

# Neuropsychological Interventions for Children and Young People - Implications for service development

Dr Anna Adlam, Dr Het Roberts, Dr Catherine Gallop,  
Professor Tamsin Ford, Professor Brahm Norwich, Dr  
Richard Tomlinson, Anna Mouser, and Dr Justin  
Cowan



# Schedule for the Day

09:30-11:00 Short talks

Dr Anna Adlam, Professor Tamsin Ford, Professor Brahm, Dr Richard Tomlinson, Dr Catherine Gallop, Sarah Haworth

11:00-11:30 Tea/Coffee & exhibitor stands (241)

11:30-12:30 Dr Ayla Humphrey & Dr Suzanna Watson

12:30-13:30 Lunch & post-its (241)

13:30-14:10 Professor Julie Mytton

14:15-14:45 Tea/Coffee & exhibitor stands (241)

14:45- 16:30 Group discussion (Chair: Dr Justin Cowan)

**Fire exits, facilities**

## Activity

Assuming that we do not have a perfect service in place for children with brain injury in the South West...

**In your experience what is the service gap that most concerns you for children following a brain injury?**

(answer on post-it)

## Activity

**In your experience what is the service gap that most concerns you for children following a brain injury?**

Answer this question again at the end of the morning talks

Place your post-it notes on the white boards in 241 during the lunch break

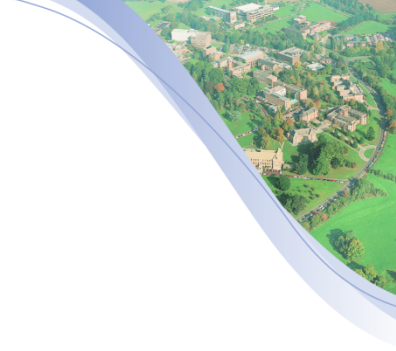


# Developing and evaluating neuropsychological interventions for children

Dr Anna Adlam & Dr Het Roberts  
University of Exeter, UK

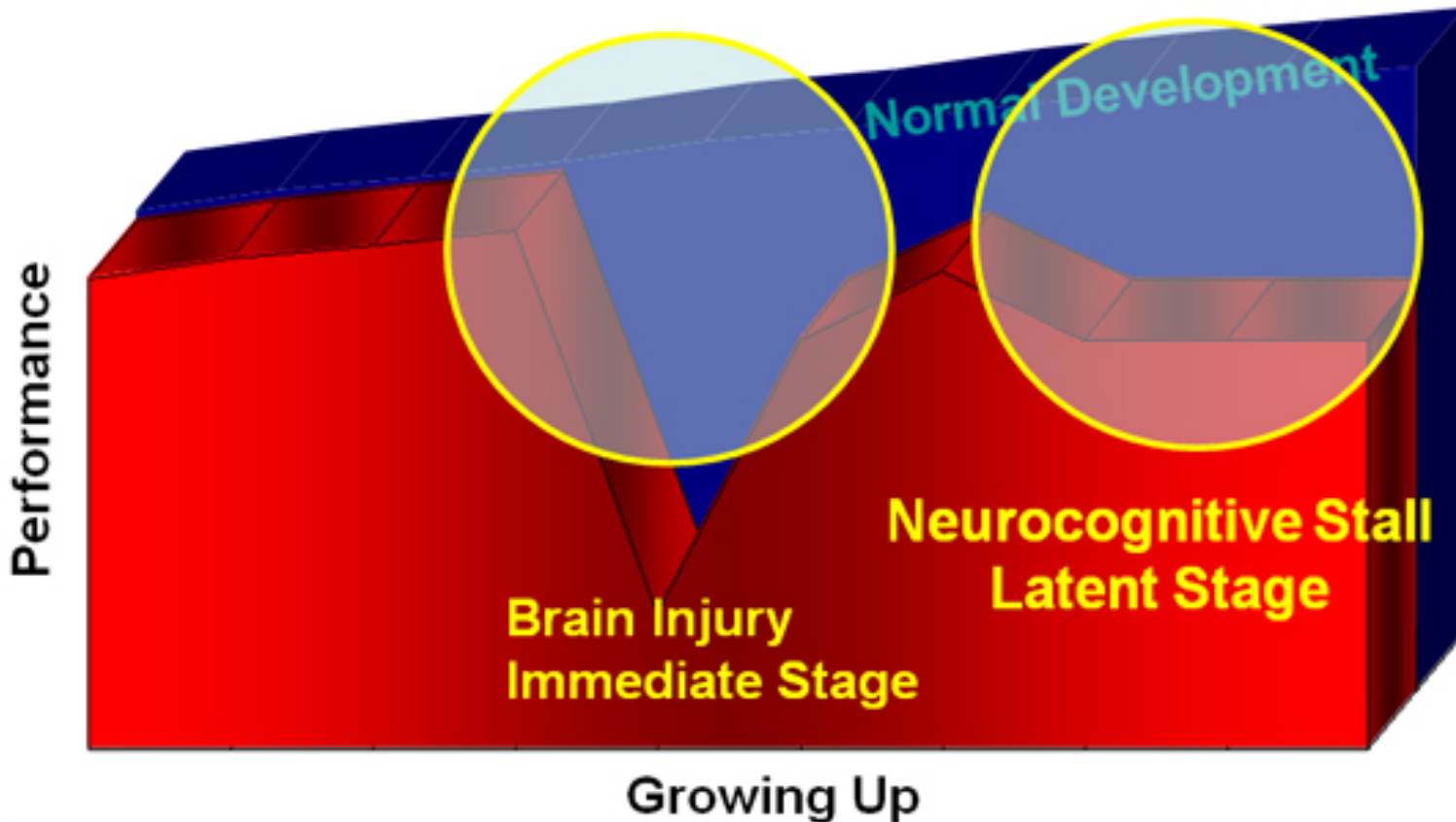
[a.r.adlam@exeter.ac.uk](mailto:a.r.adlam@exeter.ac.uk)

[h.roberts@exeter.ac.uk](mailto:h.roberts@exeter.ac.uk)



# **THE EFFECTS OF INJURY IN CHILDHOOD**

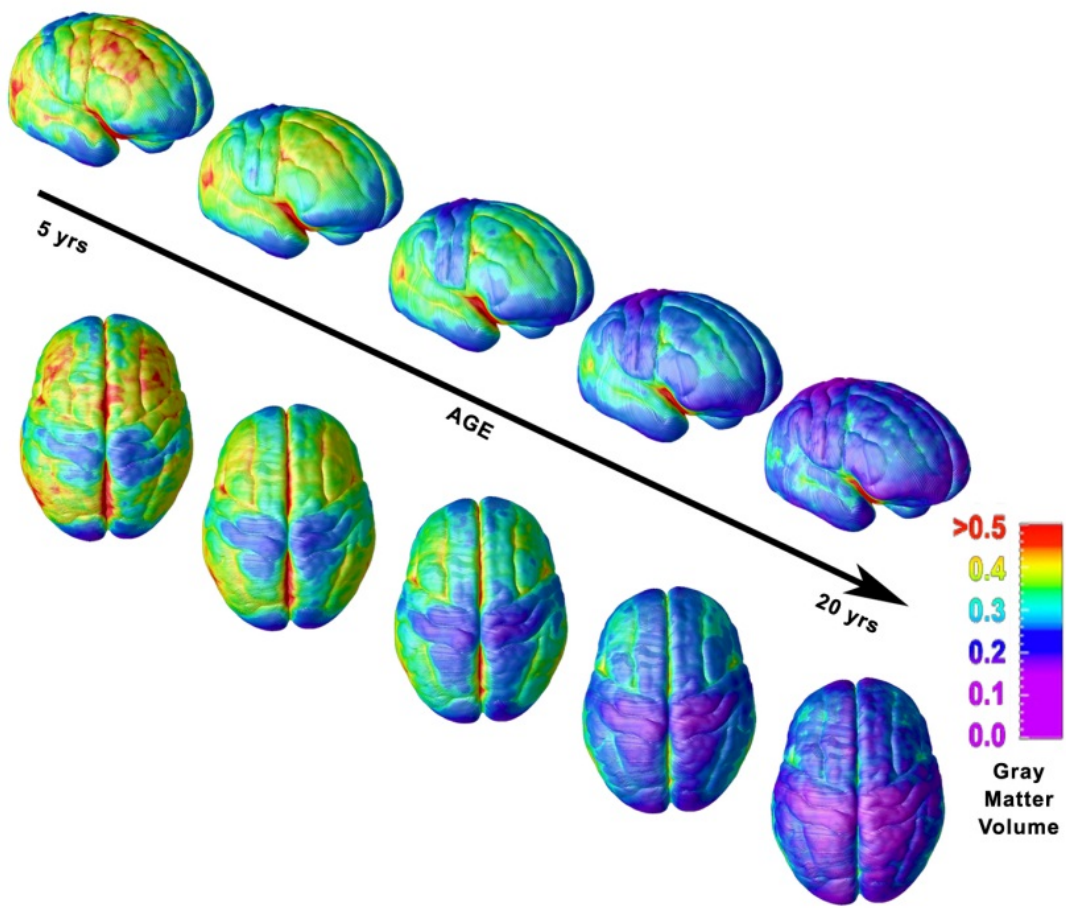
# Paediatric ABI



**Plasticity vs. vulnerability:** ‘Derails’ normal development as the brain continues to mature in the context of a diffuse injury

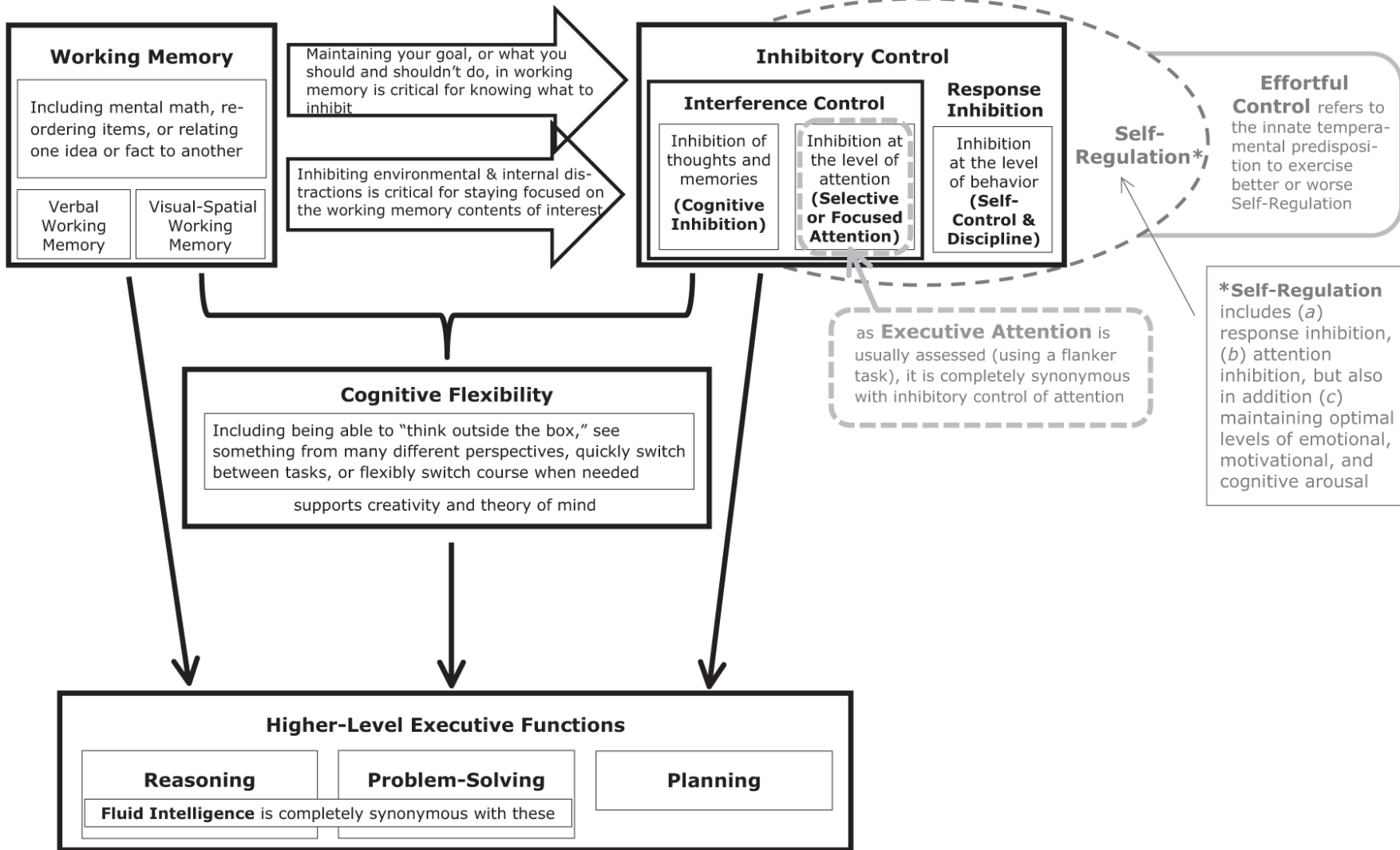
# Paediatric ABI

- Deficits can emerge over time, as different cognitive functions come 'on line', e.g., executive functions associated with the frontal lobes continue to develop in to early adulthood.





# EXECUTIVE FUNCTIONS



Diamond A. 2013.

Annu. Rev. Psychol. 64:135–68



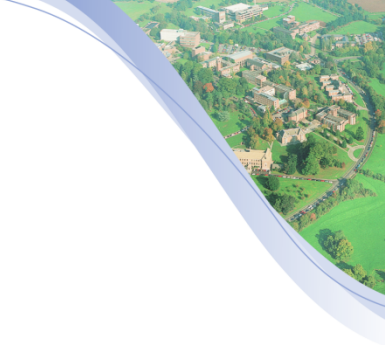
## Why neuropsychological interventions?

- Neuropsychological difficulties are common following brain injury in childhood, especially executive processes (maturity?)
- Neuropsychological (executive process) difficulties are also common in other childhood conditions:
  - Epilepsy
  - Oncology – tumours, Acute Lymphoblastic Leukaemia
  - Genetic syndromes
  - Chronic health conditions – cardiac, diabetes, endocrine
  - Prematurity
  - ADHD
  - Neurofibromatosis (genetic: tumors on nerves, inherited)
  - Tuberous sclerosis (genetic: tumors, inherited)
  - Other genetic conditions: 22q11.2 (gene deletion), phenylketonuria (PKU; inherited)

# Why neuropsychological interventions?

- Neuropsychological (executive processes) difficulties are also associated with difficulties in:
  - Academic attainment - maths, literacy
  - Emotion regulation – high prevalence of depression/anxiety
  - Behavioural regulation – high prevalence of aggression/conduct
  - Social communication
  - Social participation
  - Family burden/stress
  
  - Future independence in adulthood, future employment, risk of crime, risk of substance use, risk of mental health difficulties etc

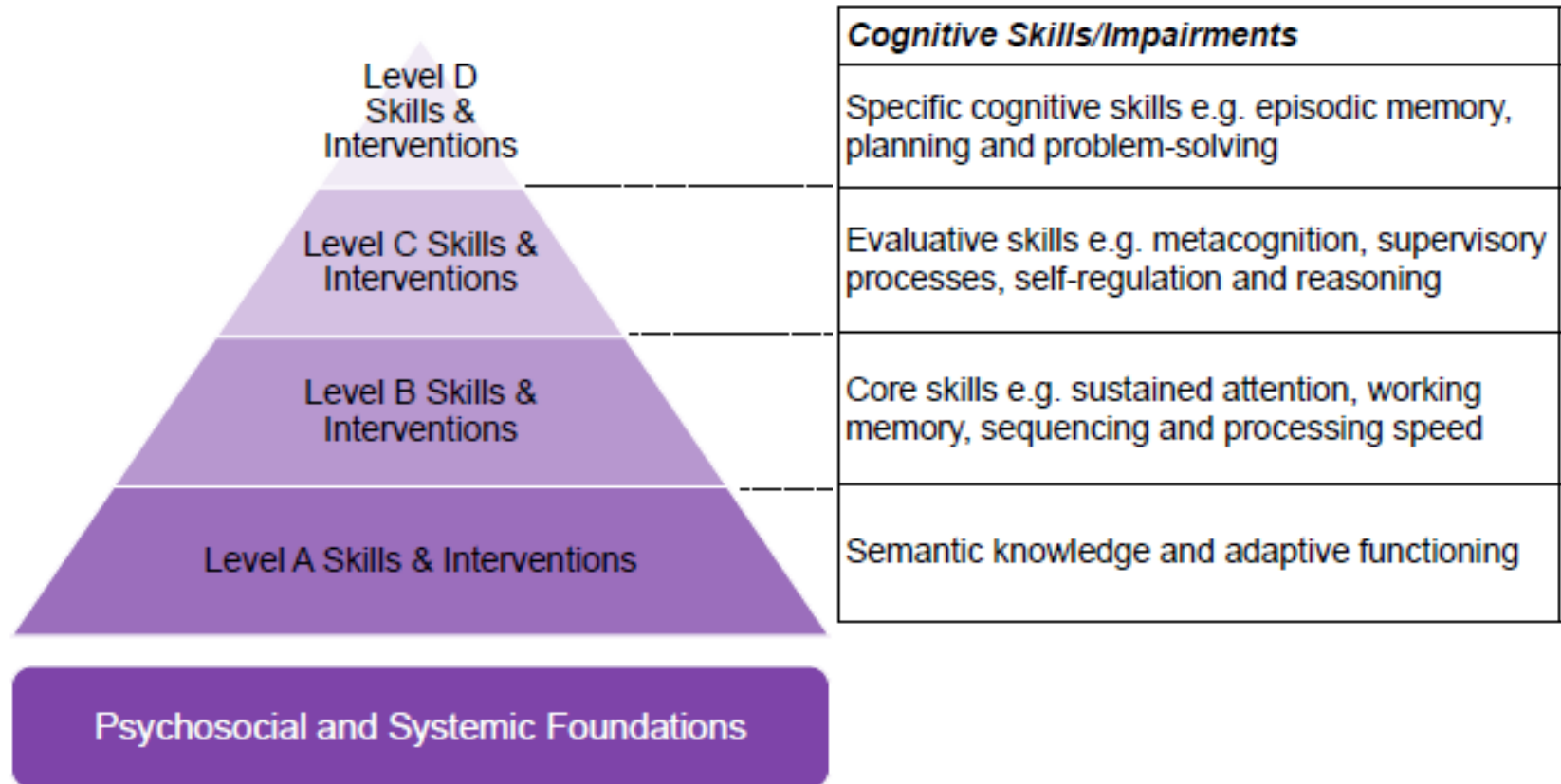




# **PAEDIATRIC NEUROCOGNITIVE INTERVENTIONS: A MODEL TO GUIDE INTERVENTION**

# Paediatric neurocognitive interventions

Model hypothesises that the success of higher level interventions is dependent on lower level skills being as close to age appropriate as possible.



# PNI Model and Clinical Practice

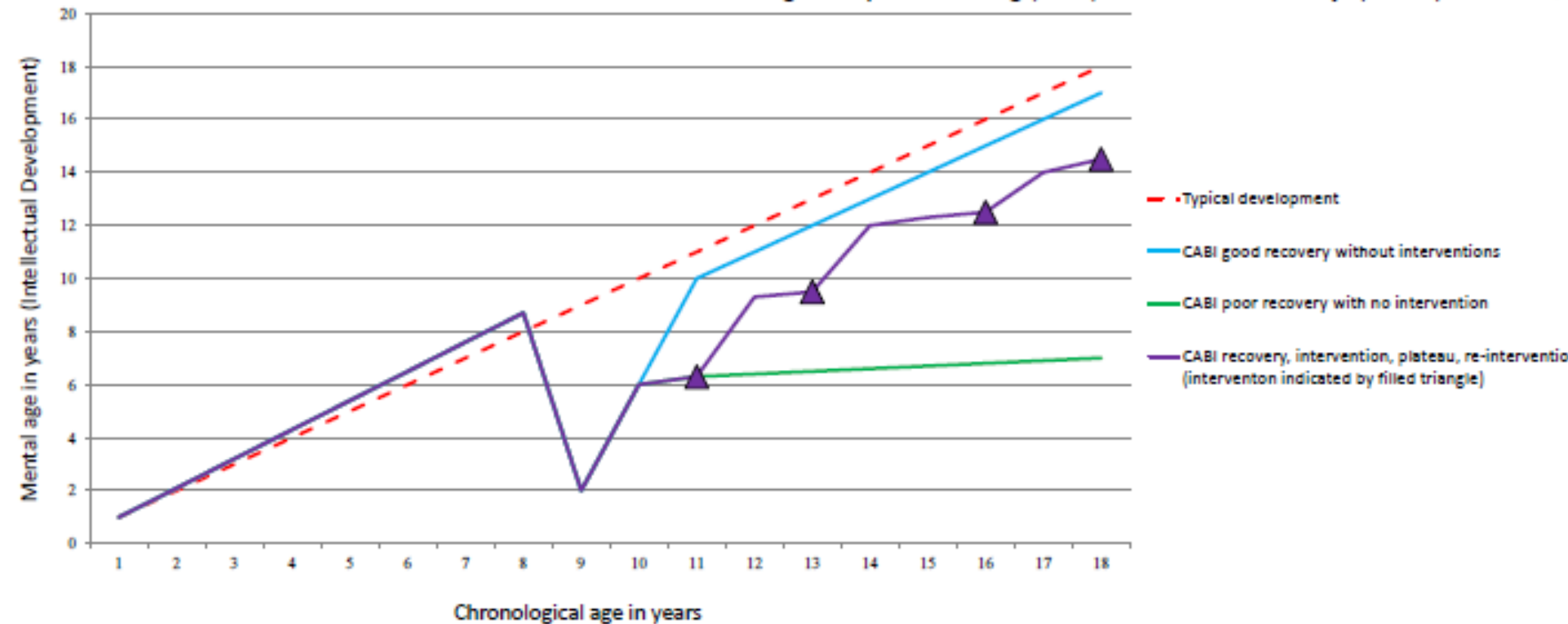
Everyone wants the person to use strategies to help them compensate ,  
but depending on age and stage...

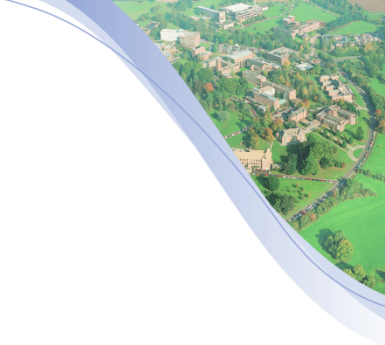
	<b>Cognitive Skills/Impairments</b>	<b>Intervention Aim</b>	<b>Intervention Examples</b>
<b>D</b>	Specific cognitive skills e.g. episodic memory, planning and problem-solving	Compensatory strategies to be used independently	Training in use of step-by-step templates; mnemonics, elaborative encoding
<b>C</b>	Evaluative skills e.g. metacognition, supervisory processes and reasoning	Training to support general cognitive functioning	Training of e.g. goal management skills, prospective reminding, “stop and think”
<b>B</b>	Core skills e.g. sustained attention, working memory, inhibitory control, sequencing and processing speed	Remediation of skills	Intensive practice e.g. Cogmed, Attention Process Training, Speed Training
<b>A</b>	Semantic knowledge and adaptive functioning	Compensatory strategies cued / supported by others	Providing techniques e.g. precision teaching, rehearsal and cues

# PNI Model and Clinical Practice

Assessments and interventions need to be considered throughout development to optimise progression.

Figure adapted from Savage, 2007, North American Brain Injury Society conference.

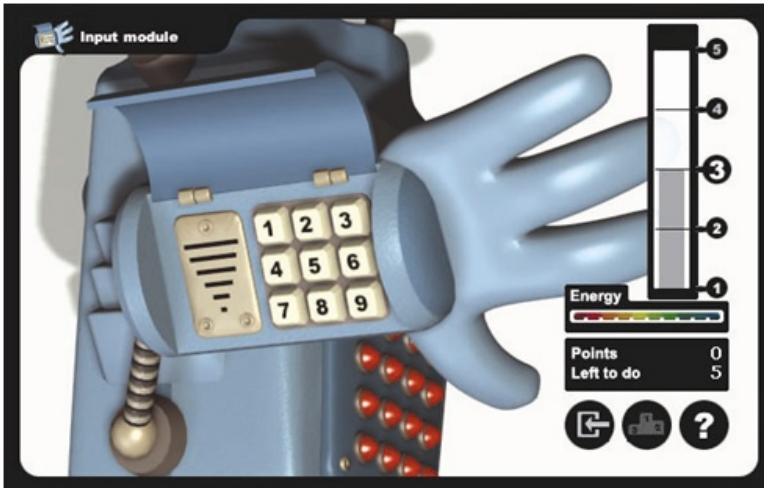




# **PAEDIATRIC NEUROPSYCHOLOGICAL INTERVENTIONS: EXAMPLES FROM OUR CURRENT RESEARCH**

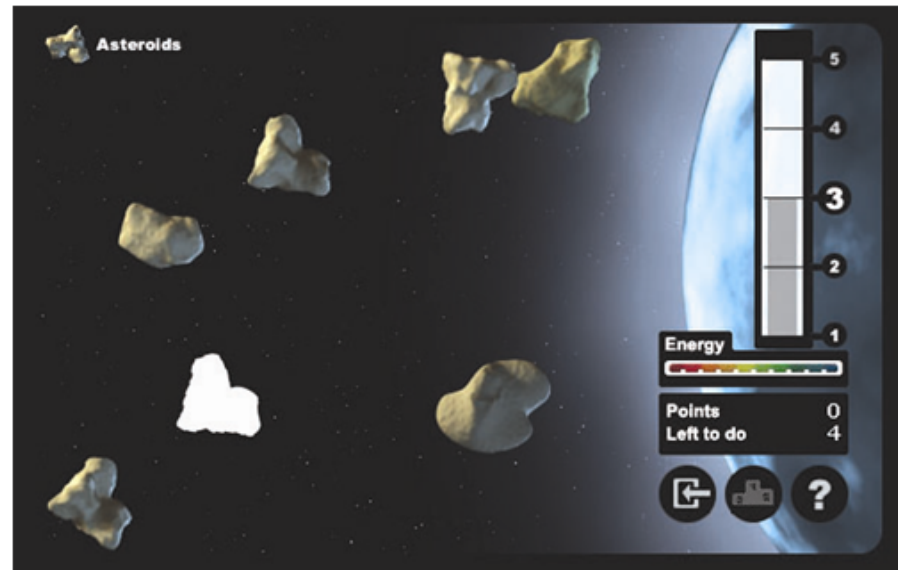


# Working Memory Training



- Array of WM tasks
- Adaptive
- 20-25 sessions
- 8 tasks/120 trials per session
- Motivational features

- RCT in child ABI (AA)
- Neural correlates in ADHD (JJ)
- Metacognition (JJ)
- RCT in rumination (HR)
- Single case in depression (RP)
- **Other groups: preterm, dementia**

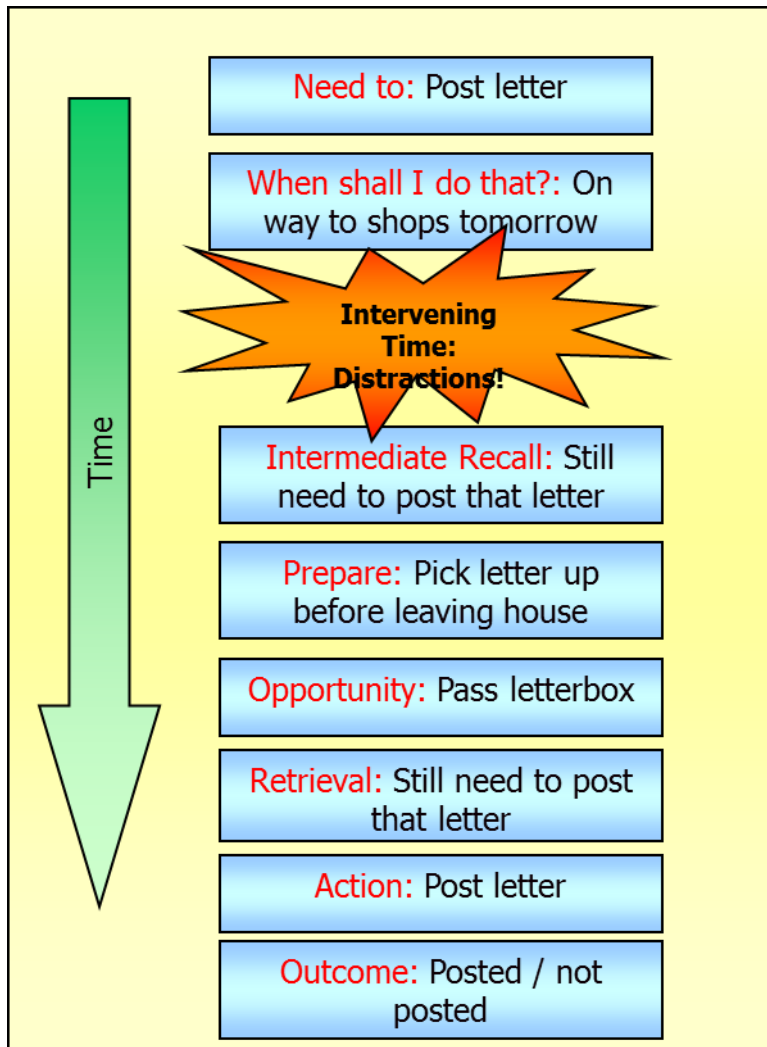


# Inhibitory Control Training

- Stop-Signal training to improve proactive control
- Metacognitive elements to enhance generalisation of proactive control
- Proof-of-concept single-case design, typically developing children (JG)
- Plan to extend to children with externalising difficulties (e.g., youth offenders with TBI)



# Prospective Memory (PM) Intervention



- Executive processes and memory
- Metacognitive training (understanding goals, strategies to keep goals in mind) plus 'content-free' cues (STOP text)
- Single case designs in children with ABI (RR & SM)

# Teen Online Problem- Solving

- NIHR RfPB (feasibility trial) & British Academy (TOPS-Y)

## *Outline of Session Content*

Session	Topic	Key features
1	Overview, identify goals	Learn about family, overview, identify goals
2	Positive problem orientation	The importance of attitude
3	Steps of problem solving	Learn steps of problem solving
4	Cognitive changes	Identify strategies to reduce frustration
5	Behavior changes	Antecedent behavior management strategies
6	Communication	Listening/positive communication strategies
7	Crisis management/review	Skills for crises, assessment of needs
8	Planning for the future	Review what works, plan for transitions

*Note.* Families who exceeded the clinical threshold on any of the Family Burden of Injury subscales or who identified deficits in problem solving, communication, or behavior management during Session 7 were targeted to receive up to four of the six supplemental sessions on the following topics: schools, communication, stress, anger management, sibling issues, and pain management.

# Neuropsychological processes in mood disorders

- Children with neuropsychological difficulties are at risk of developing mood disorders.
- Current mood treatments have limited effectiveness.
- How can our understanding of neurocognitive (executive) processes in depression in individuals without brain injury help us to understand and treat depression in individuals with brain injury?
- Can we enhance existing treatments for depression by also targeting neurocognitive (executive) processes?



# Acknowledgements

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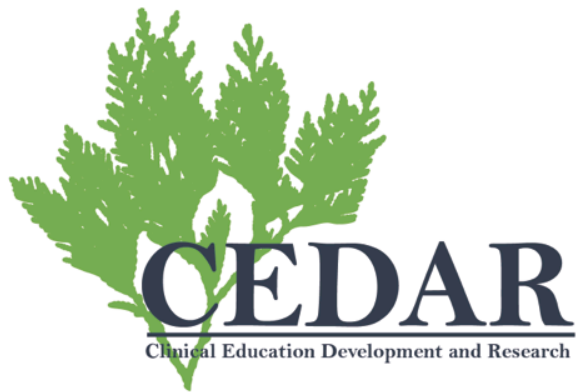
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Pearson





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University of Exeter  
College of Life and Environmental Sciences  
Washington Singer Building  
Perry Road  
Exeter  
EX4 4QG



[www.exeter.ac.uk/mooddisorders](http://www.exeter.ac.uk/mooddisorders)

University of Exeter  
College of Life and Environmental Sciences  
Mood Disorders Centre  
Sir Henry Wellcome Building for Mood Disorders Research  
Queens Drive  
Exeter  
EX4 4QQ