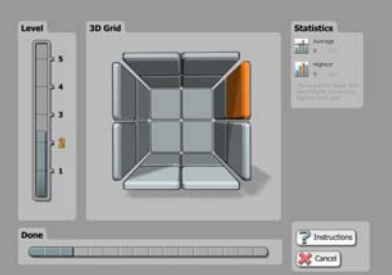**Pearson**

Working Memory impact and interventions used for improvement

May 23, 2017

Agenda

- Why is Working Memory Training Salient?
- What is Working Memory?
- How would you define and describe it?
- How does it differ from Long Term Memory & Short Term memory?
- Are there any interventions for WM that work?
- How do you implement them?

2

Working Memory: What does it consist of?
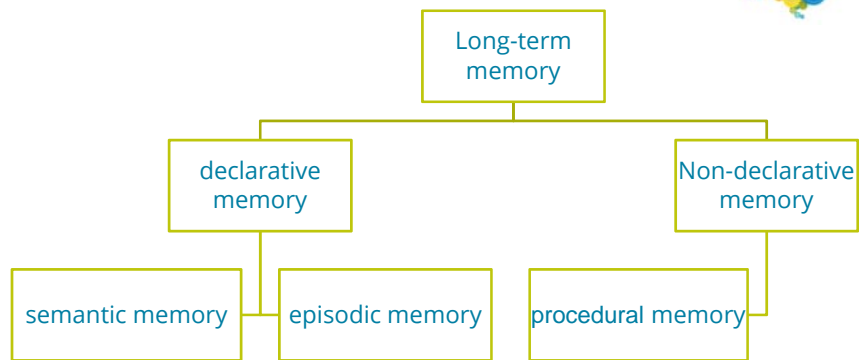
How does it differ from other types of memory?

Is it the same as Attention? Or Simple Recall?

Is it the same as Long -Term memory?

Is it the same as Short -Term Memory?

Structure of Long-Term Memory

```
                        Long-term
                         memory
                    ┌───────┴───────┐
              declarative        Non-declarative
                memory              memory
            ┌───────┴───────┐          │
    semantic memory   episodic memory   procedural memory
```
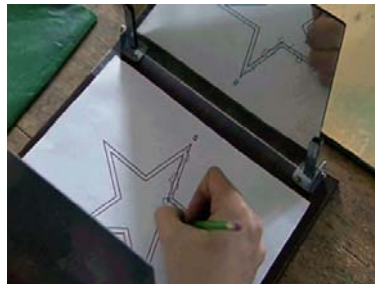
➤ General understanding
➤ Factual knowledge (Education)

➤ Personal life (temporally and spatially classification)
➤ Public life (important events, celebrities)

➤ Practical routines

Ⓟ Pearson

Procedural memory

Pearson

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Working Memory

What is it? How is it defined?
Why is it important?

What is working memory? How does it differ from other types of memory?

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Working Memory: Definition

WM requires the manipulation of stimuli -not just the repetition of visual or auditory input.

It may involve re-ordering, or regrouping or applying information learned in order to problems solve...

Working memory impacts your daily life

Working memory is used for…

Organization

Concentration
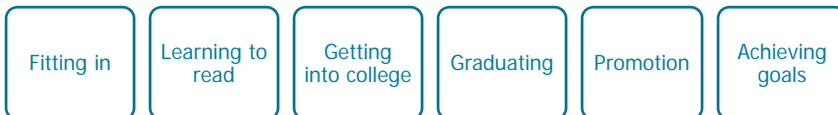
Problem solving

Remembering tasks

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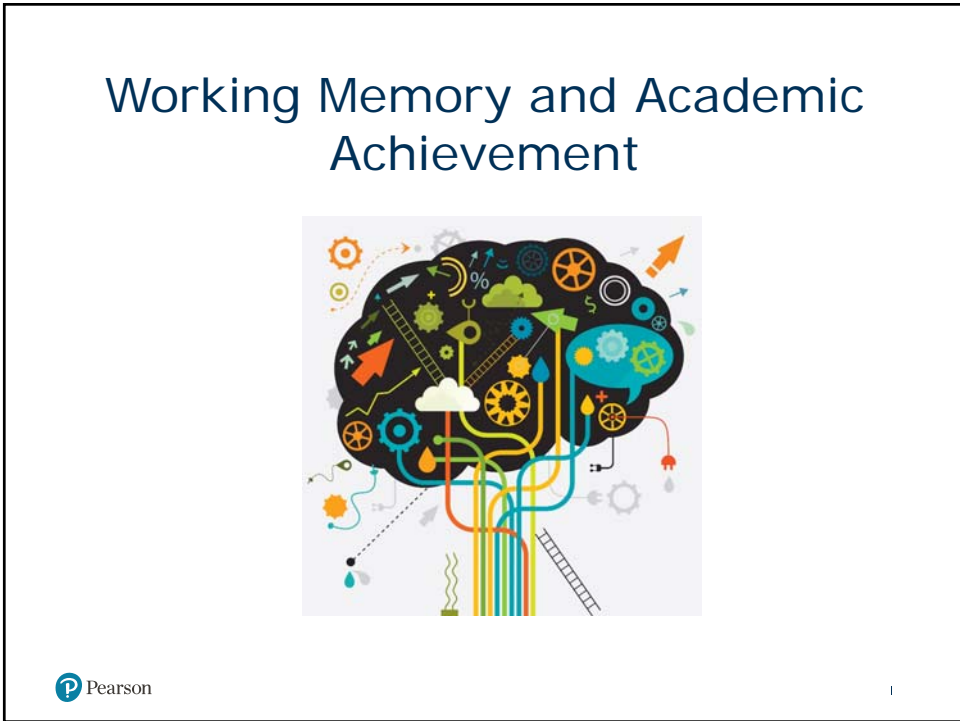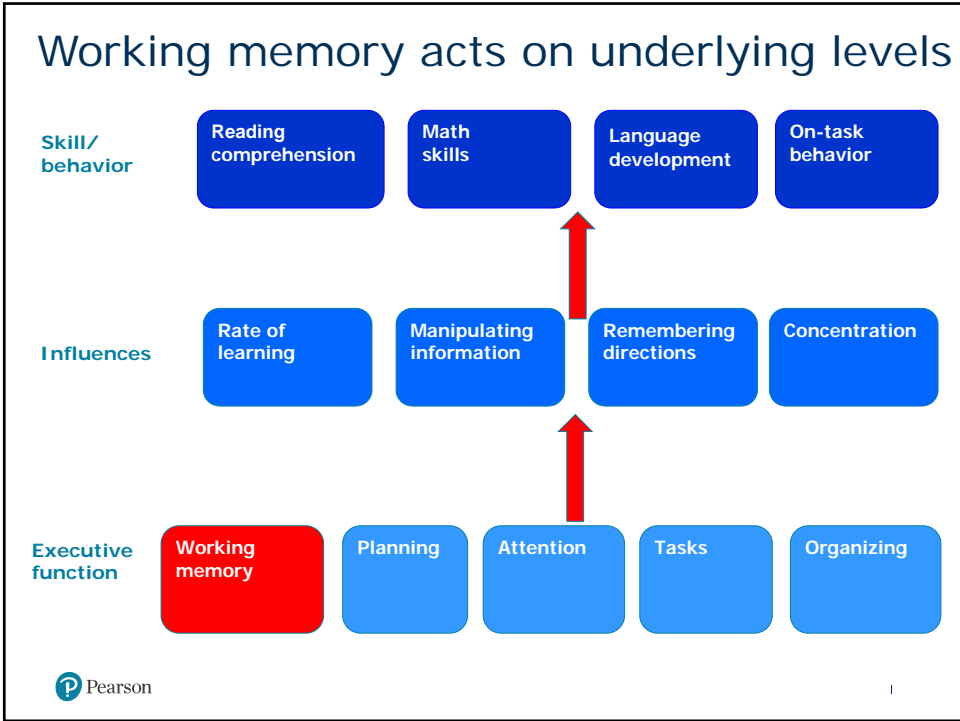## Multiple failure points in the life of the working memory deprived

Age	School	Higher Education	Career

Challenge	Fitting in	Learning to read	Getting into college	Graduating	Promotion	Achieving goals

Pearson

Working memory acts on underlying levels

Skill/ behavior	Reading comprehension	Math skills	Language development	On-task behavior

Influences	Rate of learning	Manipulating information	Remembering directions	Concentration

Executive function	Working memory	Planning	Attention	Tasks	Organizing

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Working Memory and Academic Achievement

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WM and Academic Achievement

Key facts about the correlation between working memory and learning.

- linked to **key learning outcomes** in literacy, numeracy and beyond

- General **learning difficulties** (i.e. forgetting instructions, place keeping errors, missing key information.

- working memory at 5 years old is a **better predictor of academic success** than IQ

- linked to a number of emotional and **behavioral problems**

- **Reading** comprehension and **math** difficulties

Ⓟ Pearson

Working Memory and Learning

- **Poor WM affects about 15% of children**. (Gathercole & Alloway, 2008).

- **Children with poor WM make poor academic progress:** Over **80%** of children with poor WM **struggle with math** and **reading** (Gathercole & Alloway, 2008).

- **WM is important for successful learning in individual classroom activities** (Gathercole & Alloway, 2008)

- **WM ability predicted attainment** on national assessments at 7, 11, 14 years of age (Gathercole et al., 2004; St Clair Thompson & Gathercole, 2006).

- People of **lower WM capacity mind-wander more than people of higher WM capacity** when activities require considerable effort and focused concentration (Kane et al. 2007).

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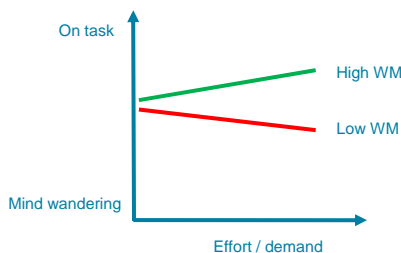
Identifying signs of working memory constraints

✓ Is easily distracted when doing something not highly interesting

✓ Has trouble waiting his/her turn

✓ Struggles with reading comprehension

✓ Struggles doing math calculations in his/her head

✓ Struggles with getting started

✓ Struggles with completing a task

✓ Difficulties when planning and organizing something with multiple steps

✓ Often seems restless and on the go

✓ Loses belongings frequently

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Working Memory in the Classroom

Working Memory Deficits present academic and behavioral problems.

Teacher Descriptions of Students:

- Unfocused
- Not listening to instructions
- Daydreaming
- Hyperactive or Impulsive
- Unmotivated
- Procrastination
- Difficulty remembering reading passages
- Inability to memorize facts
- Inability to break down word problems
- Inability to write coherently
- Lack of participation
- Forgetful

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Classroom Strategies

Working Memory Deficits present academic and behavioral problems.

Educational Strategies

- Repetition and Review

- Breaking down information or instructions

- Provide memory aids and visual supports

- Playing visual or auditory memory games

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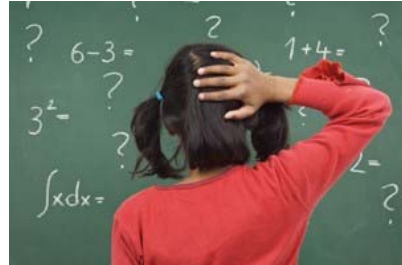
Computerized Interventions

Interventions used to support students
Computer based support

Cogmed

Computer based intervention for working memory

Provides exercises that working memory and related functions

Dybuster Calcularis

Computer based intervention for dyscalculia

Software designed to target math

Pearson

What is Cogmed?

An **adaptive**, online training program proven to increase working memory – which underlies **Attention**, **Behavior**, and the **Capacity to learn**

- Working memory is linked to **key learning outcomes** in literacy, numeracy and beyond

- Over 80% of students who complete the Cogmed training see **improvement of over 30%** in working memory

- Wide **range of applicability** – ADHD, Dyslexia, ELL, Title I, "504 accommodation" students

- **Over 60 published studies** on Cogmed benefits

Made for iPad

ANDROID

Pearson

Cogmed Training Outcomes

Cogmed is the most researched method for strengthening Working Memory. Has been demonstrated to improve:

- **A**ttention
- **B**ehavior
- **C**apacity to learn

"Cogmed ABCs"

COGMED CLAIMS & EVIDENCE

COGMED

Cogmed Working Memory Training
Pearson
Clinical Assessment

Version 2.0

Prepared by:
Kathryn Ralph
Research Relationship Manager
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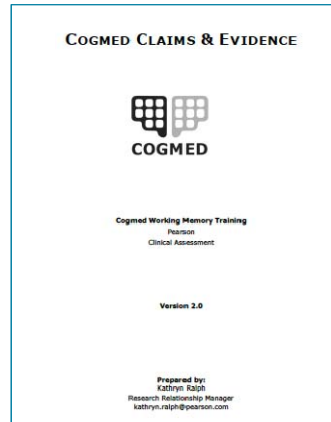
What makes Cogmed work?
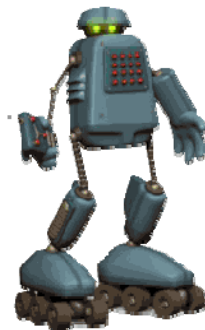
1. **Scientific** – designed by leading neuroscientists

2. **Adaptive** - in real time

3. **Intensive** – hard work

4. **Sustained** – consecutive training

5. **Supported** – your coach will be there

6. **Targeted** – wm only

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Three programs for Cogmed training

Cogmed JM
preschoolers

Cogmed RM
school-age
children
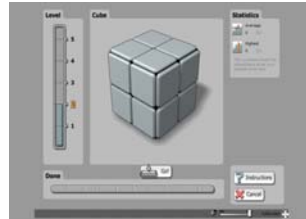
Cogmed QM
adults

All the products share the same underlying design – the only difference is in the user interface

---

Cogmed Training – the basics

Training done **at school** – Mac, PC, IPAD or Android

Supported by a **coach/teacher** from the school

Choose protocol appropriate for your student – **length of time** and **number of days per week**

The results tracked online in the **Cogmed Coaching Center**

Cogmed is a highly structured, supportive process

| 2.
Start-up session | → | 3.
Training and Coaching | → | 4.
Wrap-up session | → | 5.
Follow-Up Session (Optional) |

For more information go to http://cogmed.com/

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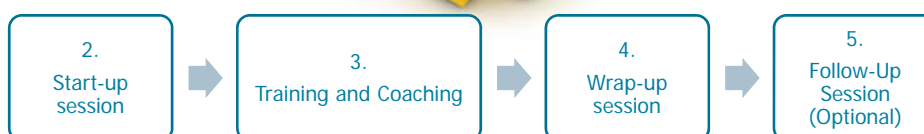
Track the students with detailed reporting

Reporting Features

Trends Reporting
Gives coaches the opportunity to look at consolidated data from multiple trainings on three levels.
- Compliance
- Motivation
- Validity

Individual Reporting
Coaches have the option to review
Individual performance data and training results for each student and print out a progress report for that student.

For more information go to http://cogmed.com/

P Pearson

Track the students with detailed reporting

Key research findings for Cogmed

1. Working memory is key to **attention**, executive function

2. Working memory can be **improved** by training, using right tool/protocol

3. Working memory can be improved at **all age levels**

4. The improvement can be tracked by on **three levels**: fMRI/PET, neuropsych testing, and by rating scales

5. Improved working memory **generalizes** to behavioral improvement

6. The behavioral improvement is **sustained**

7. Training effects are pronounced in **populations with a WM constraint**, effects not limited to ADHD

   For more information go to http://cogmed.com/

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What is Dybuster Calcularis?

Dybuster Calcularis is mathematical learning software for school and home. Dybuster Calcularis lays a solid foundation for mathematics and can be integrated easily in the day-to-day activities of the school

- 17 different learning games - in a total of 48 different varieties

- Supports neuronal processing of numbers and promote the development of basic mathematical skills

- Adapts to the users capability

- Students can work independently

- Teachers and students can track their progress online.

- Evidence Based training
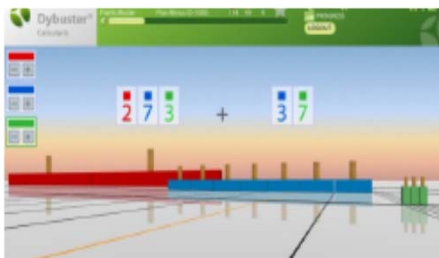
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Dybuster Calcularis?

Pearson

For more information go to:
Pearsonclinical.com/DybusterCalcularis

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Thank you!

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