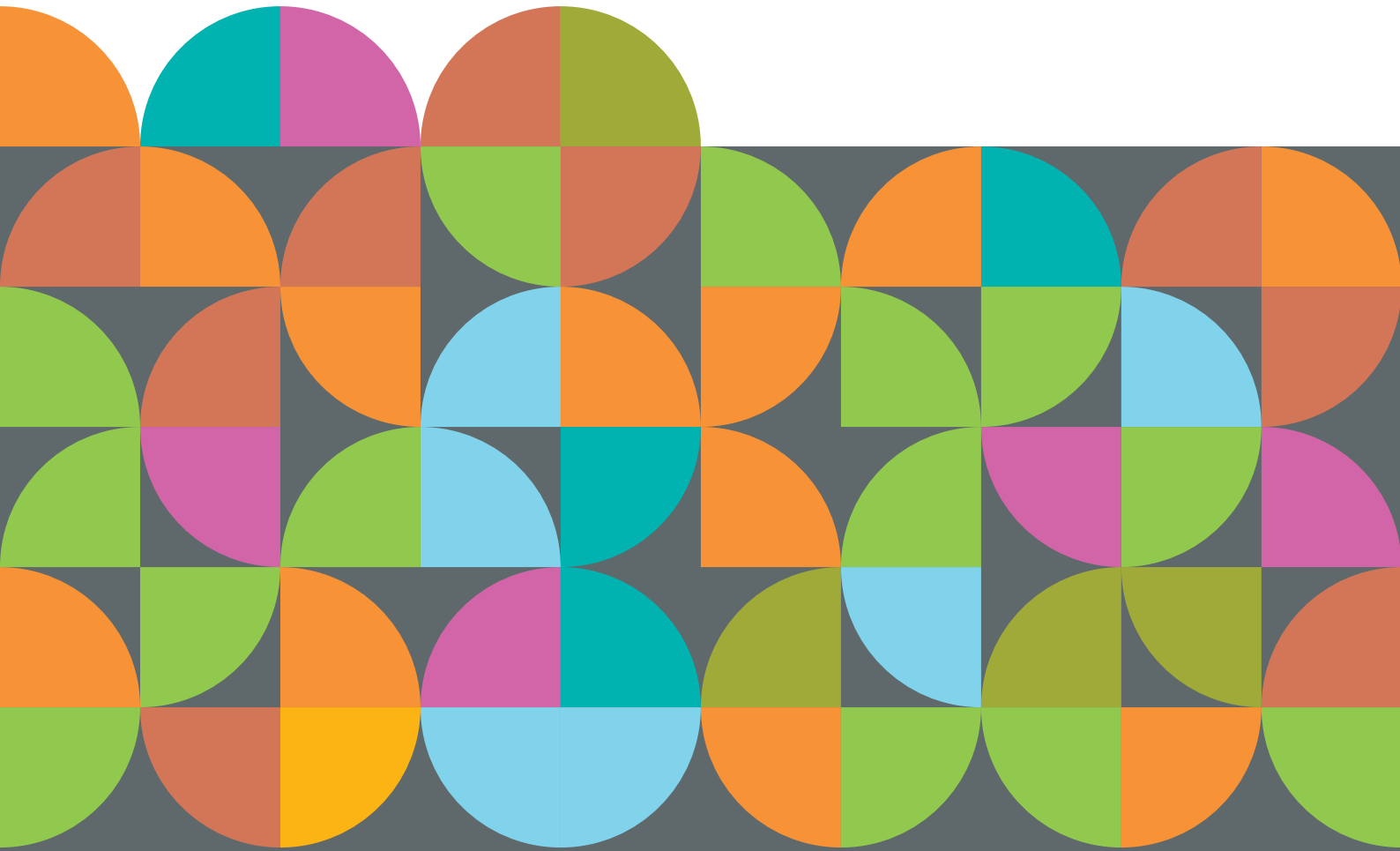




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**THE ALZHEIMER  
SOCIETY of IRELAND**



# STRATEGIES AND TECHNIQUES FOR COGNITIVE REHABILITATION

Manual for healthcare professionals  
working with individuals with cognitive impairment

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# Disclaimer

## COGNITIVE REHABILITATION MANUAL

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### **No advice**

This cognitive rehabilitation manual ("CR MANUAL") contains general information regarding cognitive rehabilitation strategies. The manual has been by created by Trinity College Dublin and The Alzheimer Society of Ireland ("AUTHORS") during the course of their academic research collaboration. The information is not to be considered as comprehensive medical advice, and should not be treated as such and should be used in conjunction with additional supporting therapies where necessary.

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## 1. Overview

The aim of this manual is to present healthcare professionals with strategies and techniques that can be used to assist people with memory problems in optimising management of their daily lives and activities. These strategies have been incorporated into goal-oriented cognitive rehabilitation interventions that aim to (i) draw on retained strengths to support adaptive behaviour; and (ii) achieve optimum levels of wellbeing by targeting performance on personally relevant goals (Clare, 2008). The manual is not a comprehensive account of cognitive rehabilitation (CR) however, and should be used in conjunction with supporting literature (e.g. Clare, 2008; Clare & Wilson, 2004; Dunn & Clare, 2007; Clare et al., 2010).

There are a number of different rehabilitative strategies outlined in this manual aimed at assisting with difficulties in memory and everyday functioning. Generally speaking, there is a lot of individual variability in how people respond to different strategies. For this reason, it is preferable to try several strategies in an attempt to determine what works best for each individual.

As the healthcare professional, your role is to help the individual understand how to use these strategies, but the individual is responsible for practice and implementation between sessions. Explain that there is a requirement of commitment and effort on their part. Typically, you would identify target areas or goals to work on, practise a number of different strategies, and then decide which strategies the person prefers and can use most efficiently. Preferred strategies can be selected for additional practice until the individual feels confident using them.

Sessions should be conducted either in the person's home, or in a comfortable setting suited to practising the identified goals. Family members/carers should be debriefed on each session and provided with explanations of strategies used so that these may be practised outside of intervention sessions.

### Rehabilitative Strategies and Interventions:

GUIDING PRINCIPLES	RECALL STRATEGIES	SPECIFIC INTERVENTIONS
Effortful Processing Dual Cognitive Support Errorless Learning	Mnemonics Cueing Chunking Method of Loci Spaced Retrieval	Face-name Recall Number Recall Story Recall List/Object Recall Procedural Memory Fluency Training Semantic Impairments

## 2. Goal Identification

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Difficulties with memory or cognition can often interfere with a person's ability to carry out specific tasks or activities; for example, the ability to recall peoples' names, play cards, or use household appliances. In some cases, people may not have any specific area of concern, but may wish to address more general memory problems. Interventions can therefore focus either on direct real-life, everyday situations or on more general rehabilitative activities.

Where a person identifies specific goals that s/he would like to work on (e.g. related to the examples provided above), the techniques in this manual can be applied to help the person to address these personal rehabilitation goals. In such instances, it can be beneficial to assist the person in eliciting goals either informally through discussion, or by using structured goal-setting approaches, like the Bangor Goal Setting Interview (BGSi; Clare & Nelis, 2012) or the Canadian Occupational Performance Measure (COPM; Law et al. 2005). These structured interview measures are used in research studies or clinical interventions to help elicit and rate progress with goals.

### Setting SMART Goals:

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When setting goals, it is helpful to ensure that those selected for intervention are Specific, Measurable, Achievable, Realistic, and Time-limited. The following areas/questions should be considered:

- **Describe exactly what is to be achieved.**
- **What is needed to reach this goal?**
- **What might get in the way of reaching this goal?**
- **What resources are available to help meet this goal.**
- **What will help to overcome obstacles and achieve this goal.**
- **How do I know the goal has been achieved?**
- **What is the time limit?**

### Examples of Goals:

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Goals might focus directly on the impact of cognitive difficulties in life or some goals may have a broader focus (e.g. socialising). Examples of goals might include: remembering the names of familiar individuals, remembering important numbers (PIN codes, phone numbers), developing and using a strategy to help remember important events or keep track of important personal effects, remembering how to carry out multi-component daily tasks, learning to use a memory aid such as a calendar or memory board, or learning and retaining personally relevant information.

### Measuring Outcomes:

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If you wish to measure outcomes, it is beneficial to gather data at the beginning and at the end of the intervention. The BGSi allows for measurement of participant, carer and therapist ratings of performance and satisfaction for each goal identified. All ratings on the BGSi are taken before the intervention begins, and then repeated at follow-up to determine what changes have occurred.

With some goals, it might also be appropriate to measure actual goal performance at baseline and follow-up. An example of this may be to record the number of correct responses on a test of face-name recall conducted prior to and after the intervention (see Clare, Wilson, Carter & Hodges, 2003). This allows for measurement of actual goal performance, to supplement self-ratings.

## 3. Guiding Principles

Throughout the rehabilitative intervention sessions, it is important to be aware of – and to implement, where possible, the following guiding principles.

### 3.1 Effortful Processing

In some cases, when a person is asked a question, the more effort they are required to make in order to retrieve the correct answer (i.e. the less prompts that are provided) the better. For example, research shows that high effort conditions (fewer prompts, more effort required) are more effective than low-effort conditions (given the answer immediately or given a lot of prompting) in facilitating cued recall of novel associations for people with cognitive impairment (Clare, 2008). It may also be beneficial for face-name recall or number recall. To achieve effortful processing, at encoding - assist the individual to engage in elaboration of the to-be-remembered item at encoding e.g. get them to generate additional cues such as (i) the category that the item is in or a person that reminds them of that item; (ii) other related meanings that can be applied to the item; (iii) or think of the item in an elaborate setting (see also mnemonics); self-generated and more personal cues may be more effective than clinician generated cues. Subsequently provide minimum cuing to aid recall, such as first letter or category cues.

### 3.2 Dual Cognitive Support

Cognitive impairment can affect peoples' ability to use methods that aid encoding and facilitate retrieval. It is important to consider how teaching strategies might provide support at both encoding and retrieval by ensuring compatibility of cues at encoding and retrieval (e.g. category cues). Interventions for people with cognitive impairment; compared to healthy older adults, need to focus on more guidance and support when encoding material, extra learning trials, additional prompts, and cues for retrieval.

**Multi-modal encoding** can be beneficial in facilitating later recall and is achieved by involving multiple sensory modalities during learning (e.g. providing sound and smell cues to accompany the demonstration of an action sequence).

### 3.3 Errorless Learning

Errorless learning is an instructional technique that allows for the reduction or elimination of errors during learning. This is particularly useful in facilitating learning or re-learning of information for people with cognitive impairment, as it minimises the number of times the person is exposed to an incorrect response (Clare, 2008). To achieve errorless learning during CR sessions, regularly remind the individual that if they are not sure of an answer, to say either "I'm not sure" or just don't respond. When this occurs, immediately provide the individual with a cue or prompt to assist them in recalling the correct answer.

## 4. Recall Strategies

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### 4.1 Mnemonics

Mnemonics are learning techniques that aid information retention. Useful mnemonics strategies include linking visual imagery, stories, poems or acronyms to the information to-be-remembered. Preferably mnemonics are combined with other methods such as spaced retrieval/repeated presentations.

#### Example 4.1.1:

A mnemonic method might involve discussing a photograph and name, and generating associations that could be used to assist recall. For example: his name is Eoin – imagine him as an onion, Onion – Eoin; OR his name is Brian – he has a large head so he must have a big brain, Brain – Brian; OR “*she looks like a girl I went to school with that has the same name*”, etc. Both parties should agree on the most effective association. It can be difficult to generate a mnemonic but work at it together and try to think of something humorous so that it stands out more to the individual when recalling it.

### 4.2 Cueing

Providing relevant cues at recall can aid retrieval and can be useful when teaching information particularly face-name recall or number recall (Clare, 2008). Two types of cueing are vanishing cues (or cueing with decreasing assistance) and forward cues (or cueing with increasing assistance). Although one study reported no significant differences between the two strategies (Dunn & Clare, 2007), two further studies that compared vanishing cues to forward cues found forward cues to be more effective (Clare & Wilson, 2004).

#### Example 4.2.1:

Vanishing Cues (errorless and effortful): Each face is first shown with the complete name and on each subsequent presentation a letter is withdrawn in order from right to left until only the first letter of the first name is presented. Participants are asked to recall the name by completing the target, but not to guess. If no response is given, the preceding stage is shown again. This is continued until a correct response is obtained. On all subsequent trials within a session, as well as between sessions, the next stage has one fewer letter than that at which the participants succeeded in the correct completion on the previous trial (Dunn & Clare, 2007).

#### Example 4.2.2:

Forward Cues (errorless and effortful): Each face is shown together with the first letter of its name. Participants are asked to recall or guess the name beginning with the cue letter. If the correct response is not given, letters are added one at a time until a correct response is obtained. Where the full name has to be presented, the participant is asked to say the correct name aloud (Dunn & Clare, 2007).

#### Example 4.2.3:

First letter cueing can also be beneficial for name recall. Go through the letters of the alphabet one by one; when you reach the first letter of the person’s name, it may prompt recall.



### 4.3 Chunking

Chunking information together into categories or small groups can be helpful when a person needs to remember lists or greater amounts of information. Organising information into small, relevant, simple chunks or categories means that there is less information to remember.

#### Example 4.3.1:

Practise making a grocery list by chunking items based on their locations in the supermarket, e.g. fruit and vegetables, dairy, meat, dried goods, cleaning products, etc. Then try cueing information by associating it with numbers; 5 fruit and vegetables items, 3 meat, 2 dairy, etc.

#### Example 4.3.2.:

Present 12 items with four of each item within the same category (e.g. dog, cat, horse, cow... shoe, hat, gloves, t-shirt, etc). Give the instruction to break these items down into categories. Once they are sorted into categories try to link the items in the category together with a bizarre picture or a story. At recall, encourage recall of the category first, then the items within the category.

### 4.4 Method of Loci

The items to be remembered in this mnemonic system are mentally associated with specific physical locations.

#### Example 4.4.1:

Visualise your house, visualise yourself going through each room, pick a special location in each room. When you are given a list to remember, visualise yourself putting one item in each special location in your house. Practise a number of times for each item. When trying to recall items on the list, imagine yourself going from room to room checking the special locations.

### 4.5 Spaced Retrieval

Spaced retrieval (SR) is also called 'expanding rehearsal', and helps to aid increased retention of information. This strategy is beneficial for face-name associations, object naming, memory for object location and prospective memory assignments (Clare, 2008). In SR, test trials are spaced at gradually expanding intervals. For example, show a picture of a face along with a name - then show the picture and ask the individual to recall the name after a number of set intervals (e.g. 5seconds, 10s, 30s, 1minute, 2m, 5m). If a correct response is given – the interval is expanded. If not, the correct answer is rehearsed, the individual is asked to repeat the correct answer – and the interval is shortened to the previous interval where successful recall occurred (Buchanan, Christenson, Houlihan & Ostrom, 2011). The goal is mastered when the information is successfully recalled at the final time-point. Testing sessions occur within the context of a situation that provides social interaction and reduces demands, such as a casual conversation.

## 5. Specific Interventions

This section provides concrete examples of how CR strategies might be put into practice to target specific goals. The examples are designed as a guide to implementing CR interventions and should be used in conjunction with CR research literature. Interventions can be adapted accordingly depending on the requirements of individual and on judgements of the healthcare professional. The person with the memory problem is referred to as a participant as they are participating in the intervention with the healthcare professional.

### 5.1 Face-Name Recall

The following information on face-name recall sessions has been adapted from Clare and colleagues work on goal-oriented cognitive rehabilitation (see Clare, Wilson, Breen & Hodges, 1999; Clare & Wilson, 2004; Dunn & Clare, 2007).

- Present a photograph of the to-be-remembered person.
- Discuss the photograph and name. Generate mnemonics (or associations) that can be used to assist recall, and agree on the most effective association.  
**For example:** if the name to be remembered is Brian – “Brian has a large forehead; he must have a big brain! Brain is like Brian!” Basically you need to work with the participant to attach a visual or a story to the to-be-remembered-item which will help them recall it. This can be challenging but it can also be fun and is a worthwhile exercise.
- Present the face-name association and mnemonic.
- For the training phase, using the forward cueing method, present prompts, one line at a time, with increasing cues. Increase the cues until the participant correctly identifies the item (see Figure 1 below).
- Next present the prompts in the reverse order and get the participant to repeat the correct answer (if known).
- Practise the mnemonic each time the answer is correctly identified.
- **Test phase:** After presenting all above prompts, ask the participant to recall the information at spaced intervals (SR). For example, test them immediately, then after 30s, 1m, 2m, 5m, 10m.
- If the participant fails to recall the item, review the correct name and mnemonic and repeat that interval. If they are incorrect again, halve the interval. **Criterion for completion:** accurate recall after 10 minutes.
- Use an ERRORLESS LEARNING technique. Ask the participant not to guess, only say the answer if they know what it is. If they do not know, encourage them to either say nothing or say “I don’t know”. This reduces the number of errors the participant makes.
- Only add one new item per session and only when the prior item has been learned.

SESSION PLAN: Face-Name Recall	
<b>Item for training</b>	Shown photograph and told name (e.g. BRIAN).
<b>Mnemonic chosen</b>	Discussed and agreed <u>mnemonic</u> for each name
<b>Learning Trials</b>	<u>Cue with increasing assistance</u> His name is Brian: Shown and asked to complete:
<b>Presentation 1</b>	B _ _ _ _ (not named) B R _ _ _ (not named) B R I _ _ (not named) B R I A _ (name identified)
<b>Presentation 2</b>	B R I A _
<b>Presentation 3</b>	B R I _ _
<b>Presentation 4</b>	B R _ _ _
<b>Presentation 5</b>	B _ _ _ _ ( <u>Errorless learning:</u> encourage saying nothing or "I don't know" if unsure. Prompt with correct ans in P2-5) Each time name given or correctly guessed – rehearse the mnemonic
<b>Consolidation and Testing</b>	Run one training trial (P1 – 5) then test immediately, after 30s, 1min, 2min, 5min, 10min. <u>Spaced retrieval.</u>
<b>Recording</b>	Only add one new name in any given session. Test all names once per session (i.e. continued baseline for successive names)

**Figure 1: Session plan for face-name recall goal.**  
Adapted from Clare et al. (1999); Appendix A: Example of a session plan (p. 46).

### 5.2 Number Recall

Present the to-be-remembered numbers in verbal and written formats. Discuss the number, what it is for, how often it is used, etc.

- As above, generate mnemonics (or associations) that can be used to assist recall, and agree on the most effective association.  
**For example:** If the number to be remembered is a daughter's phone number (086) 84 75 350 – "we moved house in '84, my daughter was born in '75, and she got 350 points in her leaving cert!" Try to link the mnemonic cues to the participant or situation pertains to. Another example is a car registration O4D99617 – (the O4D can usually be recalled without a cue) "My old car was a '99, I got my first car in '61, and I used to drive my seven brothers and sisters around", etc.
- Next, for the training phase, present the prompts, one line at a time, with increasing or decreasing cues (depending on the individual's preferred strategy). Increase/decrease the cues until the participant correctly identifies the item (see Figure 2, below).
- Next present the prompts in the reverse order and get the participant to repeat the correct answer (if known).

8 _ _ _ _ _	84 75 35 _
84 75 _ _ _	84 75 3 _ _
84 75 3 _ _	84 75 _ _ _
84 75 35 _ (number identified)	8 _ _ _ _ _

**Figure 2: Sample prompt for number recall task.**

- Practise the mnemonic each time the answer is correctly identified.
- Use the ERRORLESS LEARNING technique.

- After 5-10 presentations of the training materials, conduct a test phase using spaced retrieval e.g. ask the participant to recall the information immediately, then after 30s, 1m, 2m, 5m, 10m.
- If the participant fails to recall the item, tell them the answer and repeat that interval. If they are incorrect again, halve the interval. Set a specific criterion for completion.

### 5.3 Story Recall

When you wish to target memory for newspaper articles or stories, try to encourage the individual to use either (or both) the WH questions or the PQRST strategy. Both strategies should be rehearsed with the individual to test for ability to use, preference and suitability.

#### 5.3.1: WH Questions:

When reading or listening to a story, it might be helpful to focus on only the key points of the story. This way, irrelevant information can be forgotten and the story may seem simplified and easier to recall. Think of it as breaking the information down into sections, and try to imagine what each section looks like:

- **What**
- **Where**
- **Who**
- **When**
- **Why**

#### 5.3.2: You might also try or add in the PQRST strategy:

- **P – Preview** – read it over again, get an overview of what the story is about
- **Q – Question** – who, what, when, where, why
- **R – Read** – read through it again
- **S – State** – state/ answer your questions (write answers)
- **T – Test** – test yourself to see if you remember the answers to your questions

Encourage the individual to rehearse the information a number of times to get the information to stick. Use spaced retrieval (i.e. gradually increase the length of time before attempting to recall the information again). Practise by discussing the details of the story with others and then check to see if it is correct. When presenting the to-be-remembered information, it is practical to use stories of actual current affairs and news events.

### 5.4 List/Object Recall

To help with recall of lists of things that need to be done, or lists of items needed for cooking or shopping, it might be useful to combine the strategies of chunking and the method of loci. Have the participant imagine they are carrying out the activity or task and have them explain this to you in detail. Conduct a number of training trials, and then use spaced retrieval to test for ability to recall.

### 5.5 Procedural Memory

To optimise procedural memory functioning, aim to target the restoration or maintenance of the ability to carry out selected tasks or activities of daily living (Clare, 2008). Tasks might range from using the phone to making breakfast. Specific strategies and intervention options include;

#### 5.5.1: Prompting and fading:

Prompting methods can be employed to assist with training, and can be faded back to encourage eventual independence conducting the task. A task-analysis is required to identify the key steps in carrying out the task. Prompts may be verbal prompts (“now pick up the phone”), model prompts (modelling the required action for the individual to imitate), gestural prompts (pointing or gesturing) or physical prompts (guiding the participants hand to the phone). Always begin with the minimum required prompt. Gradually fade back as performance improves until the participant independently carries out the task.

### 5.5.2: Action-based encoding:

Instead of only providing a verbal instruction, where appropriate, the participant could also physically engage in completing the task along with the verbal instruction at the time of encoding. Provide appropriate cues at the time of retrieval (e.g. “now it’s time to wash your hands” and point to the tap) as the individual may be less likely to independently initiate the correct response at the correct time.

### 5.5.3: Chaining:

*Chaining* is useful for relearning tasks with various steps, such as making breakfast, brushing teeth, fishing, etc. Conduct a task analysis to identify the key stages in completing a task and the specific actions required by the participant at each stage. Conduct an assessment of the participant’s performance of each stage to determine the appropriate level of prompting required for each step in the task. Fade back prompts until each step can be carried out independently. Teach as a chain of behaviour so that each step becomes a prompt for the next.

*Backward Chaining:* The participant is fully prompted (visual, verbal, and model prompts) through each step of the task first. In the next trial, all steps are prompted except prompts are faded back for the **last** step until it becomes independent. Work backwards successively through steps until the participant can complete the entire task independently.

*Forward Chaining:* The participant is fully prompted through each step of the task first. In the next trial, all steps are prompted except prompts are faded back for the first step until it becomes independent. Work forward successively through steps until the participant can complete the entire task independently.

## 5.6 Fluency Training

### – Direct Instruction and Precision Teaching

Fluency training is thought to produce better learning outcomes including long-term maintenance, the ability to display skills in a distracting environment, and an increased likelihood of component skills being appropriately applied in practice (Kubina & Wolf, 2005). Below is a suggested strategy for training to fluency. Others may be found in *Precision Teaching* (Lindsley, 1991) and *Direct Instruction* literature (<http://www.education.ie/en/Education-Staff/Information/NEPS-Literacy-Resource/NEPS-Resource-Precision-Teaching-Approach.pdf>).

Identify the material that you wish to train to fluency. Here, we use the example of face-name or number recall.

#### 5.6.1: Fluency Training – Names:

- Show the pictures one at a time. “This is \_\_\_ (name)” and printed text.
- For each picture, instruct the participant to “Tell me something about him/her”? Anything they know is fine, even 1 or 2 pieces of relevant information. If they know very little, suggest some additional information that may differentiate the to-be-remembered participant.
- After each has been individually named and discussed, put all pictures out on the table at the same time and say “point to \_\_\_ (name)”. Continue with all pictures x2.
- Pick up photos, shuffle, put them down one at a time and ask the individual to name each participant.
- Repeat this entire process 2 to 5 times or until deemed appropriate to move to the test phase.

### 5.6.2: Fluency Training – Numbers:

- Identify important numbers.
- Say the numbers out loud.
- Ask the participant “What is this number for?”
- The participant should write out each number twice.
- Place written copies of each number on the table one at a time and ask the participant to identify the number and say it out loud.
- Repeat 2 to 5 times, as above.
- After the fluency training sessions are complete, you need to run a **test trial**. This consists of setting a timer for one minute and recording how many names/numbers the participant can correctly recall per minute. Also record errors. Get the participant to record these – place the data in a table so the participant can track their own performance.
- Aim to complete up to eight sessions.

Sessions	S1	S2	S3	S4	S5	S6	S7	S8
Correct/ minute	8	10	23	30	24	34	26	32
No. of errors	1	2	2	0	0	0	0	0

**TABLE 1:** Sample table for recording performance during fluency training

### 5.7 Semantic Impairments

Rehabilitation interventions may be considered for individuals with semantic impairments, such as temporal variant fronto-temporal dementia (Clare, 2008). Although this area of work is still in its infancy, research shows that the following techniques can be beneficial -in alleviating semantic impairments.

- Repeated rehearsal of names of concepts or items paired with pictures or exemplars has been shown to improve a participant’s ability to produce previously hard to retrieve words. Constant practice was needed though (Graham et al. 2001).
- Recent research has shown that simple, repetitive practice of word-picture pairing in a 3-week word-training programme significantly improved the ability to name trained item for four people with mild to severe impairments in semantic knowledge (Savage, Ballard, Piguet & Hodges, 2013). See Savage et al. (2013) for more information and a discussion about research on strategies for re-building vocabulary in individuals with semantic impairments, with promising results.
- Learning is more effective when: 1) the individual retains some semantic knowledge of the item, object or concept to be learned; and 2) learning is supported by the availability of temporal and spatial contextual information relevant to the participant’s daily life (this way learning extends beyond verbal labels to associated relevant knowledge). Effective learning might require the material to be linked with personal experience (Snowden & Neary, 2002).
- Research suggests that rehabilitation in those with semantic impairments should focus on maintenance of current vocabulary rather than relearning forgotten vocabulary; using repetition combined with a multi-modal approach involving manipulation, naming and rich description of objects (Reilly, Martin & Grossman, 2005).

**5.7.1: For individuals with more mild impairments including word finding difficulties during conversation, or issues with verbal fluency, it can be beneficial to practise:**

- Word-pairs: provide a word and ask the individual to pair it with another appropriate word.
- Word associations: provide one word and ask the individual to identify a related word or a word with the same meaning.
- Commonly used fluency tests (e.g. F, A, S test) e.g. go through lists of words beginning with F, then present a brief one minute test session. Present repeated exposures to lists and one minute tests in successive sessions Allow individuals to keep track of their own scores to track any improvements or progress.
- Use repeated presentations and practice across sessions using multiple examples.

For this type of intervention, ask the individual to identify common words, word-types or categories that they typically find difficult (the participant's family may be able to help with this also). Based on the information provided, select relevant words for word pairing and associations. Practising particular word associations and word pairs may not necessarily generalise to fluency of all speech in everyday living but can provide confidence and practice in specific areas of difficulty.

Word Pairs	Word Associations	Letter F Fluency Test
Share ---- Knowledge	Father ---- Dad	Fast
Be ---- Creative	Son ---- Child	Far
Remain ---- Hopeful	Mother ---- Mum	Fall
Meet ---- Needs	Car --- Automobile	Fly
Promote --- Health	Bicycle ---- Bike	Film
Support- --- Family	Train ---- Bus/Transport	Fit
Remember ---- Me	Cup ---- Mug	Full
Build ---- Strength	Jug ---- Pitcher	Fried
Similar ---- To	Medication ---- Tablets	Fling
Prepare ---- For	Cow ---- Farm Animal	Flick
Take ---- Responsibility	Pen ---- Pencil	Front
Shine ---- Brightly	Paper ---- Page	Fake
Fill ---- Up	Lamp ---- Light	Father
Last ---- Night	Couch ---- Chair	Feather

**TABLE 2: Examples of word pairs, word associations and responses for the letter F fluency test**

## 6. Additional Support

### 6.1 Memory Aids

Providing external support in the form of compensatory memory aids can help to reduce demands on impaired aspects of memory, provide cognitive support, reduce anxiety and even promote social engagement.

Selection of aids requires careful consideration – where use of the aid is already within the behavioural repertoire, focus should be on more regular or efficient use; while if new learning is required, use an intervention to address this before everyday implementation is expected. For generalised reminders, the association with the desired response needs to be carefully taught. Aids need to be acceptable to the individual, accessible and easy to use.

Specific strategies to consider for training association with memory aids include:

- Action-based learning
- Prompting and fading
- Modelling
- Errorless learning
- Chaining

### 6.2 Environmental Adaptation

Adapt the environment to be more organised – a place for everything and everything in its place. Encourage the development of habits and routines so that items are placed only in specific locations and always placed back there after use. For example: A key holder by the door for all keys; a 'special place' in each room for glasses, wallet, phone; an 'in' tray for bills and letters; letters to post by the door, etc. Encourage strategic placement of objects when out – e.g. bag/ umbrella in front of you or on your lap. This may require an object-location pairing intervention where the object is placed in the correct location repeatedly; use action based encoding, spaced retrieval, mnemonics and errorless learning. Reinforce correct placement.

### 6.3 Relaxation

Examples include breathing techniques, progressive or passive muscle relaxation, yoga, relaxation classes, exercise interventions, mindfulness, etc. Discuss with the individual and find out what relaxation method suits them best. Provide the participant with appropriate reading materials, information about classes and techniques that are suited to their needs. If possible, practise relaxation strategies with the individual during the CR sessions.



## 7. Examples of CR in Practice

### Case 1:

#### Number & Face-Name Recall

Joe was 75 years old with early-stage Alzheimer's disease. He had difficulty with **remembering important numbers like PIN codes, and the names of people** from his club.

The numbers included in the intervention were Joe's PIN code, house alarm code, car number-plate, and his mobile phone number. The numbers were targeted one by one – that is, the therapist only worked on one number at a time. When it was deemed that Joe had learned that number, the therapist moved on to the next number. First, the number was chunked together (i.e. conceptualising 3-5-6 as 356). Next the therapist worked together with Joe on selecting a verbal mnemonic for each number (see section 5.2, page 9). Training sessions consisted of 5-10 presentations of the to-be-learned number using forward cues (see figure 3), followed by rehearsal of the number using spaced retrieval (see section 3.3 and section 5.2) at the time intervals of 0s, 30s, 1m, 2m, 5m, 10m. The mnemonic was practised each time the number was correctly identified. If an incorrect or no response was given at a certain interval, the therapist told Joe the number and the interval was repeated. If this occurred again, the interval was halved. The learning session was complete when Joe correctly recalled the target number after 10 minutes. All learned numbers were rehearsed once in a probe session at the end of each intervention session to ensure that previously learned numbers were not forgotten when the new number was introduced. Note that errorless learning was adopted throughout – Joe was reminded not to guess, only say the answer if he knew it. If he did not know, he was encouraged to either say nothing or say "I don't know".

This strategy worked well for Joe, so it was adopted for the face-name recall task also. To help remember the names of his club members, Joe and the therapist selected the five names he was most likely to forget (Joe attended the club and brought a notebook to record the names he wanted to work on). Joe had a picture of the club members from a recent event which was used for the intervention. Recall of the five names was targeted using the intervention outlined in section 5.1. As above, only one name was targeted at any given time. First, Joe spoke about the person, what he/she looked like, their personality, etc. Then Joe identified the mnemonic for the person. In learning sessions, the name was learned using the picture and forward cues (as in section 5.1). The name was rehearsed using spaced retrieval at the time intervals of 0s, 30s, 1m, 2m, 5m, 10m. The mnemonic was practised each time the name was correctly identified. If an incorrect or no response was given at a certain interval, the therapist told Joe the person's name and the interval was repeated. If this occurred again, the interval was halved. The learning session was complete when Joe correctly recalled the target name after 10 minutes. Only one new name was trained per session but a probe of all names was also conducted at the end of each session (as above).

**Case 2:****Face-Name Recall & Conversational Fluency**

Mary was 62 years old with younger onset dementia, and was experiencing mild impairments as a result of her dementia. Mary wanted to improve her **memory for the names of characters in the TV soaps** she watched with her husband; and her ability to **remember words during conversation**.

The face-name recall intervention targeted recall of 10 face-name associations of TV soap stars; and employed direct instruction and precision teaching (see section 5.6) methodologies. Mary and her husband assisted the therapist in identifying the 10 names they wanted to work on. During intervention sessions, photographs of the soap stars were placed on the table one by one, and the names were identified. The therapist again placed the pictures on the table one by one and asked Mary to relay 2-3 pieces of information about each person “tell me about him?” Next, the therapist placed all pictures on the table at the same time and said “point to\_\_” and the name of each person. This was repeated 2-3 times. All photographs were then picked up and shuffled and placed on the table one by one for Mary to name. If the Mary did not know the name, the therapist would name the person in the picture and chat about the person using the information previously identified. When all the pictures were correctly named, a one minute fluency test-session was conducted. Mary recorded her own performance at each intervention session, and noted improvements week to week (e.g. see table 1).

Mary also had trouble with word finding during conversations. The word would usually come back to her eventually but it bothered her that she often forgot words and she noted that her confidence was affected when speaking to people. The therapist asked Mary to write down words she had difficulty recalling on a week-to-week basis. During the intervention sessions, Mary and the therapist compiled a list of these words (and similar words), and created word association lists – where alternative words with the same or similar meaning to the target word were generated. The therapist told Mary that if she could not think of a specific word during a conversation, that perhaps she could try to think of a suitable alternative (as in the word association lists). Mary practised rehearsing the lists between sessions. During sessions, Mary and the therapist read over the lists together and completed one minute test sessions. In addition to the word association lists, Mary and the therapist wrote lists of words beginning with the letters F, A, and S, and wrote lists of animals, fruit, vegetables, etc. Mary also worked on rehearsing these lists between sessions. Mary tracked her own progress from week to week on the one minute tests, and noted improvements. Although the possibility for generalisation to everyday conversation was questionable, Mary reported feeling more confident during conversations and being more determined to try harder to retrieve the correct word or a suitable alternative. Her family also reported an improvement.

**Case 3:****Playing Bridge**

John was 68 and had a diagnosis of Mild Cognitive Impairment (MCI). He engaged in a range of weekly activities including Bridge, Golf, and attending GAA games. He reported most difficulty with **playing Bridge** due the number of complex rules to be remembered while playing.

To target John's ability to play Bridge, the intervention worked on the use of memory aids, and repeated practice of important conventions. The therapist had no prior experience of playing bridge and so asked John if he could help her to learn. John was asked to write down the rules of bridge, along with the most important conventions that a novice should know (John worked on compiling these with his wife between sessions). The therapist initially targeted the rules; and then worked on approximately one convention per session. Prior to each session – the therapist flagged with John what convention would be worked on in the next session and he was required to bring in his notes about that convention for the session. During intervention sessions, John was asked to name the convention, talk about it, and write down the most important points. John was then asked to help the therapist to learn the convention (using playing cards and notes). Repeated practice was conducted throughout each session to ensure clarity on how to use each convention, how it fit into a 'standard bidding system', etc. At the end of each session, the therapist worked with John on drafting key summary points, and they tested each other's knowledge by asking questions based on the summary information. As above, an errorless learning strategy was employed, and only one new piece of information was introduced at a time. The therapist concluded subsequent sessions by conducting a probe of 1-2 questions on conventions targeted in prior sessions, to ensure retention of important information. Importantly, John was encouraged to use his notes during games when he had difficulty remembering details of a certain conventions. This way, John built up a notebook of important rules and conventions, and could use it fluently when required. It should be noted that Bridge is very complex. John was encouraged to focus on only the most important rules and conventions (that were deemed manageable for his abilities). Although this would allow him to continue to play, it was acknowledged that he may be limited in more complex playing circles.

**Case 2:****Using the Phone & Repetitive Questions**

Jane was diagnosed with early stage Alzheimer's disease at 75. Jane had a busy social life, as she had a large family and a number of grandchildren. She reported **difficulty with using her phone, and her family noted that she repeatedly asked about the time, dates and appointments.**

Jane was having difficulty recalling the sequence of actions required to make a phone call using her mobile phone. The target activity was broken down into small steps (1. Unlock the phone; 2. Enter pin-code; 3. Select 'contacts'; 4. Scroll to the number you wish to call; 5. Press the 'Call Button'; 6. Press the red button to hang up). The sequence of actions was taught using backward chaining, prompting and fading (see section 5.5). The therapist delivered verbal and gestural prompts to Jane for steps 1-6 in the chain. Prompts were subsequently faded back for step 6. When step 6 was completed independently, prompts were faded back for step 5, and so on until all steps in the chain could be completed independently. Action based encoding was implemented throughout, i.e. Jane completed the activity herself at each step. As mastery increased during intervention sessions, the therapist asked Jane's family to prompt her to make phone calls throughout the day, and also to reinforce her with extra praise and conversation if she made calls unprompted.

A whiteboard with information about the day, date, and appointments was placed on a wall in Jane's kitchen. Jane always wore a watch but did not use it to tell the time. At random intervals during initial intervention sessions, the therapist asked Jane either the time or about an upcoming appointment and then immediately prompted her to check the whiteboard or her watch. Jane gladly provided the information to the therapist, who reinforced her by saying "it's great that you can use that whiteboard" or "if you aren't sure what time it is you can always look at your watch", "that's a lovely watch", etc. Prompts were gradually faded back during subsequent sessions using a progressive time delay of 1s, 2s, 3s, 5s, 8s, 10s. In response to spontaneous questions, Jane was given a standard response – "check your watch/ the whiteboard". Jane's family were instructed to direct Jane to her watch/whiteboard at random intervals throughout the day by asking her about time or appointments, and also to give the standard response if she asked them questions. Jane's husband also reminded her each night before bed to change the information on the board so that she was responsible for managing the board, and to ensure the relevant information was available each day.

**\*Note that for all CR interventions, substantial time and effort practising the intervention outside of sessions is required by each participant, and their family/ carer. CR was most successful when the participant adopted the strategies, practised frequently, and attempted to apply learned strategies to other areas of difficulty.**

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