

NEUROPSYCHOLOGICALLY - INFORMED INTERVENTIONS IN PRIMARY PROGRESSIVE APHASIA

*APS FESTIVAL OF PSYCHOLOGY,
GOLD COAST, SATURDAY 17TH
MAY, 2025*

DR SHARON SAVAGE



ACKNOWLEDGMENTS

Traditional owners of the lands in which we are meeting on now - Yugambah people

Traditional owners of the lands on which I work – Awabakal people

and pay respect to Elders past, present and emerging and acknowledge the enduring knowledge of the Aboriginal Custodianship of Country



Acknowledge the FRONTIER research group

HOW TO SESSION OUTLINE

1. Brief overview of PPA
2. Neuropsychological assessment in PPA
3. Cognitive rehabilitation - Word retraining/ word retrieval practices
 - ✓ For generalization
 - ✓ For maintenance
4. Quick mention: psychosocial supports and group interventions
5. Questions and close

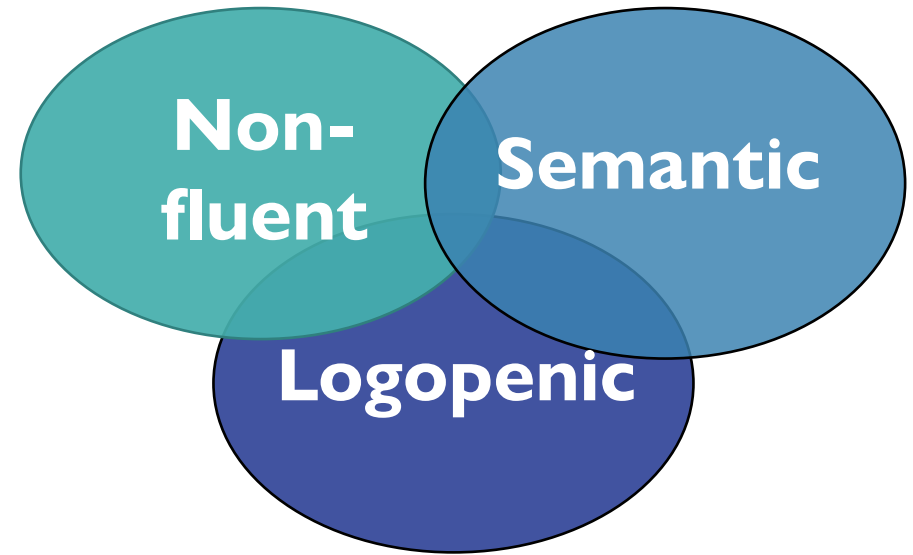


Introduction - PPA

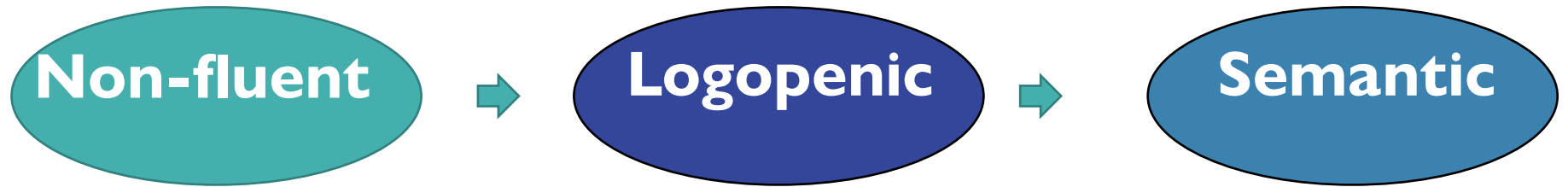


Introduction: Primary Progressive Aphasia

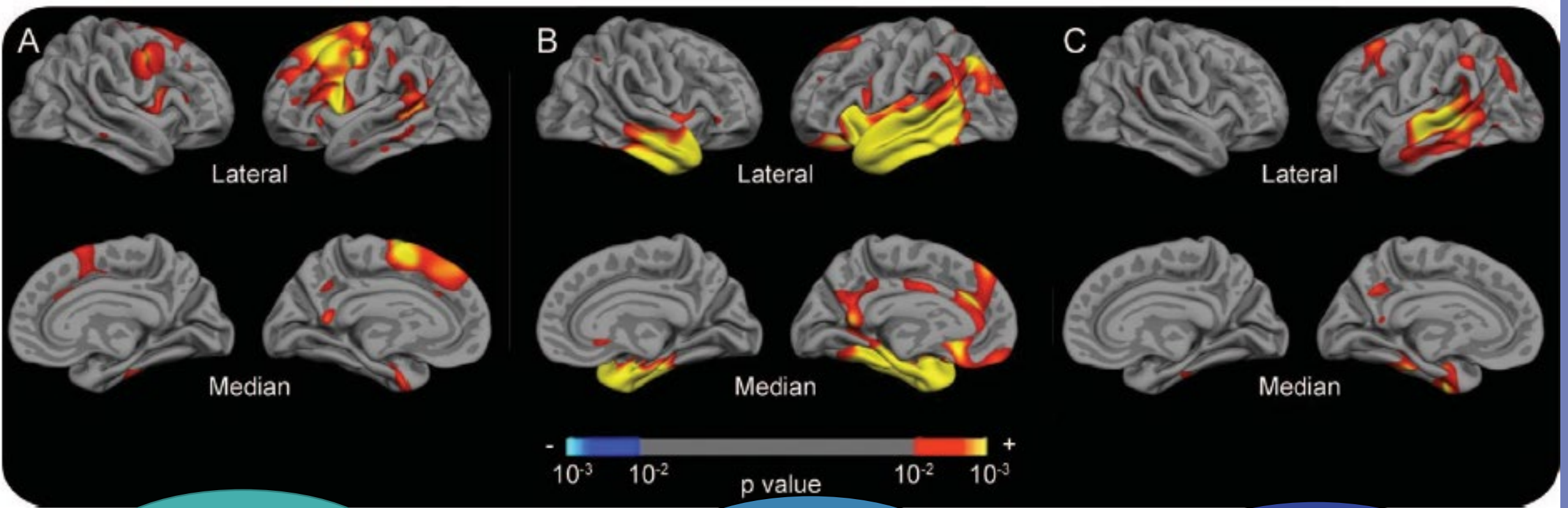
- Neurodegenerative condition
- Specific language disturbance
 - 2-year onset before other difficulties
 - Language remains the most prominent deficit



Primary Progressive Aphasia Clinical Profiles



	Non-fluent	Logopenic	Semantic
Anomia	↓ Variable	↓↓ Moderate	↓↓↓ Severe
Speech	Non-fluent, laboured	Slowed, word finding pauses	Fluent, grammatical
Repetition	↓ multi-syllabic words	Phonological errors; ↓ span ↓ sentence repetition	Preserved
Word comprehension	Preserved	Preserved	↓↓↓ Impaired
Syntactic comprehension	↓ complex grammar	↓ multi-step commands	Preserved



Non-fluent

- **Pathology:**
 - FTD type: with tau
 - Alzheimer type
 - Other (e.g. PSP, CBD)

Semantic

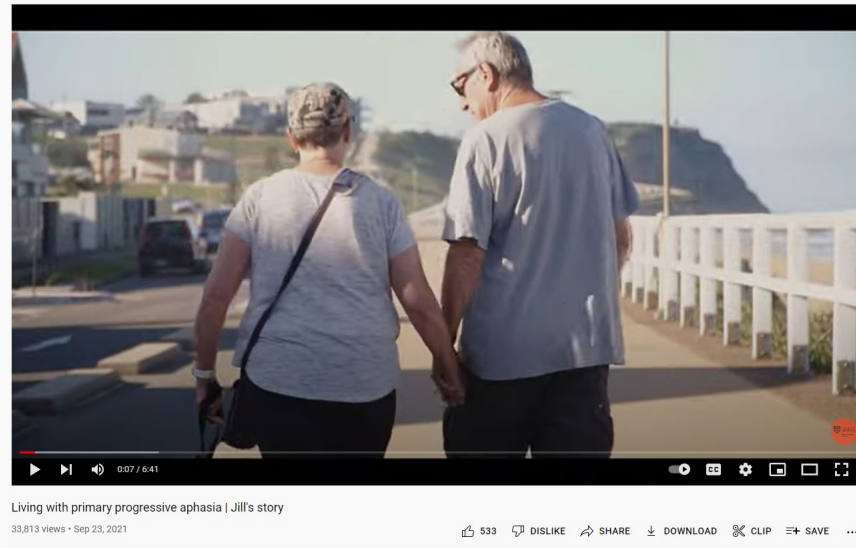
- **Pathology:**
 - FTD type: with ubiquitin (TDP-43)

Logopenic

- **Pathology:**
 - Alzheimer type

WHY PROVIDE COGNITIVE REHAB?

- Language impairments can have significant impact on life



- PPA by definition involves greater impact on language than other areas of cognitive or behavioural change
- There is evidence that interventions are effective

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DOI: 10.1111/1460-6984.12798

REVIEW

International Journal of Language & Communication Disorders

My experience of living with nonfluent/agrammatic variant primary progressive aphasia: Challenges, compensatory strategies and adaptations

Joanne T. Douglas 

MECHANISM OF CHANGE: NEUROPLASTICITY

- Behavioural training results in alterations in brain structure and function

R. Jokel et al. / Neuropsychologia 89 (2016) 191–216

209

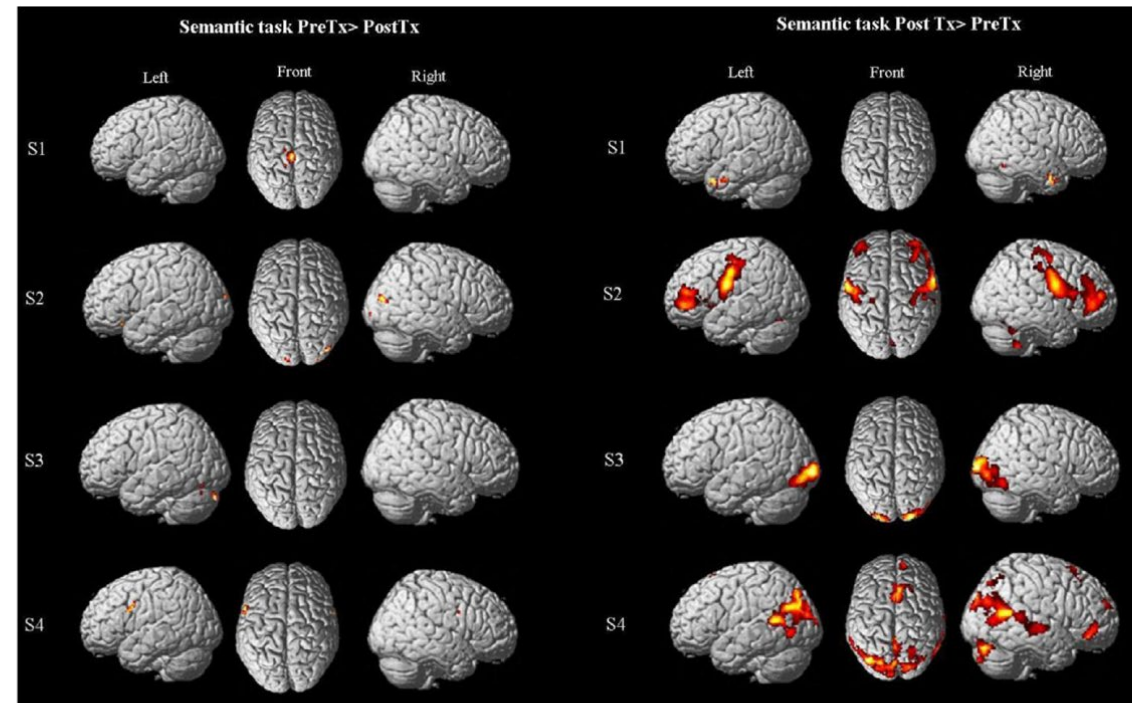
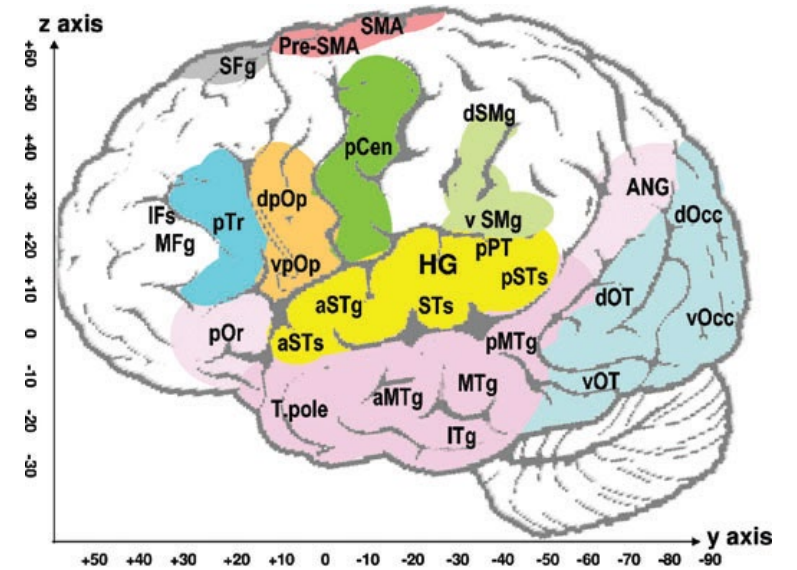
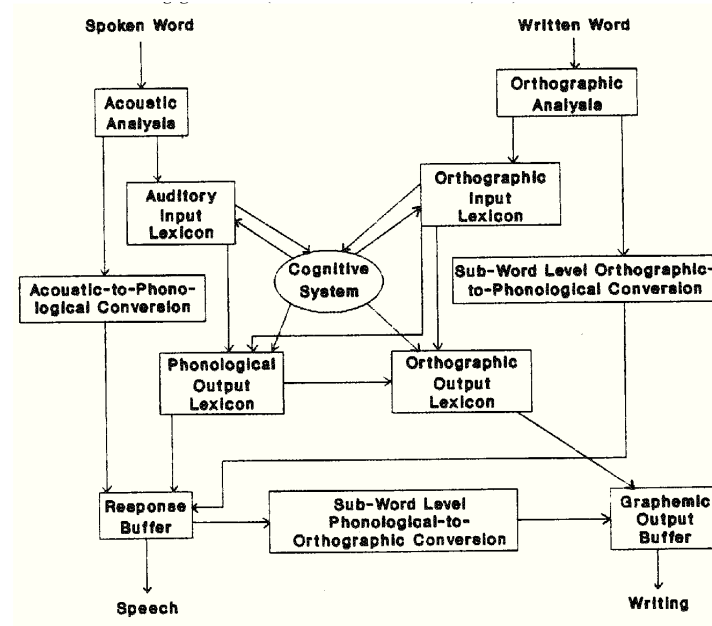
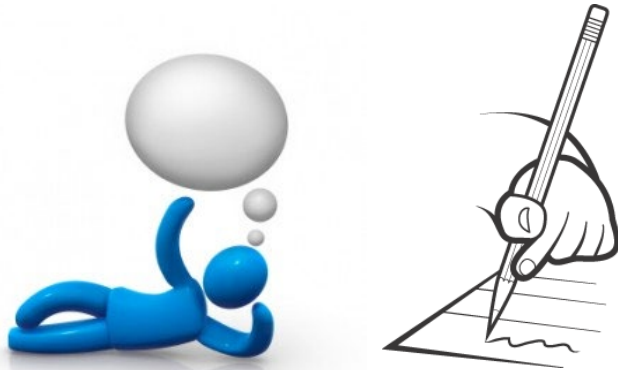


Fig. 11. Activation patterns for individual SvPPA patients at pre > post and post > pre treatment in the semantic judgement tasks (thresholded at voxelwise level $p < .001$, corrected for multiple comparisons at the cluster level using FWE $p < .05$; Pre > Post: S2, S3, S4 and Post > Pre: S1, uncorrected $p < .001$, $k > 3$).

WHY NEUROPSYCH-INFORMED?



THERAPY TARGET: ANOMIA (WORD FINDING DIFFICULTIES)

Common language complaint

- Decreased ability to produce a target word in response to stimulus or situation

Dysfluency:

- Filled & unfilled pauses, word repetitions, phrase repetitions, phrase revisions (retracing)

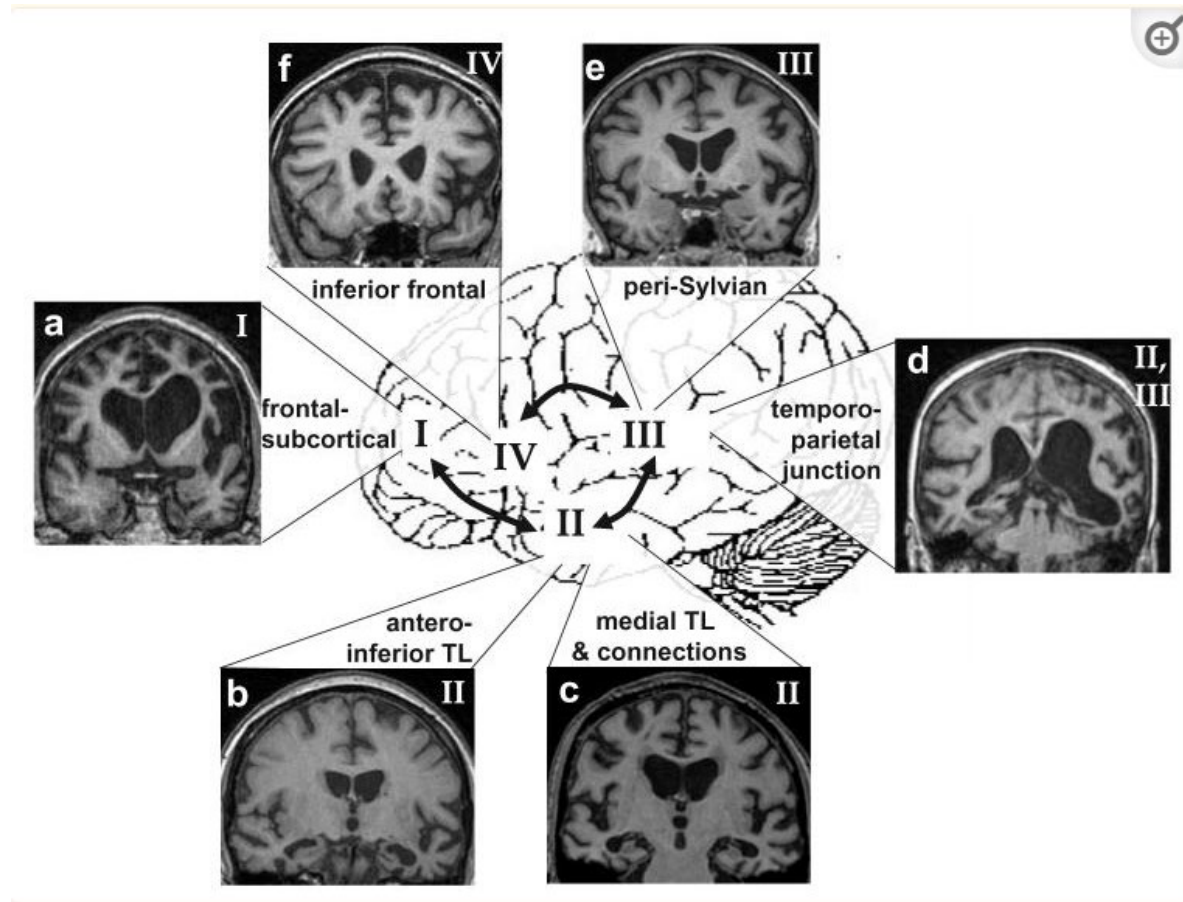
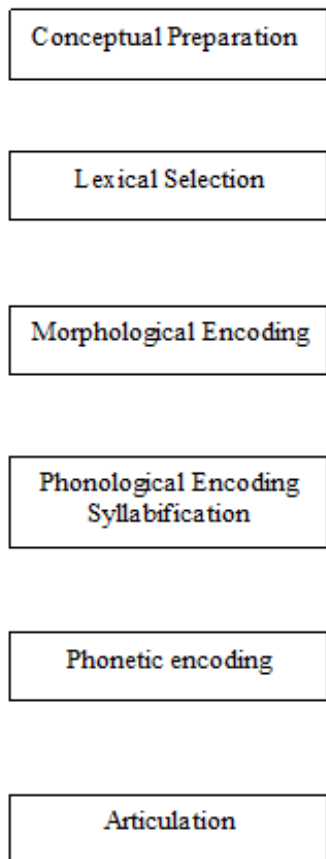
Word retrieval errors

- semantic, phonological, mixed paraphasias
- use of indefinite terms



Therapy target: Word finding difficulty

Model of language production and potential breakdowns in PPA



<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2373641/>

Adapted from Levelt, Roelofs & Meyer (1999)

Access vs storage?

Neuropsych Assessment in PPA



Aspects to cover in the assessment

- Dementia screening measure – ACE-III (Hsieh et al., 2013)

<https://www.sydney.edu.au/brain-mind/our-clinics/dementia-test.html>

- Overall score (measure of severity) PLUS
- Subscale scores across important domains

- ☐ orientation to time/place

- ☐ working memory (serial 7s)

- ☐ verbal memory (immediate, short delay, effect of repetition; recognition)

- ☐ basic visuospatial and visuoconstructional

- ☐ language screening (single word and sentence repetition, comprehension, semantics,

- ACE-III Calculator (Foxe et al., 2022)

https://shiny.maths.usyd.edu.au/PPA_diagnostic_calc/



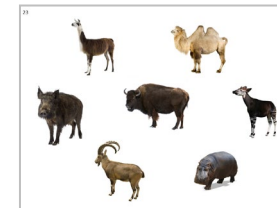
Aspects to cover in the assessment

- Attention & concentration – Digit Span (WAIS-IV); Sentence repetition – Multilingual Aphasia Examination (MAE)
- Visuospatial – Rey Complex Figure Test (Copy)
- Memory – Rey Complex Figure Test (3 min recall); Doors & People – Doors
- Executive function – Trail Making Test; Verbal fluency (phonemic & semantic); Brixton
- Language – Sydney Language Battery (Savage et al., 2013)
 - ☐ Naming
 - ☐ Single word comprehension (word picture matching)
 - ☐ Single word repetition
 - ☐ Semantic association

<https://www.sydney.edu.au/brain-mind/our-clinics/dementia-test.html>



What do we call this?



Point to the... –

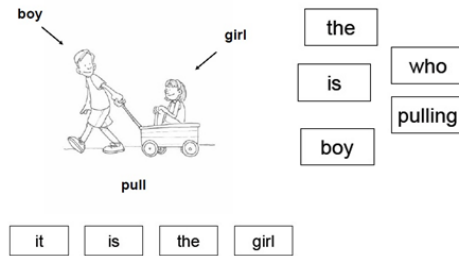


Which goes with...

Aspects to cover in the assessment

- Grammatical processing –

- ☐ Test for Receptive Grammar (TROG); OR
- ☐ Northwestern Anagram Test (Weintraub et al., 2009)

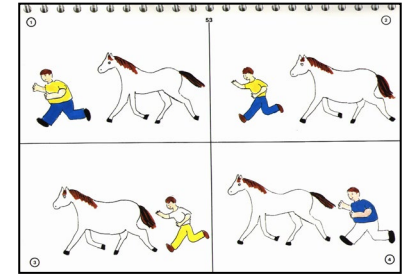
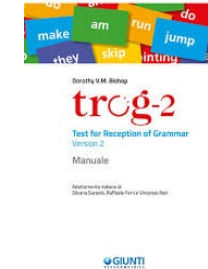


- Connected speech, narrative or sentence level - Cookie Theft Description

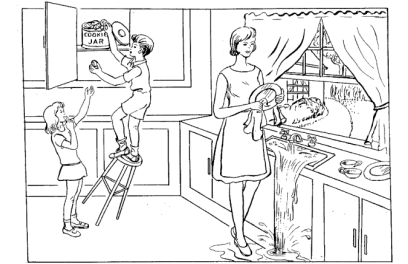
- Behaviour – Cambridge Behavioural Inventory – Revised

<https://www.sydney.edu.au/brain-mind/our-clinics/dementia-test.html>

- Mood – DASS-21 (with help around comprehension for svPPA)



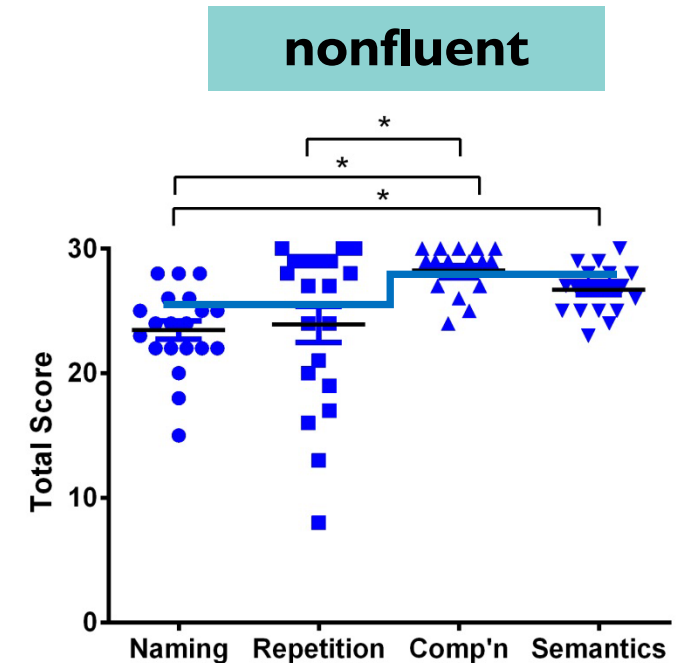
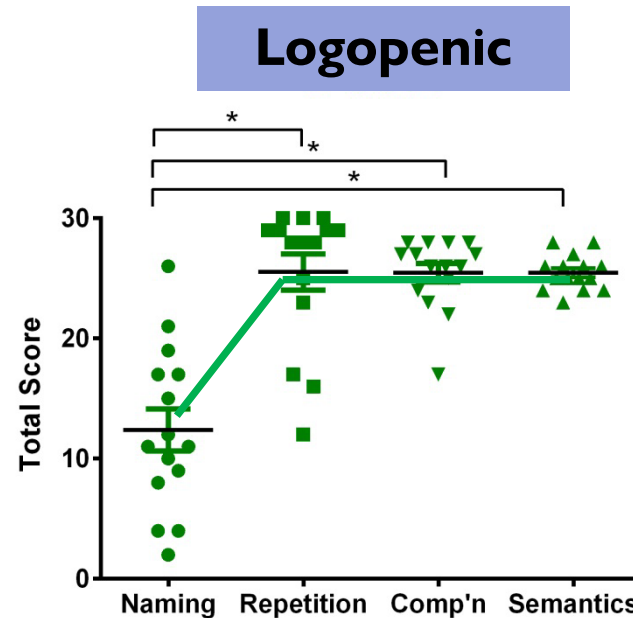
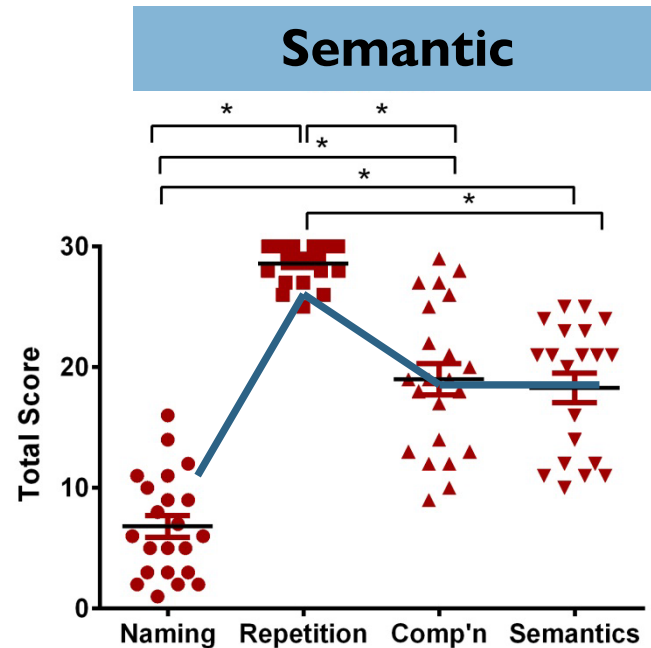
The boy chasing the horse is fat



PPA profiles of single word processing

Cause of the impairment – level of processing

- Lexical / semantic knowledge (Semantic variant PPA)
- Lexical/ phonological (Logopenic variant PPA)
- Post-lexical (non-fluent agrammatic PPA)



BUILDING EFFECTIVE WORD RETRIEVAL INTERVENTIONS



PRINCIPLES OF NEUROPLASTICITY:

Principle	Description
Use it or lose it	Failure to drive brain functions ... functional degradation
Use it and improve it	Training that drives a specific brain function enhances that function
Specificity	Nature of training experience dictates nature of plasticity
Repetition matters	Induction of plasticity requires sufficient repetition
Intensity matters	Induction of plasticity requires sufficient training intensity
Time matters	Different forms of plasticity occur at different times during training
Salience matters	Induction of plasticity requires sufficient salience
Age matters	Training induced plasticity occurs more readily in younger brains
Transference	Plasticity in response to one training experience can enhance acquisition of similar behaviors
Interference	Plasticity in response to one experience can interfere with acquisition of other behaviors

WORD THERAPY RESEARCH TO-DATE

- Word training, word relearning, naming therapy, retrieval therapy
- Delivery methods:
 - Low tech: Flash cards,
 - High tech: Computer programs, apps
- Therapies
 - Look, Listen and Repeat or Reading and repetition in the presence of a picture
 - Semantic treatment
 - Sentence generation
 - Semantic, phonological, orthographic &/or autobiographical cueing

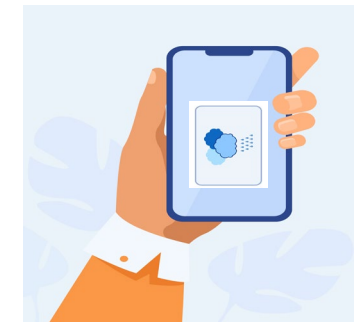


Fig. 2 – Illustration of participant completing treatment using Repetition and Reading in the Presence of a Picture at a home computer. Image credits: Man at computer: iStock.com/RUSSELLTATEdotCOM modified by the first author with permission. Apple: all-free-download.com/BSGStudio.

Croot et al., 2019, Cortex

NEUROPSYCH PROFILE CHECKLIST

- ✓ Verbal attentional capacity
- ✓ Word repetition intact (i.e. motor-speech or phonemic sequencing ok)
- ✓ Visuospatial skills adequate
- ✓ Episodic memory supportive (can benefit from repetition)
- ✓ Executive function adequate – distractibility
- ✓ Mood adequate (or effective supports in place)
- ✓ Hearing and vision checked and corrected as needed

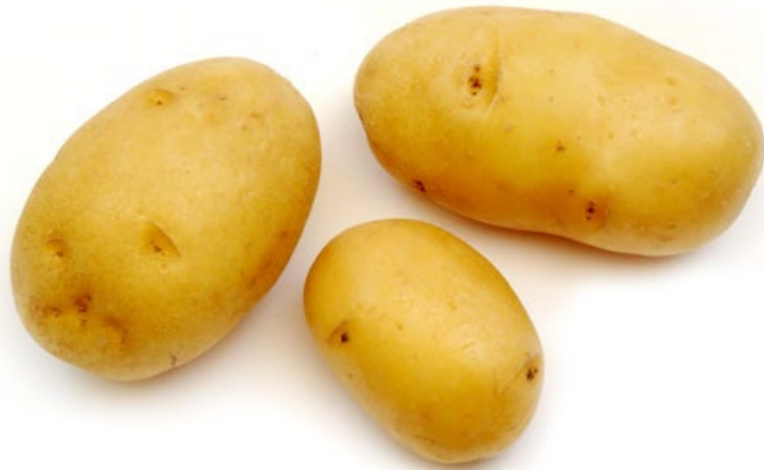
For particular techniques, need to consider:

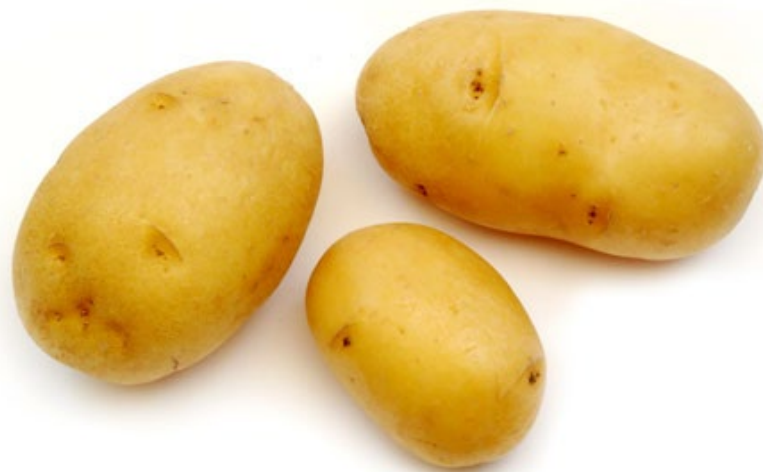
- Access vs storage issues – which cueing is going to help
- Semantic preservation – supporting conceptual knowledge with training
- Rigidity or potential for overgeneralisation

THERAPIES BY SUBTYPE

Technique	Nonfluent	Logopenic	Semantic
“Look, Listen & Repeat” or “Reading & repetition in the presence of a picture”	✓ Speech-motor rehearsal	✓	✓
Semantic treatment	Limited impact	✓	X
With Semantic cueing	Limited impact	✓	✓✓
With phonological cueing	✓✓	✓✓	Limited impact
With orthographic cueing	✓ moderate	✓ moderate	✓
With autobiographical cueing	?	?	✓

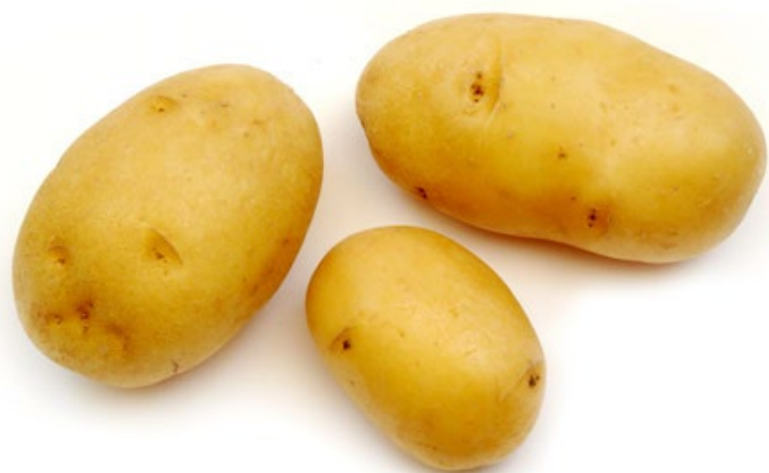
EXAMPLE: LOOK, LISTEN, REPEAT

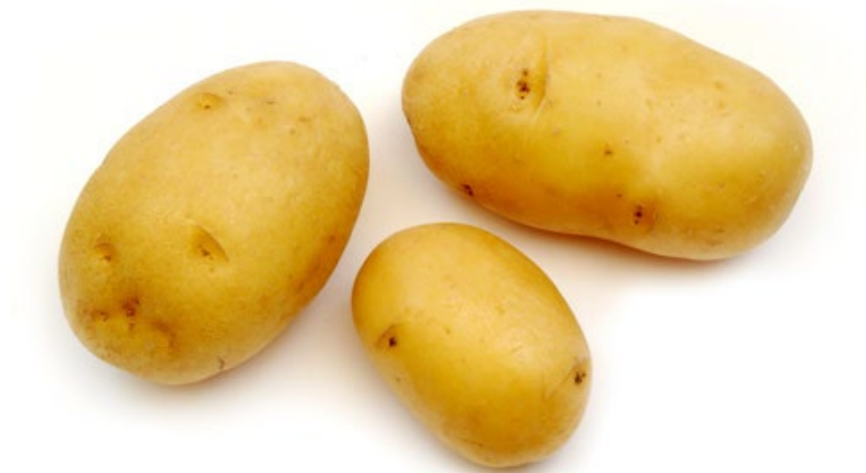




Potatoes







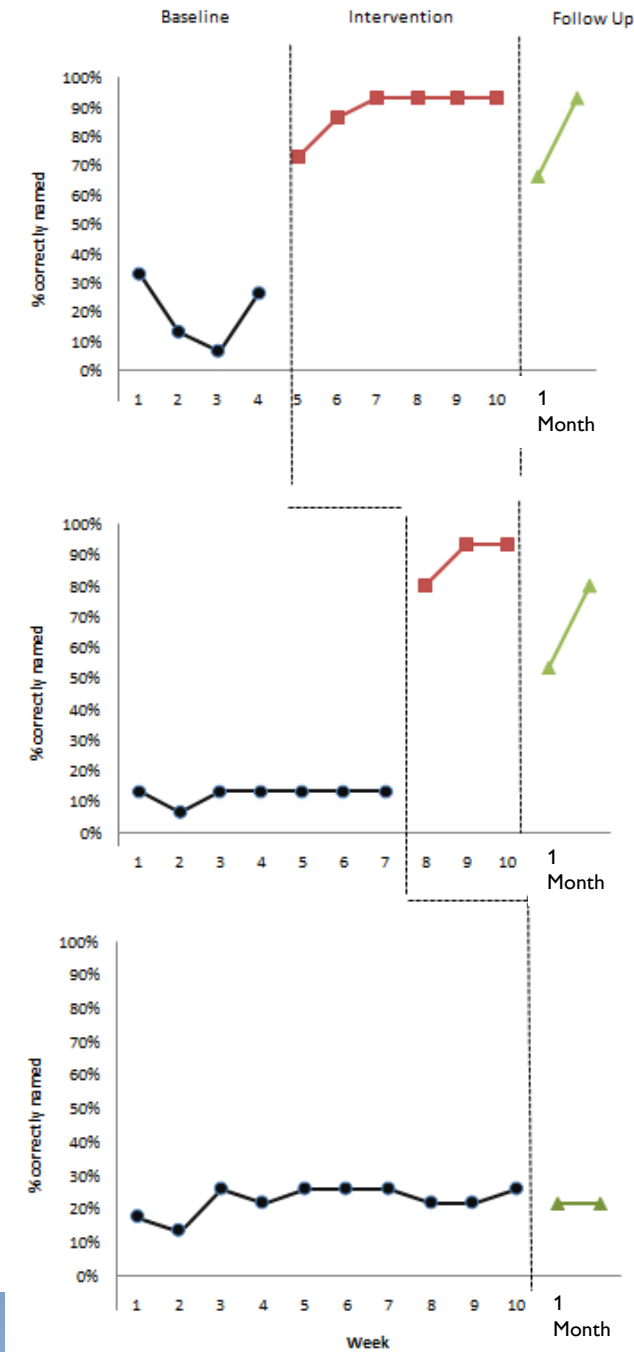
Potatoes



CASE G

Semantic PPA with
severe semantic loss

- Fast improvements in naming
- Only when training begins

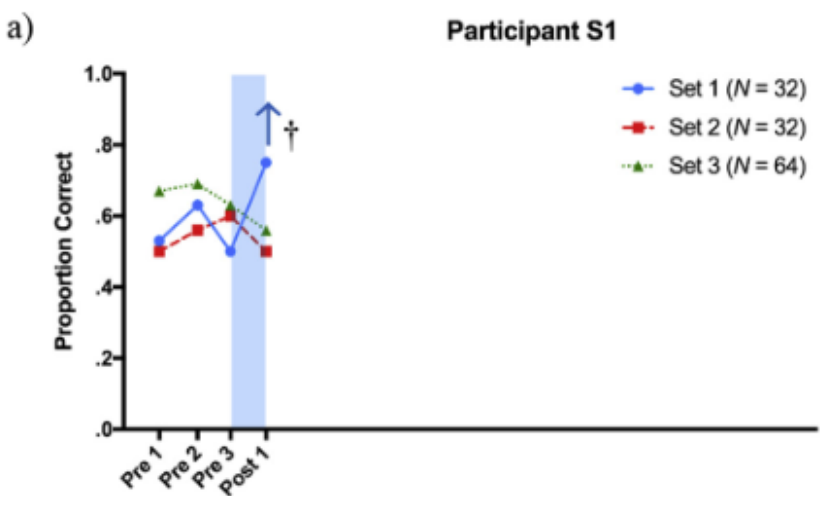
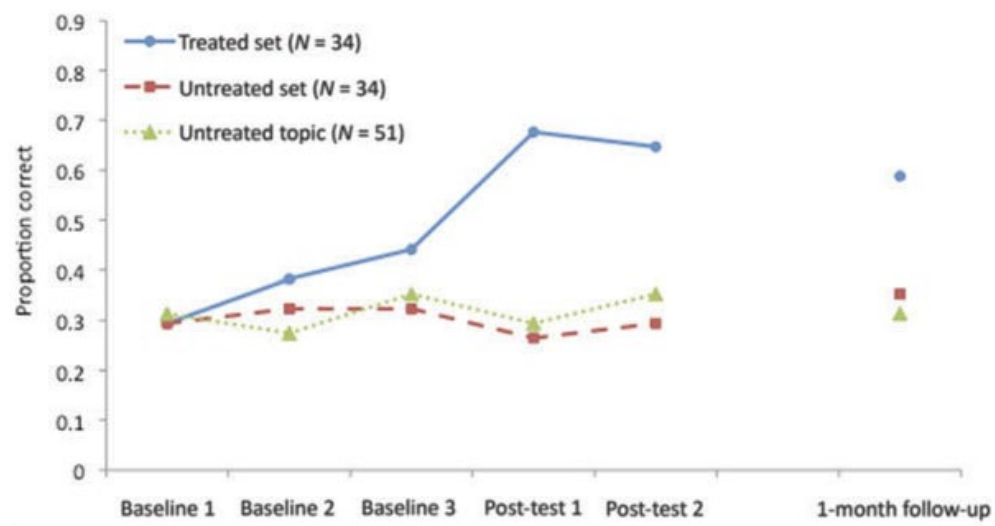


List 1

List 2

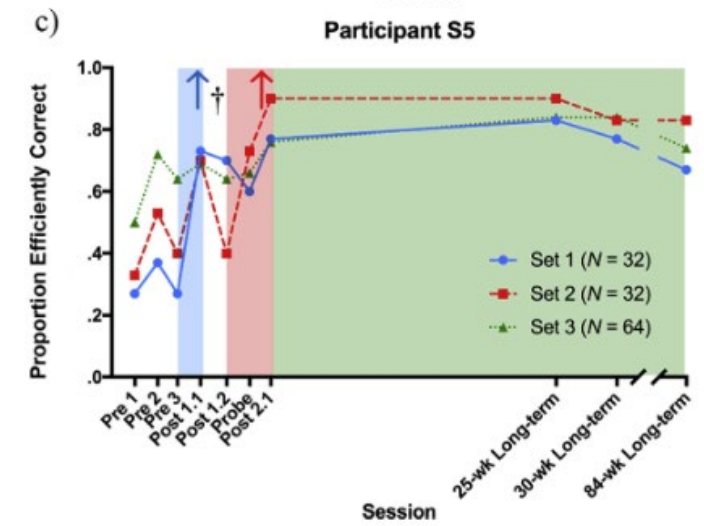
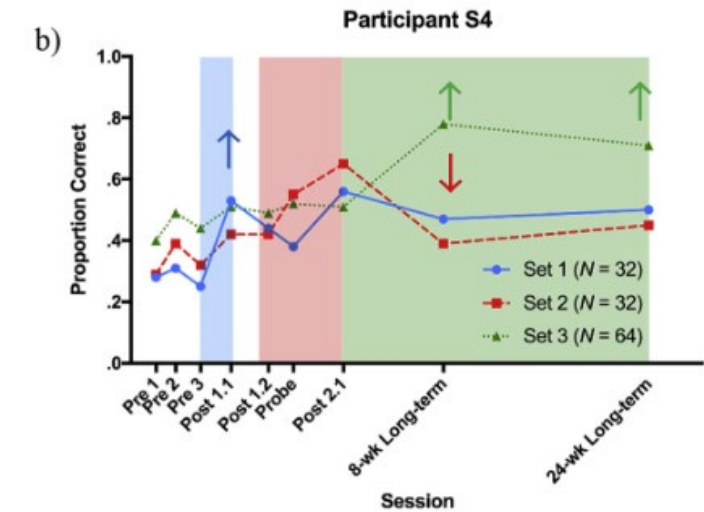
Untreated

Croot et al., (2015) Aphasiology, nfPPA



Croot et al., (2019) Cortex

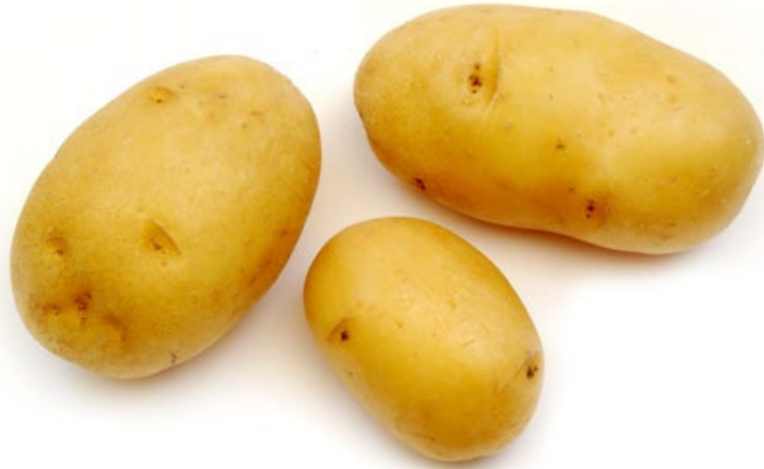
Set 1 = 2 weeks tx
Set 2 = 4 weeks tx
Set 3 > 25 weeks tx



THERAPY DESIGN STARTING POINT:

**TAKING INTO ACCOUNT THE LEVEL
OF SEMANTIC IMPAIRMENT**

TRAINING WHEN SEMANTIC KNOWLEDGE IS VERY LIMITED



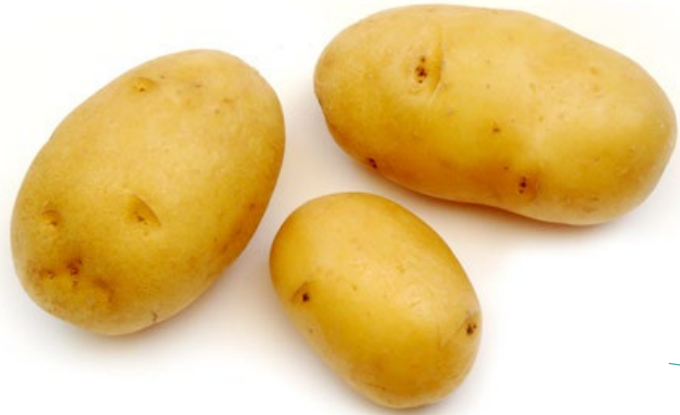
Residual knowledge

“It’s something to eat”

Meaning completely lost

“What is it? It’s rounded ... is it something for kids to play?”

COEN



Potatoes



Restoration of conceptual knowledge in a case of semantic dementia

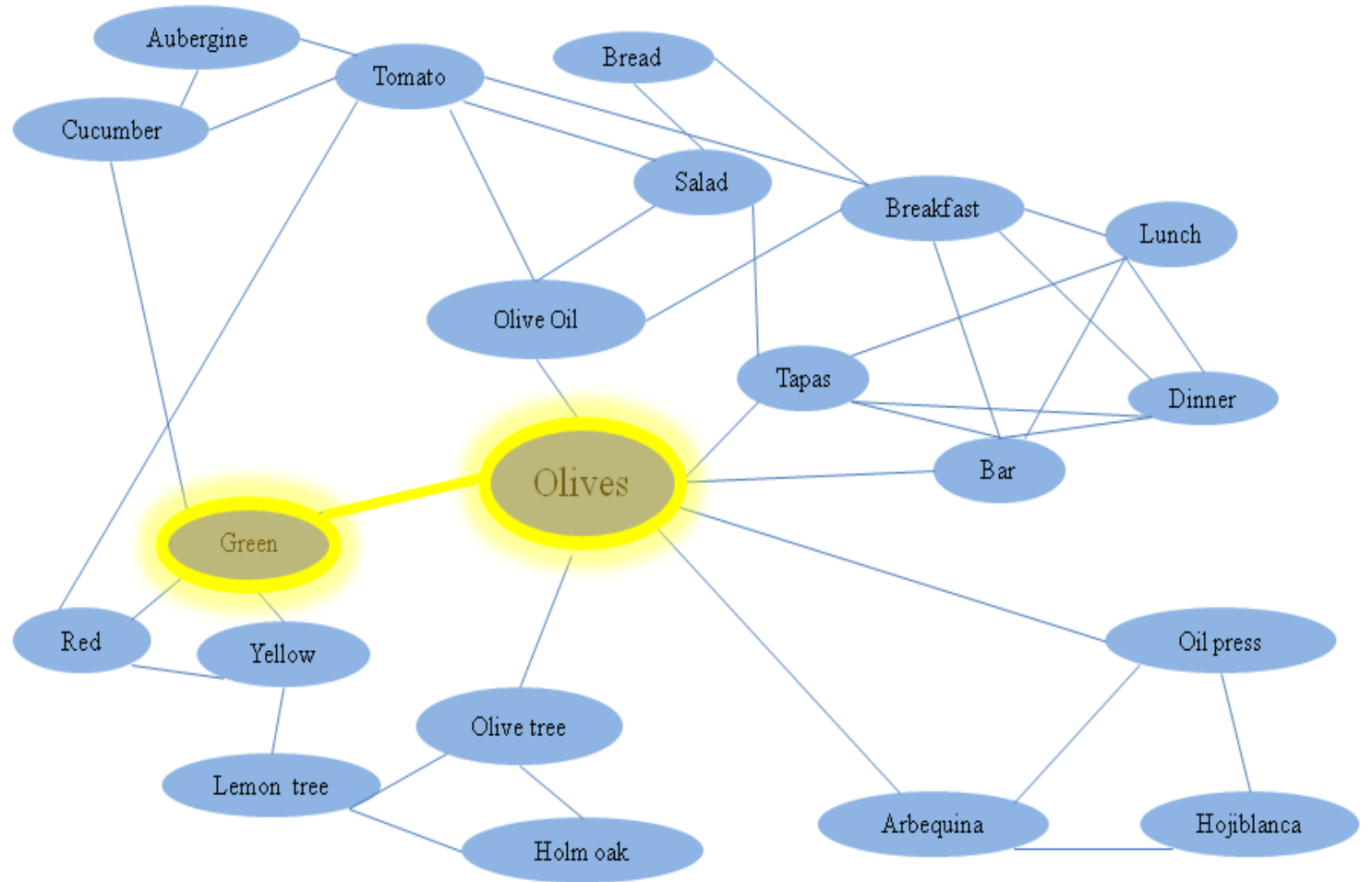
Aida Suárez-González^{a,b*}, Cristina Green Heredia^c, Sharon A. Savage^d, Eulogio Gil-Néciga^a, Natalia García-Casares^e, Emilio Franco-Macías^a, Marcelo L. Berthier^e and Diana Caine^b

Neurocase (2014)

^aMemory Disorders Unit, Department of Neurology, University Hospital Virgen del Rocío, Seville, Spain; ^bDepartment of Neuropsychology, National Hospital for Neurology and Neurosurgery, London, UK; ^cDepartment of Neuroscience, Quirón Hospital Málaga, Málaga, Spain; ^dNeuroscience Research Australia, Sydney, Australia; ^eUnit of Cognitive Neurology and Aphasia, Centro de Investigaciones Médico-Sanitarias (CIMES), University of Málaga, Málaga, Spain

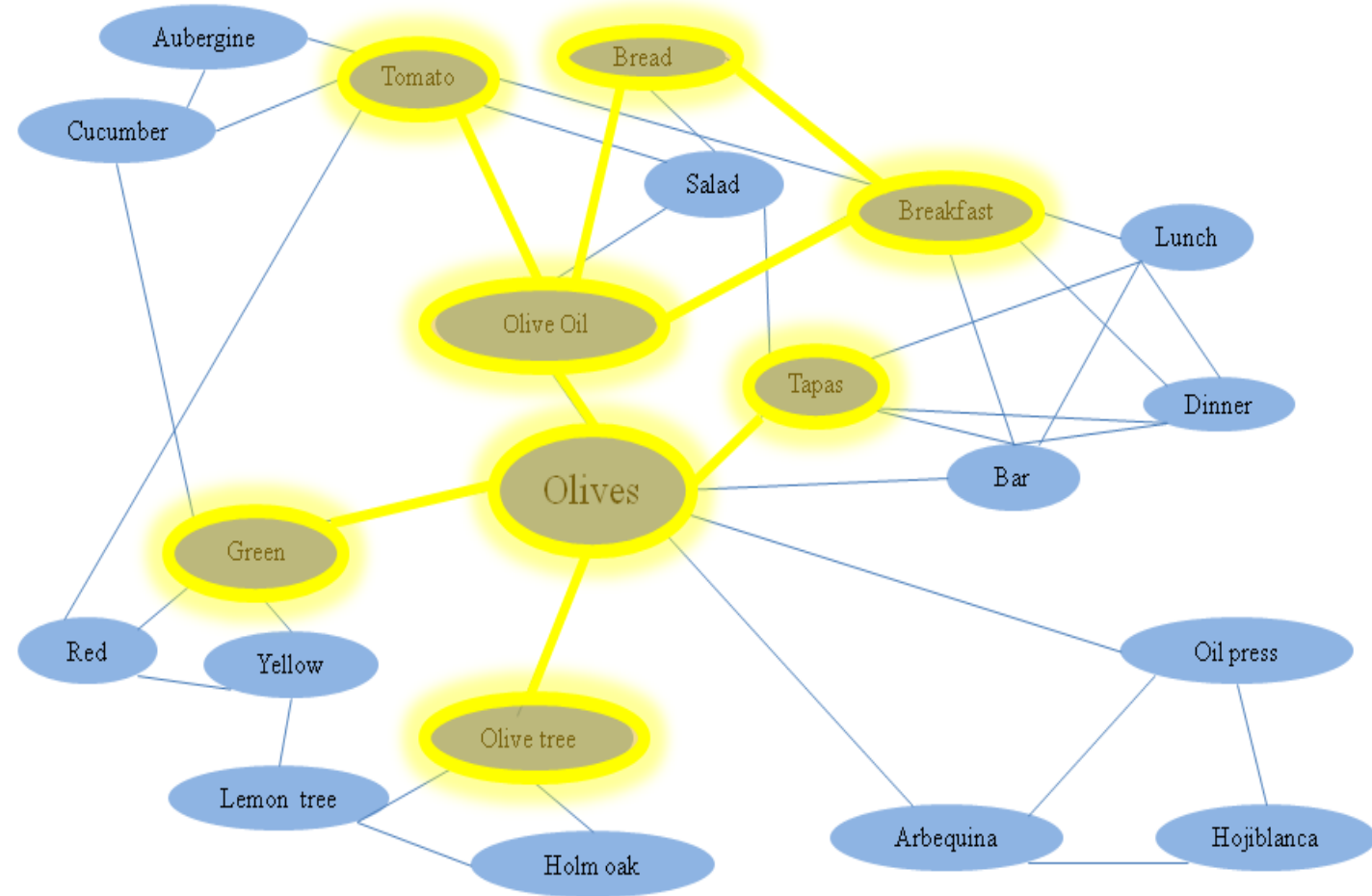


Olives





Olives



LENGTH OF SESSIONS AND NUMBER OF WORDS PER PRACTICE SESSION

15-30



More in prophylactic sessions
Less for COEN

20-60 mins



20 min



1 hour

- **Regular practice but not rote practice**
 - Ideally several times a week
 - Not the same order of items every time

SETTING UP TRAINING MATERIAL

○ Personalise stimuli

- Select items used and meaningful to the person
- Take (multiple) photographs of items (svPPA)
- If computer-based: make audio recordings of the word

**** Consider the cognitive and behavioural profile**

- *speed of delivery of items*

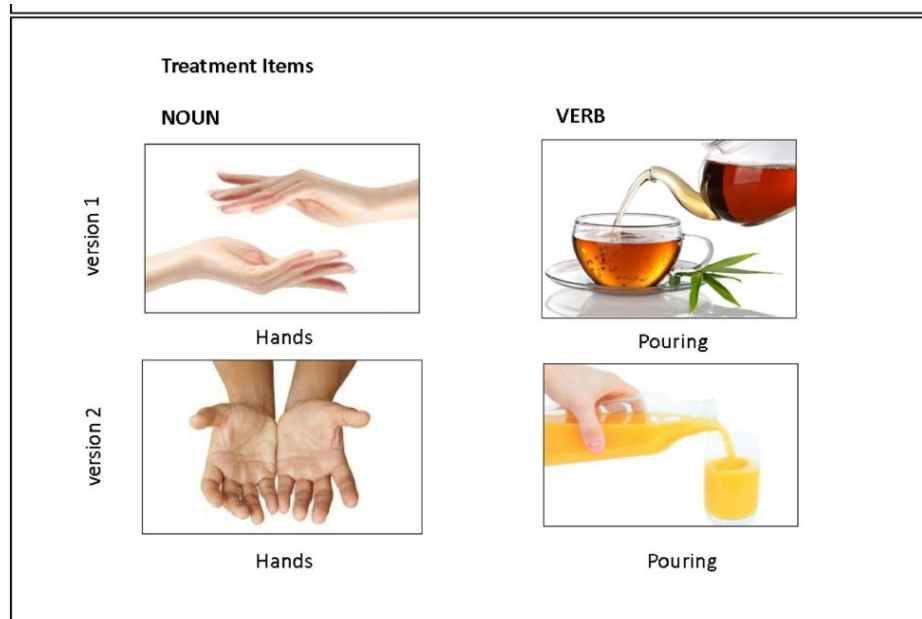
- *motivation & focus: supports around running of therapy (e.g. with spouse)*

Reviews:

- Cathery-Goulart et al (2013) *Dementia Neuropsych.* 7(1), 122-131
- Croot et al (2009) *Aphasiology*, 23(2), 125–160
- Jokel et al (2014) *Aphasiology*, 28, 1038–1068.

PRIORITY VOCABULARY

✓ Imageable – concrete



Taylor-Rubin et al., (2022), *Neuropsych Rehab*

✓ Personally important



Ask the family - people with sv PPA don't always know what they don't know!

Savage et al., (2015) *J of Alzheimer's Disease*

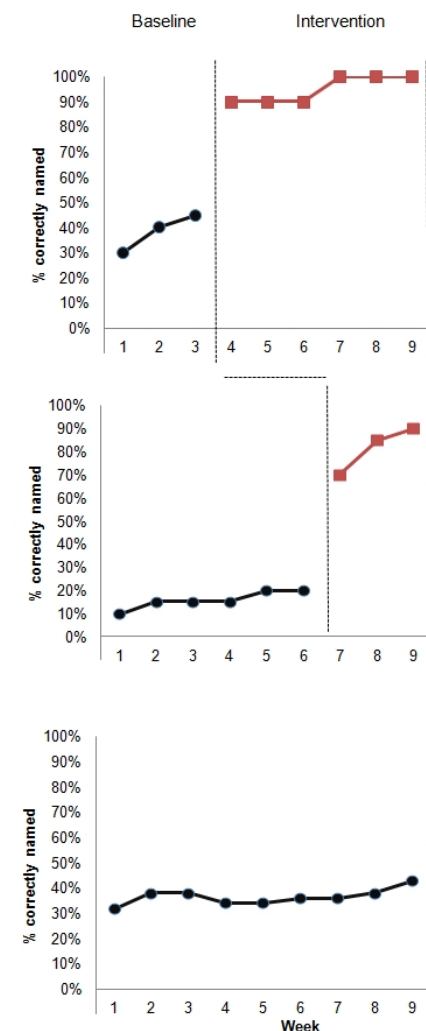
PROMOTING GENERALISATION

- Indicate that improvements likely on trained words only
- Randomise order but block items into categories to reinforce concepts



- Photos of all relevant versions of items
- Encourage use of spoken words at home

See Hoffman et al., 2015. Neuropsychologia



Savage et al 2013, Cortex; 49(7), 1823-1832

Transcript – SD8 Baseline:

Video- Making toast:

Participant: She's cooking breakfast. And I know exactly what those things are but I can't think of the words. That's what I use but I never know the words. Now and again I come up with a word. I can't.

Examiner: What about some of the things here?

Participant: Apart from the meat [bread], that's all I know. **Knife**. Is it knife? I can't believe it. I remembered! I was trying to think of it before.

Examiner: And these?

Participant: Yeah, but I don't know the name

Examiner: do you remember where she got this from?

Participant: The kitchen [fridge]

Transcript – SD8 Follow up:

Video- Making toast:

Participant: Going to make something to eat. She's opened the **fridge**, got something out. Some meat [bread] and heat it up. Is it kettle? [toaster]

Examiner: Keep going

Participant: Fridge. She's got a **knife** andcheese and it looks like a **jam**. Pull it out, probably add the cheese and the jam. Not cheese, it's some **butter**.

Examiner: So if you can tell me everything about what you saw her do and all the things she's been using?

Participant: Oh well she's... she's just having breakfast and she put some **bread** into the... I know what it is, it's to heat it up but I can't think of the word. And once it was warm enough, hot enough, then she put some .. ah... jam on it and ... some **butter**.

Examiner: What were some of the other things you can see here that she's been using?

Participant: Oh she had a **knife** and a **plate**.

PROMOTING RETENTION

- Level of impairment to frequency of practice
- Role of booster sessions

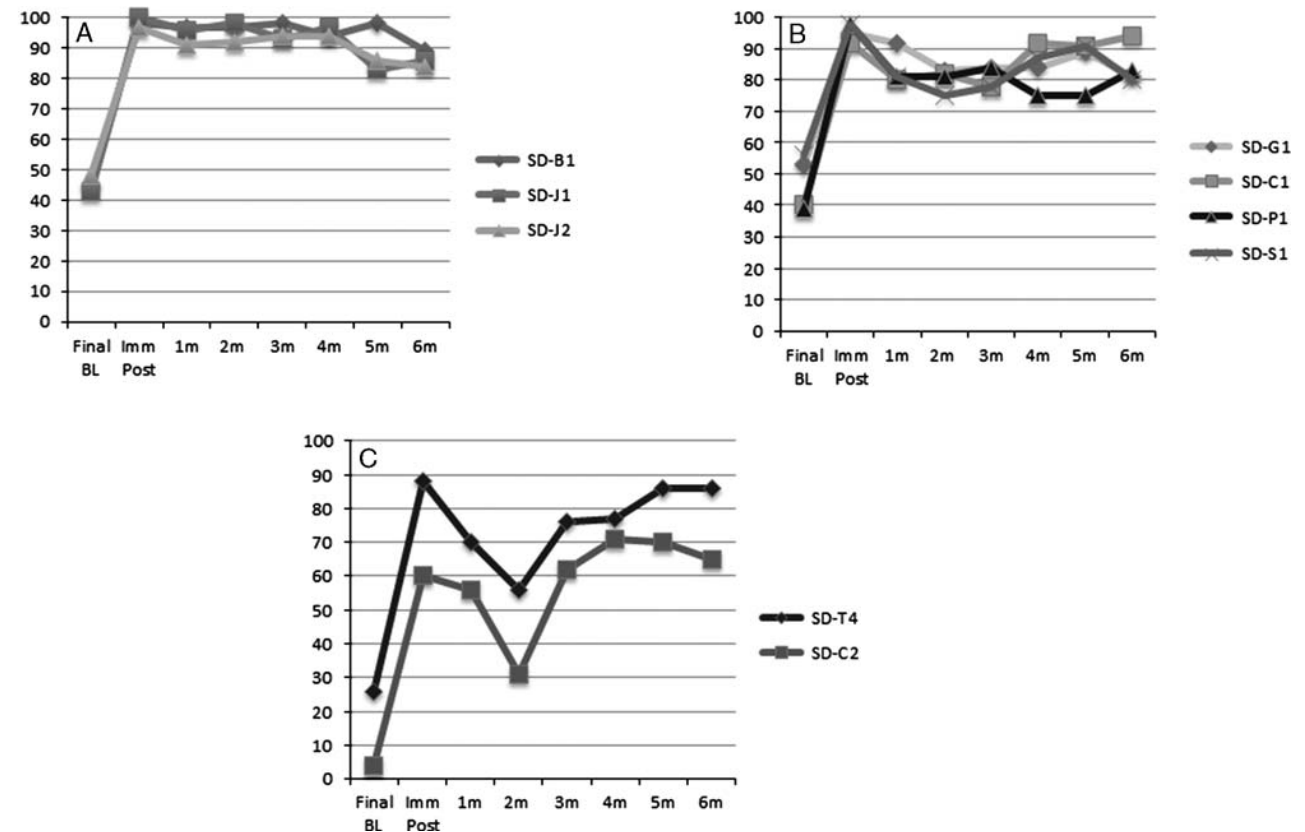
TABLE 4. Number and Frequency of Revision Sessions Provided During the Postintervention Period

Participants	Total Times Revised	Frequency of Sessions
SD-J1	0	0/week
SD-S1	5	1/week (initiated 3 mo post)
SD-P1	3	2/week for one week (initiated after 5 mo post)
SD-B1	0	0/week
SD-G1	4*	1-2 sessions/week for 2 wk (at 4 mo post)
SD-J2	0	0/week
SD-C1	8	1/week for 3 wk (at 4 mo post); then 1/fortnight
SD-C2	14	1/week continuously (initiated after 2.5 mo post)
SD-T4	23	2/week continuously (initiated after 2 mo post)

*Revision based on a subset of n = 15 trained words only, rather than the full training lists.

Cognitive Intervention in Semantic Dementia *Maintaining Words Over Time*

Sharon A. Savage, MClinNeuro,*†‡ Olivier Piguet, PhD,*†‡
and John R. Hodges, FRCP*†‡



OTHER INTERVENTIONS THAT ARE IMPORTANT :

PPA EDUCATION AND SUPPORT



Health
South Eastern Sydney
Local Health District



MACQUARIE
University



ELSEVIER

Contents lists available at [ScienceDirect](#)

Journal of Communication Disorders

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

Group intervention for individuals with primary progressive aphasia and their spouses: Who comes first?

Regina Jokel^{a,*}, Jed Meltzer^b, J. D.R.^c, L. D.M.^c, J. J.C.^c, E. A.N.^c, C. D.T.^c

Article

Development of a psycho-educational support program for individuals with primary progressive aphasia and their care-partners

Darby J Morhardt, Mary C O'Hara, Kristine Zachrich, Christina Wieneke and Emily J Rogalski

Cognitive Neurology and Alzheimer's Disease Center, Northwestern University Feinberg School of



Dementia
0(0) 1–18

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DOI: 10.1177/1471301217699675

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Speech and Swallowing Special Issue

Primary Progressive Aphasia Education and Support Groups: A Clinical Evaluation

Cathleen Taylor-Rubin, MAppSc^{1,2,3} , Lisa Azizi, D (Psych)/MSc⁴, Karen Croot, PhD^{2,3,5}, and Lyndsey Nickels, PhD^{2,3}

American Journal of Alzheimer's
Disease & Other Dementias®
Volume 35: 1-8

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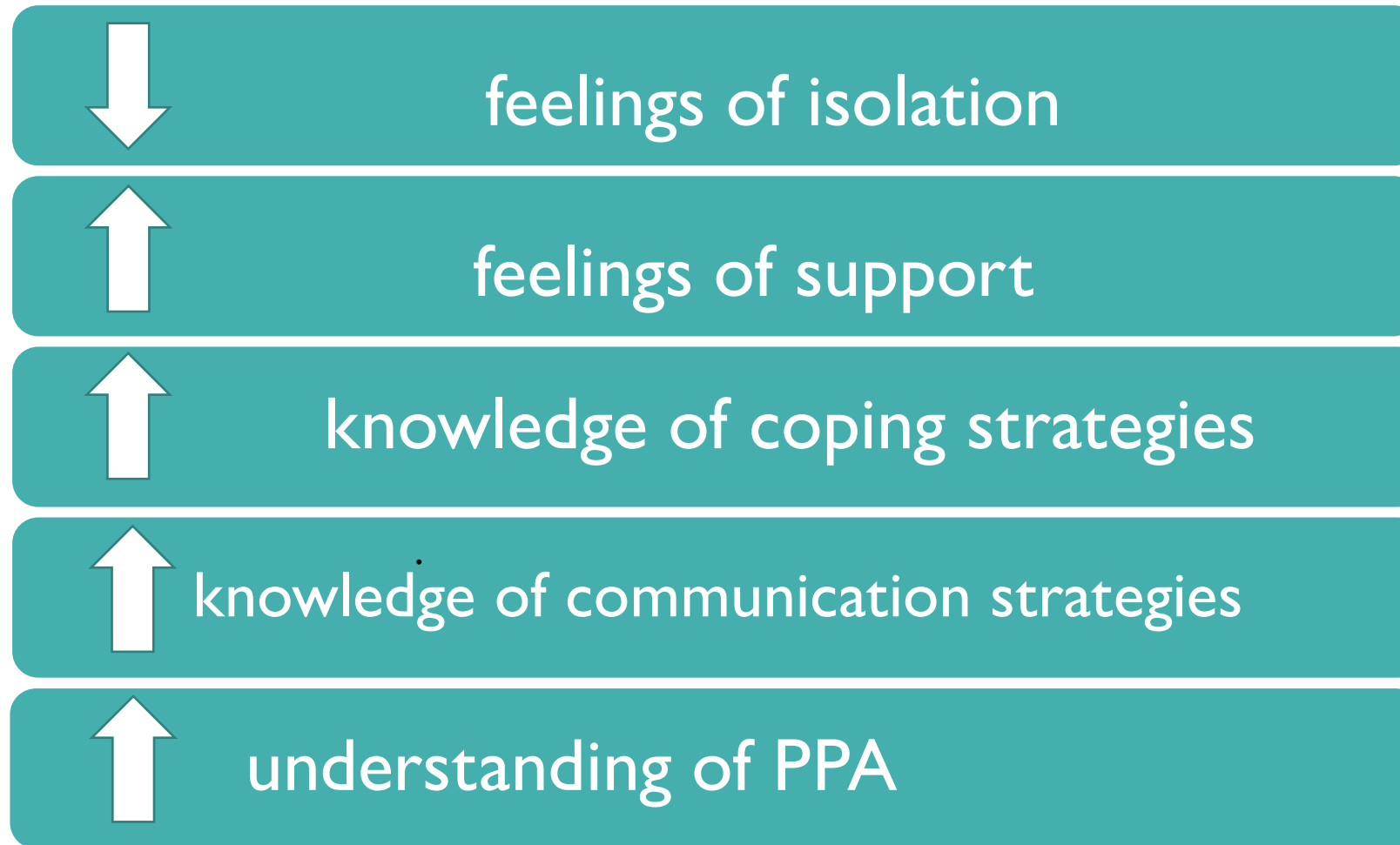
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POSITIVE BENEFITS



PwPPA –opportunity
to provide support to
peers

CONCLUSIONS

- Language is an important area where interventions can make a difference even for people with neurodegenerative disease
- Simple, carefully constructed word retrieval therapies are effective
- Word retrieval therapies can be successfully delivered even when semantic knowledge is significantly reduced
- Generalisation and retention can be achieved with careful construction and regimes of practice

QUESTIONS & CLOSE

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Search



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Newcastle)

KEY REFERENCES - WORD RETRIEVAL

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