UNLOCKING DYSLEXIA



THE PICTURE OF DYSLEXIA

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THE PICTURE OF DYSLEXIA

THE **WHO** > WHAT > WHEN > WHERE > WHY 8 > WHAT IT LOOKS LIKE > WHAT TO DO

WHAT IT ISN'T DYSLEXIA IS ...

> NOT A VISUAL PROBLEM > NOT A LACK OF INTELLIGENCE NOT DUE TO LACK OF EFFORT NOT A DEVELOPMENTAL LAG. ► NOT UNCOMMON – 5 – 17.5 % **OF POPULATION** > **NOT** RESPONSIVE TO STANDARD READING INSTRUCTION

WHAT IT IS *DYS* = TROUBLE *LEXIA* = WORDS TROUBLE WITH WORDS

- > NEUROLOGIC IN ORIGIN GENETIC
- LIFELONG ENVIRONMENT MAY ALTER COURSE
- CORE DEFICIT IN PHONOLOGICAL COMPONENT OF LANGUAGE
- > READING COMPREHENSION > WORD READING
- > ACCOMPANYING CHALLENGES (50%)

>ADHD

- SENSORY MOTOR DIFFICULTY
- > BEHAVIORAL PROBLEMS

>MORE CHALLENGING TO REMEDIATE

THE PICTURE OF DYSLEXIA

(All Symptoms Do Not Occur With Everyone)

STRENGTHS

LEADERSHIP SKILLS









THINKING "OUT OF THE BOX"



POLITICAL & MILITARY ENTREPRENEURS

SCIENTISTS & INVENTORS



HANS CHRISTIAN ANDERSEN LEONARDO Da VINCI MOZART

HARRISON FORD & STEVEN SPEILBERG



NEUROSURGERY

MOHAMMAD ALI

NOLAN RYAN

WHAT TO DO?

COMPENSATE

REMEDIATE

ACCOMMODATE

PROMOTE

WHAT TO REMEDIATE?

"IF YOU DON'T KNOW THE CAUSE YOU GET INSTRUCTIONAL PARADIGMS BUILT ON FAULTY ASSUMPTIONS."

G. Reid Lyon, Ph.D.

PHONOLOGICAL AWARENESS

THE CORE DEFICIT



PHONOLOGICAL AWARENESS

THE UNDERSTANDING THAT WORDS ARE MADE UP OF SMALL BITS OF SOUND – PHONOLOGICAL SENSITIVITY Do the words cat and fat sound the same at the end? What is the first sound in the word man?

INNATE IN A TYPICAL BRAIN RECEIVING APPROPRIATE LANGUAGE INPUT

Torgesen, www.fcrr.org

PHONEMIC AWARENESS

THE ABILITY TO IDENTIFY, THINK ABOUT, AND MANIPULATE THE INDIVIDUAL SOUNDS (PHONEMES) IN WORDS

THE IMPLICATION OF A <u>GROWING</u> ABILITY TO IDENTIFY INDIVIDUAL SOUNDS IN WORDS.

Torgesen, www.fcrr.org

EARLY LANGUAGE DEVELOPMENT

BRAIN IS TUNED TO PARENTS' LANGUAGE

NEWBORN: INTEGRATES:
 ORAL-FACIAL MOVEMENTS
 SPEECH SOUNDS – PHONOLOGY
 SOCIAL – EMOTIONAL (NON VERBAL TONES & GESTURES) - PRAGMATICS

LANGUAGE (BUILDING BLOCKS)



PRINCIPLES OF LEARNING

WHAT FIRES TOGETHER, WIRES TOGETHER – MULTIPLE SENSES STRENGTHEN PATHWAYS

> OPTIMAL ATTENTION

CONSISTENT INPUT

INTENSITY SALIENT FREQUENT REPETITION, REPETITION, REPETITION

Alexander, 2003

PHONOLOGY (PERCEPTION / PRODUCTION)





THE EFFECTS OF WEAKNESSES IN ORAL LANGUAGE ON READING GROWTH

(Hirsch, 1996)



Chronological Age

EARLY READING DEVELOPMENT

BREAKING THE CODE

RECIPE FOR READING

DECODING (MECHANICS)

+

READING COMPREHENSION

LANGUAGE COMPREHENSION



IT'S A LEARNED <u>SKILL</u>

PRONOUNCE THESE WORDS... blit frachet

IT MUST BE <u>TAUGHT</u>

NEED PA (SOUNDS) TO HOOK TO ABSTRACT WRITTEN SYMBOLS (LETTERS)

GROWTH IN "PHONICS" ABILITY OF CHILDREN WHO BEGIN FIRST GRADE IN THE BOTTOM 20% IN PHONEME AWARENESS AND LETTER KNOWLEDGE (Torgesen & Mathes, 2000)



GROWTH IN WORD READING ABILITY OF CHILDREN WHO BEGIN FIRST GRADE IN THE BOTTOM 20% IN PHONEME AWARENESS AND LETTER KNOWLEDGE (Torgesen & Mathes, 2000)



Torgesen, www.fcrr.org









> ANYWHERE

SIGNATURE BRAIN MAGES ARE THE SAME

DIFFERENT LANGUAGES AFFECT THE PICTURE ITALIAN VS ENGLISH





> ANYONE > ALL AGES > ALL WALKS OF LIFE **PREPONDERANCE IN : ARCHITECTS** *ENGINEERS* **SURGEONS** *ENTREPRENEURS* >SCHOOL DROPOUTS **>PRISON INMATES**



> AS EARLY AS THE NEWBORN PERIOD

>IDENTIFICATION OF A PHONOLOGIC "GLITCH"

> THE WEAKER THE PHONOLOGY, THE EARLIER THE STRUGGLE

THE PICTURE OF DYSLEXIA

WHAT DOES IT "LOOK" LIKE?





(ALL SYMPTOMS DO NOT OCCUR WITH EVERYONE)

ACCOMPANYING CHALLENGES (SENSORIMOTOR)



THE PICTURE OF DYSLEXIA (ALL SYMPTOMS DO NOT OCCUR WITH EVERYONE)

ACCOMPANYING CHALLENGES (BEHAVIORAL)




DEVELOPMENTAL DIFFERENCES

PRESCHOOL: SENSORIMOTOR ORAL LANGUAGE ATTENTION

> EARLY ELEMENTARY:

PRINT RECOGNITION LETTER – SOUND KNOWLEDGE MECHANICS OF READING HANDWRITING ATTENTION

DEVELOPMENTAL DIFFERENCES

MID ELEMENTARY / MIDDLE SCHOOL: COMPREHENSION WRITTEN EXPRESSION ATTENTION

HIGH SCHOOL / ADULT: READING EFFICIENCY COMPREHENSION FOREIGN LANGUAGE
ATTENTION



WHAT TO DO

ASSESSMENT OF STRENGTHS AND WEAKNESSES

NEUROCOGNITIVE
PSYCHOSOCIAL

ASSESSMENT DRIVES TREATMENT

BELL SHAPED CURVE NORMAL POPULATION DISTRIBUTION



PROFILE GRAPH

BRAIN TEAM

	S	VERE		AT	RISK	<u> </u>	· /	AVERA	GE		SUPE			GIFTEI	
		WEA	AKNESS			<u> </u>		RANC	ЗЕ			STR	ENGTH		
Standard Scores	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135
Percentiles	1st	2nd	5th	9th	16th	25th	37th	50th	63rd	75th	84th	91st	95th	98th	99th
ATTENTION/ INTENTION															
Visual				\rightarrow											
Auditory			\rightarrow												
Fluid Reasoning											\rightarrow				
Executive Processes					Δ	+					Y				
Processing Speed															
ORAL LANGUAGE															
Phonological Awareness				\rightarrow											
(Morpho)Syntactic Awareness				Ĺ	\rightarrow										
Receptive (Listening)					,										
Expressive (Speaking)															
Word Retrieval (Naming)															
MEMORY															
Aud. Working Memory		\rightarrow													
Vis. Working Memory										+					
SENSORIMOTOR															
Visual Processing															
Visuo/Motor Ability						+									

PROFILE GRAPH

BRAIN TEAM RESULTS

	SEV	/ERE		AT RIS	K			AVERA	GE		SUP	ERIOR		GIFT	ED
		WEAKNESS					RANGE					STRENGTH			
Standard Scores	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135
Percentiles	1st	2nd	5th	9th	16th	25th	37th	50th	63rd	75th	84th	91st	95th	98th	99th
WRITTEN LANGUAGE															
Word Reading (Real)			\rightarrow												
Word Reading (Rate)			۷												
Word Reading (Nonsense	e)	,													
Word Reading (Rate)															
					,										
Passage Comprehension					\rightarrow										
Passage Fluency				\rightarrow											
Writing/Written Expression	on														
Writing Fluency			\rightarrow												
Spelling															
			\rightarrow												
ARITHMETIC															
Concepts															
Operations						\rightarrow									
Applications						+									
Fluency					\rightarrow	V									

PRESCHOOL PREDICTORS OF FUTURE READING SUCCESS

PHONOLOGICAL AWARENESS

LETTER NAME KNOWLEDGE

RAPID NAMING of OBJECTS, COLORS

ALL OF THESE PREDICTORS ARE DEPENDENT ON A STRONG PHONOLOGICAL SYSTEM





>EARLY IDENTIFICATION >PREVENTION OF READING DIFFICULTIES

LATER IDENTIFICATION INTERVENTION FOR READING DIFFICULTIES

PREVENTION STUDY

- ➢ MID KG − END 2ND GRADE
- ➤ SCREENING BOTTOM 10TH %ILE
- FREQUENCY 20 MINUTES / 4 DAYS / WEEK
- ➢ INTENSITY 1:1, 67 HRS.
- TEACHERS & AIDES

4 METHODS – <u>PASP</u> (MULTISENSORY, "BOTTOM UP"- LiPS) <u>EP</u> (TRADITIONAL RDG INSTRUCTION WITH EXPLICIT PHONICS) <u>RCS</u> (SUPPORT OF CLASSROOM TEACHING)

<u>NTC</u> (NO TREATMENT CONTROL)

Torgesen et al, 1999 NICHD

PREVENTION STUDY OUTCOME

>ONLY PASP YIELDED SIGNIFICANT PHONOLOGICAL AWARENESS AND WORD READING GAINS

END OF 2ND GRADE: 50TH %ILE WORD READING SKILLS (ACCURACY AND FLUENCY).

>OTHERS NO BETTER THAN NO TREATMENT CONTROL

>BEST PREDICTORS OF GROWTH IN READING: ATTENTION/BEHAVIOR, HOME BACKGROUND, AND P/A.

A SOLUTION TO THE PROBLEM OF THE FLUENCY GAP: PREVENTIVE INTERVENTIONS



DYSLEXIA PREVENTION STUDY "BOTTOM-UP" VS "TOP-DOWN"

PASP (LiPS) USES A MORE EXPLICIT, CONCRETE, MULTISENSORY ("BOTTOM UP") APPROACH TO DEVELOP PHONOLOGICAL AWARENESS



Percent retained in K or 1

Torgesen et al, 1999

GROWTH IN WORD READING ABILITY



Torgesen, www.fcrr.org

AT RISK READER

Left

Right



Simos et al, 2005

REMEDIATION STUDY

> OLDER CHILDREN (8 – 10 YRS)

SEVERE DYSLEXIA 2nd %ILE FOR WORD READING 35th %ILE IQ

 2 TREATMENTS – BOTH EXPLICIT PHONICS RX A "BOTTOM UP" (LIPS) VS A "TOP DOWN" (EP)
 EQUAL TIME AND INTENSITY

 1:1
 100 MINS DAILY
 8-9 WEEKS
 TOTAL 67.5 HRS

RESEARCH DEMONSTRATES BOTH IMMEDIATE & LONG LASTING RESULTS IN BROAD READING (DECODING+COMPREHENSION)



Torgesen, Alexander, Wagner et al, 2001



p= <.05



SPOKEN LANGUAGE GAINS

GROWTH IN SPOKEN LANGUAGE DURING INTERVENTION & FOLLOW-UP



Torgesen, Alexander, Wagner et al, 2001

EFFECT SIZE OF TREATMENT ON LANGUAGE COMPREHENSION

		IPS					E				
	PRE - POST	PRE	PS PRE - 2 ¥ 0.977 0.755 0.444 0.933 0.588		PR	E - P	OST	PR	E - 2 \	YRS	
RLS	1.05	C).97			0.49					
OD	0.75	C).75			0.31					
WC	0.61	C).44			0.50					
SR	0.61	C	0.93			0.37					
LP	0.62	C).58			0.03			0.38		
ELS	0.85	C).71			0.70					
FS	0.60	C).70			0.44					
RC	0.24	C).54			0.20			0.16		
SA	0.75	C).49			0.76					

ES of 5 – 7 moderate; 8+ large

P<= 0.05

TREATMENTS EFFECTS ON BRAIN ACTIVITY



Increased activity in left hemisphere

Simos et al 2002

EXCITING RESULTS!

HOWEVER.....

LATE VS EARLY INTERVENTION (PREVENTION)

WORD READING ACCURACY AND RATE



PROJECTED GROWTH IN "SIGHT VOCABULARY" OF NORMAL READERS AND DISABLED CHILDREN BEFORE AND AFTER REMEDIATION Torgesen



Later intervention does not close fluency gap – early intervention does

EARLY INTERVENTION IS URGENT!

▶ 10TH %ILE 5TH GRADE READER 50,000 WORDS A YEAR

50TH %ILE 5TH GRADE READER 600,000 WORDS A YEAR

AVERAGE STUDENTS RECEIVE ABOUT 10 TIMES AS MUCH PRACTICE IN A YEAR

Percentile Rank	Minute Da	es Per ≉y	Words Read Per Year						
	Books	Text	Books	Text					
98	65.0	67.3	4,358,000	4,733,000					
90	21.2	33.4	1,823,000	2,357,000					
80	14.2	24.6	1,146,000	1,697,000					
70	9.6	16.9	622,000	1,168,000					
60	6.5	13.1	432,000	722,000					
50	4.6	9.2	282,000	601,000					
40	3.2	6.2	200,000	421,000					
30	1.8	4.3	106,000	251,000					
20	0.7	2.4	21,000	134,000					
10	0.1	1.0	8,000	51,000					
2	0	0	0	8,000					
(Anderson, Wilson, & Fielding, 1988)									

RESPONSE TO INTERVENTION MODEL

> APPLICATION OF EVIDENCE-BASED TREATMENT TO SCHOOLS

>A TIERED APPROACH

TIER 1: CLASSROOM

TIER 2: PULL OUT SUPPORT

> TIER 3 :TOTAL PULL OUT

TIER TWO LITCHFIELD SCHOOL DISTRICT PHOENIX, ARIZONA

- ID BY CLASSROOM TEACHER
 SPALDING INSTRUCTION IN CLASSROOM
- READING / PA ASSESSMENT BELOW GRADE LEVEL OR, AT GRADE LEVEL, BUT STRUGGLING
- NOT QUALIFIED FOR SLD

EXPLICIT, MULTISENSORY PROGRAM (LiPS) 40 MINS DAILY, 120 DAYS, 80-100 HRS GROUPS : 6-8:1 (YOUNGER) 8-12:1 (OLDER)

LSD RESULTS 1st GRADE



p= <.05

LSD RESULTS 2nd GRADE



LSD RESULTS 3rd – 5th GRADES



> WHAT FIRES TOGETHER, WIRES TOGETHER – MULTIPLE SENSES STRENGTHEN PATHWAYS

> OPTIMAL ATTENTION

CONSISTENT INPUT

INTENSITY
 SALIENT
 FREQUENT
 REPETITION, REPETITION, REPETITION

Alexander, 2003

TIER THREE

EINSTEIN MONTESSORI CHARTER

SCHOOL

FLORIDA

www.einsteinmontessori.com

EINSTEIN Montessori SCHOOL

ABOUT EMS



September 05, 2003 EMS launches new website.



WELCOME TO EMS

Welcome to Einstein Monetessori School. Zach Osbrach, founded this school to better educate children with reading and spelling delays. Our dyslexic students have achieved the highest reading gains among their peers in the state of Florida. Our extensive testing has shown a 285% increase in reading gains. For that reason and others, we feel that it is important to share with you our instructional model and how to reproduce these gains in your school.



SUBMIT

CREATED BY BIG MEDIA STUDIOS 🔘 WWW.BIGMEDIASTUDIOS.COM

EMS PROGRAMS FOR YOUR SCHOOL

Fill out this short form to receive an EMS packet on how to implement our proven methods in your school.



EINSTEIN MONTESSORI SCHOOL, INC (EMS)

- CHARTER SCHOOL (1999)
- REMEDIATE LITERACY SKILLS
 - LANGUAGE-BASED LEARNING DIFFICULTIES
- > 2ND 8TH GRADE
- LITERACY SKILLS FOUR CLASS PERIODS/DAY
 - **1. PHONOLOGICAL AWARENESS (LIPS)**
 - 2. READING
 - **3. READING**
 - 4. WRITING
- > TEACHER TRAINING ACROSS ALL CLASSES

EMS GAINS 2004-2005 (GRADES 3-5)

SIGNIFICANT IMPROVEMENT (P <0.001)
 WORD ATTACK
 PASSAGE COMPREHENSION
 PHONOLOGICAL PROCESSING
 WORD & NONWORD READING EFFICIENCY
 STATE ACHIEVEMENT TESTING

NON-SIGNIFICANT IMPROVEMENT
WORD IDENTIFICATION
EINTSTEIN MONTESSORI RESULTS

HOWEVER....MANY MEASURES, WHILE SIGNIFICANT, DID NOT REACH 30TH%ILE BENCHMARK

THEREFORE....INSTITUTING AN INTENSIVE FOUNDATIONAL INTERVENTION (LiPS) 3 HOURS/DAY X 6 WEEKS SMALL GROUP

FCAT 2005

AVERAGE CHANGE IN READING DEVELOPMENT

(IMPROVEMENT FROM 2004 TO 2005)





FOR THE TREATMENT RESISTERS

> THE RESEARCH MODEL

> THOROUGH BRAIN TEAM ASSESSMENT

TREAT OTHER FACTORS THAT MAY BE OBSTACLES ATTENTION BEHAVIOR SENSORIMOTOR

RESEARCH RESULTS 3rd – 5th GRADES



p= <.05

CONCLUSION

TREATMENT IS MOST EFFECTIVE IF:
YOUNGER AGE
INTENSIVE
EXPLICIT PHONOLOGICAL/PHONICS
ATTENTION IS OPTIMAL

* "BOTTOM-UP" MORE EXPLICIT PHONICS APPROACH: PREVENTION MILD TO SEVERE DYSLEXIA AUDITORY WORKING MEMORY WEAKNESS

"TOP-DOWN" PHONICS APPROACH: AFTER 3RD GRADE MILD TO MODERATE DYSLEXIA

NEUROBIOLOGY REVIEW WHY DOES INTERVENTION WORK?

WHY "OUT OF LINE NEURONS" (ECTOPIAS)



FRONT

LAYERS OF BRAIN CORTEX



http://www.thebrain.mcgill.ca/flash/d/d_02/d_02_cl/d_02_cl_vis/d_02_cl_vis.html#3

NEURAL MIGRATION

GENETICALLY PROGRAMMED



http://www.thebrain.mcgill.ca/flash/a/a_09/a_09_cl/a_09_cl_dev/a_09_cl_dev.htm

NEURAL MIGRATION

GONE AWRY IN DEVELOPMENTAL DYSLEXIA



http://www.thebrain.mcgill.ca/flash/a/a_09/a_09_cl/a_09_cl_dev/a_09_cl_dev.htm

ECTOPIC CELLS



Ramus, 2004

NEURONAL CONNECTIONS



"OUT OF LINE NEURONS" (ECTOPIAS)



FRONT

TYPICAL LANGUAGE ACTIVATION AREAS



TYPICAL READING ACTIVATION AREAS



BRAIN ACTIVATION WITH READING



Β

Simos, Fletcher, Bergman, et al 2002

> WHAT FIRES TOGETHER, WIRES TOGETHER – MULTIPLE SENSES STRENGTHEN PATHWAYS

> OPTIMAL ATTENTION

CONSISTENT INPUT

INTENSITY
SALIENT
FREQUENT
REPETITION, REPETITION, REPETITION

Alexander, 2003

WHAT HAVE WE LEARNED FROM RESEARCH?

- GOOD SCIENCE BEHIND INSTRUCTION AND MATERIALS.
 - >INFORMED CONSUMERS OF MATERIALS.
- **>** FOLLOW PRINCIPLES OF LEARNING.
- PREVENTION IS THE MOST EFFECTIVE TREATMENT APPROACH.

FUTURE DIRECTIONS

- SHOULD WE ACCEPT THE PERSISTENCE OF A "GAP" AND ONLY FOCUS ON THE STRENGTHS?
 - HAVE WE LEARNED ALL THERE IS TO KNOW ABOUT IMPROVING LANGUAGE AND LEARNING SKILLS?
- IS "CLOSING THE GAP" AN ACHIEVABLE GOAL?
 - PREVENTION RESEARCH CLOSED THE GAP IN FLUENCY AND READING ACCURACY.
 - REMEDIATION RESEARCH CLOSED THE GAP IN READING ACCURACY AND IMPROVED FLUENCY.

> NCLB – THE LEGISLATURE'S RESPONSIBILITY.



> NCLB – OUR RESPONSIBILITY IS TO PREVENT AND REMEDIATE LANGUAGE/LEARNING DISABILITIES; GIVIVING THE TAX PAYER THEIR MONEY'S WORTH.

AVAILABLE SCIENCE

JOE TORGESEN, Ph.D. WWW.FCRR.ORG

- RICHARD WAGNER, Ph.D. NICHD – FSU LEARNING DISABILITIES RESEARCH CENTER
 - GENETICS / DYSLEXIA REGISTRY
 - FOLLOW SEVERE DYSLEXICS
 - WEBSITE CLEARING HOUSE FOR TREATMENT RESEARCH

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