work and anecdotal reports suggest that apps have potential benefits in supporting people with neuropsychological difficulties. In light of this, we have collated a review of apps currently available that might aid with memory and other aspects of cognitive function. We aim to continue updating the review, and would welcome any feedback regarding our listed apps or any recommendations. These, with permission, will also be disseminated in a blog format.

brainline.org **preventing, treating,** and **living** with traumatic brain injury

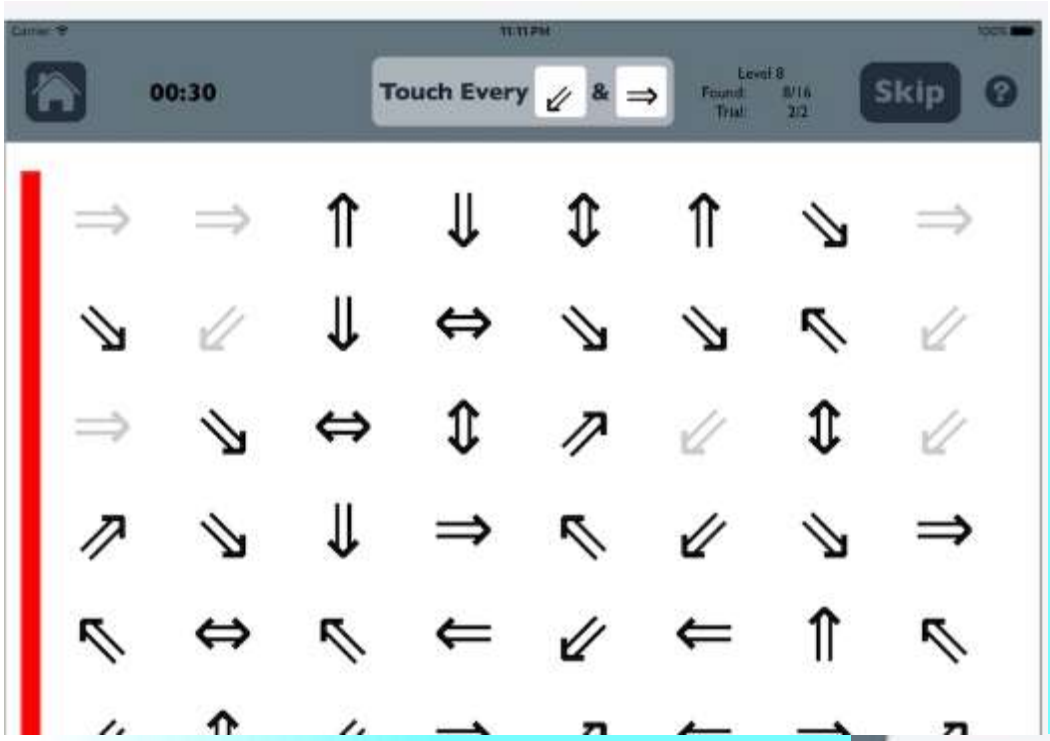
27 Life-Changing iPhone and iPad Apps for People with Brain Injury

Revolutionary apps for simplifying everyday life with brain injury

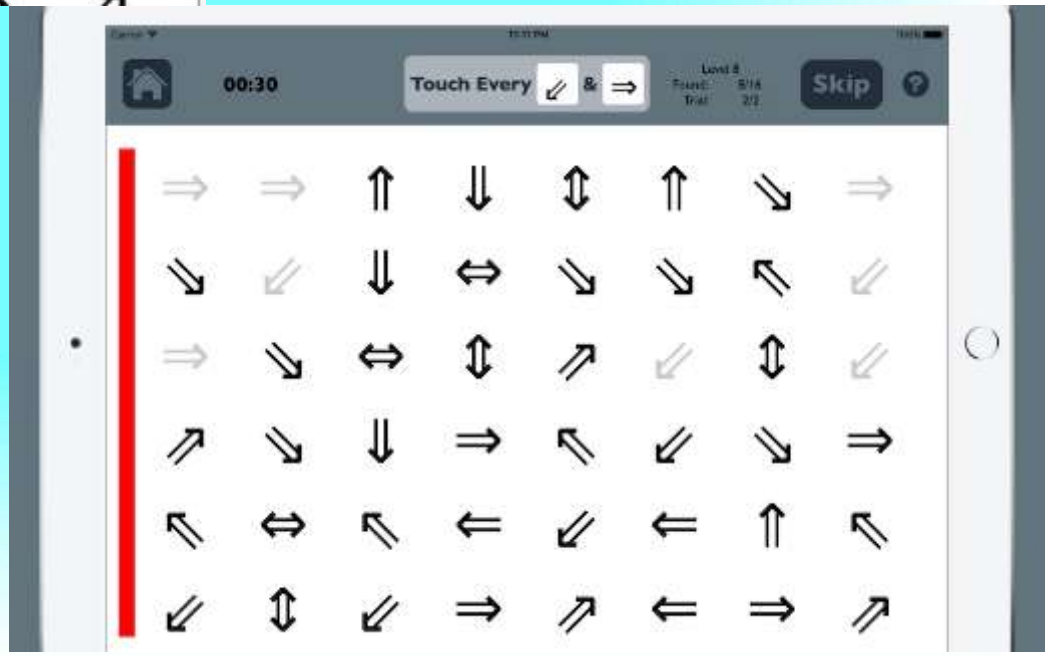
www.therapy-box.co.uk

CHATABLE

ChatAble is designed for adults who are unable to write or speak. ChatAble provides a grid of symbols that can be pressed to speak words and construct sentences. ChatAble includes customisable communication pages, a library of picture communication symbols, a customisable voice, language development and enables you to track progress.



www.tactustherapy.com



APPLICATIONS AT ELYSIUM BADBY PARK CENTRE

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f) **Intelligent Clock Displays**

g) Virtual Reality

h) Multisensory Mindfulness

i) Vibrating Reminder Prompts

7" Unforgettable 2-in-1 Calendar & Day Clock Black

★★★★★ 227 reviews SKU: UF0070

£29.99 with VAT Relief (£35.99 incl. VAT)

This product qualifies for VAT relief. What is VAT relief?

- ✓ Less stress, anxiety, and confusion with a 7" display
- ✓ Changes to your needs. Exact time and date or just time of day
- ✓ Easy to set up.

www.unforgettable.org

Reminders and wifi-connectivity in some calendar clocks

iGuerburn Talking Dementia Clock Digital Calendar
£45

www.amazon.co.uk

Clinical History (earlier case using Voice Assistant)

Man in mid 50s. Underwent brain surgery in 2008 for left occipital intraventricular meningioma. This was followed by severe obstructive hydrocephalus. Left with marked visual loss, executive function deficits and poor memory.

Orientation Button Clock

SPEAKS: Time – Day – Month – Date – Year

(also has daily alarm facility)

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Virtual Reality

Recent Advances in Virtual Rehabilitation System Design

Wendy Powell
Albert Rizzo
Paul M. Sharkey
Joav Merrick
Editors

Disability Studies

NOVA

2017

VIRTUAL REALITY AND THE CRIMINAL JUSTICE SYSTEM

Bobbie Ticknor

EXPLORING THE POSSIBILITIES FOR CORRECTIONAL REHABILITATION

2018

Inclusive Class VR

60s promotional video – first image of sea lapping onto shore is one viewed by patient in second video clip

Oculus Quest

Google Cardboard

CLINICAL CASE

Clinical History

Lady in mid 40s. Jugular foramen meningioma, haemorrhage with surgical decompression. Turner syndrome. Hypothyroidism. Bulbar palsy. Depression.

60s video. Describes watching VR clip of beach, with sights and sounds, and that this evokes past memories of holidays

Some Possible VR Applications in NeuroRehab

1. **Relaxation / Mindfulness….transport yourself to another world**
2. **Put yourself in someone else's shoes – teach compassion, anger management [social cognition]**
3. **Skill learning / re-learning (e.g. driving)**
4. **Home-to-Hospital – Re-create home environment in hospital, to make therapy more ecologically valid (e.g. practise climbing stairs, but with image of own stairs in VR headset)**

Dementia in Africa: Virtual reality app aims to break stigma

An estimated 4 million people across Africa live with dementia, according to the latest figures by Alzheimer's Disease International. It's an incurable condition that affects people's mental abilities, including memory.

VR Revival is a health technology start-up aiming to improve the quality of life and care for those with dementia with a new virtual reality app.

The company's British-Gambian founder, Mansata Kurang, explains how she hopes the app will help sufferers and those who care for them.

Producers: Lisa-Marie Misztak and Rupert Waring

04 Jul 2019

Share

2 mins video

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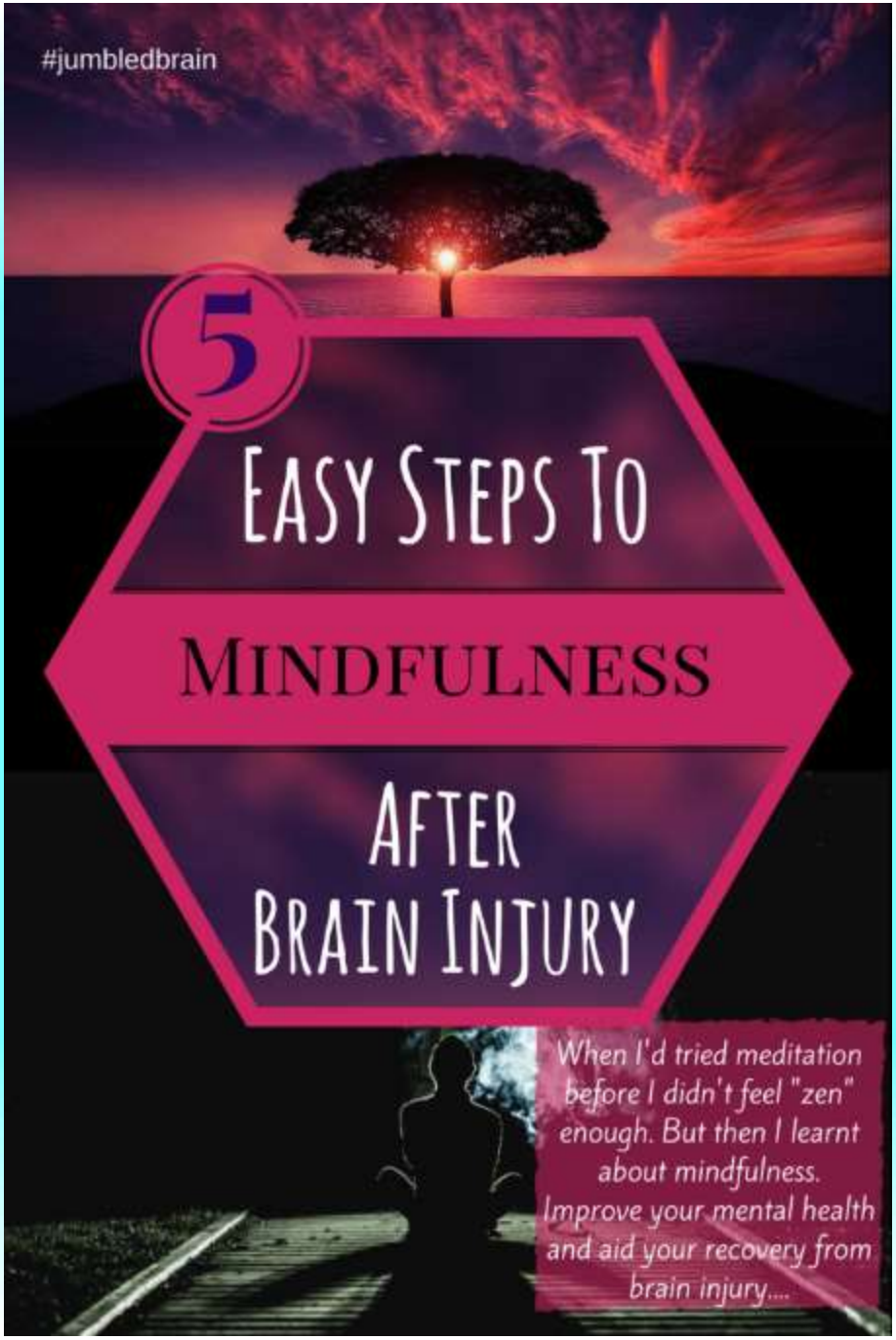
#jumbledbrain
5
EASY STEPS TO
MINDFULNESS
AFTER
BRAIN INJURY
When I'd tried meditation before I didn't feel "zen" enough. But then I learnt about mindfulness. Improve your mental health and aid your recovery from brain injury....

frontiers in Psychology

REVIEW
published: 23 June 2016
doi: 10.3389/fpsyg.2016.00912

Clinical Utility of Mindfulness Training in the Treatment of Fatigue After Stroke, Traumatic Brain Injury and Multiple Sclerosis: A Systematic Literature Review and Meta-analysis

Kristine M. Ulrichsen[1], Tobias Kaufmann[2], Erlend S. Dørum[1,2,3], Knut K. Kolskår[1,2,3], Geneviève Richard[1,2,3], Dag Alnæs[2], Tone J. Arneberg[4], Lars T. Westlye[2,3]* and Jan E. Nordvik[1]*

[1] Sunnaas Rehabilitation Hospital HT, Nesodden, Norway, [2] KG Jebsen Centre for Psychosis Research, Division of Mental Health and Addiction, NORMENT: Norwegian Centre for Mental Disorders Research, Oslo University Hospital and Institute of Clinical Medicine, University of Oslo, Oslo, Norway, [3] Department of Psychology, University of Oslo, Oslo, Norway, [4] Department of Behavioural Sciences, Oslo and Akershus University College of Applied Sciences, Oslo, Norway

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Background: Fatigue is a common symptom following neurological illnesses and injuries, and is rated as one of the most debilitating sequela in conditions such as stroke, traumatic brain injury (TBI), and multiple sclerosis (MS). Yet effective treatments are lacking, suggesting a pressing need for a better understanding of its etiology and mechanisms that may alleviate the symptoms. Recently mindfulness-based interventions have demonstrated promising results for fatigue symptom relief.

Objective: Investigate the efficacy of mindfulness-based interventions for fatigue across neurological conditions and acquired brain injuries.

Materials and Methods: Systematic literature searches were conducted in *PubMed*, *Medline*, *Web of Science*, and *PsycINFO*. We included randomized controlled trials applying mindfulness-based interventions in patients with neurological conditions or acquired brain injuries. Four studies ($N = 257$) were retained for meta-analysis. The studies included patients diagnosed with MS, TBI, and stroke.

Results: The estimated effect size for the total sample was −0.37 (95% CI: −0.58, −0.17)

The Use of Relaxation Training to Enhance Functional Outcomes in Adults With Traumatic Head Injuries

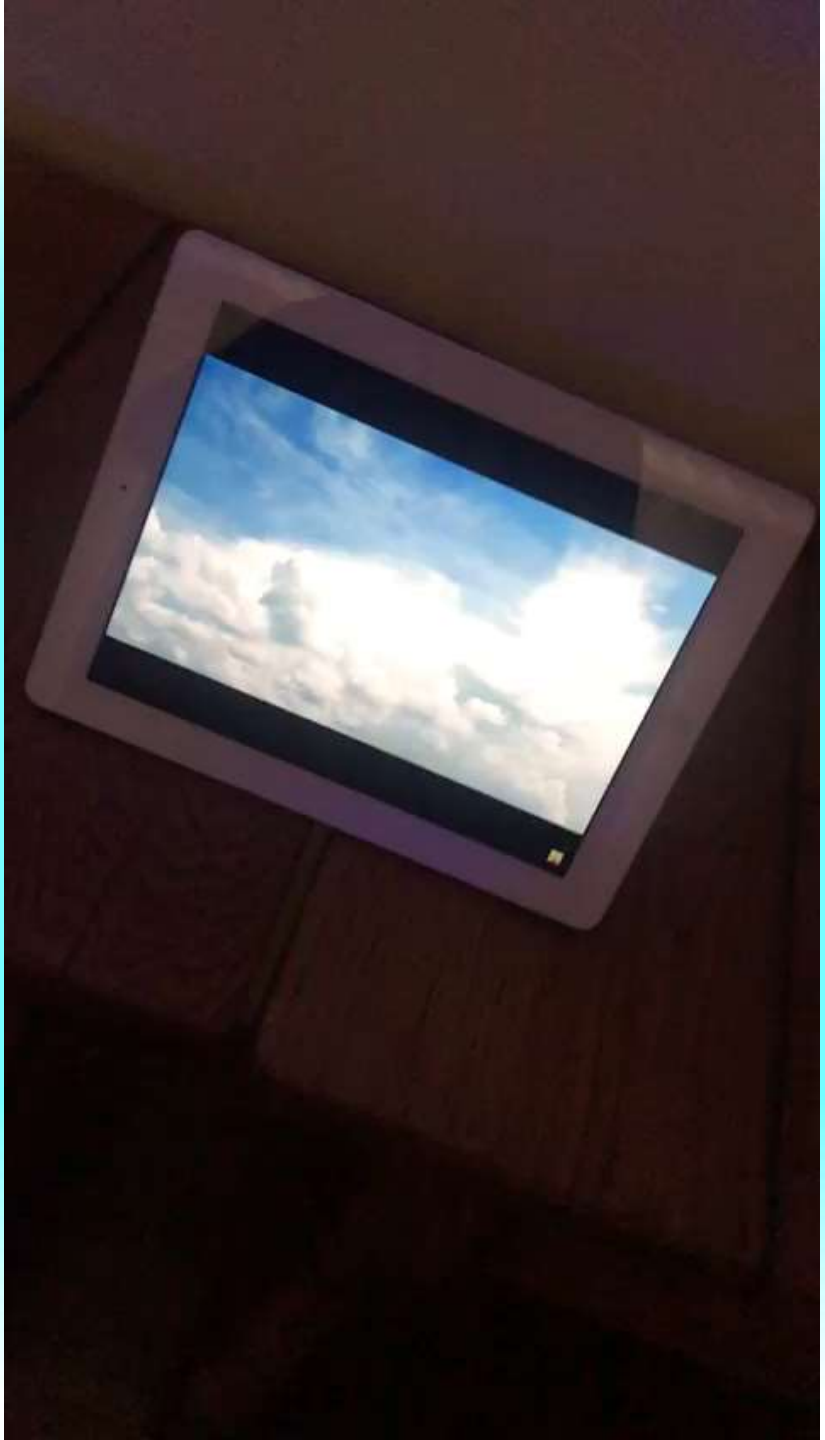
Rosemary Lysaght,
Eugenia Bodenhamer

Key Words: biofeedback • head injuries • stress, psychological

Impaired anxiety management and poor emotional control have a negative effect on the adaptive functioning of persons with head injuries who are in the postacute stages of recovery. This paper outlines a relaxation training program administered individually to 4 adults with severe head injuries. Each subject was in the postacute phase of recovery and had reported stress to be a persistent problem in daily living. The relaxation training protocol combined biofeedback, imagery, autogenic training, and deep breathing. Significant improvement in function, measured by scores on a scale of illness-related dysfunction, support the potential benefits of stress management training as part of functional training programs for persons with traumatic head injuries.

American Journal of Occupational Therapy, 1990

Brief 15s video clip of iPad, lights and perfume diffuser used in relaxation session



Relaxation script = ‘Floating on a cloud’

Images of clouds on iPad

Coloured light projected on walls and ceiling

Soft music

Diffuser with perfume


Aromatherapy
Moisture Skin
Clam and Relax
Purify Air
Night Light
Health care
14.6cm
16.7cm
victsing

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ELSEVIER

Neuropsychologia 45 (2007) 1318–1330

NEUROPSYCHOLOGIA

www.elsevier.com/locate/neuropsychologia

Rehabilitation of executive dysfunction following brain injury: "Content-free" cueing improves everyday prospective memory performance

Jessica Fish [a], Jonathan J. Evans [b,c], Morag Nimmo [b], Emma Martin [b], Denyse Kersel [d], Andrew Bateman [c], Barbara A. Wilson [a,c], Tom Manly [a,*]

[a] *Medical Research Council Cognition and Brain Sciences Unit, Box 58 Addenbrooke's Hospital, Hills Road, Cambridge CB2 2QQ, UK*
[b] *Department of Psychological Medicine, University of Glasgow, UK*
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[d] *The Community Treatment Centre for Brain Injury, Glasgow, UK*

Received 11 May 2006; received in revised form 19 August 2006; accepted 27 September 2006
Available online 3 November 2006

Abstract

Prospective memory (PM) is often claimed to rely upon executive as well as mnemonic resources. Here, we examined the contribution of executive functions towards PM by providing intermittent support for monitoring processes using "content-free" cues, which carried no direct information regarding the PM task itself. Twenty participants with non-progressive brain injury and PM difficulties received brief training in linking a cue phrase "STOP!" with pausing current activity and reviewing stored goals. The efficacy of this strategy was examined with a PM task requiring participants to make telephone calls to a voicemail service at four set times each day for 10 days. Task content was encoded using errorless learning to minimise retrospective memory-based failures. On five randomly selected days, eight text messages reading simply "STOP!" were sent to participants' mobile telephones, but crucially not within an hour of a target time. Striking improvements in performance were observed on cued days, thus demonstrating a within-subjects experimental modulation of PM performance using cues that carry no information other than by association with participants' stored memory of their intentions. In addition to the theoretical insights, the time course over which the effect was observed constitutes encouraging evidence that such strategies are useful in helping to remediate some negative consequences of executive dysfunction. It is proposed that this benefit results from enhanced efficiency of goal management via increased monitoring of current and future goals, and the steps necessary to achieve them, perhaps compensating for under-functioning fronto-parietal attention systems.

PROMPTING DEVICES

CLINICAL CASE

Clinical History

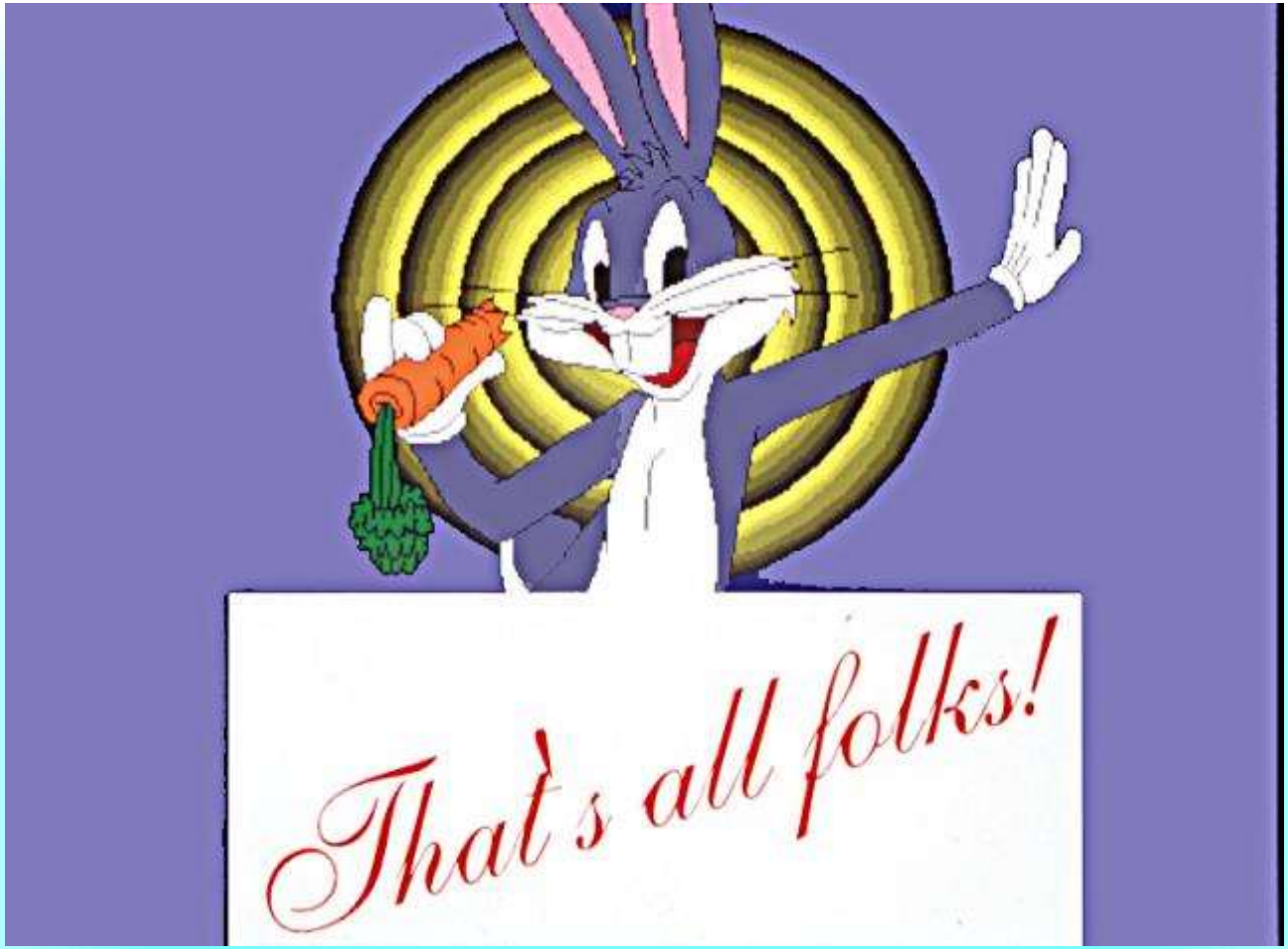
Man in early 50s. Left middle cerebral artery infarct in October 2018. Seizures post-thrombolysis. CT scan showed multiple posterior cerebral infarcts. Tracheostomy inserted in November 2018.

Due to stroke, he had lost ability to swallow reflexively, and had two episodes of aspiration pneumonia. In an attempt to wean him off tracheostomy, we planned to use one of these prompting devices to remind him to swallow or spit out his saliva at regular intervals.

However, he recovered spontaneously by the time we were about to introduce the prompting device!

Conclusions

1. **Assistive technology has potential to transform the lives of those with a neurological disability, with secondary benefits for families and for healthcare staff.**
2. **Smart phones, voice assistants and virtual reality hold particular promise.**
3. **Research trials need to be carried out to provide a strong evidence-base for their implementation.**
4. **A need to keep in mind any ethical issues which may arise.**



Thank you for your attention!

Related resources and links
at Clinical Excellence UK website…..
www.clinicalexcellenceuk.com