

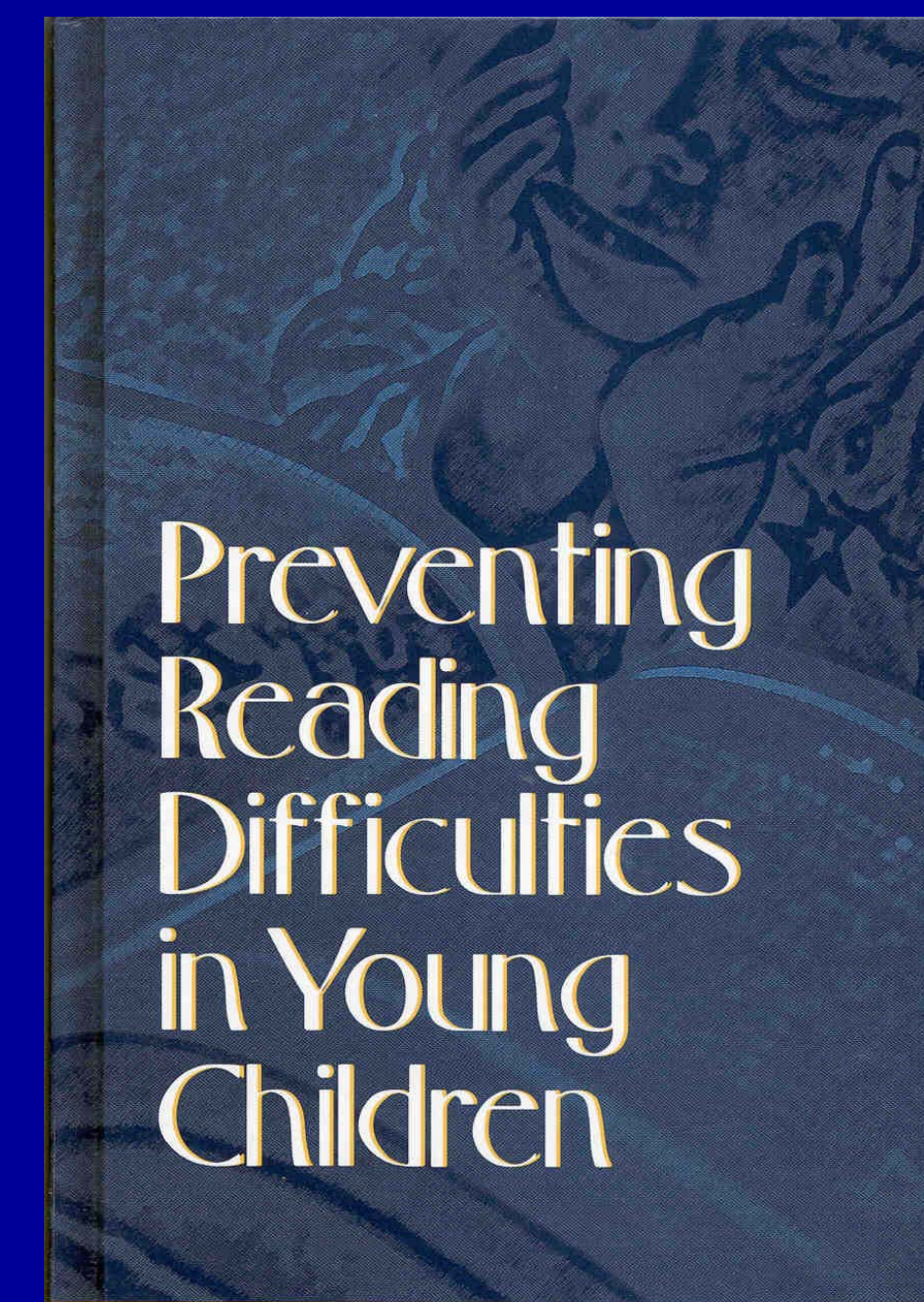
Remedial Interventions for Students with Dyslexia: National Goals vs. Real Accomplishments

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Preventing Reading Difficulties in Young Children

NATIONAL RESEARCH COUNCIL

“Current difficulties in reading largely originate from rising demands for literacy, not from declining absolute levels of literacy”

Increasing demands for higher levels of literacy in the workforce require that we do better than we have ever done before in teaching all children to read well.

Policy Environment for Intervention Research

Two recent policy statements:

Annual Yearly Progress under the NCLBA

“schools are held accountable for the achievement of all students, not just average student performance”

Secretary Paige

What works to improve performance for which students?

How much improvement can we expect for which students?

President’s commission on special education.

“The ultimate test of the value of special education is that, once identified, children close the gap with their peers.”

What do we mean by “closing the reading gap”?

This phrase might be used in two ways:

1. *Closing the gap* means narrowing the gap between a student’s current performance and grade level reading skills. Requires an acceleration in the rate of growth in reading skills – evidence: change in standard score or percentile ranking
2. *Closing the gap* means bringing a student’s reading skills to within grade level standards. For struggling readers, this requires an acceleration of development over a sufficient period of time. The most important grade level standard involves ability to comprehend complex text

What reading and language skills are required for proficient performance on “high stakes” measures of reading comprehension, and how do they change with age?

A study of one state's accountability measure in reading— the Florida Comprehensive Assessment Test

What reading, language, and cognitive skills are most important in accounting for individual differences in performance on the test at grades 3, 7, and 10?

What are the areas of greatest difficulty for students who struggle on the test at various ages?

State accountability measures of reading comprehension are not all alike, and the FCAT has two features that present special challenges to many students

It was specifically created to place high demands on vocabulary (word knowledge) and reasoning/inferential skills

It requires students to read relatively long passages before asking them to answer questions. This places special demands on reading fluency.

At fourth grade, the FCAT is very similar in difficulty to the NAEP

Passage length at different levels

3rd grade – 325 words

7th grade – 816 words

10th grade – 1008 words

How the study was conducted:

Gave 2 hour battery of language, reading, nonverbal reasoning, and memory tests to approximately 200 children in each grade at 3 locations in the state

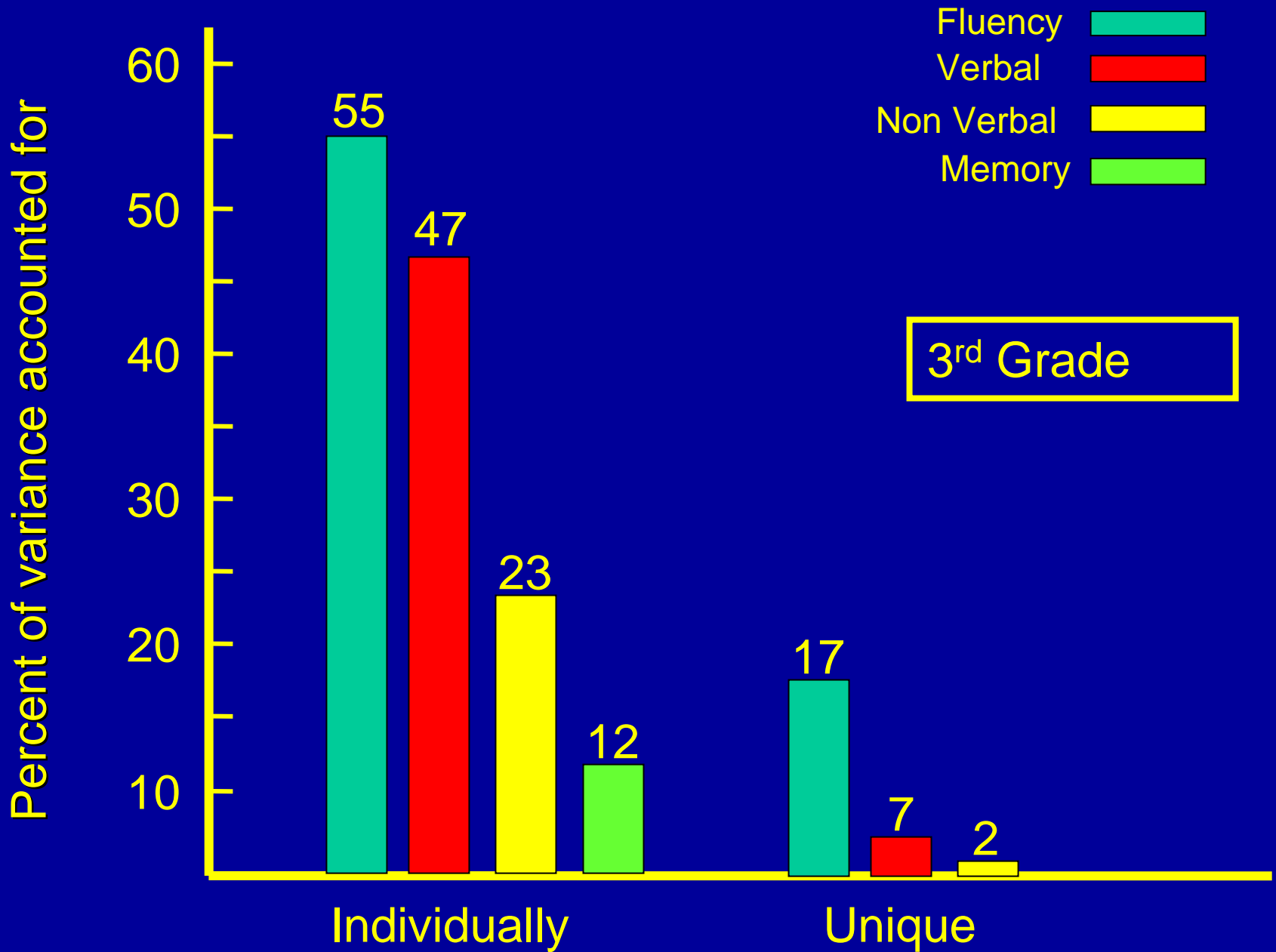
Language – Wisc Vocab and Similarities

Listening comprehension with FCAT passage

Reading– Oral reading fluency, TOWRE, Gray Oral Reading Test

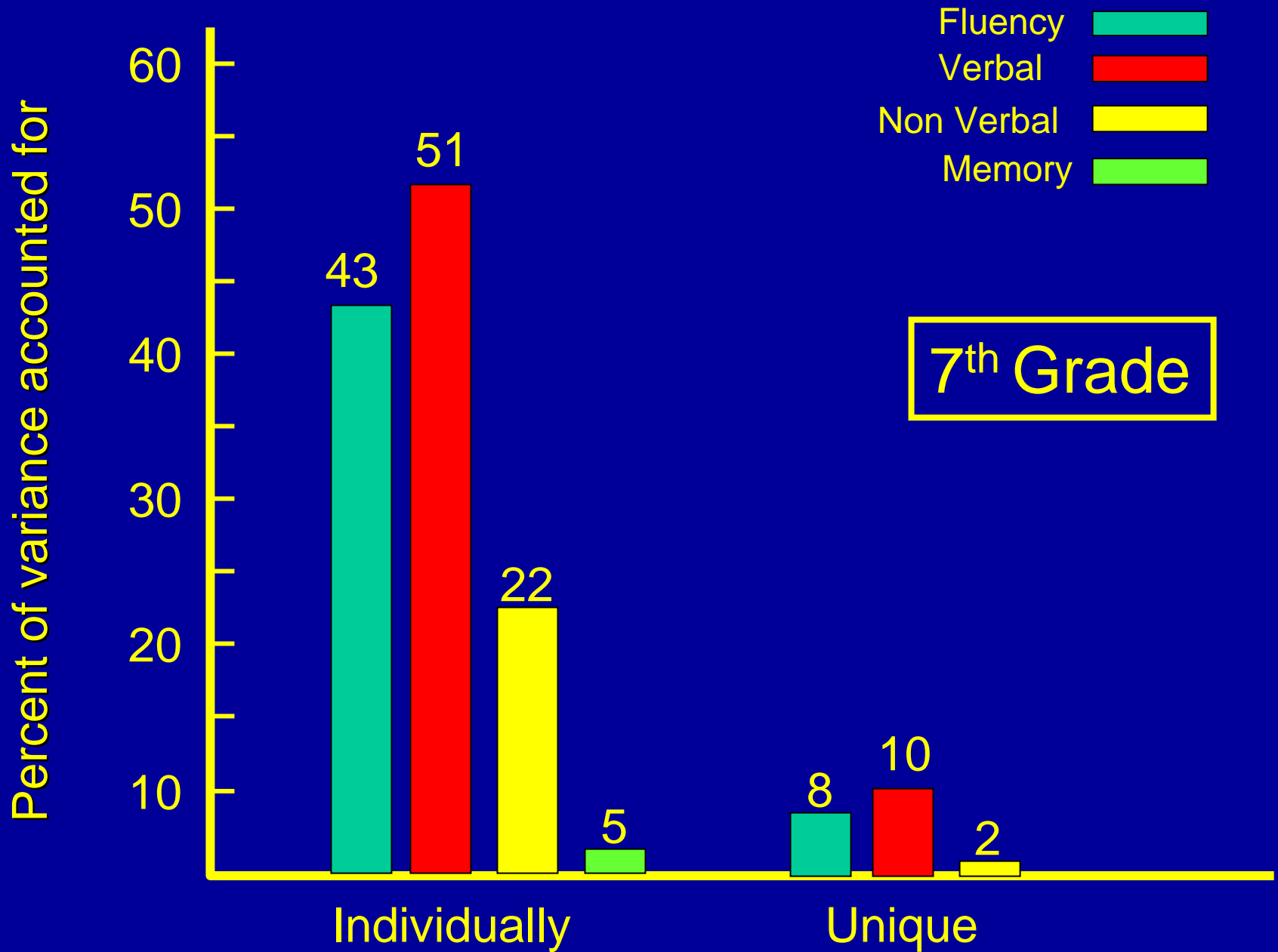
NV Reasoning – Wisc Matrix Reasoning, Block Design

Working Memory– Listening span, Reading Span



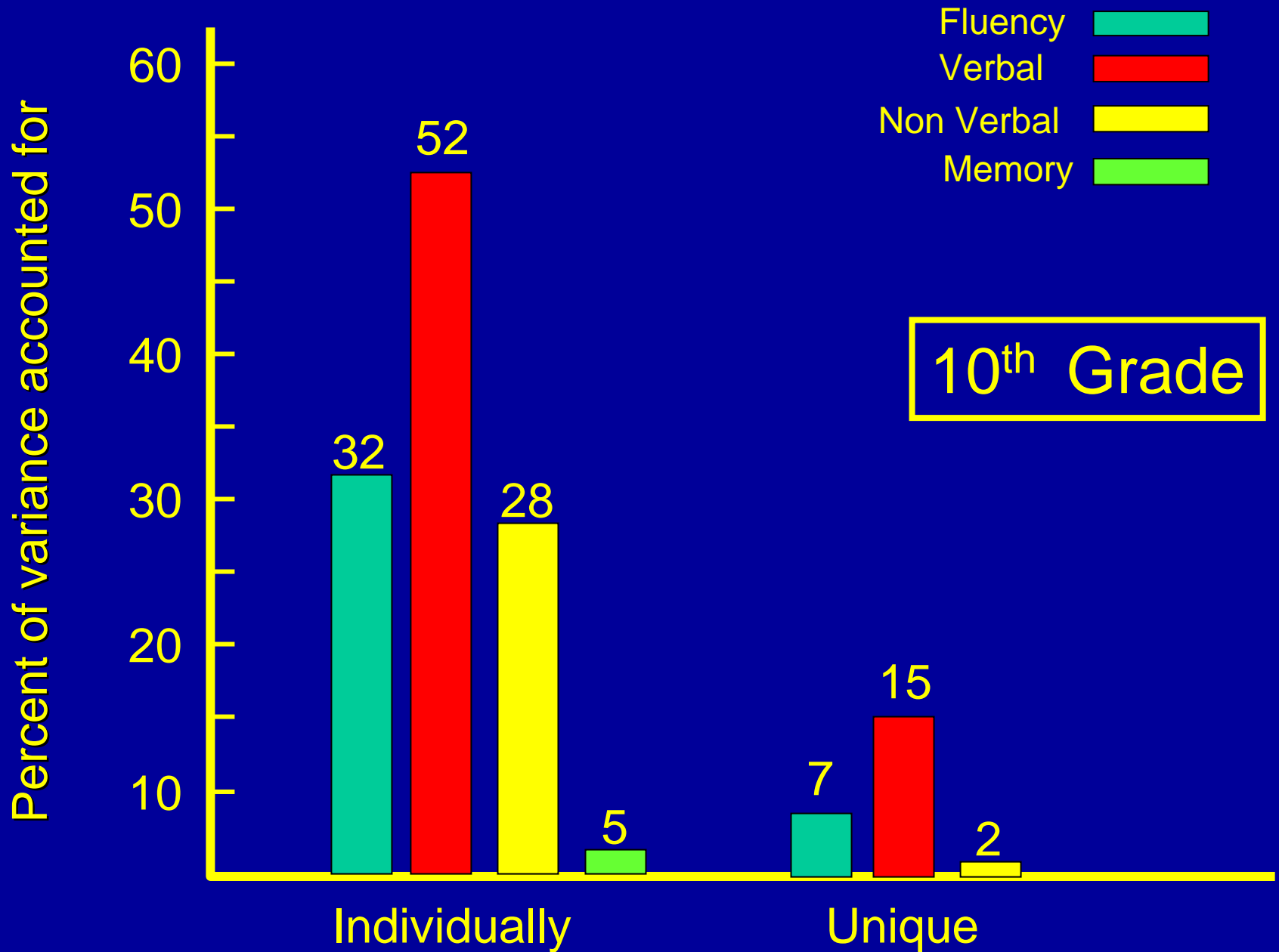
What skills are particularly deficient in level 1 and level 2 readers in 3rd grade?

<u>Skill/ability</u>	<u>FCAT Performance Level</u>				
	1	2	3	4	5
WPM on FCAT	54	92	102	119	148
WPM on DIBELS	61	96	111	132	155
Fluency percentile	6 th	32 th	56 th	78 th	93 rd
Phonemic decoding	25 th	45 th	59 th	74 th	91 st
Verbal knowledge/ reasoning	42 nd	59 th	72 nd	91 st	98 th



What skills are particularly deficient in level 1 and level 2 readers at 7th grade?

<u>Skill/ability</u>	<u>FCAT Performance Level</u>				
	1	2	3	4	5
WPM on FCAT	88	113	122	144	156
Fluency percentile	7 th	25 th	45 th	82 th	95 th
Phonemic decoding	27 th	53 rd	53 rd	74 th	84 th
Verbal knowledge/ reasoning	34 th	45 th	64 th	88 th	93 rd



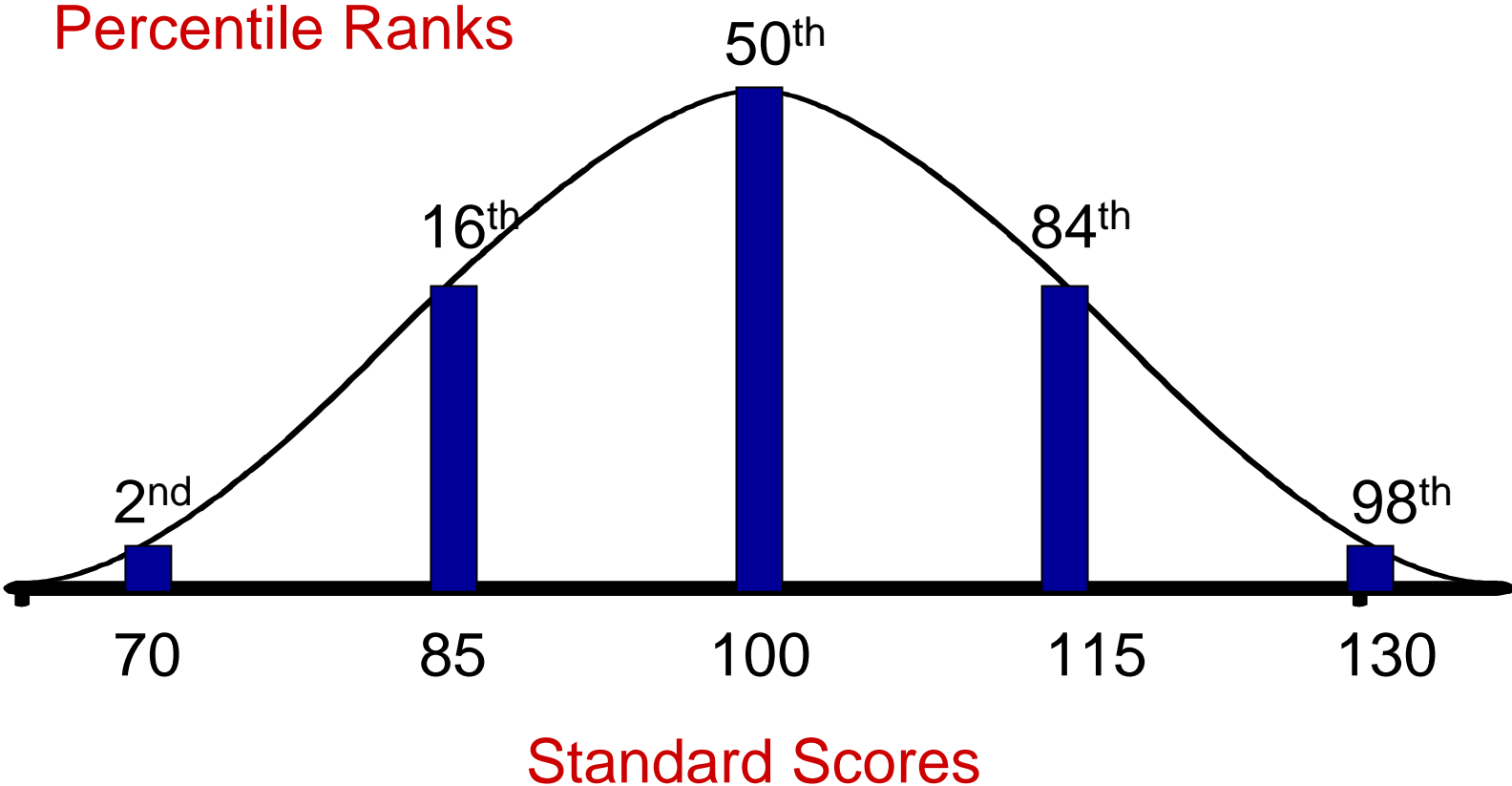
What skills are particularly deficient in level 1 and level 2 readers at 10th grade?

<u>Skill/ability</u>	<u>FCAT Performance Level</u>				
	1	2	3	4	5
WPM on FCAT	130	154	175	184	199
Fluency percentile	8 th	30 th	68 th	87 th	93 rd
Phonemic decoding	18 th	27 th	45 th	56 th	72 nd
Verbal knowledge/ reasoning	30 th	60 th	66 th	84 th	89 th

Remedial effectiveness vs. state level reading standards – what do we know about closing the reading gap?

An accurate and widely available metric—change in standard score per hour of instruction suggests that we know how to “close the gap” in terms of narrowing the gap

A standard score shows where you fall within the normal distribution of reading skills for student at your age or grade



Growth rates for samples that started below the 5th percentile (ss<75) in word reading ability

<u>Authors(date)</u>	<u>Reading Skill</u>		
	<u>Word Attack</u>	<u>Word ID</u>	<u>P.Comp.</u>
Alexander, et al 1991	<u>.32</u> (45 th)	<u>.19</u> (21 st)	

Provided 65 hours of 1:1 instruction to students with average age of 10 yr. 8 mo. Students finished at the 45th percentile in word attack and 21st percentile in word identification. Used the Lindamood instructional program

Growth rates for samples that started below the 5th percentile (ss=75) in word reading ability

<u>Authors(date)</u>	<u>Reading Skill</u>		
	<u>Word Attack</u>	<u>Word ID</u>	<u>P.Comp.</u>
Alexander, et al 1991	<u>.32</u> (45 th)	<u>.19</u> (21 st)	
Lovett, et al., 1994		<u>.16</u> (2 nd)	.14

Provided 35 hours of 1:2 instruction to students with average age of 9yr, 7mo. Used modification of the Reading Mastery/Direct instruction method

Growth rates for samples that started below the 5th percentile (ss=75) in word reading ability

<u>Authors(date</u>	<u>Reading Skill</u>		
	<u>Word Attack</u>	<u>Word ID</u>	<u>P.Comp.</u>
Alexander, et al. 1994	<u>.32</u> (45 th)	<u>.19</u> (21 st)	
Provided 40 hours of 1:1 and 1:4 instruction to students with average age of 8yr, 9 mo. Used combination Lindamood instruction and computer based word reading practice			
Wise, et al., 1999	<u>.30</u> (35 th)	<u>.24</u> (13 th)	.14

Growth rates for samples that started below the 5th percentile (ss=75) in word reading ability

<u>Authors(date)</u>	<u>Reading Skill</u>		
	<u>Word Attack</u>	<u>Word ID</u>	<u>P.Comp.</u>
Alexander, et al 1991	<u>.32</u> (45 th)	<u>.19</u> (21 st)	
Lovett, et al., 1994		<u>.16</u> (2 nd)	.14
Provided 67.5 hours of 1:1 and instruction to students with average age of 9yr, 10mo. Used Lindamood method 1999			
Torgesen, et al 2001	<u>.41</u> (39 th)	<u>.20</u> (12 th)	.12

Growth rates for samples that started below the 5th percentile (ss=75) in word reading ability

<u>Authors(date</u>	<u>Reading Skill</u>		
	<u>Word Attack</u>	<u>Word ID</u>	<u>P.Comp.</u>
Alexander, et al 1991	<u>.32</u> (45 th)	<u>.19</u> (21 st)	
Lovett, et al., 1994		<u>.16</u> (2 nd)	.14
Wise, et al.,	<u>.30</u> (35 th)	<u>.24</u> (13 th)	.14
Provided 67.5 hours of 1:1 and instruction to students with average age of 9yr, 10mo. Used explicit phonics instruction linked with extensive, supported reading of text			
Torgesen, et al 2001	<u>.30</u> (25 th)	<u>.21</u> (10 th)	.15

Growth rates for samples that started below the 5th percentile (ss=75) in word reading ability

<u>Authors(date)</u>	<u>Reading Skill</u>		
	<u>Word Attack</u>	<u>Word ID</u>	<u>P.Comp.</u>
Lovett, et al., 2000	<u>.24</u> (14 th)	<u>.18</u> (5 th)	.16

Provided 70 hours of 1:3 and instruction to students with average age of 9yr, 8mo. Used explicit phonics instruction (PHAB) followed by instruction in 4 word reading strategies (WIST)

Growth rates for samples that started below the 5th percentile (ss=75) in word reading ability

<u>Authors(date)</u>	<u>Reading Skill</u>		
	<u>Word Attack</u>	<u>Word ID</u>	<u>P.Comp.</u>
Lovett, et al., 2000	<u>.24</u> (14 th)	<u>.18</u> (5 th)	.16
Lovett, et al., 2000	<u>.30</u> (14 th)	<u>.20</u> (5 th)	.18

Provided 70 hours of 1:3 and instruction to students with average age of 9yr, 8mo. Provided initial instruction in 4 word reading strategies (WIST) followed by explicit phonics instruction (PHAB)

Growth rates for samples that started below the 5th percentile (ss=75) in word reading ability

<u>Authors(date)</u>	<u>Reading Skill</u>		
	<u>Word Attack</u>	<u>Word ID</u>	<u>P.Comp.</u>
Lovett, et al., 2000	<u>.24</u> (14 th)	<u>.18</u> (5 th)	.16
Lovett, et al., 2000	<u>.30</u> (14 th)	<u>.20</u> (5 th)	.18
O'Connor & Wilson, 1995	<u>.23</u> (35 th)	<u>.18</u> (9 th)	.17

Provided 60 hours of 1:1 instruction to students between 3rd and 8th grade. Instruction was guided by the Wilson Reading Program

Growth rates for samples that started below the 5th percentile (ss=75) in word reading ability

<u>Authors(date)</u>	<u>Reading Skill</u>		
	<u>Word Attack</u>	<u>Word ID</u>	<u>P.Comp.</u>
Lovett, et al., 2000	<u>.24</u> (14 th)	<u>.18</u> (5 th)	.16
Lovett, et al., 2000	<u>.30</u> (14 th)	<u>.20</u> (5 th)	.18
Provided 133 hours of 1:1 and 1:2 instruction to students with average age of 9yr, 10mo. Instruction was a combination of Lindamood, Fluency Practice, and comprehension instruction			
Torgesen, et al., 2003	<u>.18</u> (39 th)	<u>.07</u> (16 th)	.07

Growth rates for samples that started below the 5th percentile (ss=75) in word reading ability

<u>Authors</u>	<u>Hrs.</u>	<u>Word Attack</u>	<u>Word ID</u>	<u>P.Comp.</u>
Alexander	65	<u>.32</u> (45 th)	<u>.19</u> (21 st)	
Lovett,	35		<u>.16</u> (2 nd)	.14
Wise,	40	<u>.30</u> (35 th)	<u>.24</u> (13 th)	.14
Torgesen	68	<u>.41</u> (39 th)	<u>.20</u> (12 th)	.12
Torgesen	68	<u>.30</u> (25 th)	<u>.21</u> (10 th)	.15
Lovett,	70	<u>.24</u> (14 th)	<u>.18</u> (5 th)	.16
Lovett	70	<u>.30</u> (14 th)	<u>.20</u> (5 th)	.18
O & W	60	<u>.23</u> (35 th)	<u>.18</u> (9 th)	.17
Torgesen	133	<u>.18</u> (39 th)	<u>.07</u> (16 th)	.07

Growth rates for samples that started with word reading ability between the 6th and 16th percentiles

<u>Authors(date)</u>	<u>Word Attack</u>	<u>Word ID</u>	<u>P.Comp.</u>
Truch (1994)		<u>.21</u> (32 nd)	

Provided 80 hours of 1:1 instruction to students with average age of 12yr. Used the Lindamood instructional program

Growth rates for samples that started with word reading ability between the 6th and 16th percentiles

<u>Authors(date)</u>	<u>Word Attack</u>	<u>Word ID</u>	<u>P.Comp.</u>
Truch (1994)		<u>.21</u> (32 nd)	
Truch (2003)		<u>.19</u> (48 th)	

Provided 80 hours of 1:1 instruction to students with average age of 12yr, 10 mo. Used the Phonographix instructional program

Growth rates for samples that started with word reading ability between the 6th and 16th percentiles

<u>Authors(date</u>	<u>Word Attack</u>	<u>Word ID</u>	<u>P.Comp.</u>
Truch (1994)		<u>.21</u> (32 nd)	
Truch (2003)		<u>.19</u> (48 th)	
Hatcher, et al., 1994		<u>.31</u> (13 th)	.39

Provided 20 hours of 1:1 instruction to students with average age of 7 yr, 6 mo. . Used an explicit phonemic awareness and phonics program called Sound Linkage

Growth rates for samples that started with word reading ability between the 6th and 16th percentiles

<u>Authors(date</u>	<u>Word Attack</u>	<u>Word ID</u>	<u>P.Comp.</u>
Truch (1994)		<u>.21</u> (32 nd)	
Truch (2003)		<u>.19</u> (48 th)	
Hatcher, et al., 1994		<u>.31</u> (13 th)	.39
Torgesen , et al., 1994	<u>.29</u> (55 th)	<u>.16</u> (25 th)	.24

Provided 51 hours of 1:4 instruction to students with average age of 12 years . Instruction followed procedures of the Spell Read P.A.T. program

Growth rates for samples that started with word reading ability between the 6th and 16th percentiles

<u>Authors(date</u>	<u>Word Attack</u>	<u>Word ID</u>	<u>P.Comp.</u>
Truch (1994)		<u>.21</u> (32 nd)	
Truch (2003)		<u>.19</u> (48 th)	
Hatcher, et al., 1994		<u>.31</u> (13 th)	.39
Torgesen , et al., 2003	<u>.29</u> (55 th)	<u>.16</u> (25 th)	.24
Torgesen , et al., 2003	<u>.23</u> (77 th)	<u>.19</u> (39 th)	.19

Provided 100 hours of 1:4 instruction to students with average age of 12 years . Instruction followed procedures of the Spell Read P.A.T. program

Growth rates for samples that started with word reading ability between the 6th and 16th percentiles

<u>Authors</u>	<u>Hrs.</u>	<u>Word Attack</u>	<u>Word ID</u>	<u>P.Comp.</u>
Truch (1994)	80		<u>.21</u> (32 nd)	
Truch (2003)	80		<u>.19</u> (48 th)	
Hatcher	20		<u>.31</u> (13 th)	.39
Torgesen	51	<u>.29</u> (55 th)	<u>.16</u> (25 th)	.24
Torgesen	100	<u>.23</u> (77 th)	<u>.19</u> (39 th)	.19

Average growth rates and final status for students who begin intervention at different levels of strength in word reading ability

<u>Beginning Level</u>	<u>Word Attack</u>	<u>Word ID</u>	<u>P.Comp.</u>
Below 5 th percentile	.28 (29 th)	<u>.18 (9th)</u>	.14
Between 6 th & 16 th	.26 (66 th)	<u>.19 (29th)</u>	.27

Across a number of different methods and group sizes, we know it is possible to narrow the gap

We have not yet demonstrated publicly that we understand what must be done to close the gap

Factors that affect the rate of improvement

1. The number of hours of treatment that are provided

Truch (2003) showed that rate of gain decelerates substantially as treatment time lengthens

Gave 80 hours of instruction using Phonographix to 202 students ranging from 10 to 16 years of age

Word Identification

First 12 - .74

Next 12 - .11

Next 56 - .10

Word Attack

First 12 - .25 GL

Next 12 - .07 GL

Next 56 - ..04 GL

Growth rates for samples that started with word reading ability between the 6th and 16th percentiles

<u>Authors</u>	<u>Hrs.</u>	<u>Word Attack</u>	<u>Word ID</u>	<u>P.Comp.</u>
Truch (1994)	80		<u>.21</u> (32 nd)	
Truch (2003)	80		<u>.19</u> (48 th)	
Hatcher	20		<u>.31</u> (13 th)	.39
Torgesen	51	<u>.29</u> (55 th)	<u>.16</u> (25 th)	.24
Torgesen	100	<u>.23</u> (77 th)	<u>.19</u> (39 th)	.19

Growth rates for samples that started below the 5th percentile (ss=75) in word reading ability

<u>Authors</u>	<u>Hrs.</u>	<u>Word Attack</u>	<u>Word ID</u>	<u>P.Comp.</u>
Alexander	65	<u>.32</u> (45 th)	<u>.19</u> (21 st)	
Lovett,	35		<u>.16</u> (2 nd)	.14
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Lovett	70	<u>.30</u> (14 th)	<u>.20</u> (5 th)	.18
O & W	60	<u>.23</u> (35 th)	<u>.18</u> (9 th)	.17
Torgesen	133	<u>.18</u> (39 th)	<u>.07</u> (16 th)	.07

Factors that affect the rate of improvement

1. The number of hours of treatment that are provided
2. The previous instructional history of the students in the intervention sample

Torgesen	68	<u>.41</u> (39 th)	<u>.20</u> (12 th)	.12
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Torgesen	68	<u>.30</u> (25 th)	<u>.21</u> (10 th)	.15
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Torgesen	133	<u>.18</u> (39 th)	<u>.07</u> (16 th)	.07
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Factors that don't seem to affect rate of improvement

1. Whether students begin intervention with word level scores below the 5th percentile or whether they are between the 6th and 16th percentile
 - True for word level skills
 - May not be true for comprehension
2. Teacher student ratio varying between 1:1 or 1:4
3. Whether instruction is multi-sensory or not

Going Forward, what kind of intervention research do we need?

1. Must involve random assignment to treatment conditions in order to answer questions about causality
2. Must have enough instruction to answer questions about narrowing the gap and about closing the gap
3. Should have, as one outcome measure, student's level of proficiency in comprehension of complex test – state accountability measures

Thank You

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Science of reading section
Presentations