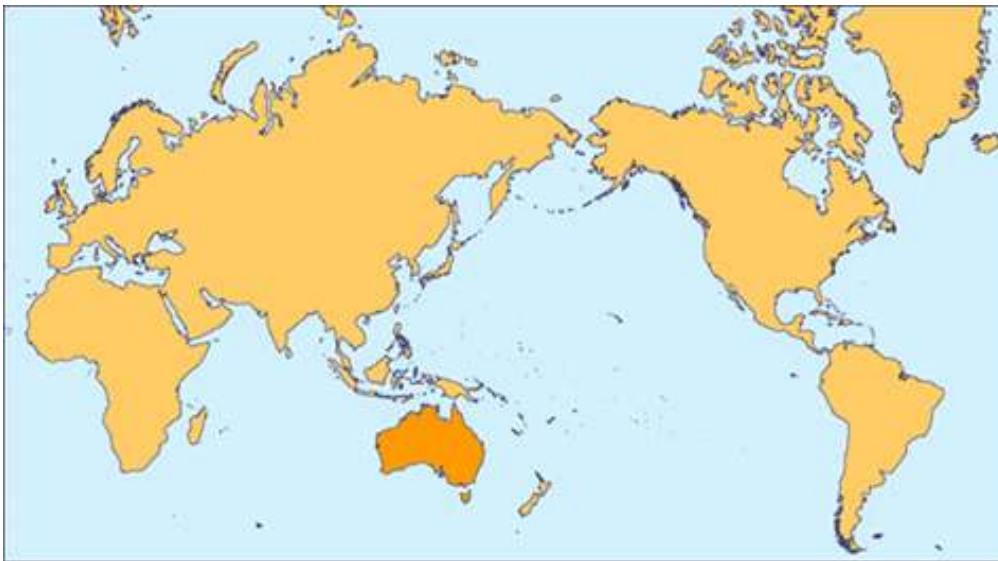




Cogmed and Literacy Disability A Clinical Approach

Dr Jason McGowan
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Child Development Network

- ▶ **Private health based service**
 - ▶ 5 part time paediatricians
 - ▶ 4 educators
 - ▶ 1 psychologist
- ▶ **Cogmed**
 - ▶ Part of a larger service
- ▶ **Kids – we see the hard ones**
 - ▶ Collaboration
 - ▶ Intervention
 - ▶ Continuity of care



Literacy Care – Service for Reading Disability (Dyslexia)



▶ **Individualised remediation**

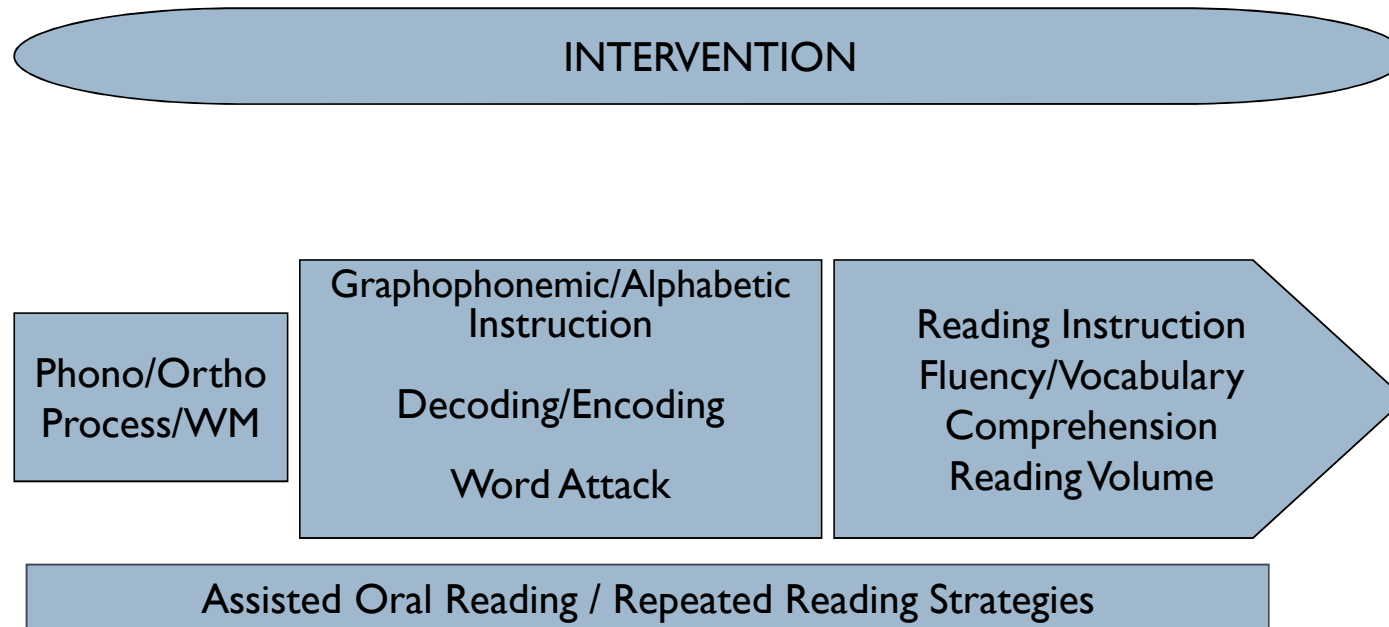
- ▶ Multi Stage
- ▶ Multi Plan
- ▶ Multi Test

▶ **Process: What is involved**

- ▶ Principles
- ▶ Practicalities
- ▶ Brokering

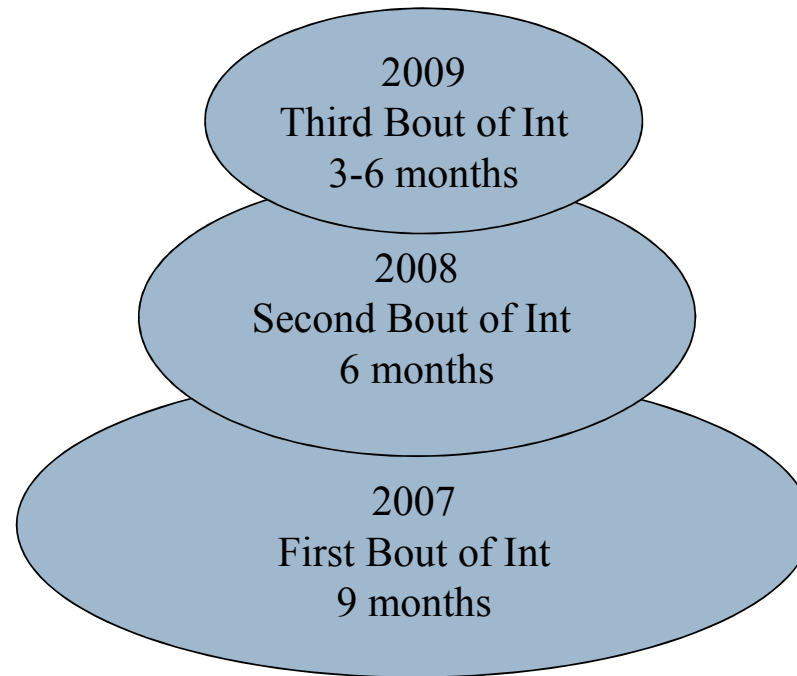


Multi Stage Model



Multi Plan Model

Plans or 'Bouts' of Intervention

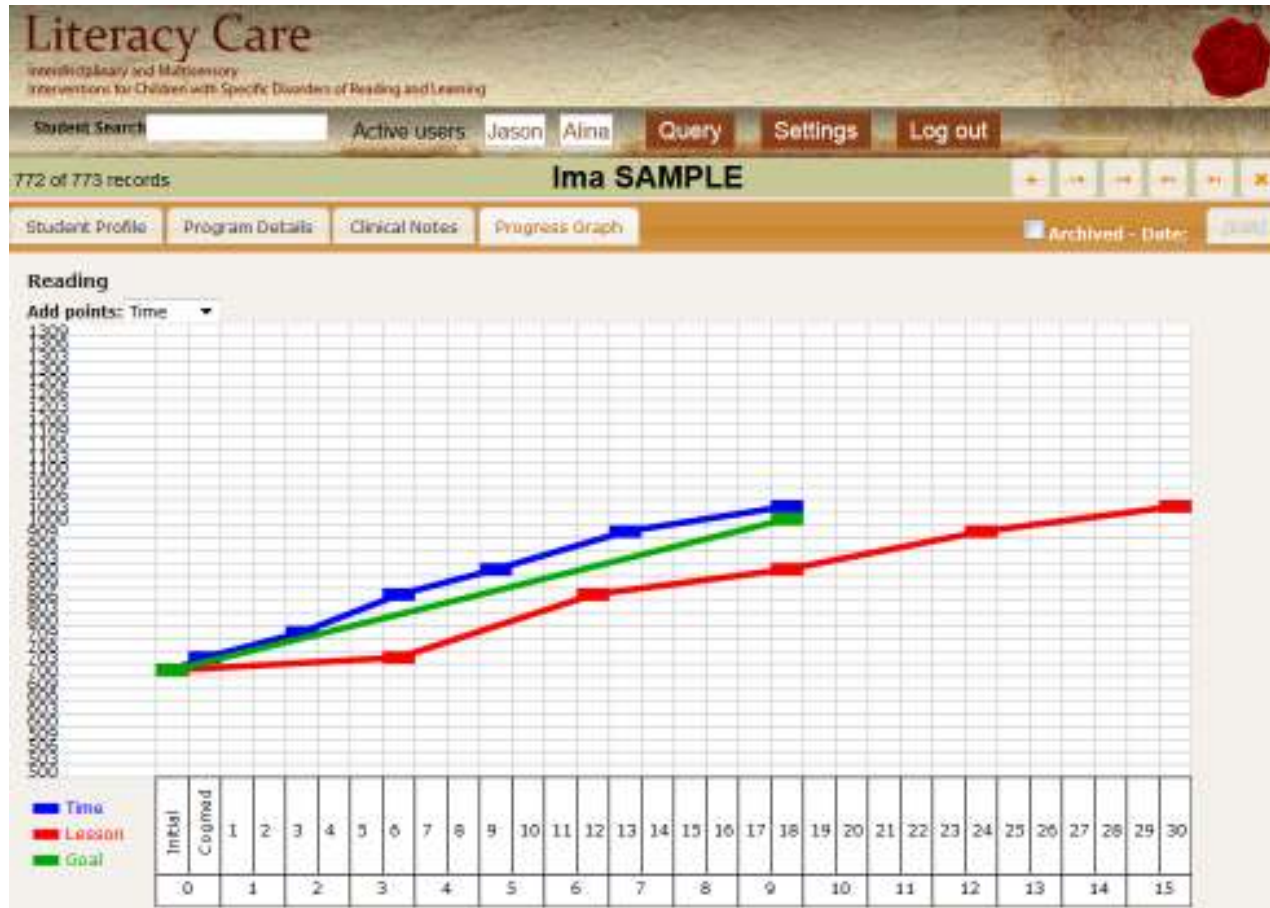


Assessment of Literacy Development Age

- ▶ Reading, Spelling, Reading Rate as a Standardized Measurement
- ▶ Phonological Processing Tests
 - ▶ Awareness
 - ▶ Memory
 - ▶ Automatic Rapid Naming
- ▶ Individualised diagnostic process
 - ▶ Reading Language Spectrum
 - ▶ Phonological/Orthographic Deficit
 - ▶ IQ-Performance Discrepancy Model
 - ▶ ‘Sea of Strengths’ Model



Multi Test Model



Literacy Care – Service for Reading Disability (Dyslexia)



- ▶ Individualised remediation
 - ▶ Multi Stage
 - ▶ Multi Plan
 - ▶ Multi Test
- ▶ **Process: What is involved**
 - ▶ Principles
 - ▶ Practicalities
 - ▶ Brokering



Process: Evidenced Based Principles

1. Structured (clear and visible building blocks)
2. Systematic (prescriptive yet eclectic – how the building blocks are laid down)
3. Cumulative (the notion of ‘interconnectivity’ of the building blocks)
4. One on one
5. Multisensory (as needed)
6. Goal Driven (36 months in 9 months)
7. Response to Intervention (RTI – child’s response provides insight into how Intervention should continue)
8. Test and re-Test Based – (Indicates that progress is in keeping with expectations)



Process: Practicalities

- ▶ Train the trainer – parents or others provide the follow up aspect of intervention (duplication of lesson)
- ▶ Weekly consultations (lessons) where clinician evaluates RTI, customises lesson and sets follow up work for 50 mins on 5 days per week
- ▶ Test every 6 weeks or so and plot results (represented graphically)



Brokering the Service

- ▶ Assessment + Clinical Experience → Ability to Predict Outcome
- ▶ Example
 - ▶ 10 year old female, moderately delayed (18 months)
 - ▶ orthographically based dyslexic (phonological processing is low av)
 - ▶ no coexisting conditions
 - ▶ intrinsically motivated, supportive family
 - ▶ Goal set of 36 months gain in 8-9 months (including 1.5 months of Cogmed)
- ▶ **Contract with the family: fixed fee to buy an outcome.**



Reading and Working Memory

Early Experiences
Introduction of Cogmed

Read Writ
DOI 10.1007/s11145-010-9238-y

**Effects of working memory training on reading
in children with special needs**

Karin I. E. Dahlin

Clinical Observations of WM Deficits

- ▶ Poor memory of contextual information so unable to use context clues in word attack (decoding)

“Quench your thirst by drinking a glass of sparkling water.”

- ▶ Segmenting and Resynthesizing Phonemes in a String
s-t-r-i-n-g becomes ‘stirring’ or ‘sing’
- ▶ Foreshortening after successful syllabification
Re/mem/ber becomes rem/ber



Clinical Observations of WM Deficits (con't)

▶ Number of instructions/steps when syllabifying

1. underline vowels
2. Cross silent letters
3. Find prefix and mark as first syllable
4. Find suffix and borrow consonant if it is a vowel suffix so as to form final syllable

Prefix Root Suffix

Con|struc|tion

Safe~~ly~~|ly



Early attempts to remediate

- ▶ It was clear that intervention for WM was necessary as part of the overall remediation package.
- ▶ The development of the three composite areas of phonological processing requires extensive WM input



Clinical Strategies - workarounds

▶ Blending and Segmenting words and non words from listening

- i. What word do these sounds make? ...s / l / i / p / t (slipped)
- ii. Sound out '*crept*' one sound at a time....c / r / e / p / t

▶ Phoneme Reversal

- i. What real word do you get when you say zmitmus backwards? (sometimes)

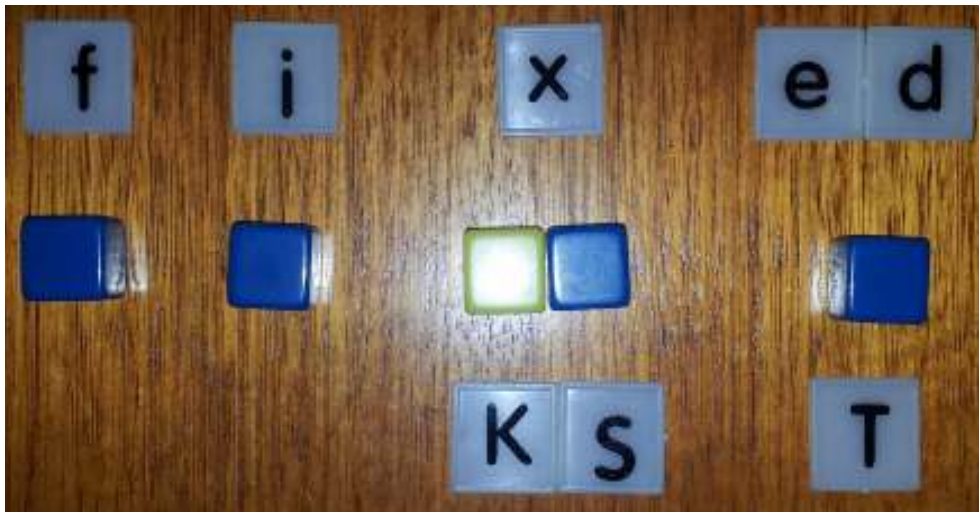
▶ Elision

- i. Say fixed but don't say /k/ - "fist"



Clinical Strategies – workarounds (con't)

Tactile and Kinaesthetic Techniques



Pre Cogmed Attempt to Train WM (circa 1998)

- ▶ Other non-computer based programs

Learning RX

- a) PACE
- b) Brainskills

These programs were (are?) a series of print based and physical activities that essentially worked on the principle of ‘overload and adapt’.



Early experience – prior to Cogmed

1. Positives

- ▶ Prepared students for the physical demands of intervention
- ▶ Alphabetic based tasks did improve letter/sound knowledge
- ▶ Pattern memory tasks seemed to improve memory for whole words

2. Problems

- ▶ Measuring efficacy. No measurable component or visual demonstration of improvement
- ▶ Transference to real skill of reading and spelling
- ▶ Lack of specificity in terms of the balance of auditory and visual spatial tasks



Introduction of Cogmed – Early Experience

1. Lack of screening produced some 'Incompletes'
2. Underdeveloped 'start up dialogue' lead to uncertainty of relevance
3. Phone tutorials tended to be too brief (time) or too shallow (content)
4. Student not involved enough in incentive reward process



Service Innovations and Enhancements

1. Formal intra-clinic referral and feedback procedure
2. Dedicated website (Optimem) for recording of Coaching Calls (dossier of student progress for other clinicians to access)
3. Formal development (documentation and phone tutorials) of trials to determine suitability for training (test 44, test 99)
4. Formal pre and post test sessions and final reports



Selling Cogmed to Parents

- ▶ Explanation of WM
- ▶ Cogmed as part of a larger management plan
- ▶ Indication of what other users have experienced
- ▶ Means to an end (it will help achieve the literacy goal) - Relevance
- ▶ Understanding the relationship between improved WM and functional outcomes; eg: better reading



Identifying Candidates for Cogmed Training

- ▶ Literacy Disability (usually severe)

- ▶ WM is part of the problem

- ▶ No impediments to engagement:
 - i. substandard computer skills
 - ii. unorganised parents
 - iii. poor relationship between child and parent
 - iv. low motivation
 - v. coexisting conditions that prohibit fulfilment of program (anxiety)



How Cogmed helps Intervention

Lessons Learned in the Clinical Marketplace

5 ways Cogmed makes a difference

1. Identify suitable candidates
2. Training parents and children how to learn
3. The effects of Cogmed itself
4. The benefits of Cogmed towards more efficient literacy intervention
5. Retention of gains and ongoing learning after intervention



1. Identifying suitable candidates

- ▶ Ability to do Cogmed screens those who will / will not be able to undertake the literacy intervention

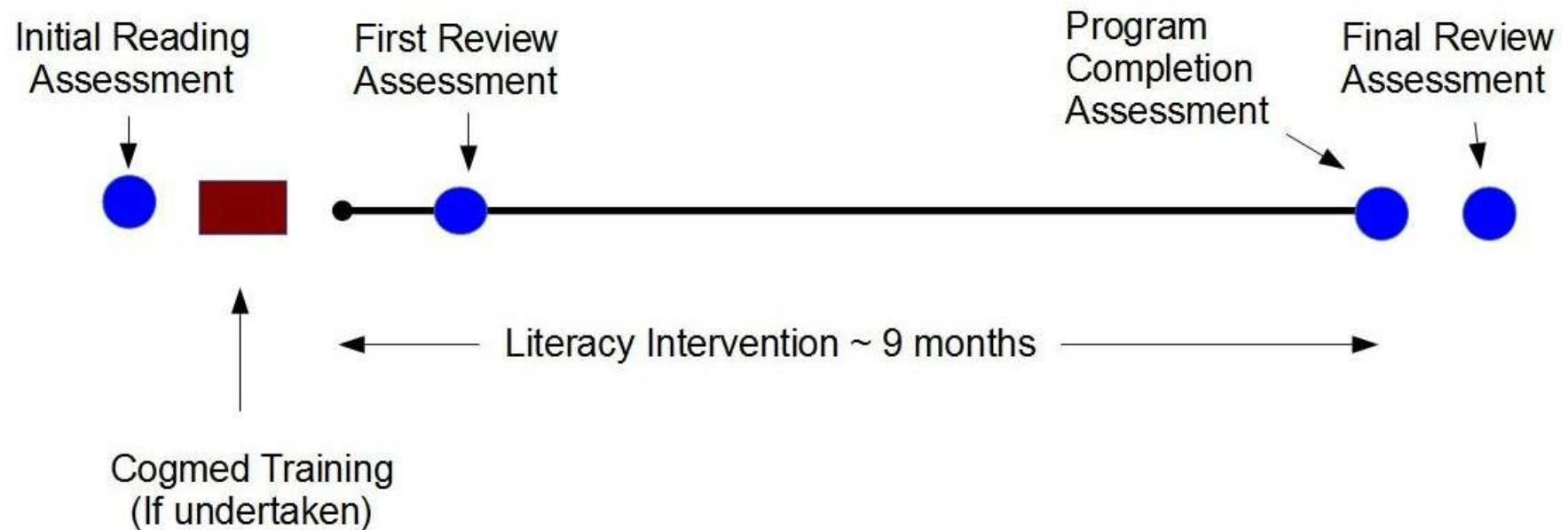


2. Teaching parents and kids how to work together

- ▶ **Child**
 - ▶ Repetition and duration
 - ▶ Active listening
 - ▶ Working past/through barriers (stick at it even when it gets intense)
 - ▶ Reflection to produce change, learning from failure, problem solving
 - ▶ Managing anxiety
- ▶ **Parent**
 - ▶ How to work with the child
 - ▶ Model of intervention



3, 4: Cogmed and literacy intervention

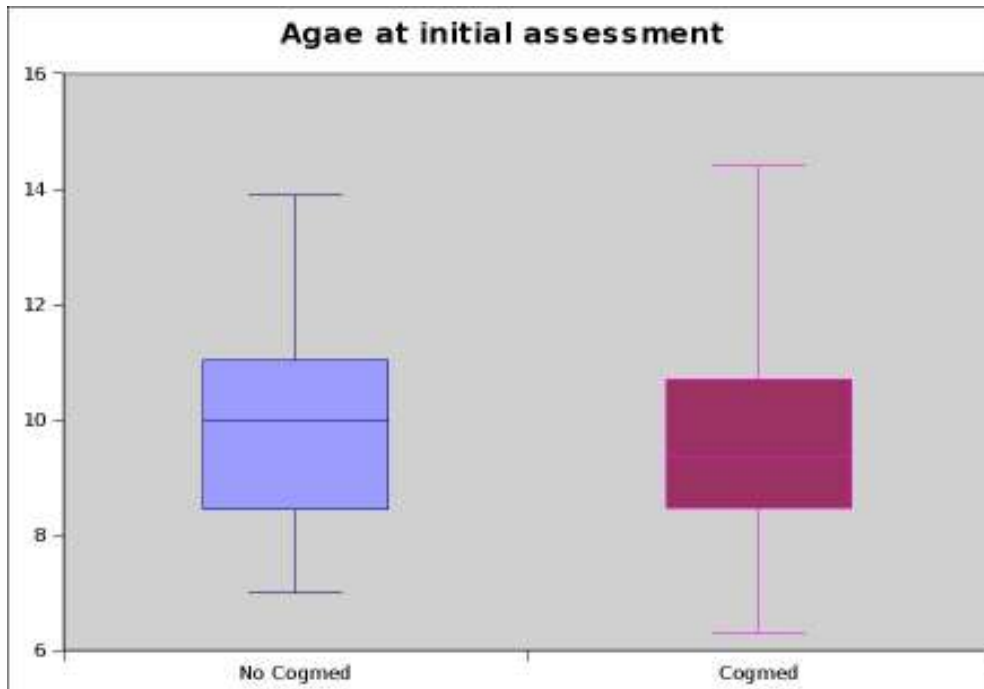


This Data is CLINICAL, not part of a research program

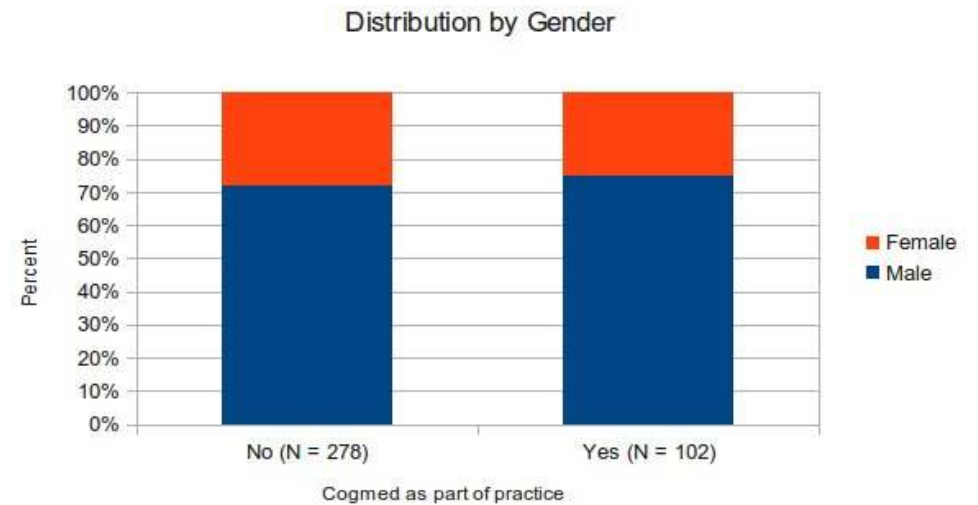


Comparing the groups of children (278, 102)

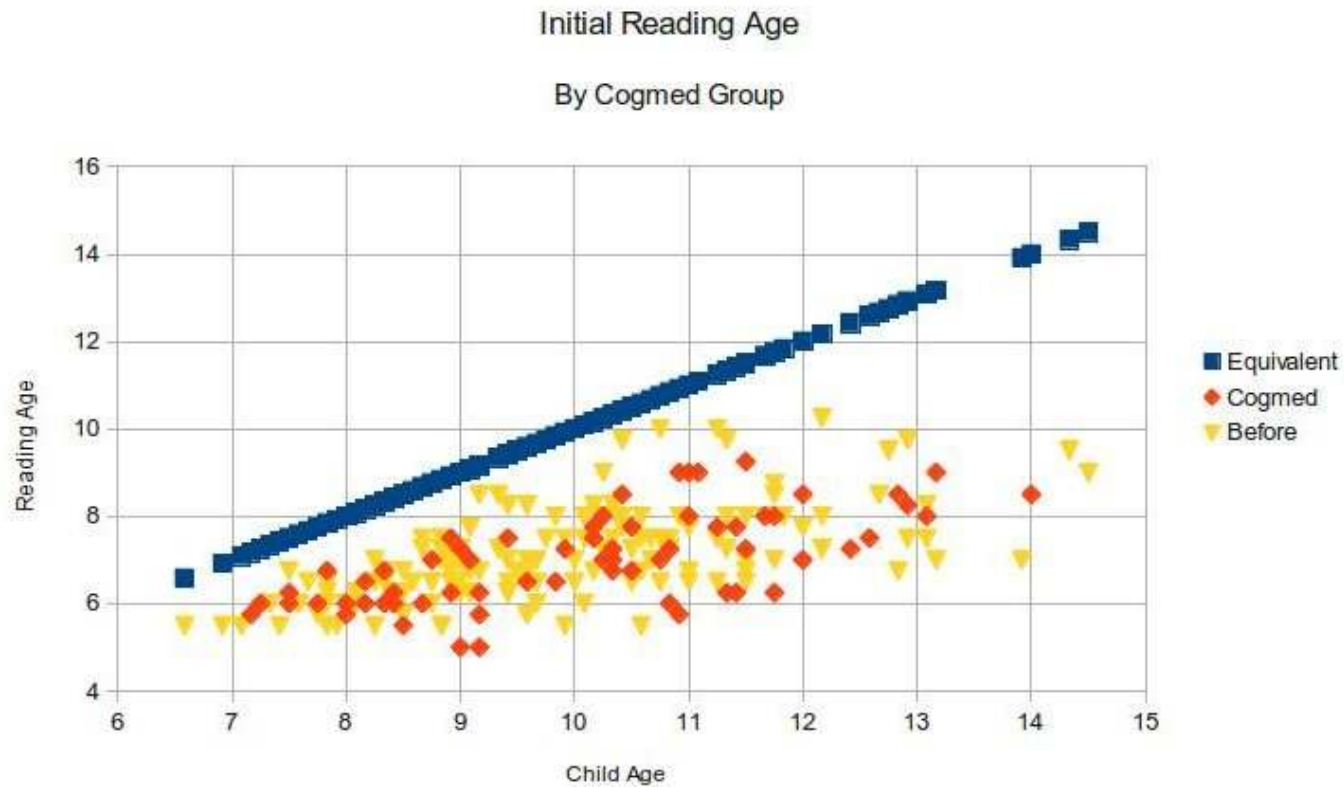
Initial Age – No difference



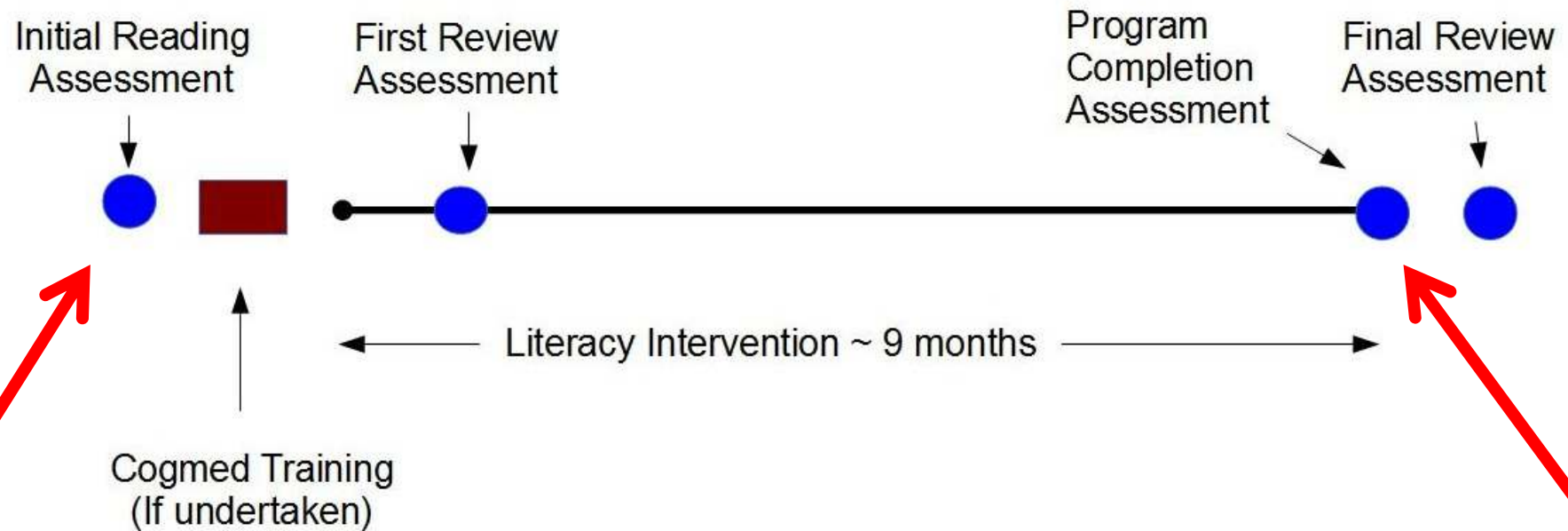
Gender – No Difference



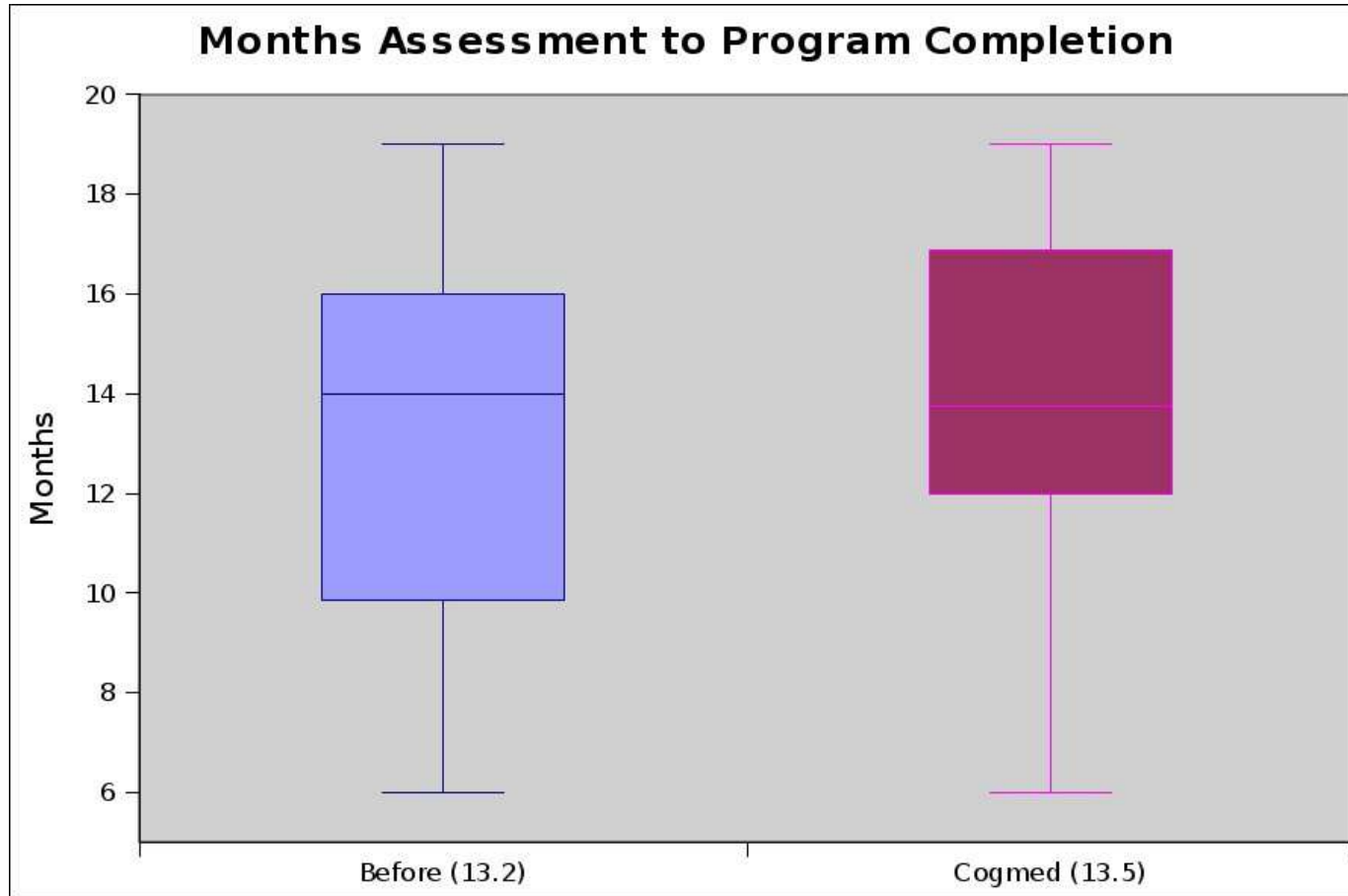
Initial Reading Age – No Difference



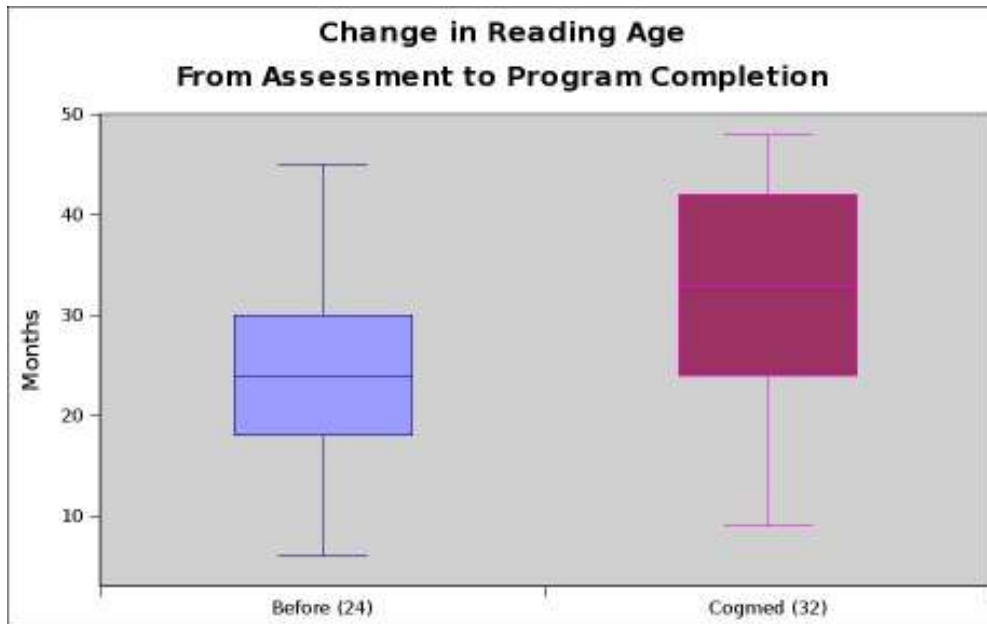
The Program –from assessment to completion



Time: Initial assessment to program completion (13.5, NS)

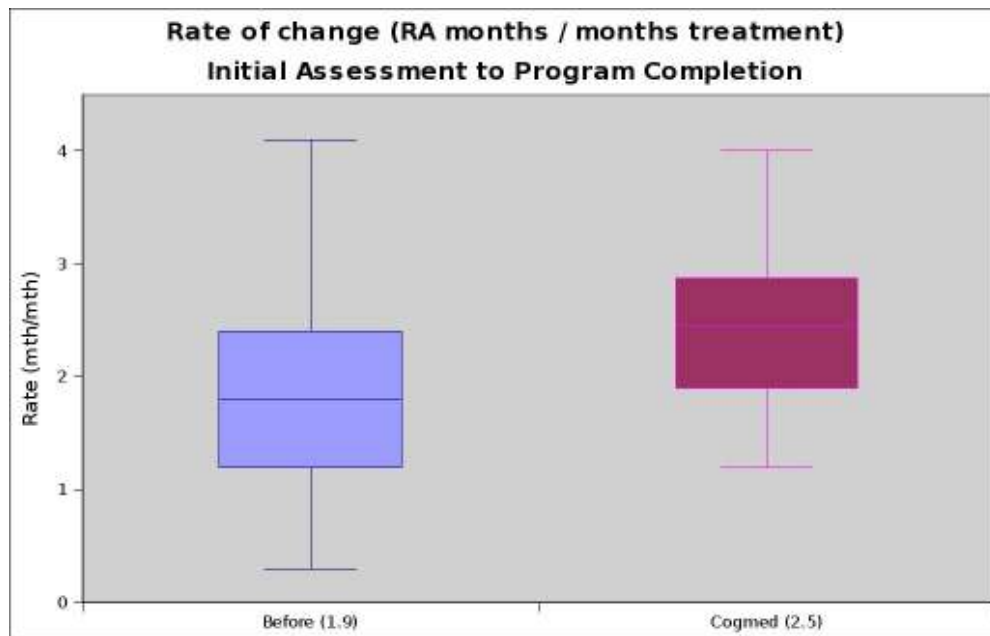


Reading Age Gain (24 to 32 Months)



	B	Std. Error	Beta	t	Significance
(Constant)	7.20	4.83	.00	1.49	.14
Cogmed	8.05	1.77	.34	4.55	.00
Age	.06	.04	.12	1.60	.11
Sex	.03	1.61	.00	.02	.98
Time	.78	.20	.29	3.80	.00

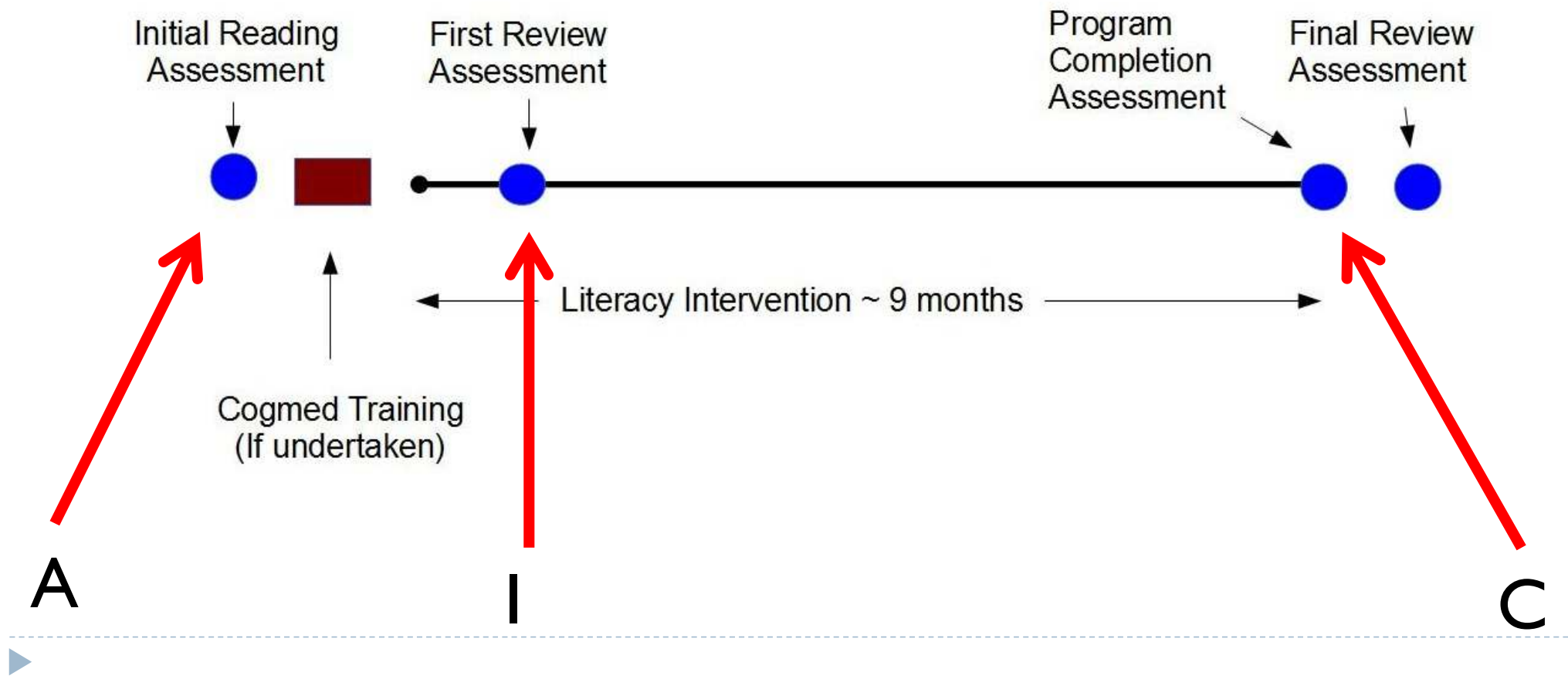
Rate of learning (RA / Time 1.9 to 2.5)



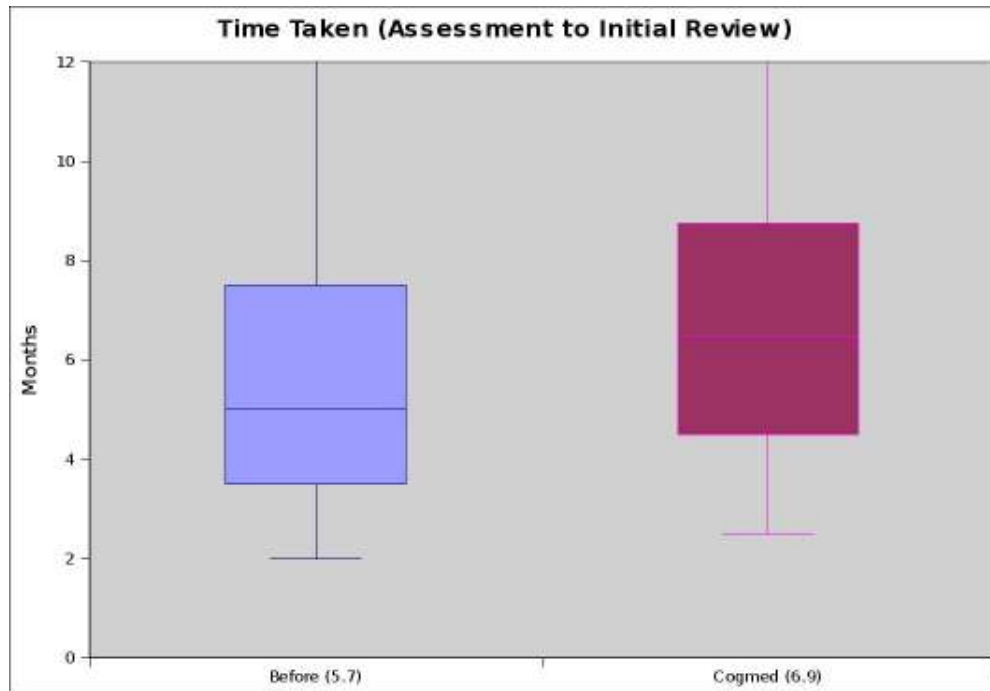
	B	Std. Error	Beta	t	Significance
(Constant)	2.79	.40	.00	7.02	.00
Cogmed	.55	.15	.28	3.80	.00
Age	.00	.00	.12	1.62	.11
Sex	.00	.13	.00	-.03	.98
Time	-.11	.02	-.46	-6.28	.00



The Program –from Assessment to Initial Review



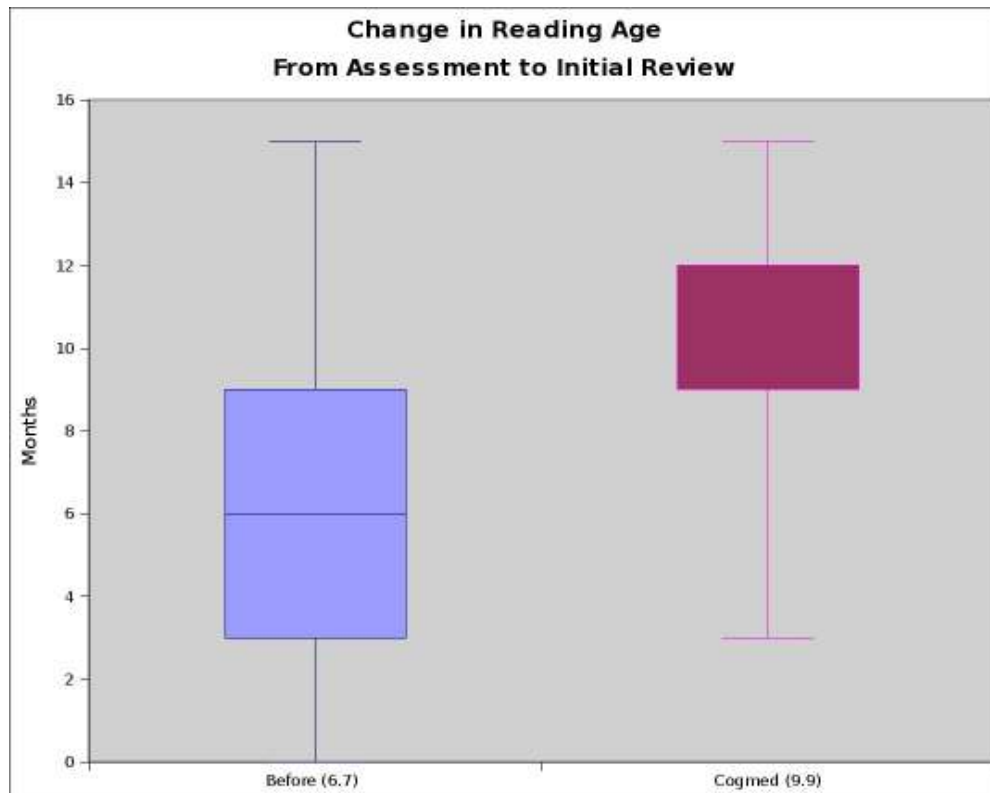
Time – Assessment to Initial review (5.7, 6.9 months)



	B	Std. Error	Beta	t	Significance
(Constant)	5.52	1.25	.00	4.43	.00
Cogmed	1.24	.46	.19	2.68	.01
Age	.00	.01	.01	.14	.89
Sex	-.11	.45	-.02	-.25	.80

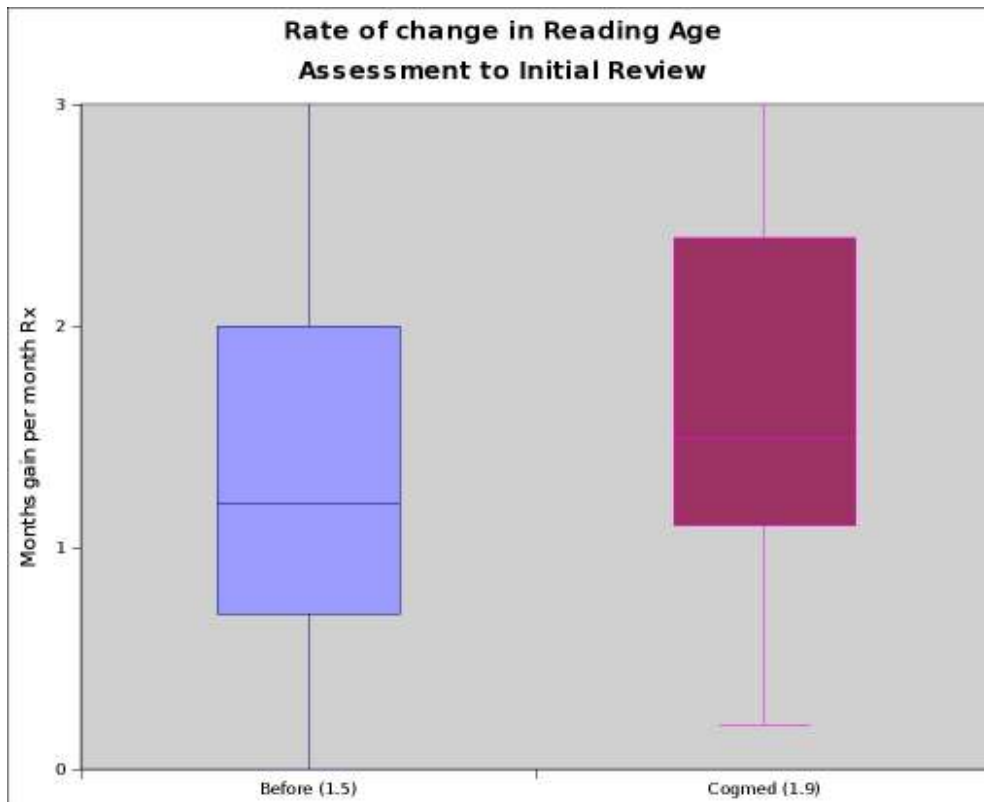


Gain in Reading Age (6.7, 9.9 months)



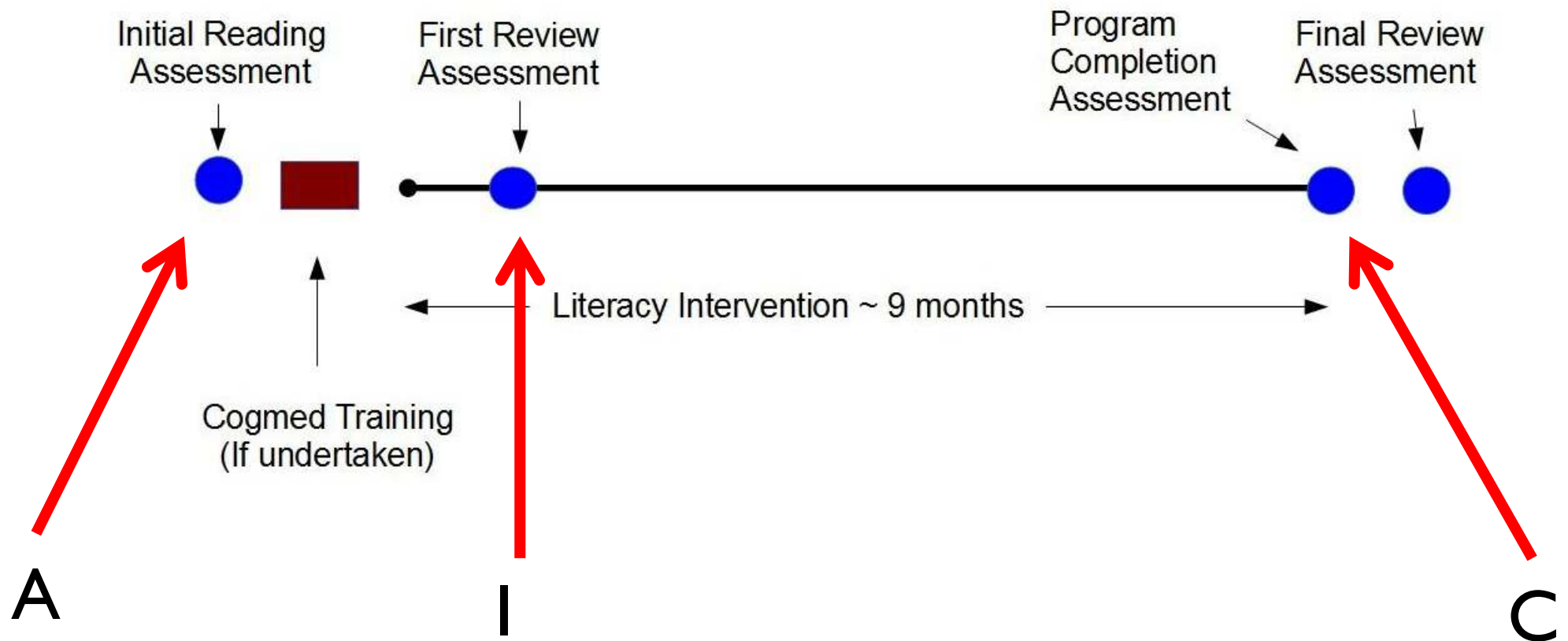
	B	Std. Error	Beta	t	Significance
(Constant)	2.79	1.58	.00	1.77	.08
Cogmed	3.03	.57	.36	5.36	.00
Age	.03	.01	.13	1.94	.05
Sex	1.31	.55	.16	2.39	.02
Time	.11	.09	.09	1.26	.21

Rate of Reading Improvement (includes some intervention)

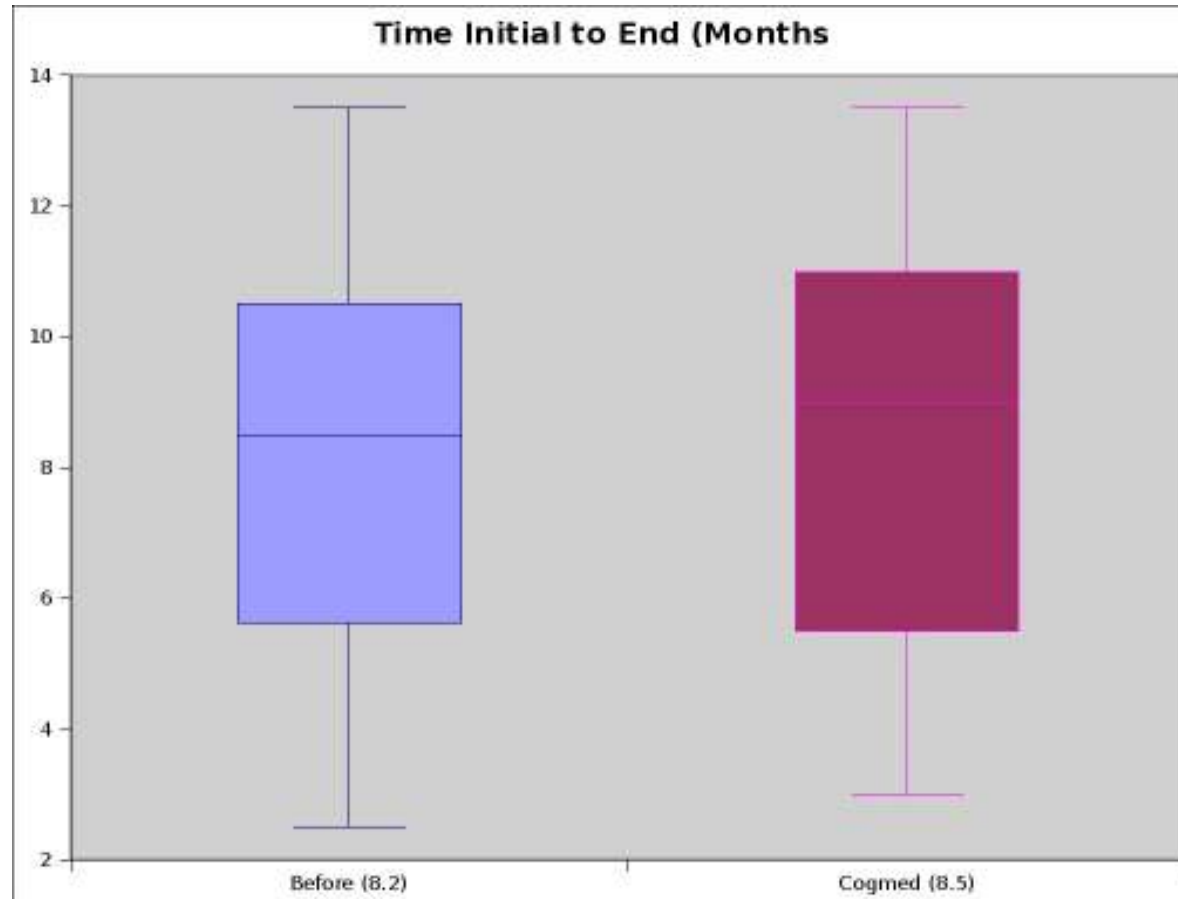


	B	Std. Error	Beta	t	Significance
(Constant)	2.08	.41	.00	5.06	.00
Cogmed	.54	.15	.22	3.64	.00
Age	.01	.00	.10	1.63	.10
Sex	.13	.14	.06	.93	.35
Time	-.23	.02	-.59	-9.71	.00

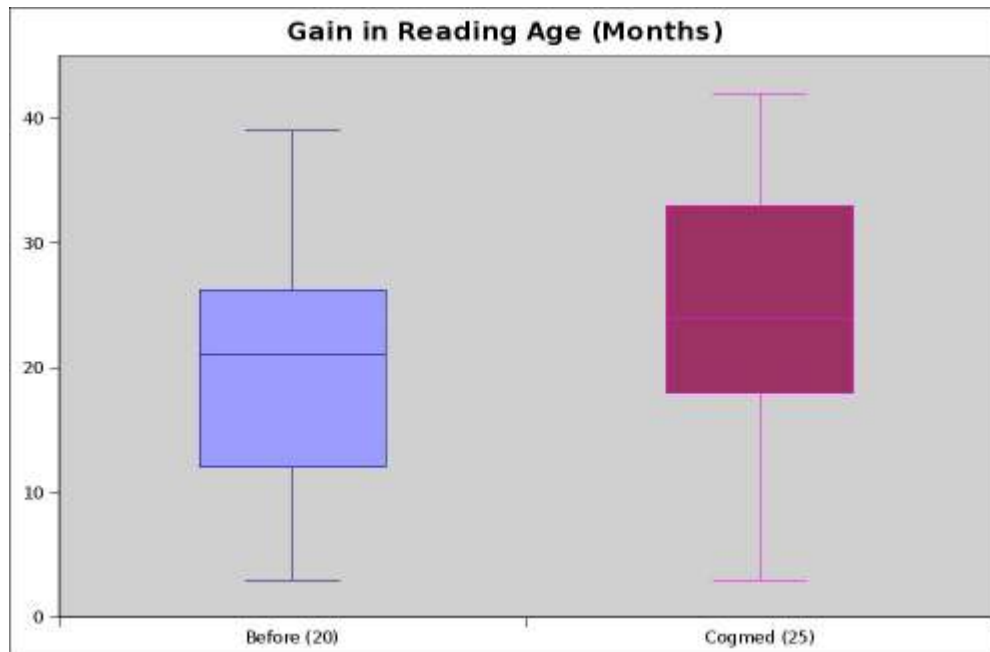
The Program –from Initial Review to Completion



Time Taken (Initial Review to Completion 8.2, 8.5)



Gain in Reading Age (20, 25 months)



	B	Std. Error	Beta	t	Significance
(Constant)	-1.64	4.01	.00	-.41	.68
Cogmed	4.62	1.32	.23	3.49	.00
Sex	1.17	1.35	.06	.86	.39
Age	.08	.03	.19	2.85	.00
Time	1.38	.20	.46	6.88	.00



Change in Reading Rate (2.6, 3.2 months / month)



	B	Std. Error	Beta	t	Significance
(Constant)	3.00	.61	.00	4.96	.00
Cogmed	.64	.20	.22	3.20	.00
Sex	.16	.20	.05	.79	.43
Age	.01	.00	.14	2.07	.04
Time	-.18	.03	-.42	-6.07	.00



Summary

- ▶ **Data is clinical only**

- ▶ No control groups
- ▶ No randomisation
- ▶ Intervention is eclectic

- ▶ **Data raises questions that would serve further study**

- ▶ **Data suggests**

1. Overall (14 months)
 - ▶ Non Cogmed 24 months gain
 - ▶ Cogmed 32 months gain
2. Assessment to initial review (6-7)
 - ▶ Non Cogmed 6.7 mths
 - ▶ Cogmed 9.9
3. Initial review to completion
 - ▶ Non Cogmed 20 mths (2.6)
 - ▶ Cogmed 25 mths (3.2)



Retention and ongoing learning – Clinical Impressions

- ▶ **Two Goals of Intervention**
 - ▶ Close the ‘gap’ as quickly as possible
 - ▶ Leave the child in a position where they can continue to get better at reading through the ‘act of reading’
- ▶ The wide range of behavioural change caused by improved WM allows students to develop studious habits of which reading is central
- ▶ WM develops comprehension which is the key reason we read (Dahlin 2010)
- ▶ Students who do extension Cogmed as well as read seem to read better at review sessions (fluency and comprehension) than students who read only but do no Cogmed





Final Reflections

Observations
Extension Training

Additional observations – Impressions Only

- ▶ **Parents more confident**
 - ▶ They can do it
 - ▶ Kid can do it
- ▶ **Kids**
 - ▶ Less scared
 - ▶ Open to success (PB's become important, beat themselves, not norm-referenced)



Looking into the future

▶ Extension training (Cogmed)

- ▶ Recess is key to successful intervention. These are ideal times to run Extension Training
- ▶ Minimum of 4 TD's still required to progress and give sense of functional change
- ▶ Follow up sessions are more than optional maintenance opportunities
- ▶ Holding pattern until learning recommences
- ▶ Opportunity not only to maintain WM levels but also to improve ST/WM and other areas of executive function
- ▶ Can be seen as a mental discipline/act of mindfulness to commence the day
- ▶ Can be seen as step one in planning for the day



Extension Training - Cont

- ▶ Students who continue with Cogmed over holidays tend not to forget as much content and there is a sense that they re-engage in the new term more easily
 - ▶ Similar to fitness – keeps the mind ticking over
- ▶ Two students have done second round of Cogmed – in both cases WM did not return to its previous level and both did much better in second round of training – both parents reported on a sense of sharpness that was starting to wain but came back in the second round of training



5 ways Cogmed makes a difference

1. Identify suitable candidates for this method of intervention
2. Training parents and children how to work together
3. The effects of Cogmed itself
4. The benefits of Cogmed towards more efficient literacy intervention
5. Retention of gains and ongoing learning after intervention

