Early Auditory Reading Success (EARS) Program: Benefit From Kindergarten to the 3rd Grade

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Definitions of Auditory Processing Disorders (APD)

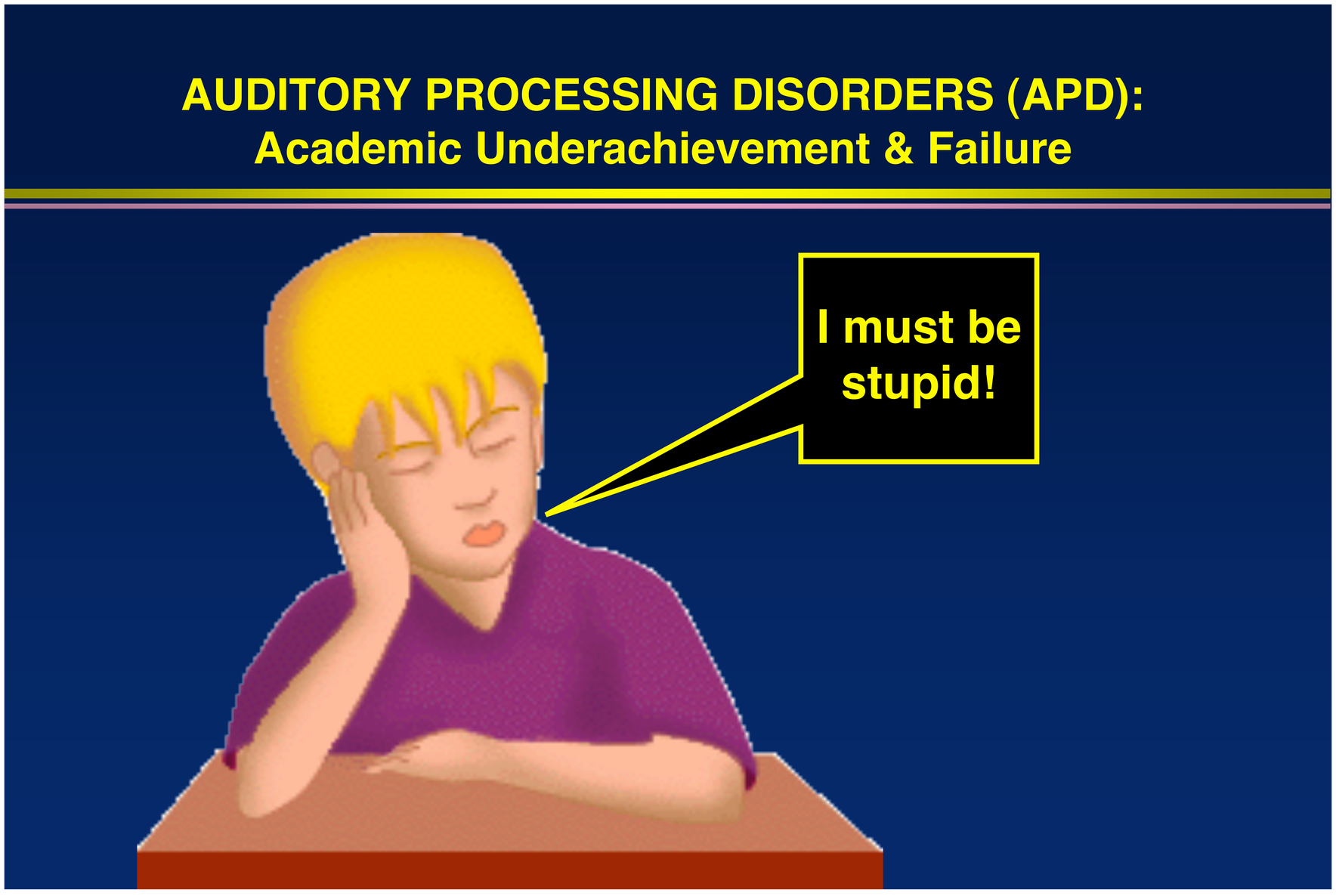
- "APD is broadly defined as a deficit in the processing of information that is specific to the auditory modality."
  (Bruton Conference in Dallas, Jerger & Musiek 2000)
- Definition: "APD is broadly defined as a deficit in the processing of information that is specific to the auditory modality." Auditory processing is "the efficiency and effectiveness by which the CNS utilizes auditory information."
  (ASHA, 2005)
- "(C)APD is seen in a wide array of populations, including children and adults. It can be the result of a number of different etiologies that involve deficits in the function of the central auditory nervous system. Neurological involvement ranging from degenerative diseases to exposure to neurotoxic substances can result in (C)APD"
  (AAA, 2009)

Auditory Processing Disorders: Early Literature

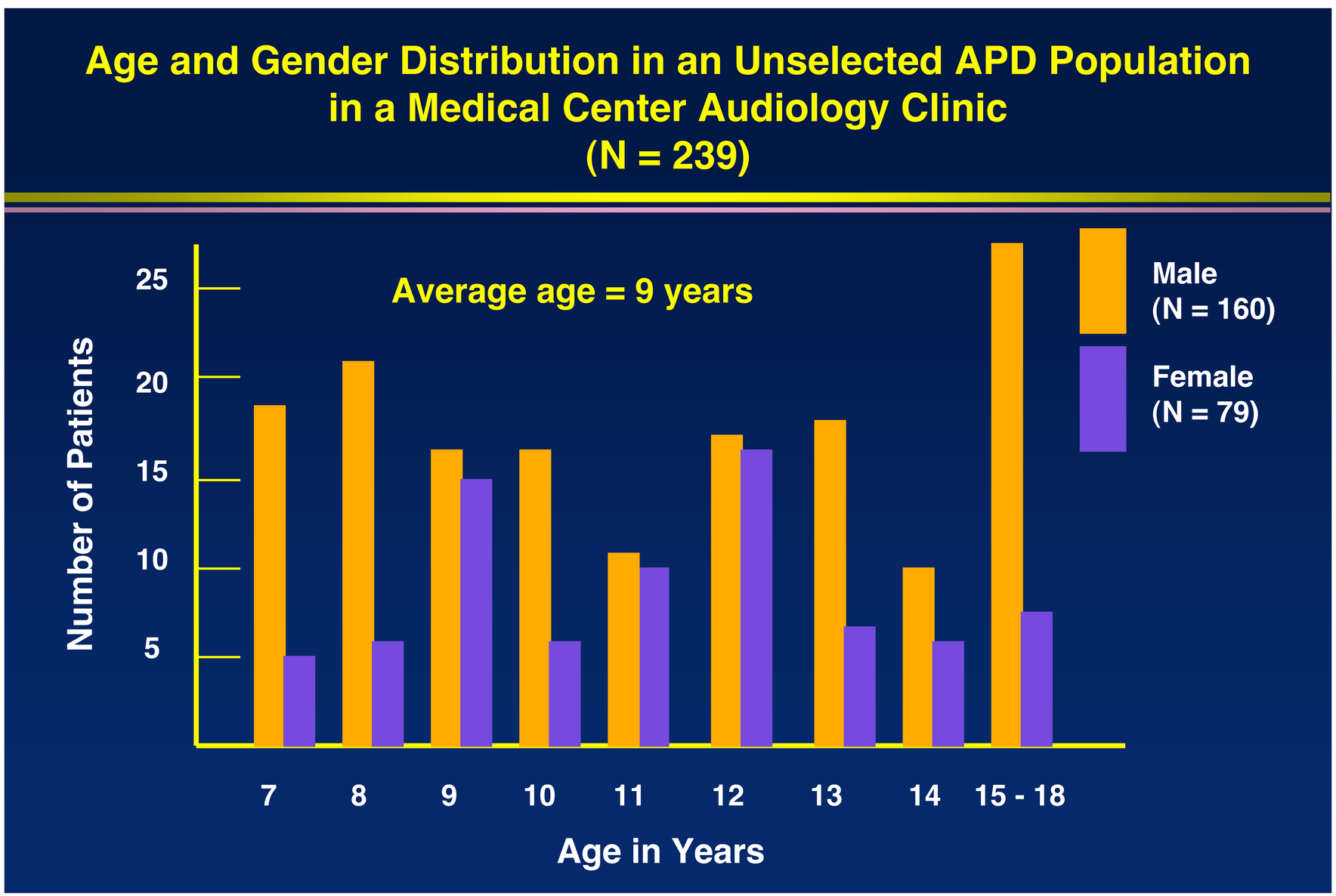
“They have mouths, but they speak not;
Eyes have they, but they see not.
They have ears, but they hear not.”

Psalms 115: 5-6.

AUDITORY PROCESSING DISORDERS (APD):
Academic Underachievement & Failure



Age and Gender Distribution in an Unselected APD Population in a Medical Center Audiology Clinic (N = 239)



Consequences of Late Identification of APD

- Reading failure
- Academic failure
- Psychosocial problems
  - Behavioral Assessment System for Children, Volume II (BASC-II)
    - ✓ A profile of adaptive and maladaptive behaviors and emotions of children and adolescents.
  - Children with APD are at risk for or have clinically significant evidence of
    - ✓ Externalizing problems (e.g., aggression, conduct problems)
    - ✓ Internalizing problems (e.g., anxiety, depression)
    - ✓ Behavioral symptoms index (e.g., withdrawal)
    - ✓ Adaptive skills (e.g., social skills, functional communication)
- May require long-term remediation
  - Increased cost and decreased benefit versus early identification and intervention

The Early Auditory Reading Success (EARS) Program: Assumptions

- Auditory processing and language deficits play a role in reading failure.
- "Struggling readers" (10 to 25% of at risk children) have weak auditory processing skills that reduce the effectiveness of traditional reading instruction.
- The outcome of screening for auditory processing disorders contributes to detection of children at risk for reading failure.
- Children at risk for reading failure (e.g., impoverished children attending Title I schools) will benefit from:
  - Classroom FM amplification
  - Computer-based training for auditory and pre-reading skills (Earobics)
- Intensive intervention for children with auditory processing and reading readiness deficits is effective in preventing reading failure and in promoting academic success.
- Cost of implementation of the EARS program will be within State of Florida guidelines (< $30 per child) for special instructional programs

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Auditory Processing Deficits in Language Learning and Reading: Neurophysiological Evidence from Northwestern University

- Kraus N, McGee TJ, Carrell TD, Zecker SG, Nicol TG, Koch DB. (1996) Auditory neurophysiologic responses and discrimination deficits in children with learning problems. Science 273: 971-973.
- Cunningham J, Nicol T, Zecker S, Kraus N. (2000) Speech-evoked neurophysiologic responses in children with learning problems: development and behavioral correlates of perception. Ear and Hearing 21: 554-568.
- Hayes E, Warrier CM, Nicol T, Zecker SG, Kraus N. (2003) Neural plasticity following auditory training in children with learning problems. Clinical Neurophysiology 114: 673-684.
- Hornickel J, Skoe E, Nicol T, Zecker S, Kraus N. (2009) Subcortical differentiation of voiced stop consonants: relationships to reading and speech in noise perception. Proceedings of the National Academy of Science 106(31): 13022–13027.
- Chandrasekaran B, Hornickel J, Skoe E, Nicol T, Kraus N. (2009) Context-dependent encoding in the human auditory brainstem relates to hearing speech in noise: Implications for developmental dyslexia. Neuron 64: 311-319.
- Abrams D, Nicol T, Zecker S, Kraus N. (2009) Abnormal cortical processing of the syllable rate of speech in poor readers. Journal of Neuroscience 29: 7686-7693.
- Banai K, Hornickel JM, Skoe E, Nicol T, Zecker S, Kraus N. (2009) Reading and subcortical auditory function. Cerebral Cortex 19(11): 2699-2707.

MISMATCH NEGATIVITY (MMN) RESPONSE: Investigations in APD and dyslexia (a few from just 2003)

- Tervaniemi & Hugdahl K. Lateralization of auditory cortex functions. *Brain Research Reviews 43*: 231-246, 2003.
- Liasis et al. Auditory event-related potentials in the assessment of auditory processing disorders: A pilot study. *Neuropediatrics 34*: 23-39, 2003.
- Guttorm et al. Event-related potentials in newborns with and without familial risk for dyslexia: principal component analysis reveals differences between the groups. *J Neural Transmission 110*: 1059-1074, 2003.
- Maurer et al. Altered responses to tone and phoneme mismatch in kindergarteners at familial dyslexia risk. *NeuroReport 14*: 2245-2250, 2003.
- Renvall & Hari. Diminished auditory mismatch fields in dyslexic adults. *Ann Neurol 53*: 551-557, 2003.

Mismatch Negativity (MMN) Response in Dyslexia
(Kujala & Nataanen. *Neuroscience & Biobehavioral Reviews 25*: 2001)

"Evidently, the MMN can be used to probe questions such as whether dyslexia is a dysfunction specific to the phonological system or a more general auditory deficit. MMN studies have so far shown that the cortical discrimination of not only speech but also non-speech sounds is affected in dyslexia (7 publications cited).

The fact that these results were obtained with non-linguistic stimuli indicates that dyslexia is based, at least to some extent, on a general failure in discriminating acoustic input." (p. 540)

AUDITORY PROCESSING DISORDERS (APD): Evidence of relation to language and reading

Wright BA, Lombardino LJ, King WM, Puranik CS, Leonard CM, Merzenich MM. Deficits in auditory temporal and spectral resolution in language-impaired children. Nature 387: 176-178, 1997.

"Here we report the results of psychophysical tests employing simple tones and noises showing that children with specific language impairment (SLI) have severe auditory perceptual deficits for brief but not long tones in particular sound contexts."

AUDITORY PROCESSING DISORDERS:
Relation to language and reading

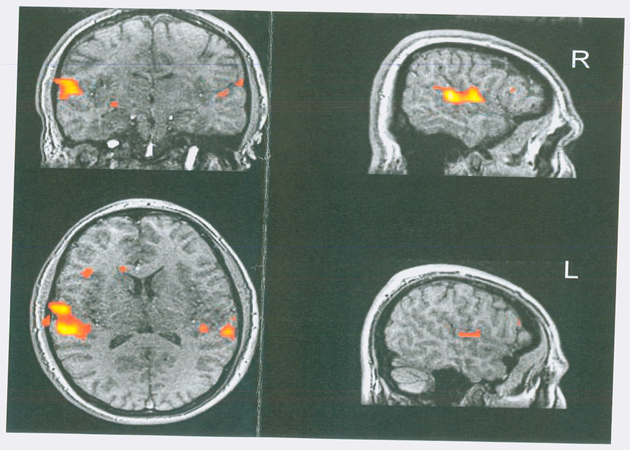
Wright BA, Lombardino LJ, King WM, Puranik CS, Leonard CM, Merzenich MM. (continued)

"The present auditory tests may also aid in the diagnosis and treatment of persons with reading difficulties …

Our results are in accord with the conclusion … that some but not all children with reading problems have difficulties accurately perceiving rapidly presented stimuli."

“fMRI” and “Auditory”
N = > 4587 Medline Citations (2/11/2010)
(18 y.o. APD Patient with Left Ear Advantage and Right Ear Dichotic Deficit)

Fig. 2 Sectional Views of Activation Maps Superimposed on T1W Images

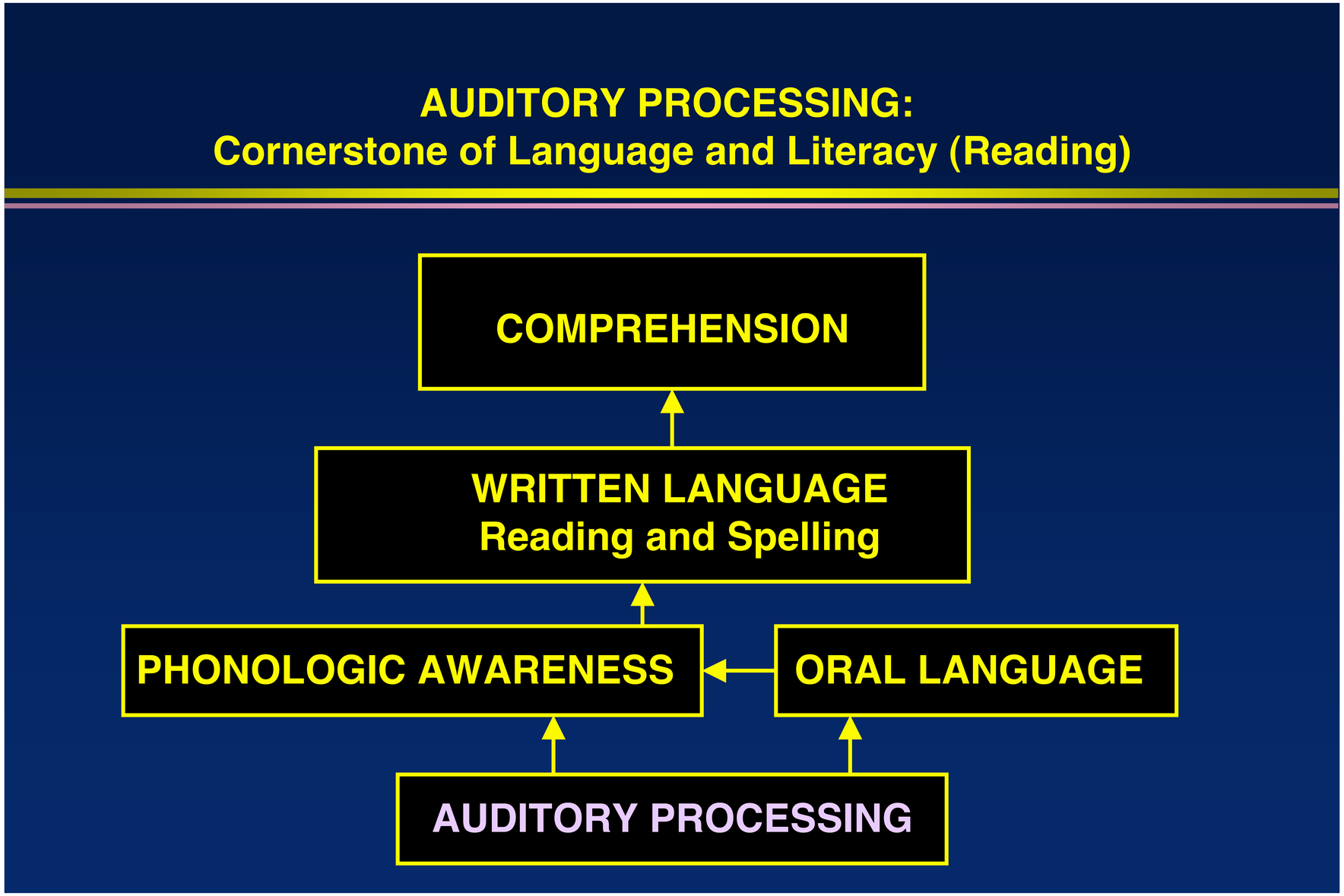


Patient:
DOB:
Date of I

Exam: Functional MRI to identify auditory area

Task: Listening and repeat the words.

Paradigm: Block (4on/5off, 30 sec/blk)


AUDITORY PROCESSING:
Cornerstone of Language and Literacy (Reading)
COMPREHENSION
WRITTEN LANGUAGE
Reading and Spelling
PHONOLOGIC AWARENESS
ORAL LANGUAGE
AUDITORY PROCESSING

The Early Auditory Reading Success (EARS) Program: Assumptions

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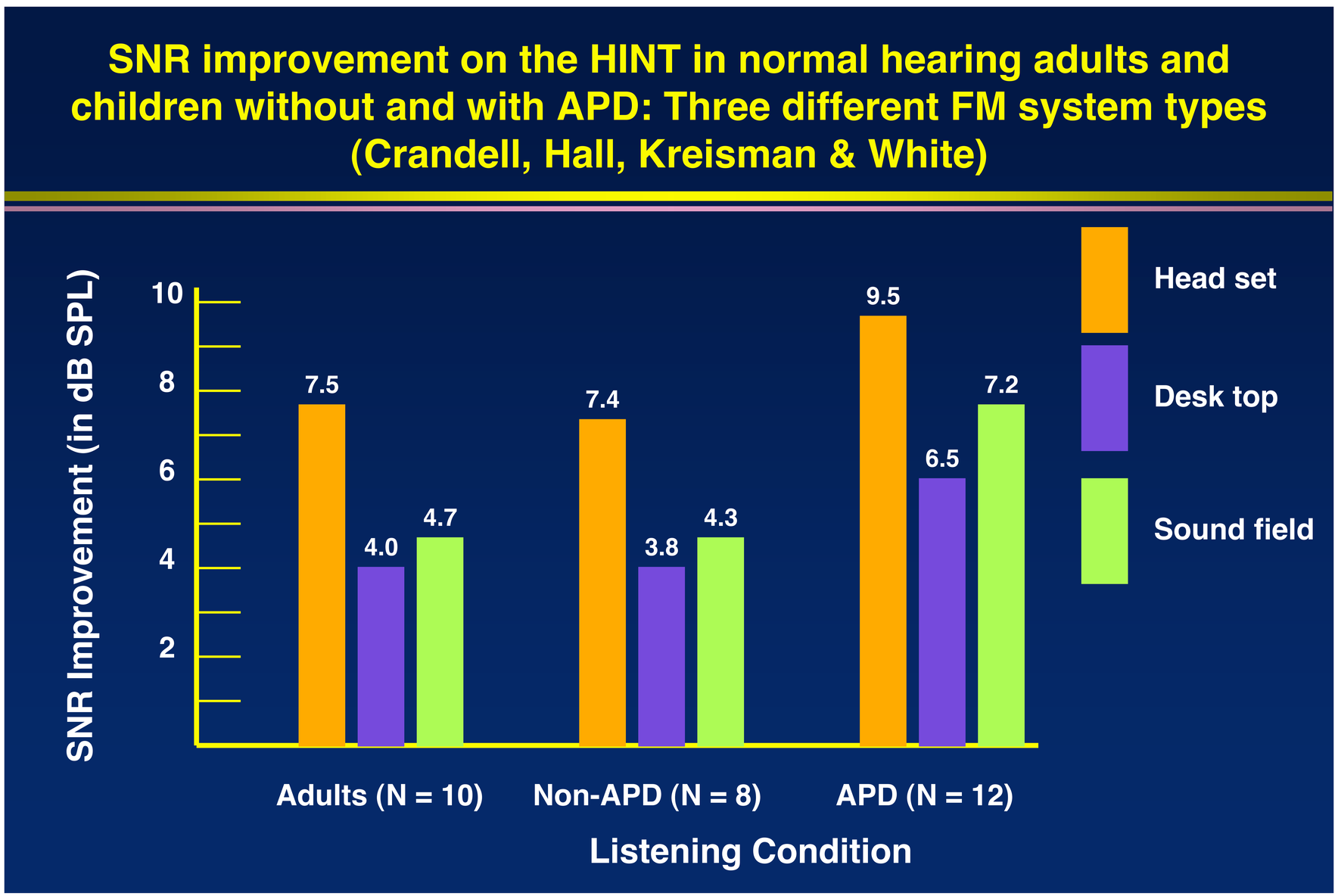
SNR improvement on the HINT in normal hearing adults and children without and with APD: Three different FM system types (Crandell, Hall, Kreisman & White)



Phonak EduLink FM System Use Improves Academic Performance and Psychosocial Status in Children with APD

Johnston, John, Kreisman, Hall & Crandell. (2009). Multiple benefits of personal FM system use by children with auditory processing disorder (APD).
***Int J Audiology, 48*, 371 - 383**

Classroom Infra-Red FM System (LightSpeed)

Screening for Hearing and Auditory Processing Disorders in Kindergarten Children: The Early Auditory Reading Success (EARS) Program

Assumptions

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Auditory, Phonological, and Pre-Reading Skills Addressed by Earobics Program

- Rhyming
- Phoneme identification
- Blending
- Segmentation (ability to break word down into individual sounds)
- Phonological manipulation
- Discrimination
- Auditory performance in competing noise
- Auditory sequential memory

Effectiveness of A Computer-Based Program for Development of Auditory Processing Skills

- Hayes, Warrier, Nicol, Zecker & Kraus. Neural plasticity following auditory training in children with learning problems. *Clinical Neurophysiology 114*: 673-684, 2003.
  - Subjects
    - ✓ 27 children with auditory learning problems (age 8–12 yrs)
    - ✓ 15 children in control group
  - Training
    - ✓ Earobics for 35 to 40 sessions (1 hour each) for about 8 wks.
  - Neurophysiologic measures
    - ✓ ABR for click and speech signals, i.e., /da/
    - ✓ Auditory late response N1 and P2 for /ga/ signal in quiet and /da/ signal in noise

Effectiveness of A Computer-Based Program for Development of Auditory Processing Skills

- Neural plasticity following auditory training in children with learning problems: Findings
  - Significant pre- vs. post-Earobics changes were noted for
    - ✓ "sound blending"
    - ✓ "auditory processing"
  - No pre- vs. post treatment change in the ABR
  - The P2-N2 amplitude showed significant decrease (maturation)
  - The N2 latency showed significant decrease (maturation)
  - The P2-N2 amplitude showed significant increase in noise
- Conclusions
  - Children with auditory learning problems who completed auditory training (Earobics) exhibited plasticity of neural encoding of speech sounds at cortical level. These changes were associated with improvement in behavioral performance.

Earobics: Comments from Website (www.cogcon.com)

Earobics is widely considered to be one of the most validated and quantifiable reading intervention programs. States across the country have reviewed the program and approved its use in their schools to quickly and effectively build student reading achievement.

Independent industry reviewers, including the Florida Center for Reading Research (FCRR), confirm these findings. As a vital source for districts and schools, FCRR regularly reviews reading programs to help teachers, principals, and district administrators make informed choices on effective instruction.

Earobics was among the select few programs in the supplemental, intervention, and technology-based program categories to achieve the FCRR's highest ranking in all five reading areas.

NOTE: FCRR = Florida Center for Reading Research (www.fcrr.org)

EARS Program Rationale: Development of the First of Five Component Skills of Reading

- Phonemic Awareness (sound/speech sound skills)
- Phonics (phoneme/grapheme skills)
- Fluency
- Vocabulary
- Comprehension

Instruction in Phonemic Awareness: Supported by the National Reading Panel (2000) Literature Review

"The results of the meta-analysis were impressive. Overall, the findings showed that teaching children to manipulate phonemes in words was highly effective under a variety of teaching conditions with a variety of learners across a range of grade and age levels and that teaching phoneic awareness to children significantly improves their reading more than instruction that lacks any attention to PA."

"The Reading Wars"
Pearson D. (2004). *Educational Policy, 18,* 216-252

"This article's fundamental argument is that the reading instruction and reading research have been shaped by political forces desiring to privilege particular approaches to instruction…"

"Other developments suggest that we are on the verge of a new paradigm, a hybrid that weds some of the principles of whole language (integrated instruction and authentic texts and tasks) with some of the traditions of the earlier eras (explicit attention to skills and strategies" (e.g., phonemic awareness and phonics).

"Just in case my personal bias has not emerged, let me declare it unequivocally. I favor the conceptual map of the ecologically balance approach, both for research and curricular policy."

The Early Auditory Reading Success (EARS) Program:
Intensive Intervention by Speech Pathologist (1)

- **Phonological Awareness (3 to 5 minutes)**
  - **Recognizing rhyme, generating rhyme, matching rhyme**
  - **Phoneme detection**
  - **Blending (phoneme, syllable, and word level)***
  - **Segmenting (phoneme, syllable, and word level)**
  - **Detection or elison ((phoneme, syllable, and word level)**
- **Alphabetic Understanding (5 to 6 minutes)**
  - **Vowel review**
  - **Consonant review**
  - **Introduce new sound**
  - **Read words with new sound**

** Sound pairs were introduced in the order recommended in the Lindamood-Bell LiPS program*

The Early Auditory Reading Success (EARS) Program: *Intensive Intervention by Speech Pathologist (2)*

- Writing (3 to 4 minutes)
  - Review new letter name and sound
  - Trace new sound
  - Write new sound
  - Write previously introduced sounds
- Spelling (7 to 8 minutes)
  - Segment and blend words (alternate using tiles, letter cards, dry erase)
  - Manipulate sounds within words
- Reading (6 to 7 minutes)
  - Introduce and review sight words
  - Read decodable book

Early Auditory Reading Success (EARS) Program; Pilot Study

- Conducted at Title I elementary school in Gainesville Florida (free breakfast and lunch for majority of children)
- Funded with $5000 from Harry Heeb Foundation
- 75 kindergarten children
- Screenings performed gratis by Au.D. students and James W. Hall III, Ph.D., including
- Components of EARS program (implemented by end of fall semester)
  - Old used FM systems in each of 3 kindergarten classrooms
  - Earobics installed on used laptops
  - 0.5 FTE speech pathologist for intensive small group instruction

Early Auditory Reading Success (EARS) Program: Screening Protocol

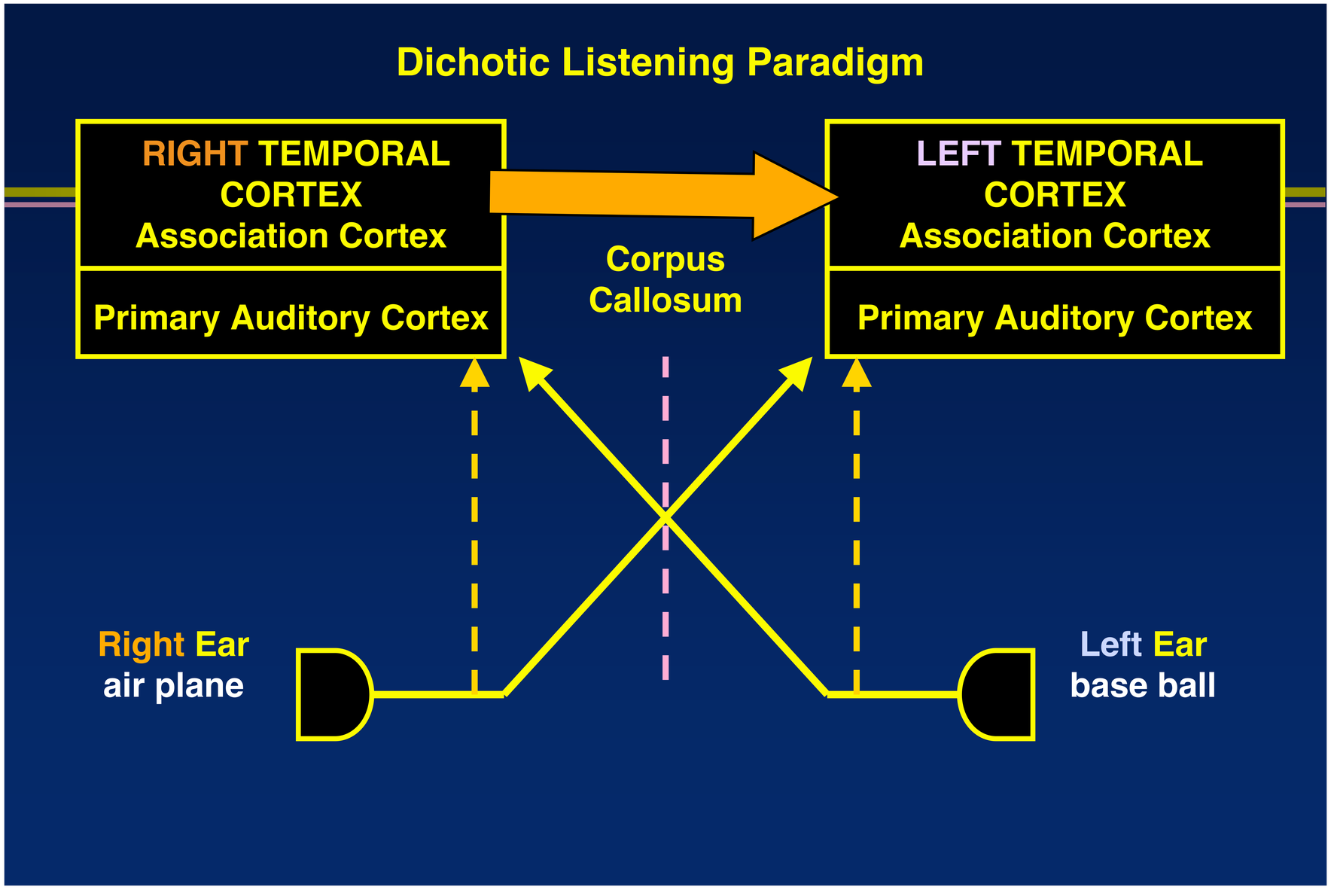
- Auditory status
  - Peripheral auditory system
    - ✓ DPOAEs
    - ✓ Tympanometry
    - ✓ Pure tone screening
  - Central auditory system
    - ✓ Staggered spondaic word (SSW) test
- Initial language and reading readiness
  - (ERSI) Early Reading Screening Inventory (Lombardino et al, 1999)
  - All screening conducted by J Hall and AuD students
- Reading readiness and reading outcome
  - Dynamic Indicators of Basic Early Literacy Skills (DIBELS)
  - Screening four times per year conducted independently by reading specialists per state mandate
  - No communication between personnel conducting DIBELS versus other screenings

Screening for Auditory Processing Disorders in Kindergarten Children: Refer Criteria

Screening Procedure	Pass Criteria
Pure tone audiometry	Response at 20 dB HL for 500 Hz, 1000 Hz, 2000 Hz, 3000 Hz, and 4000 Hz
Tympanometry	Type A (peak pressure with range of + 50 to - 150 daPa)
Otoacoustic emissions	DP – NF difference > 6 dB at 2K, 4K and 8K)
SSW	Less than 11 errors (< 1 std dev for 20 items) for left ear competing condition

Dichotic Listening Procedures:
Historical Perspective

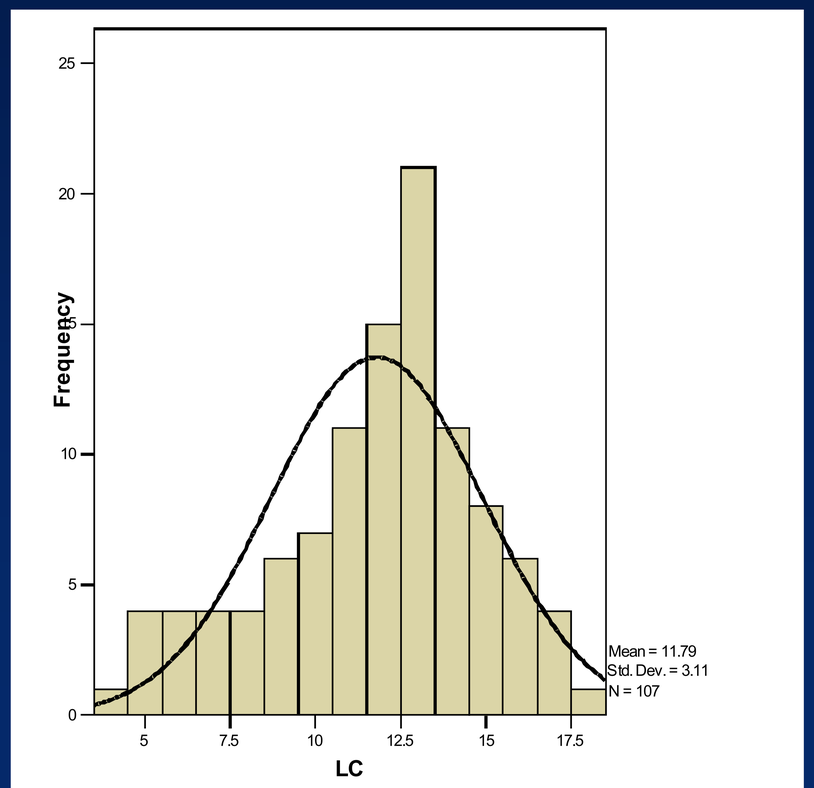
- Dichotic listening tests: *1956 – 1962*
  - Broadbent DE. Successive responses to simultaneous stimuli. *Quart J Exp Psychol 8*: 1956.
  - Kimura D. Cerebral dominance and the perception of verbal stimuli. *Canad J Psychol 15*: 1961
  - Kimura D. Some effects of temporal-lobe damage on auditory perception. *Canad J Psychol 15*: 1961
  - Katz J. The use of staggered spondaic words for assessing the integrity of the central auditory nervous system. *J Aud Res 2*: 1962.


Dichotic Listening Paradigm
RIGHT TEMPORAL CORTEX
Association Cortex
Primary Auditory Cortex
Corpus Callosum
LEFT TEMPORAL CORTEX
Association Cortex
Primary Auditory Cortex
Right Ear
air plane
Left Ear
base ball

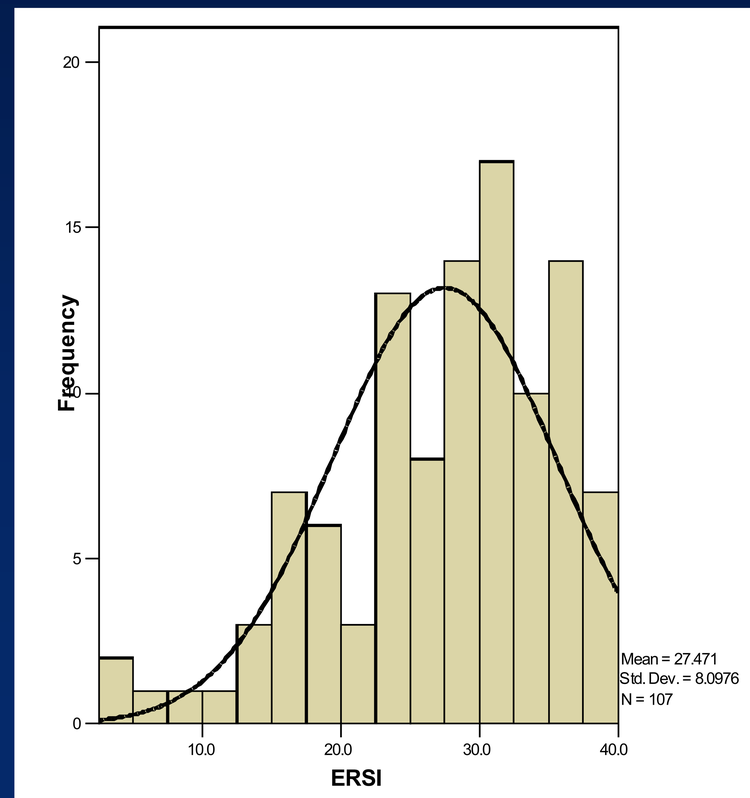
Correlation of APD Screening (SSW) Outcome with Risk for Reading Failure based on Findings of Early Reading Success Indicator (ERSI)

Significant at p < 0.05

Left Ear Competing Error Scores



ERSI Scores



EARS: Screening and Monitoring Reading Readiness with the DIBELS (Dynamic Indicator of Early Literacy Skills)

- Developed at the University of Oregon (www.dibels.uoregon.edu)
- Details in publications by Roland H. Good III and colleagues
- Required by Alachua County School System (and in state of Florida) to monitor academic progress in kindergarten children
- Four measures of reading reading skills
  - Initial sounds fluency (ISF)
  - Letter naming fluency (LNF)
  - Phonemic segmentation fluency (PSF)
  - Nonsense word fluency (NSF)
- Administered four times in kindergarten year
  - Early fall semester (September)
  - Late fall semester (December)
  - Early spring semester (January)
  - Late spring semester (May)

http://dibels.uoregon.edu/measures/isf_tutorial.php

DIBELS Data and Debate (1)

- Concerns about validity of DIBELS raised by major reading experts (e.g., Goodman, 2005; Pressley et al, 2005; Shanahan, 2005)
- Literature reflects strong positive and negative views of DIBELS (see review by Hoffman, Jenkins, Dunlap. (2009). Reading Psychology, 30, 1-16)
- Principles, concepts, and constructs underlying DIBELS are supported by compelling evidence. Published data support DIBELS as consistent with early reading best practice.
- Oral Reading Fluency (ORF) risk categories are significant predictor of later reading proficiency (e.g., by TerraNova and PSSA measures of reading/language arts, writing, math, science, and social studies)
- "DIBELS … was far better at identifying students with adequate reading skills than those with inadequate reading skills." (Nelson, 2008)
- "Opponents critique [DIBELS] political positioning in the reform climate, and raise concerns that it may impair reading instruction." (Hoffman et al, 2009)

DIBELS Data and Debate (2)

- Debate about DIBELS stems from widespread adoption within the federal government mandated Reading First Initiative
- Kathleen K. Manzo article in Education Week (2005) entitled “Clout of DIBELS Test Draws Scrutiny: Critics say reading tool’s scope fails to justify its broad use”
  - “Some critics charge that DIBELS got the competitive edge not because of its superiority, but because its developers and their colleagues at the University of Oregon, located in Eugene, were key consultants to the U.S. Department of Education for Reading First. Mr. Good was on the assessment committee that evaluated 29 early-literacy tests, including DIBELS, his own product. That list was provided as a resource to states for drafting their Reading First plans.”
  - “The battery of tests was not the first choice for Illinois and some states applying for the federal money. In fact, a number of states had intended to use other assessments for screening children and gauging progress in Reading First schools. They changed their plans, they maintain, after federal officials and consultants pressured them to include DIBELS in their grant proposal as a condition for approval. Federal officials deny those charges. “

DIBELS Data and Debate (3)

- Burke, Hagan-Burke, Kwok & Parker. (2008). Predictive indicators from the middle of kindergarten to second grade. *J Spec Educ, 42*, 209-236
  - "NCLB's emphasis on the use of scientifically based practices, along with a focus on prevention in the field of special education, is moving schools toward formative evaluation for early literacy."
  - Children who lack adequate reading skills in the first grade are less likely to become proficient readers as they advance through higher grades"
  - "Poor reading trajectories may be avoided if critical pre-skills that are predictive of mature reading can be strengthened during kindergarten."
  - Sample consisted of 159 kindergarten children
    - ✓ 56% boys and 44% girls
    - ✓ 61% Caucasian, 30% African American, 9% mixed ethnicities
    - ✓ 38% eligible for free lunch
  - "The results support the validity of kindergarten DIBELS in predicting ever more complex reading skills in a developmental progression from the middle of kindergarten to second grade."

DIBELS (Reading Readiness) Outcome in the Initial (Pilot) EARS Project in 2002-2003

DIBELS Outcome	EARS School Early N = 52	EARS School Final N = 63	Control School Final N = 48
Deficit	50%	27%	40%
Emerging	31%	22%	44%
Established	19%	60%	16%

Early Auditory Reading Success (EARS) Program

- Proposed and implemented in four Alachua County public elementary schools during 2004/2005 and 2005/2006 academic years
- Funded from various sources as a special project through the Exception Student Education (ESE) Department
- Each school met Title 1 criteria (free breakfast and lunch for majority of children)
- N = 322 children with average age of 5 years
  - 139 male
  - 153 female
- Hearing screenings performed by Au.D. students and mentor, James W. Hall III, Ph.D.

The Early Auditory Reading Success (EARS) Program: *General Assumptions*

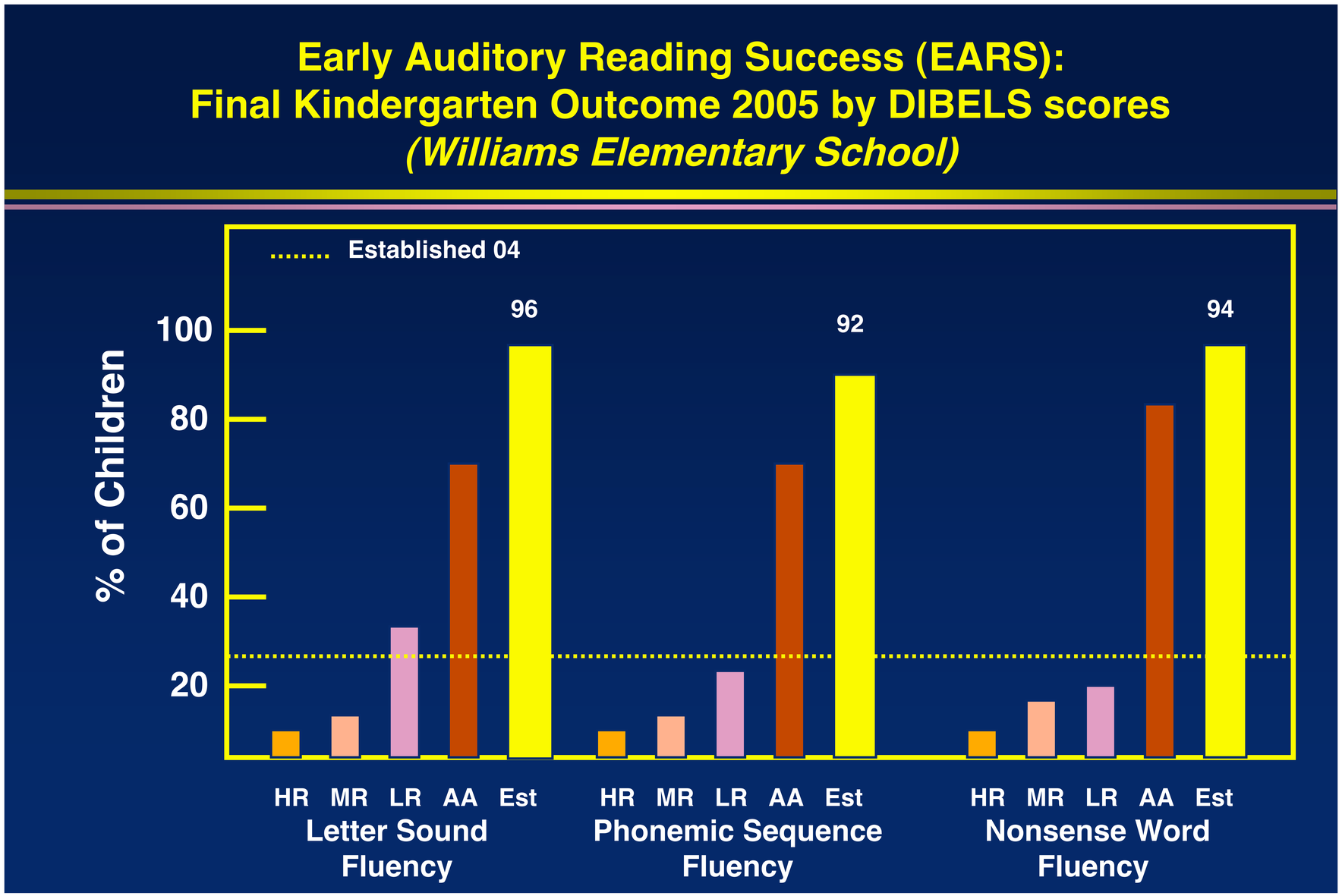
- Kindergarten children learn mostly through the auditory modality, and learn best in an optimal acoustic environment.
- Academic success is dependent on reading success.
- Reading failure a product largely of auditory processing and phonemic awareness deficits.
- Auditory processing and phonemic awareness deficits must be identified early through screening of all kindergarten children.
- Early and intensive intervention for auditory processing and phonemic awareness deficits is necessary reading and academic success.

EARS: Screening for Auditory Processing Disorders in Kindergarten Children (N = 322)

Screening Procedure	Pass	Fail
Peripheral Auditory Screening		
Pure tone audiometry	83%	17%
Tympanometry	89%	11%
Otoacoustic emissions	87.5%	12.5%
Combined	65%	35%
Central auditory screening		
SSW*	54%	46%

** Left ear competing condition RE: 5 year old normative data*

Early Auditory Reading Success (EARS):
Final Kindergarten Outcome 2005 by DIBELS scores
(Williams Elementary School)



EARS Program:
Summary of DIBELS Findings at the End of 1st Grade

School	DIBELS Component*				
	Mean Score			National %ile Rank	
	PSF	NWF	ORF	OLV	Reading Comp
EARS (n=180)					
A	**40**	**64**	**59**	**57**	**62**
B	**55**	**66**	**33**	**31**	**53**
C	**59**	**64**	**51**	**33**	**56**
Average	*51*	*65*	*48*	*40*	*57*
CONTROL (n=143)					
A	**46**	**57**	**39**	**26**	**54**
B	**52**	**70**	**31**	**18**	**30**
C	**54**	**60**	**50**	**18**	**38**
Average	*51*	*62*	*40*	*21*	*38*

*__PSF__ = phoneme segmentation fluency; __NWF__ = nonsense word fluency; __ORF__ = oral reading fluency; __OLV__ = oral language vocabulary; __Reading Comp__. = reading comprehension

DIBELS (Reading Readiness) Outcome Kindergarten to 3rd Grade

(Kindergarten scores include: letter naming fluency, initial sound fluency, phoneme sequence fluency)

DIBELS RLI*	Control Schools (N = 140)	EARS Schools (N = 295)
Kindergarten Initial		
Initial (established)	39%	38%
Strategic (emerging)	37%	38%
Intensive (deficit)	17%	17%
Kindergarten Final		
Initial (established)	55%	90%
Strategic (emerging)	21%	5%
Intensive (deficit)	24%	3%
3rd Grade (Final Oral Reading Fluency)		
Initial (established)	46%	57%
Strategic (emerging)	30%	27%
Intensive (deficit)	24%	16%

*RLI = Recommended Level of Instruction; Initial = low risk of reading failure; Strategic = moderate risk of reading failure; Intensive = high risk of reading failure

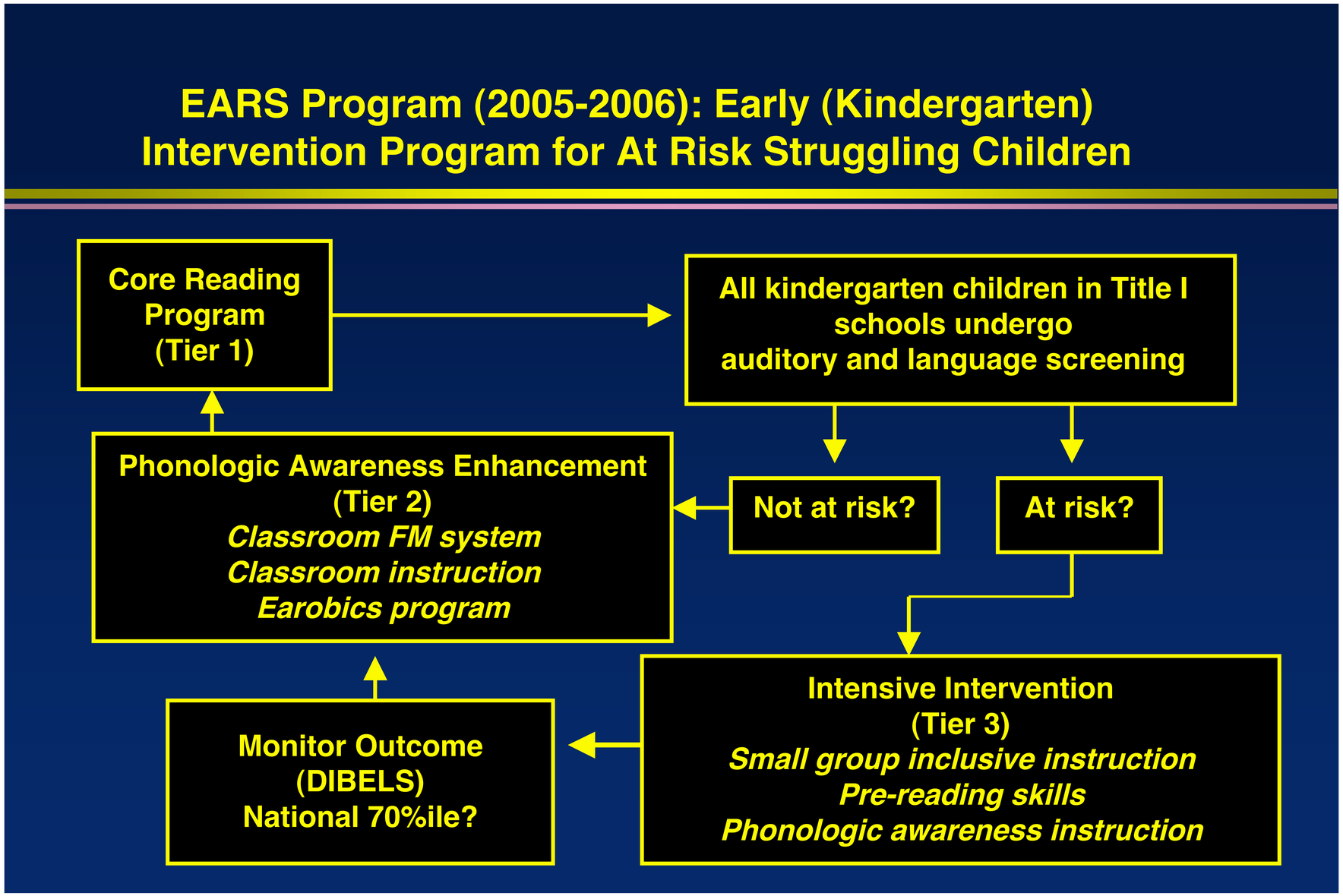
The Early Auditory Reading Success (EARS) Program:
Intervention based on screening outcome

- Children diagnosed with hearing, cognitive, attention, or other deficits referred for appropriate management
- Intervention components
  - FM systems in each kindergarten classroom
  - All kindergarten students complete Earobics program
  - Multi-sensory reading instruction strategies used by each kindergarten teacher
  - Children diagnosed with APD and/or deficits in phonologic awareness receive intensive small group treatment by speech pathologist
    - ✓ Letter recognition
    - ✓ Phonologic awareness
    - ✓ Other basic reading skills

The Early Auditory Reading Success (EARS) Program:
Intervention based on screening outcome

- Children diagnosed with hearing, cognitive, attention, or other deficits referred for appropriate management
- Intervention components
  - FM systems in each kindergarten classroom
  - All kindergarten students complete Earobics program
  - Multi-sensory reading instruction strategies used by each kindergarten teacher
  - Children diagnosed with APD and/or deficits in phonologic awareness receive intensive small group treatment by speech pathologist
    - ✓ Letter recognition
    - ✓ Phonologic awareness
    - ✓ Other basic reading skills

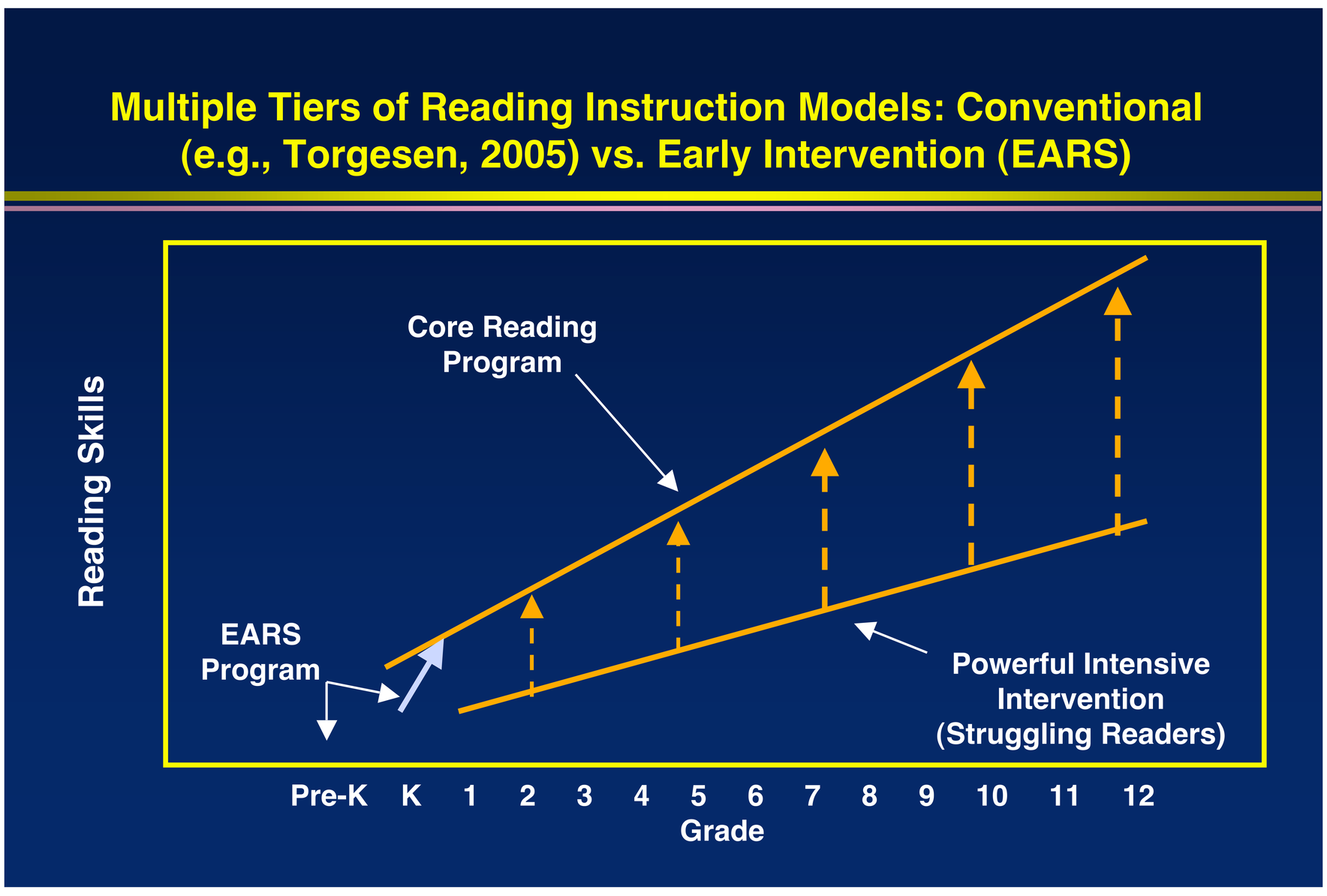
EARS Program (2005-2006): Early (Kindergarten) Intervention Program for At Risk Struggling Children



The Early Auditory Reading Success (EARS) Program: *Conclusions*

- The results of auditory processing can be used to determine children at risk for reading and academic failure.
- All kindergarten children in Title I schools benefit from
  - Adequate acoustic learning environment (classroom)
  - Enhancement of phonologic awareness instruction in by the classroom teacher
  - Therapy for auditory processing and pre-reading skills (Earobics)
- Intensive intervention for auditory processing and phonologic awareness deficits improves early literacy skills.
- The EARS program offers effective early intervention for kindergarten children at risk for reading failure.

Multiple Tiers of Reading Instruction Models: Conventional (e.g., Torgesen, 2005) vs. Early Intervention (EARS)



The Early Auditory Reading Success (EARS) Program:
Plan for 2006-2007 Academic Year

- 10 Title I elementary schools in Alachua County Florida
- Sound field FM systems installed in each kindergarten class in each school
- In-service by speech pathologist of kindergarten teachers prior to school year on year long curriculum for classroom instruction in auditory and phonologic awareness skills
- Screening within first month of school year of hearing and auditory processing skills in all kindergarten children by audiologists
- Intensive intervention for children with below normal auditory processing skills
- All children complete the Earobics program during the school year via internet connections (site license signed by school system for 600 students)
- Monitor classroom progress and scores on DIBELS through 1st grade

Thank you!
Questions?