OPTIMAL EHDI OUTCOMES: WHAT'S MISSING

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Outcomes of Children who are deaf or hard of hearing:3rd to 12th grade & 4 to 7 year longitudinal study
ONE FOR ONE: ONE YEARS GROWTH FOR ONE YEAR OF LIFE

CSAP (Colorado State Assessment Project) Reading Performance Growth 2004 vs 2005

▸ **ONE FOR ONE: ONE YEAR FOR ONE YEAR**

▸ *Reading grades 3-10*

▸ *N=751 students*

▸ *Adequate Yearly Progress or 1 years growth in 1 year*

  ▸ *40% made 1 years growth*

  ▸ *40.8% made > 1 years growth*

  ▸ *18.7% made < 1 years growth*

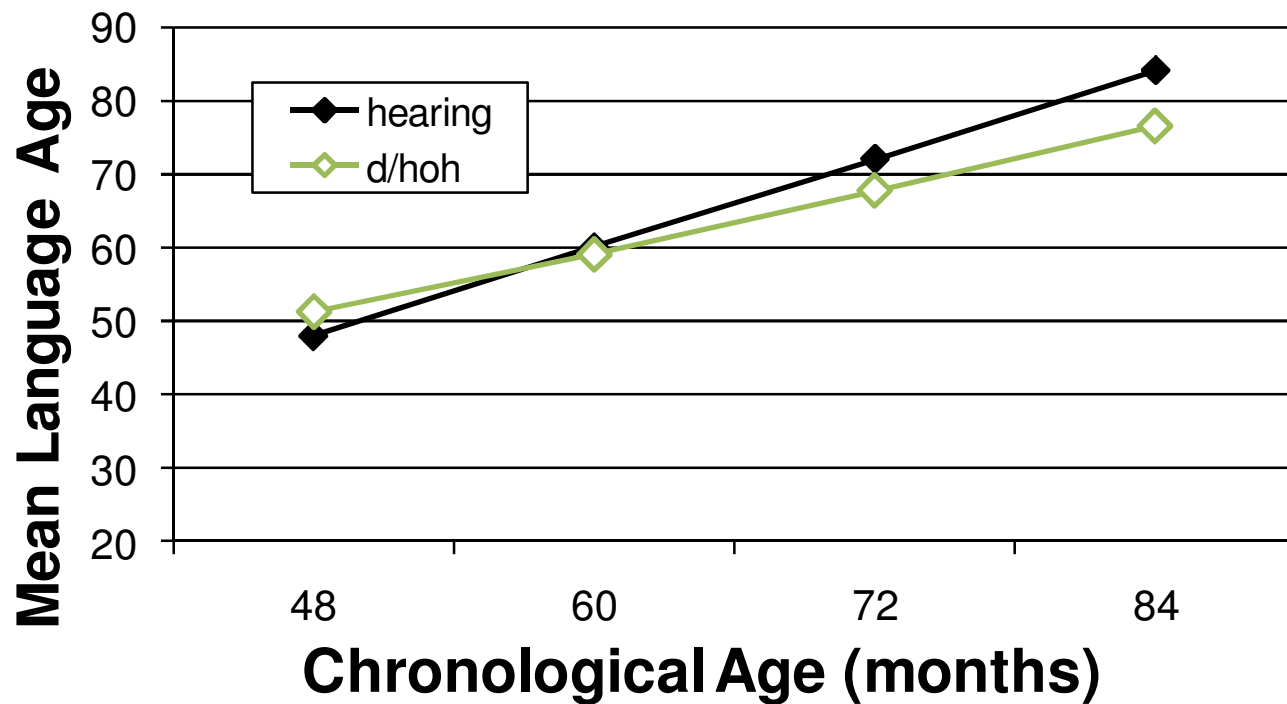**Marion Downs** HEARING CENTER
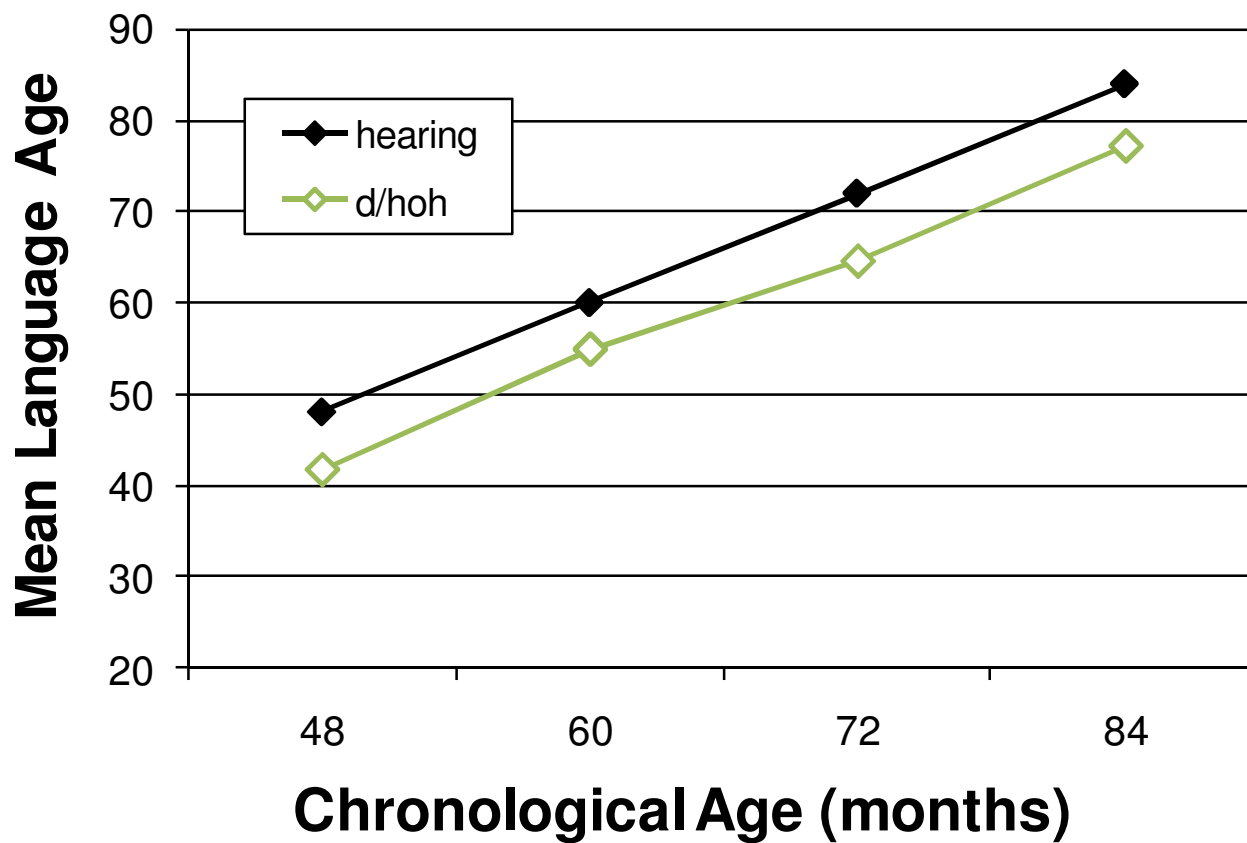
Vocabulary Comprehension (TACL)
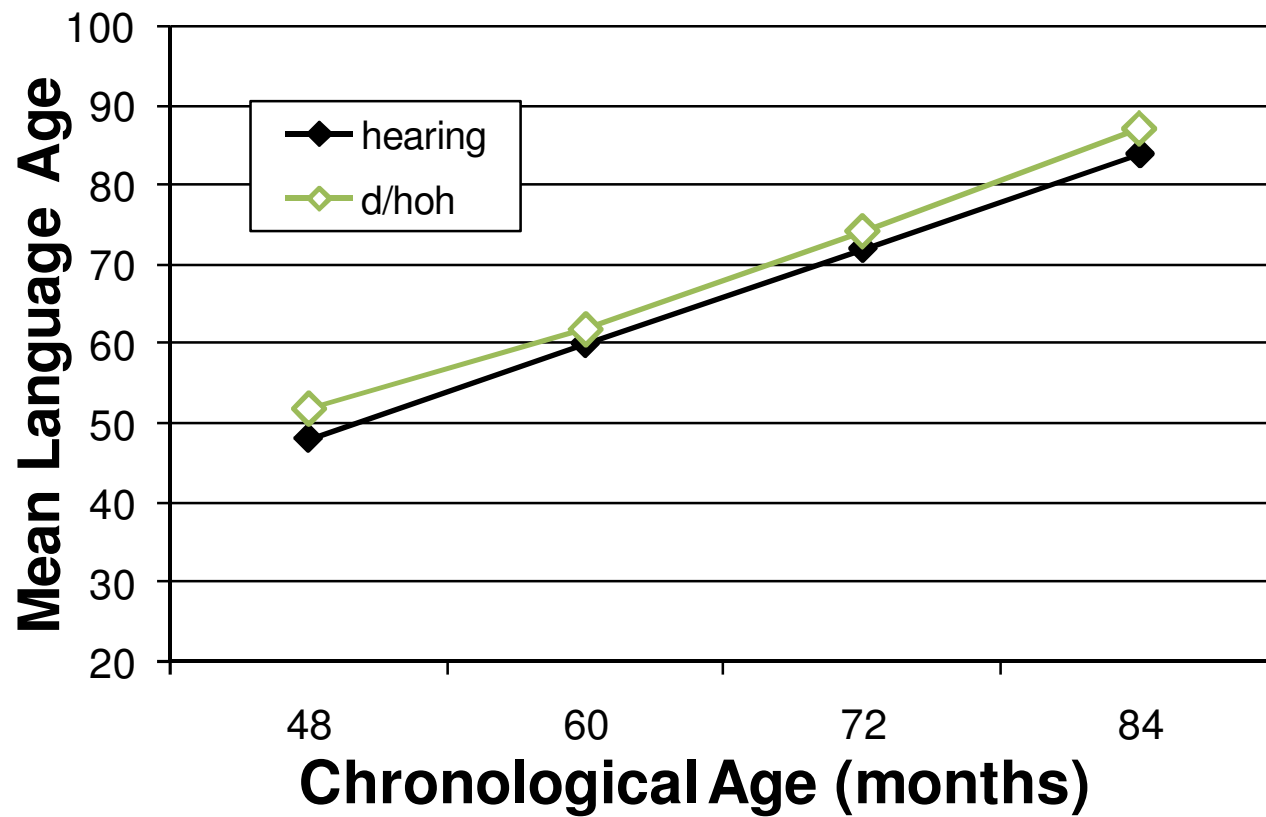
Comprehension of Grammar (TACL)
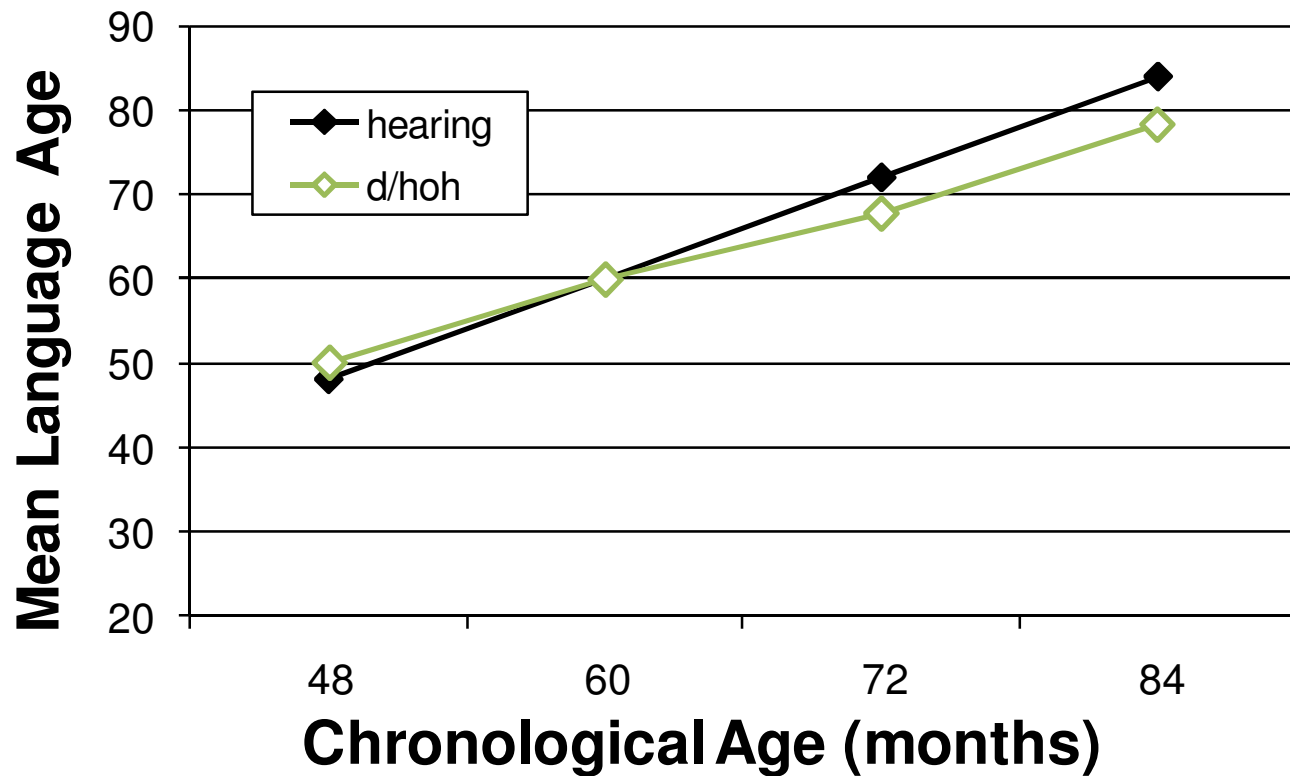
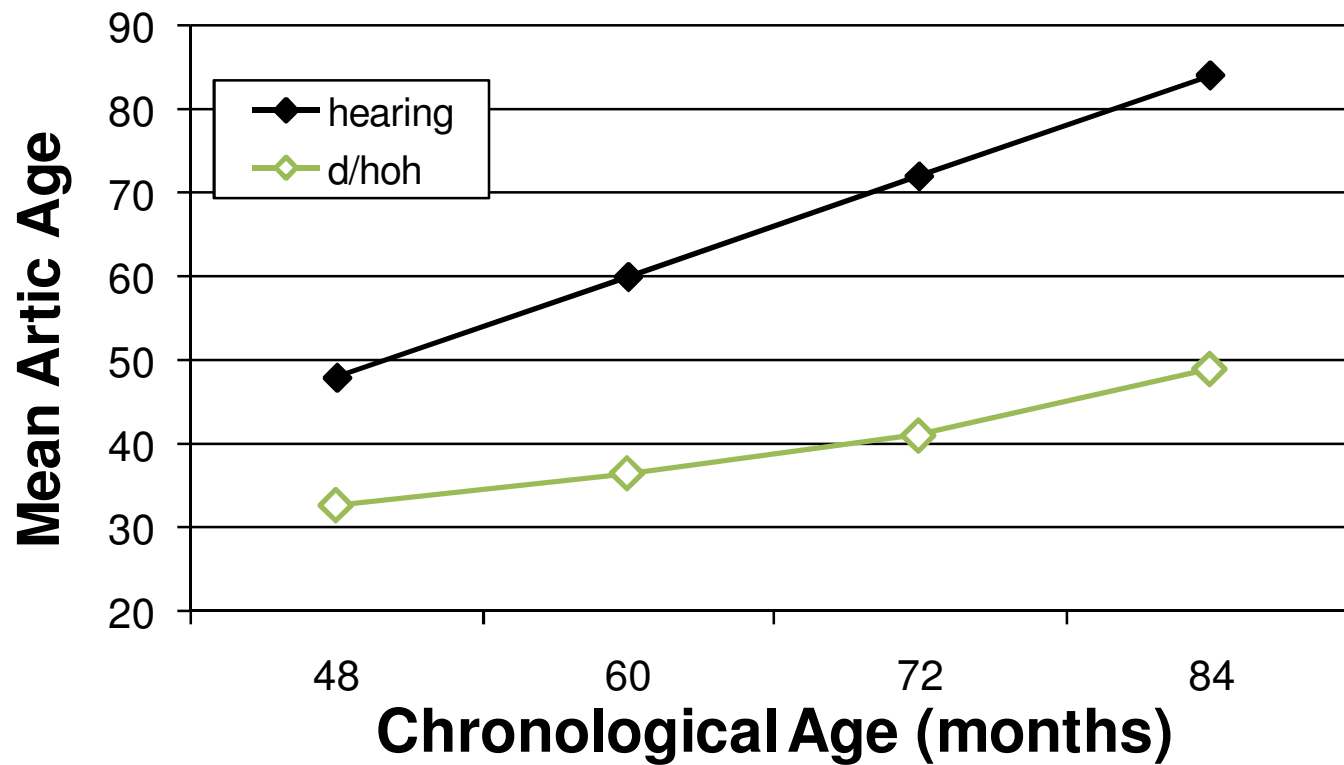# Comprehension of Elaborated Sentences (TACL)

Expressive Vocabulary (EOWPVT)

Speech Articulation (GFTA)

MCDI-EL and TACL-3 (Baca, 2009)

MCDI-Expressive Language & EOWPVT-2-Language Comprehension
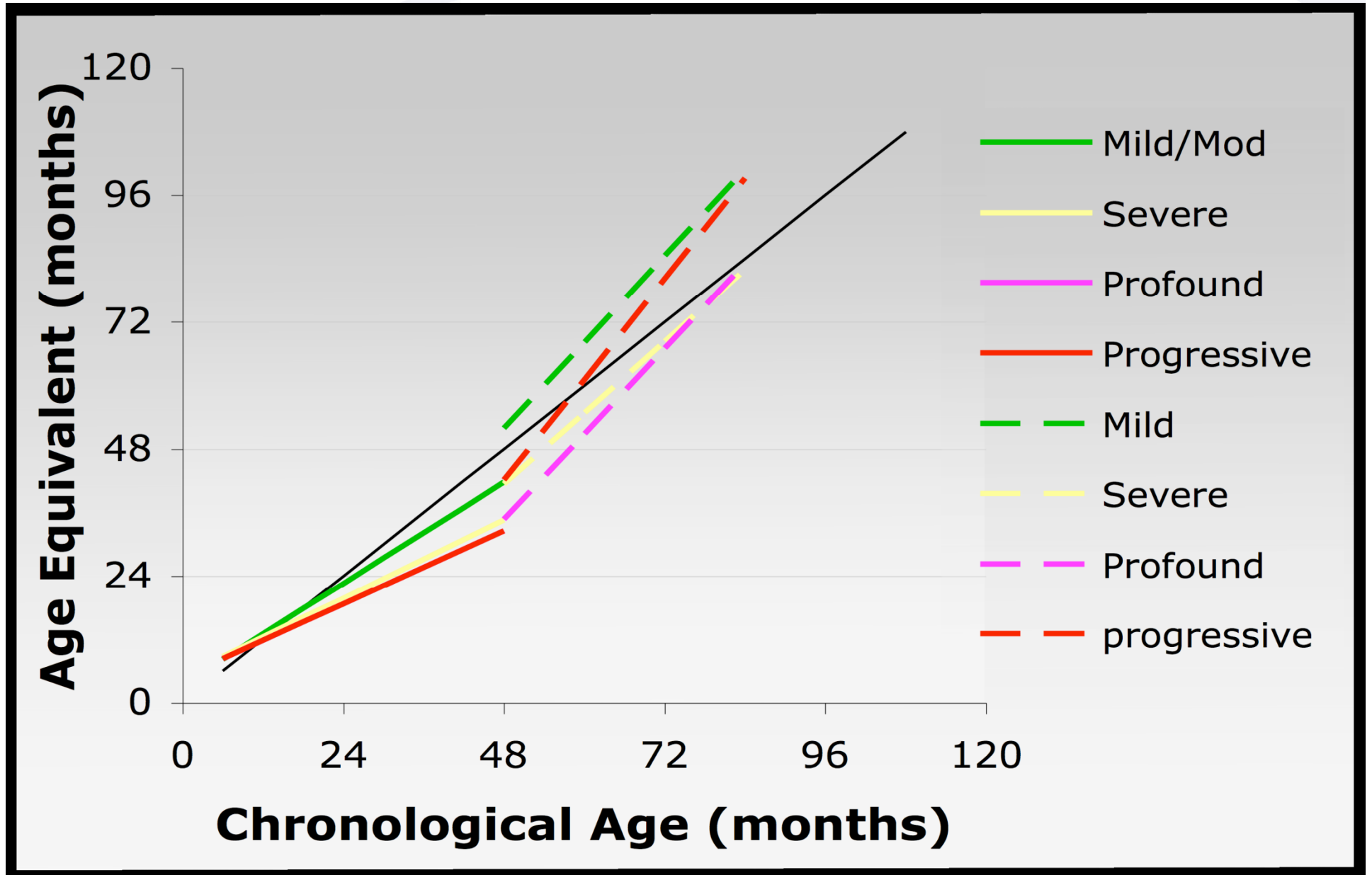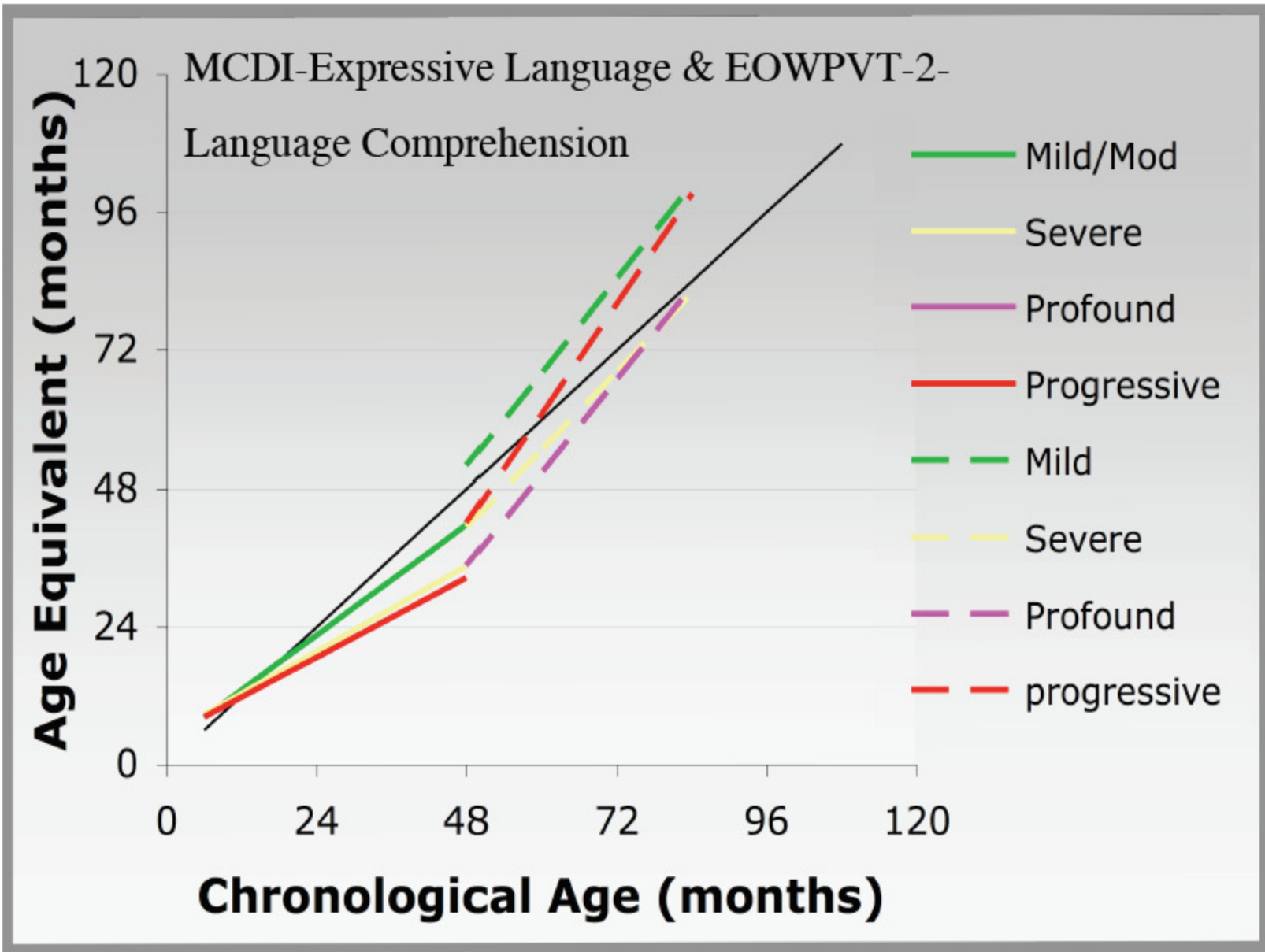
NECAP:

NATIONAL EARLY CHILDHOOD ASSESSMENT PROJECT: DEAF AND HARD OF HEARING

States collecting outcomes of children identified through UNHS/EHDI programs

Participating States

- Arizona – Arizona School for the Deaf and Blind

- California – Fremont School for the Deaf and Blind, LA Unified Public Schools

- Colorado: Colorado State School for the Deaf and Blind

- Idaho: Idaho State School for the Deaf and Blind

- Indiana: Indiana State School for the Deaf and Blind

- Texas: 5 pilot sites

- Wisconsin: state EHDI program

- Wyoming: state EHDI program

- NOW EXPANDING TO 12 states

Assessments Completed

- 259 assessments completed (not including Colorado)

- 162 children assessed 1 to 4 times each

- Colorado: 225 assessments per year

Doubled this number by December 2011

Participant Characteristics (excluding Colorado)

- Bilateral loss = 249; Unilateral loss = 10

- Auditory Neuropathy = 7

- English-speaking home = 239; Spanish-speaking home = 20

- No additional disabilities = 229; Have additional disabilities = 30

- Boys = 140; girls = 119

Participant Criteria for Language Outcomes Analysis

- Bilateral hearing loss
- English-speaking home
- No other disabilities that would affect speech or language development

States Represented in Current Language Outcomes Analysis

- Arizona
- Colorado
- Idaho
- New Mexico (previous participant)
- Texas
- Utah (previous participant)
- Wisconsin
- Wyoming

☐ Note: CA and IN just initiated NECAP; data now being collected

Median Language Quotients
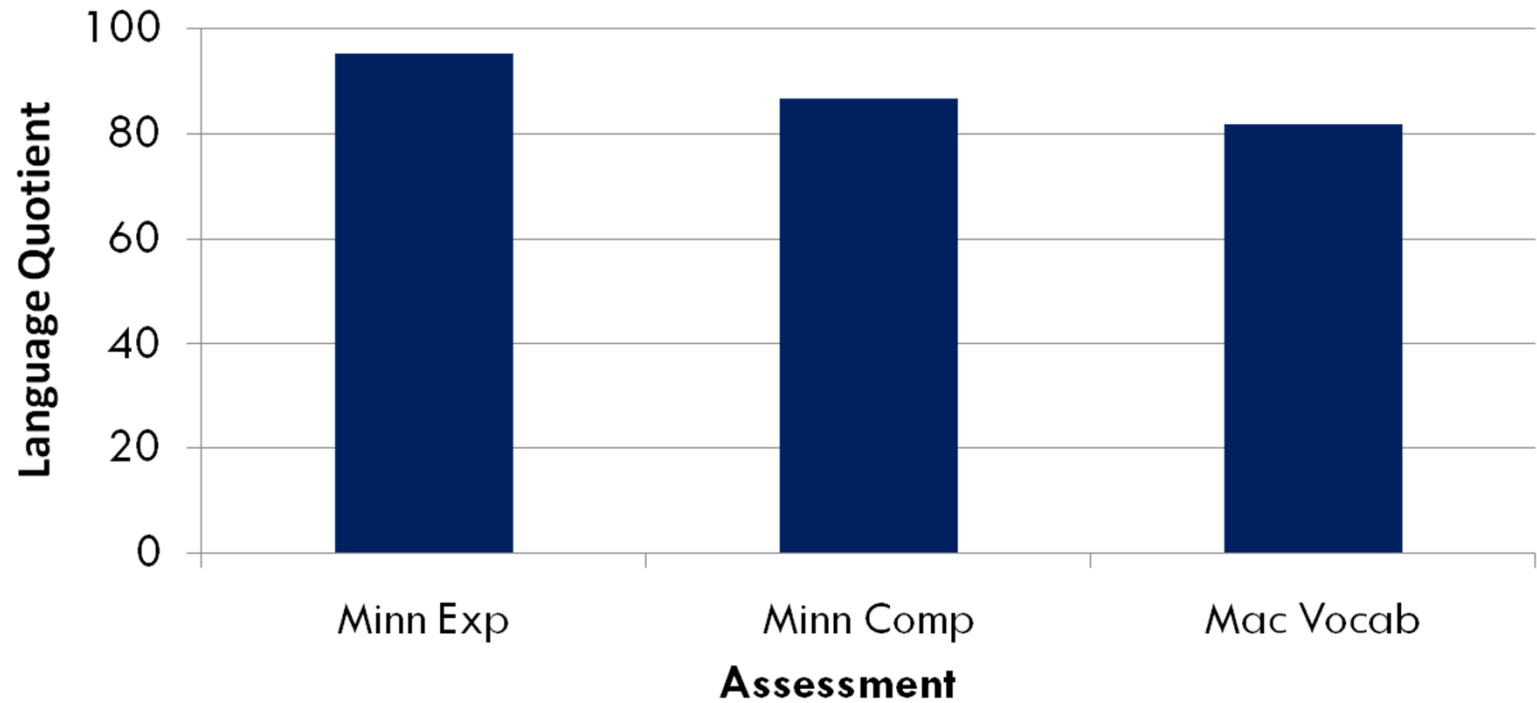
Percent of Scores in the Average Range (LQ = 80+)

Minnesota CDI:
Median Language Quotients
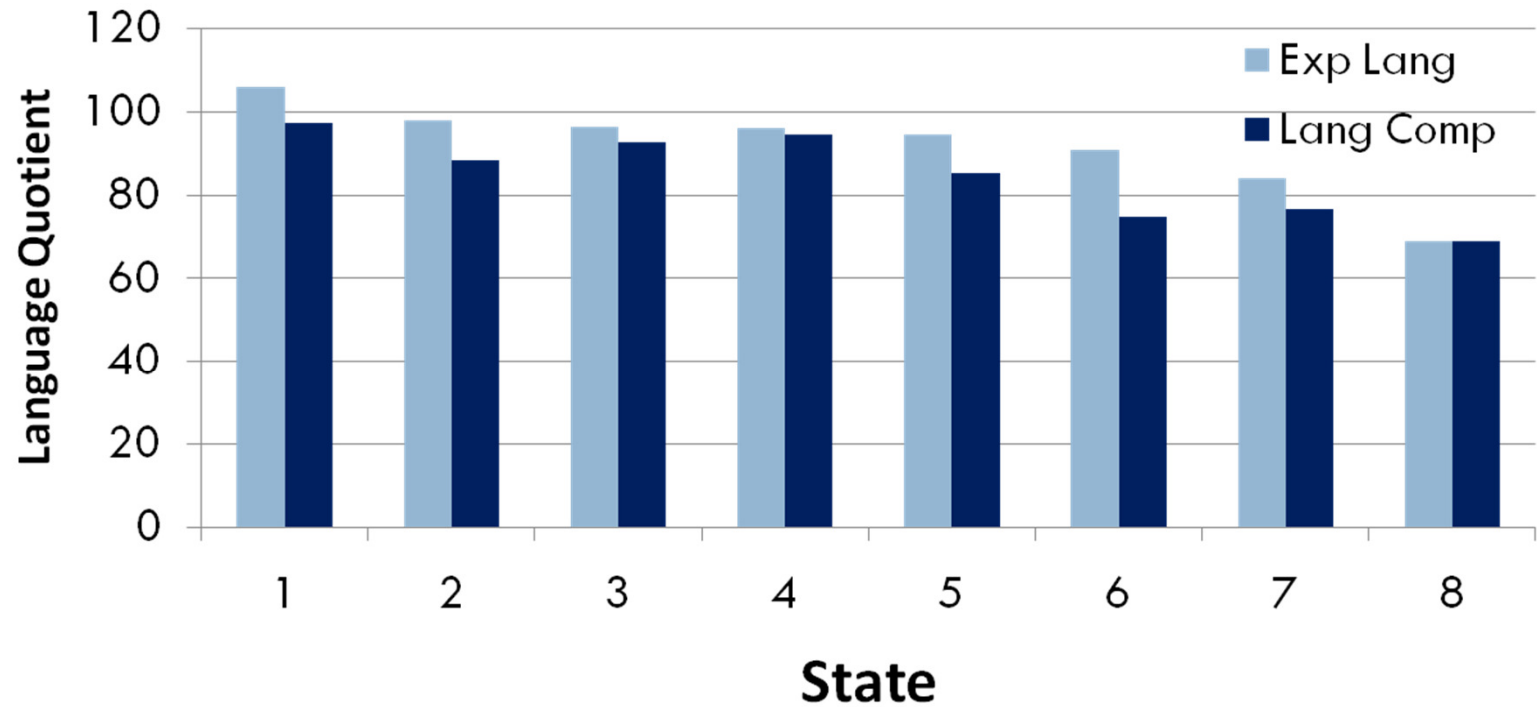
MacArthur-Bates: Median Vocabulary Production Quotients
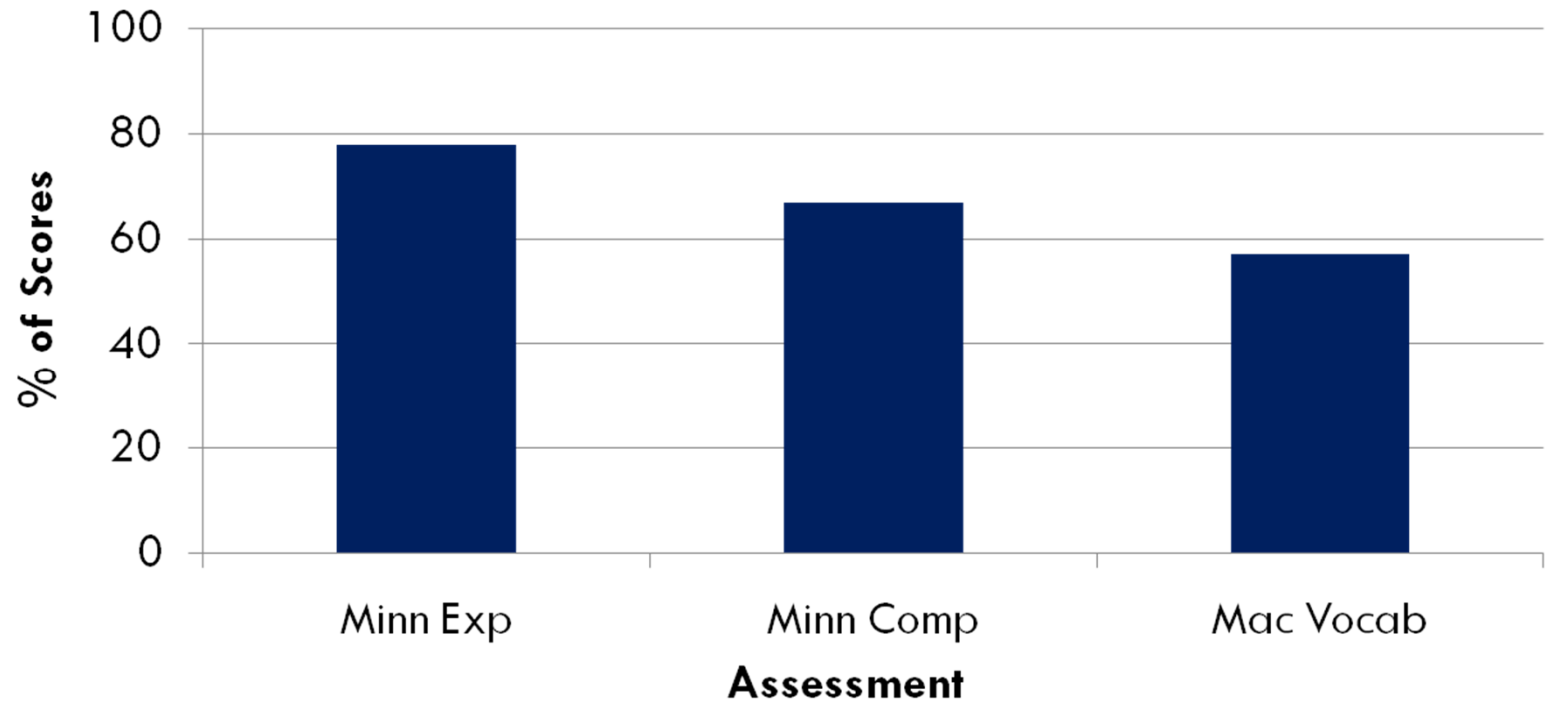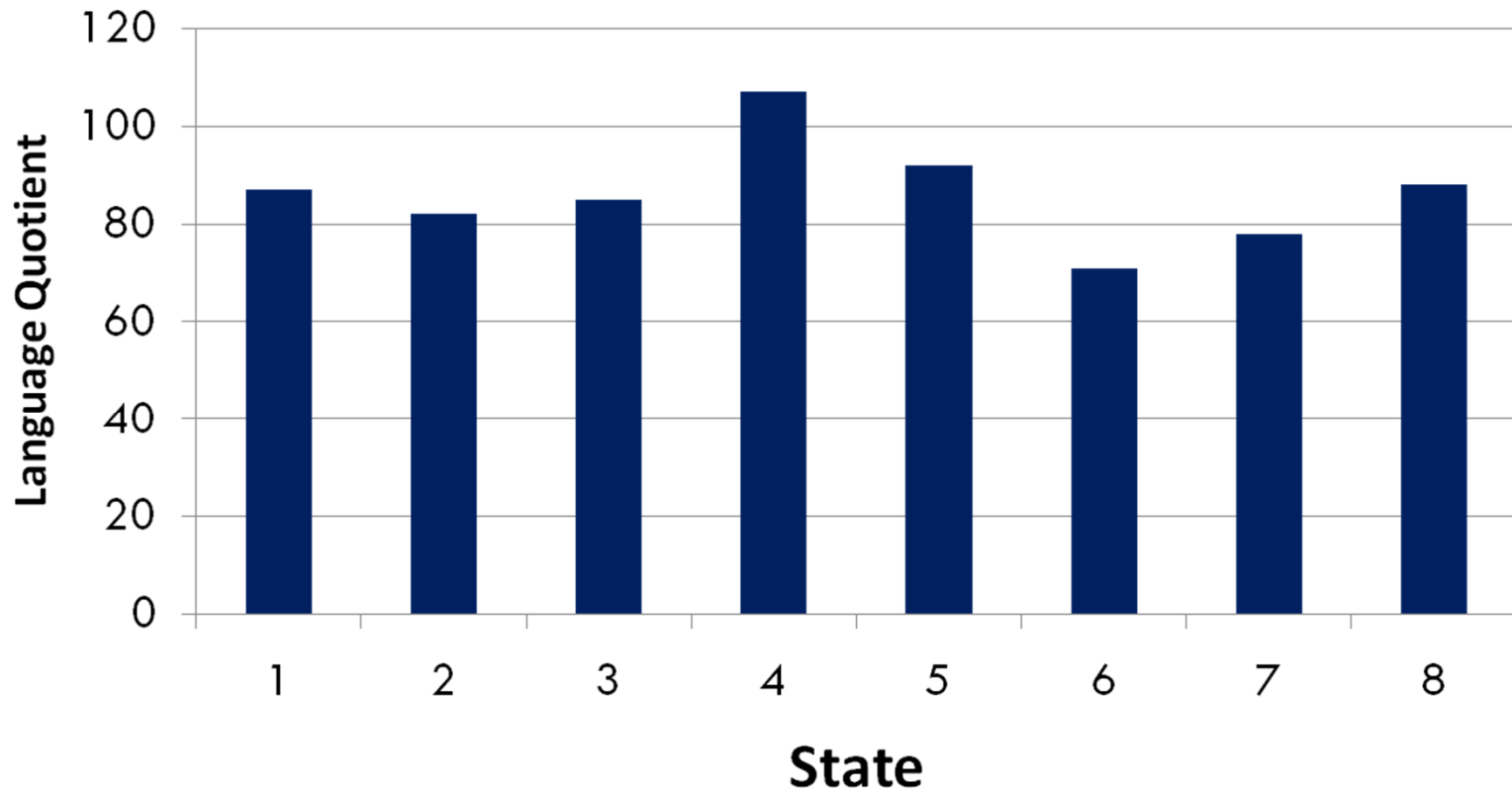
Conclusions: Celebrating our successes

- Almost 80% of children scored within the average range on the Minnesota Expressive Language subtest

- On average, children in all states scored more poorly on cognitive-linguistic items (Minn Lang Comp) compared to more superficial language items (Minn Exp Lang)

Conclusions: More work to do!

- Acquiring an age-appropriate lexicon is a challenge for many children with 43% demonstrating significant delays

- Differences in language outcomes are apparent between some states

- As more assessments are collected, factors predictive of better language outcomes will be identified

What predicts optimal outcomes at 7 years- longitudinal study?

- Accounts for 68% of the variability in outcome of expressive vocabulary and 71% of the variance in receptive syntax at the oldest age between 4 and 7

- Unchangeable variables:
  - Non-verbal cognitive Level
  - Age of confirmation
  - Hearing level
  - Maternal level of education

- Variables amenable to early intervention
  - Amount of parent talk – both sign and spoken – language at 36 months

THE MISSING LINK:

PRAGMATIC LANGUAGE DEVELOPMENT

7 Pragmatic Characteristics: Communication Intention

- **Instrumental** – language for getting things, for satisfying needs- requests for action/object
- **Regulatory language**: language for maintaining personal relationships, e.g. commands
- **Interactional**: Social rules, poise, politeness
- **Personal language**: language for expressing personality or individuality or feelings
- **Imaginative language**: language for creating world of one's own, pretending

Communicative Purpose

- **Informative language**: language for conveying information, for communicating something about the experienced world, cause/effect, compare/contrast, evaluation

- **Heuristic language**: language for finding things out, for wondering, for hypothesizing, questions for obtaining information

Pragmatics Checklist

Pragmatic Objective Instrumental	Not Present	Uses No Words Preverbal	Uses 1-3 Words	More Complex Language
States Needs (I want…)				
Makes polite requests				
Makes choices				
Gives description of an object wanted				
Expresses a specific personal need				
Requests help				

Pragmatic Objective Regulatory	Not Present	Uses No Words Preverbal	Uses 1-3 Words	More Complex Language
Gives Commands (Do as I tell you…)				
Gives directions to play a game				
Gives directions to make something				
Changes the style of commands or requests depending on who the child is speaking to and what the child wants.				

Pragmatic Objective Personal	Not Present	Uses No Words Preverbal	Uses 1-3 Words	More Complex Language
Personal (Expresses Feelings…)				
Identifies feelings (I'm happy.)				
Explains feelings (I'm happy because it's my birthday.)				
Provides excuses or reasons				
Offers an opinion with support				
Complains				
Blames others				
Provides pertinent information on request (2 or 3 of the following: name, address, phone number, birth date)				

Pragmatic Objective Interactional	Not Present	Uses No Words Preverbal	Uses 1-3 Words	More Complex Language
Interactional (Me and You…)				
Interact with others in a polite manner				
Uses appropriate social rules such as greetings, farewells, thank you, getting attention				
Attends to the speaker				
Revises/repairs an incomplete message				
Initiates a topic of conversation (doesn't just start talking in the middle of a topic)				
Maintains a conversation (able to keep it going)				
Ends a conversation (doesn't just walk away)				

Interjects appropriately into an already established conversation with others				
Makes apologies or gives explanations of behavior				
Requests clarification				
States a problem				
Criticizes others				
Disagrees with others				
Compliments others				
Makes promises				

Pragmatic Objective Informative & Heuristic	Not Present	Uses No Words Preverbal	Uses 1-3 Words	More Complex Language
Wants Explanations (Tell me Why…)				
Asks questions to get more information				
Ask questions to systematically gather information as in "Twenty Questions")				
Asks questions because of curiosity				
Asks questions to problem solve (What should I do…?, How do I know…?)				
Asks questions to make predictions (What will happen if…?)				

Pragmatic Objective Imaginative	Not Present	Uses No Words Preverbal	Uses 1-3 Words	More Complex Language
Shares Knowledge and Imaginations (I've got something to tell you…)				
Role plays as/with different characters				
Role plays with props (banana as a phone)				
Provides a description of a situation which describes the main events				
Correctly re-tells a story which has been told to them				

Relates the content of a 4-6 frame picture story using correct events for each frame				
Creates an original story with a beginning, several logical events, and an end				
Explains the relationship between two objects, actions or situations				
Compares and contrasts qualities of two objects, actions or situations				
Tells a lie				
Expresses humor/sarcasm				

Presentation Overview

- Background
  - Pragmatic skill development
  - Methods
- Results
  - Normal hearing data
  - Compare pragmatic skills of children with and without hearing loss
- Conclusions
- Future Directions

Research Questions

- When do children with hearing loss master specific pragmatic skills in comparison to their peers with normal hearing?

- How does development differ based on degree of hearing loss?

Pragmatics – Social Language Use

- ASHA Website:
  - Using language for different purposes
  - Changing language according to the needs of a listener or situation
  - Following rules for conversations and storytelling

Pragmatics

- Pragmatic language difficulties increase risk for victimization (Conti-Ramsden & Botting, 2004).

- Pragmatic difficulties increase risk for social and emotional deficits (Ketelaars, et al., 2009)

Hearing Loss and Pragmatics

- Children who are deaf or hard of hearing use more directive and less informative communicative functions than their normally hearing age-matched peers (Day, 1986; Nicholas, 2000; Nicholas & Geers, 1997)

Normal Hearing Group: Data Collection

- Pragmatics Checklist
  - Goberis, D., 1999, adapted from work done by Simon, C.S., 1984.
- Online version of Pragmatics Checklist created on SurveyMonkey
- Solicited participants:
  - Posted on Hand and Voices website
  - Through E-mail

Hearing Loss Group: Data Collection

- U.S. Dept. of Education
  - Office of Education #H325D030031A, H324C030074 supported research project on language acquisition of children with hearing loss
  - Parents completed a printed version of the Pragmatics Checklist
  - Children were re-assessed annually

The Pragmatic Checklist (Goberis, D., 1999)

- 45 items
- Parents are asked to indicate whether or not a skill is present by selecting from the following choices:
  - Not present
  - Preverbal
  - 1-3 words
  - Complex language

Study Participants

- Normal Hearing Group
  - N=109
  - Age Range: 2-7 years
  - Normal hearing and cognition

- Hearing Loss Group
  - N=126
  - Age Range: 3-7 years
  - All Levels of hearing loss
  - Normal cognition

Study Participants

- Children in both groups were determined to have normal cognition
  - Normal hearing group: based on parent report
  - Hearing loss group: IQ $\geq$ 70 on the Leiter non-verbal intelligence test

Demographics: Gender
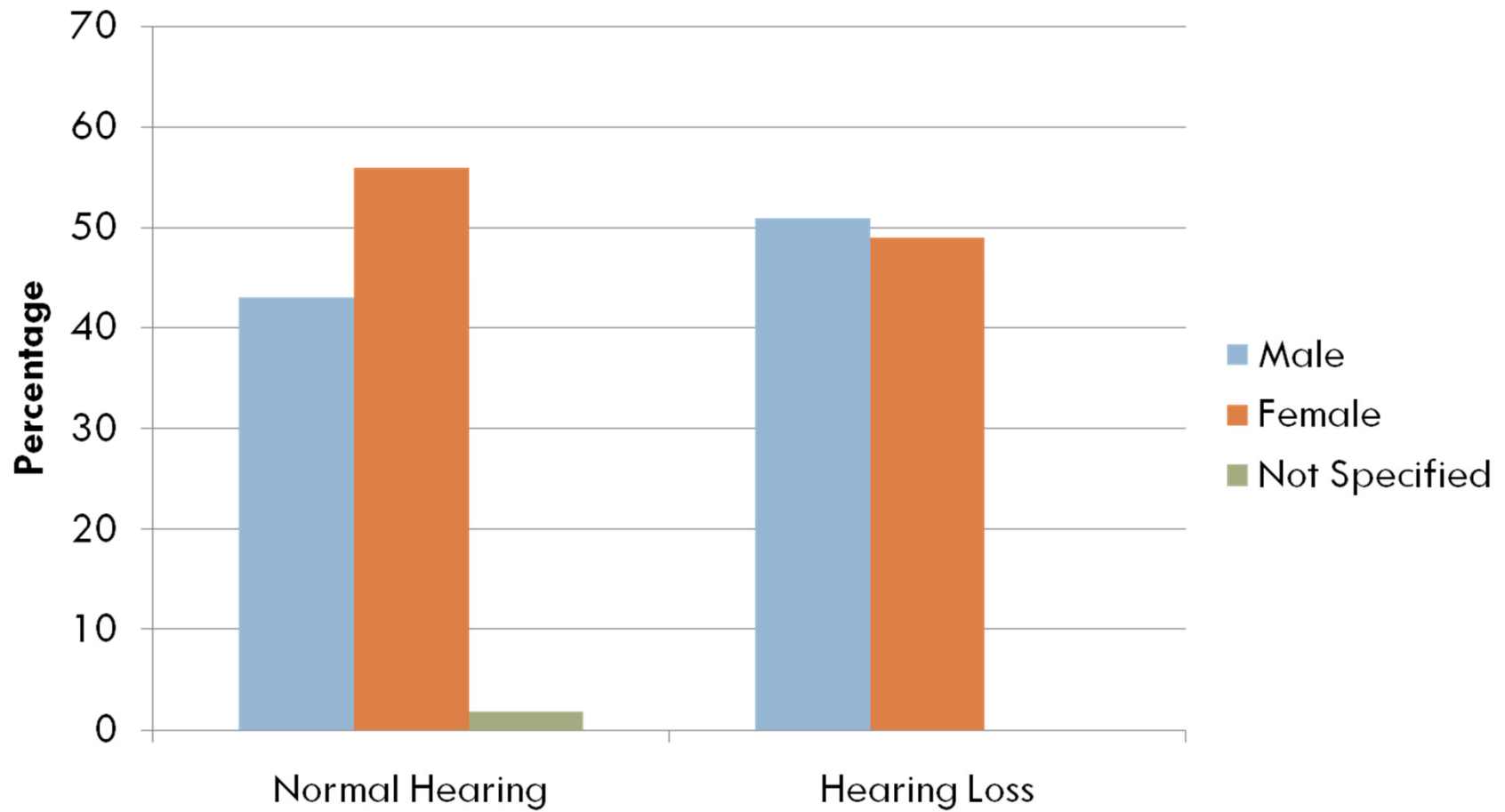
Age

Years	Age Range (Months)
2 Years	1;6-2;5 years (18-29 months)
3 Years	2;6-3;5 years (30-41 months)
4 years	3;6-4;5 years (42-53 months)
5 years	4;6-5;5 years (54-65 months)
6 years	5;6-6;5 years (66-77 months)
7 years	6;6-7;5 years (78-89 months)
8 years	7;6 + years (90+ months)

Demographics: Age
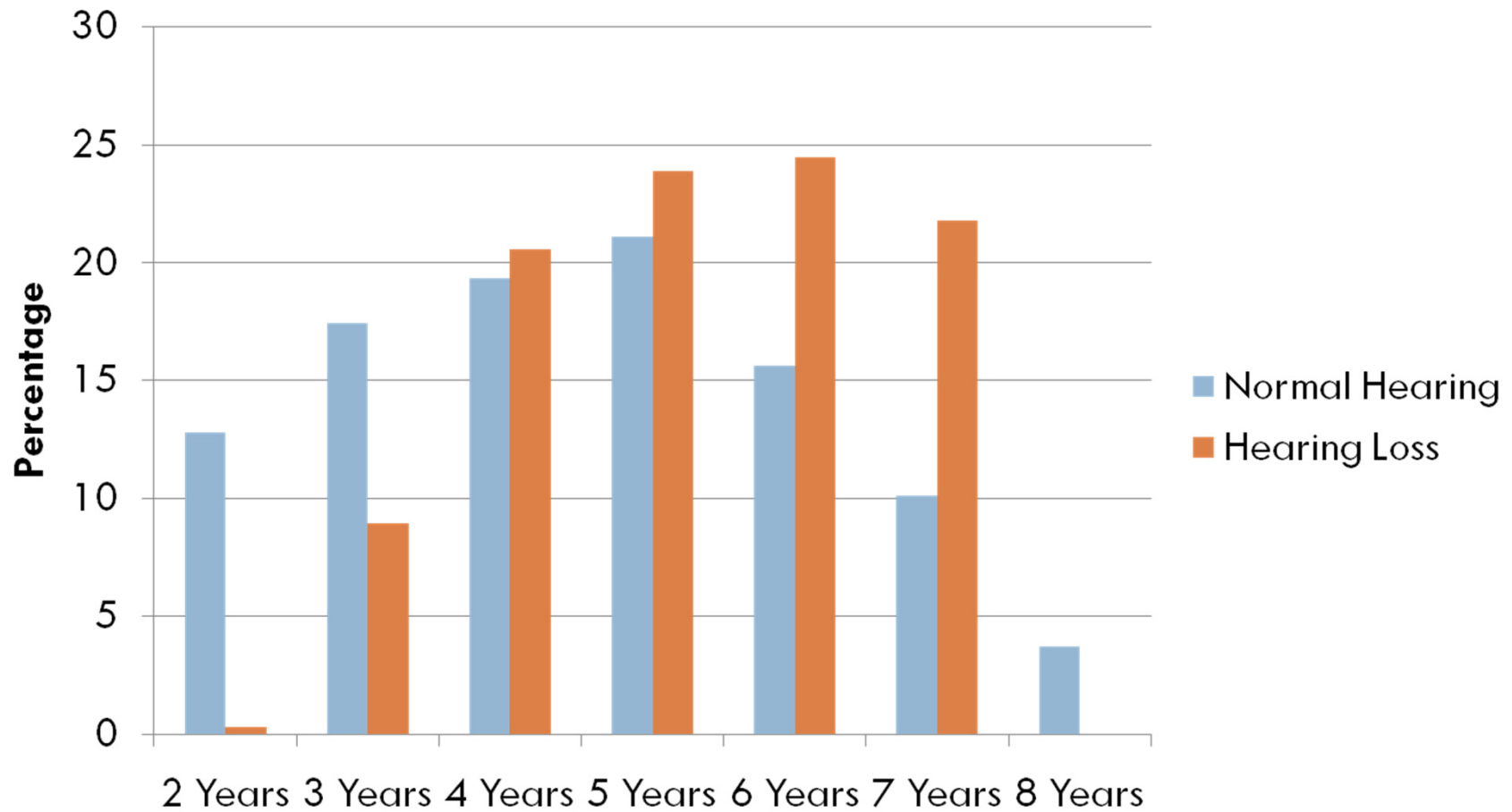
Demographics:
Maternal Level of Education
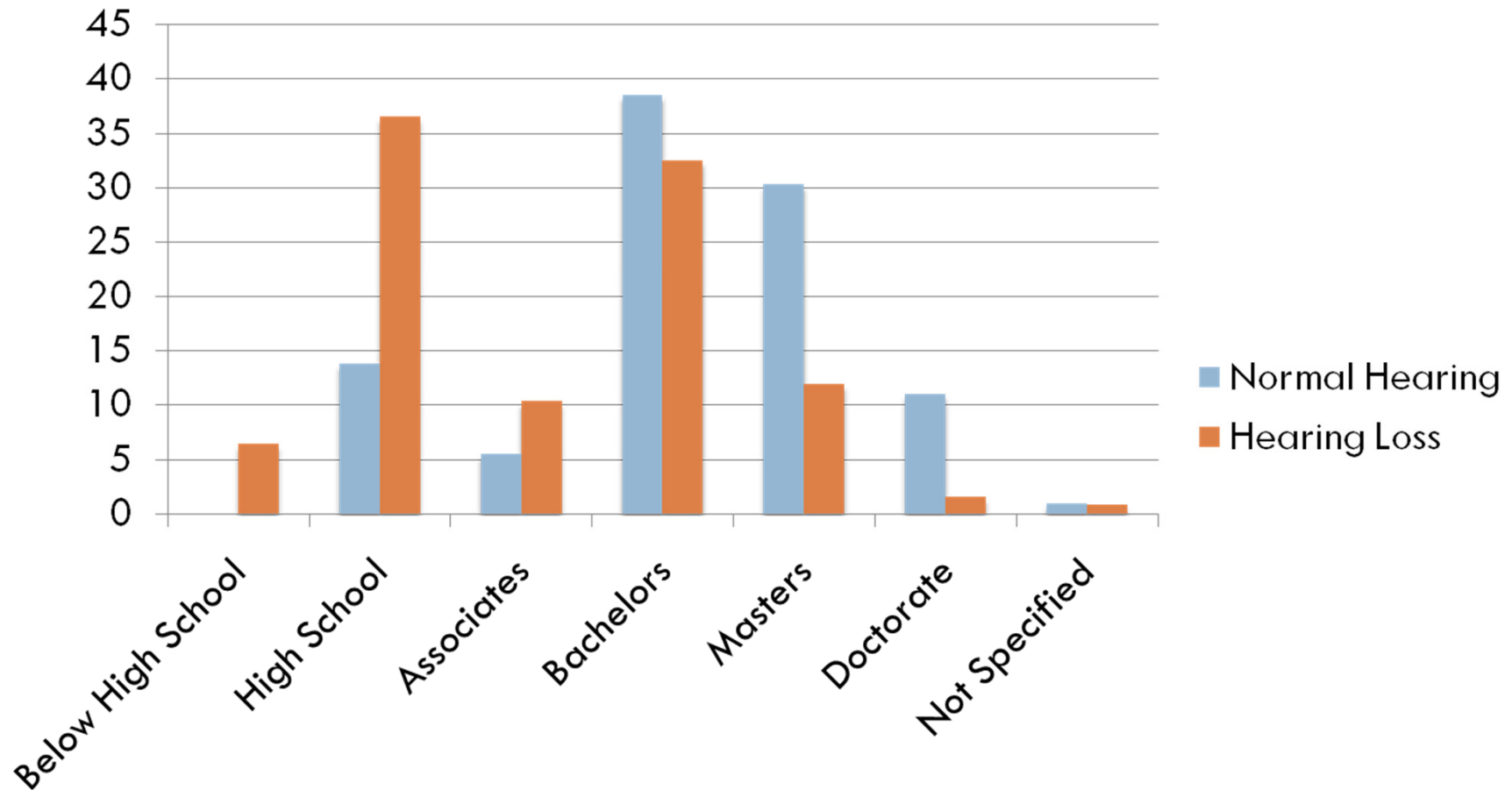
Demographics: Ethnicity
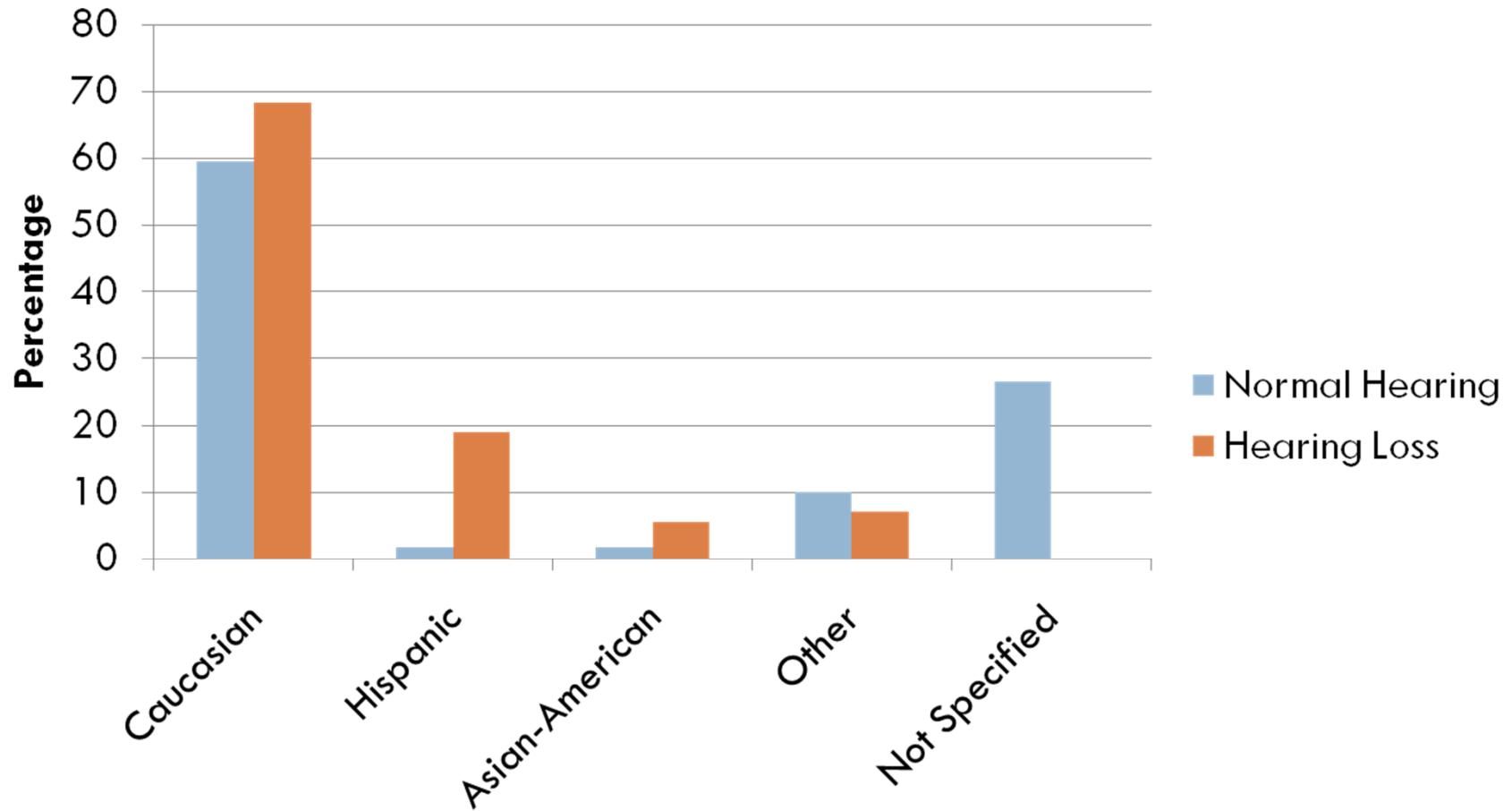
Demographics:
Languages Spoken
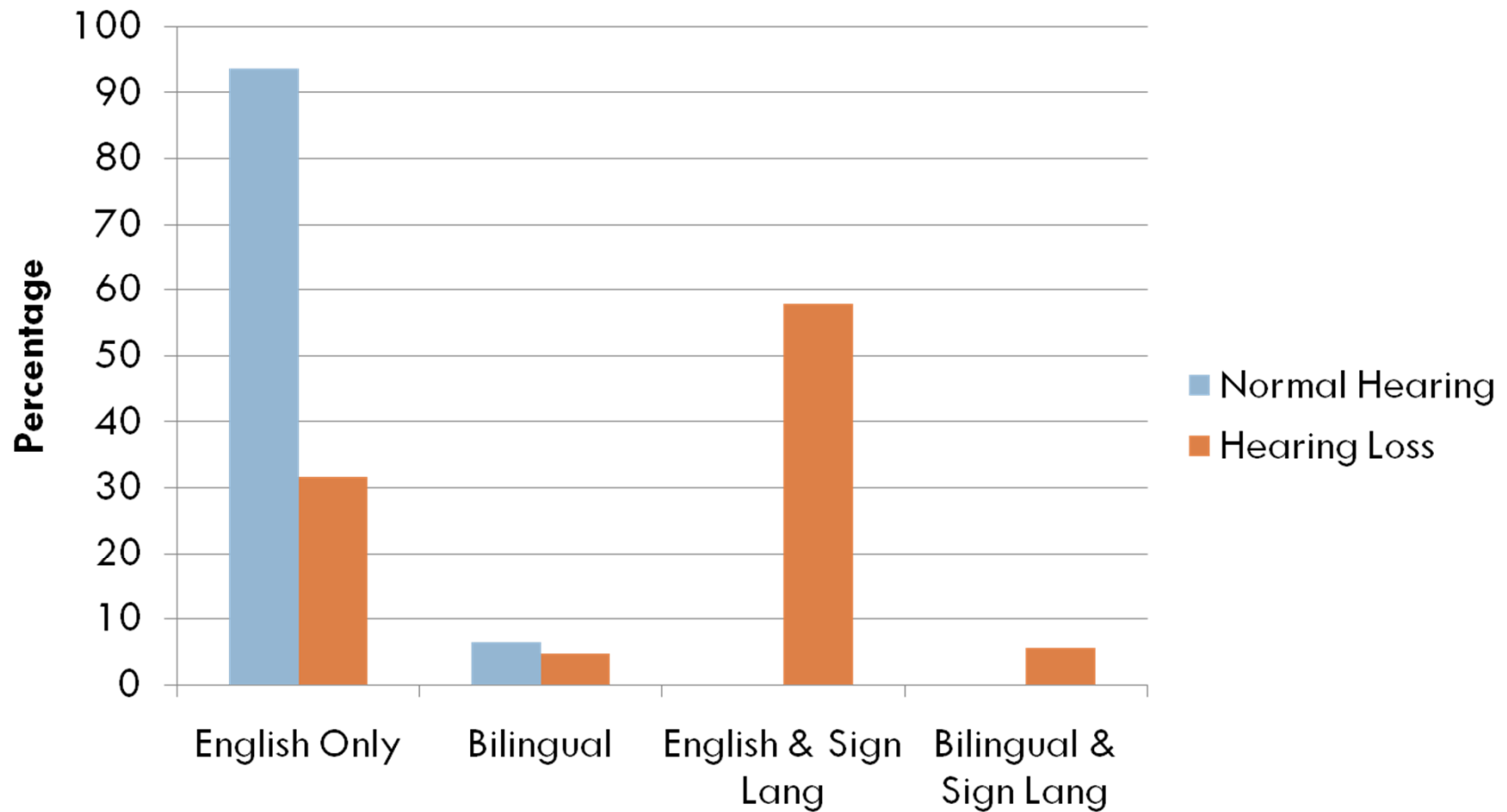
Demographics:
Degree of Hearing Loss

Hearing Loss Group
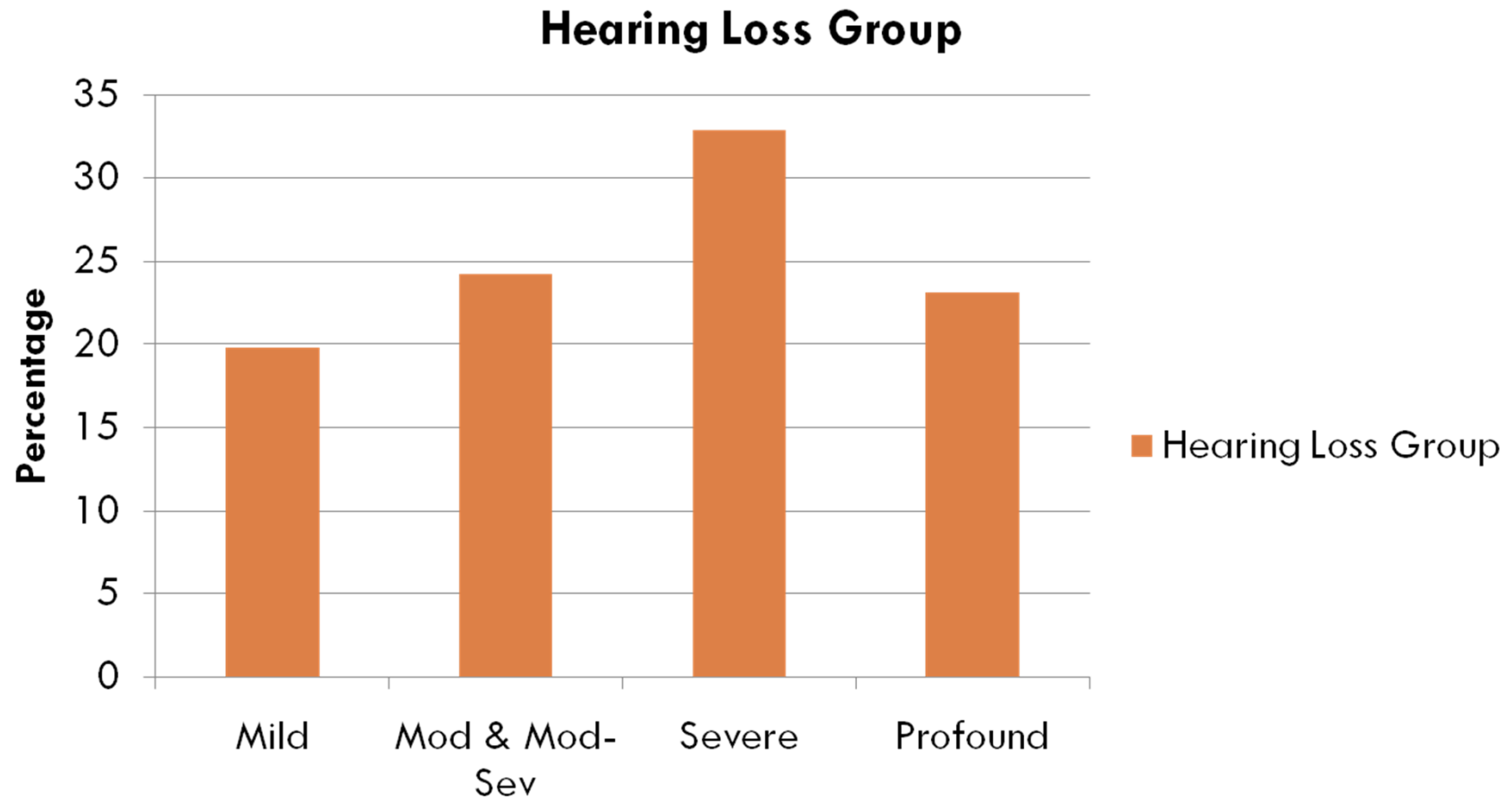
Mastery Criterion

- Children in age groups were determined to have "mastered" a skill with use of complex language when 75% of the children achieved the skill.

Children with Normal Hearing

- 44% (20 of 45) of the items were mastered using complex language by 3 years of age
- 95.5% (43 of 45) of the items were mastered by 4 years of age
- 98% by 5 years
- 100% by 6 years

Final Items to Master for NH group

- Provides information on request
  - Name, date of birth, address (2 of 3 items)
- Makes promises

Children with Hearing Loss

- 6.6% (3 of 45) of the items were mastered with complex language by six years of age
- 69% (31 of 45) of the items were mastered by 7 years of age

Earliest Items to Master (HL Group)

- Makes polite requests
 - Uses words: please, thank you.
- Expresses needs
- Role plays with props

Items not Mastered by 7yrs (HL Group)

- Provides information on request
- Repairs incomplete sentences
- Ends conversations
- Interjects
- Apologies
- Request clarification
- Makes promises
- Ask questions to problem solve

- Asks questions to make predictions
- Retells a story
- Tells 4-6 picture story in right order
- Creates original story
- Explains relationships between objects-action-situations
- Compares and contrasts

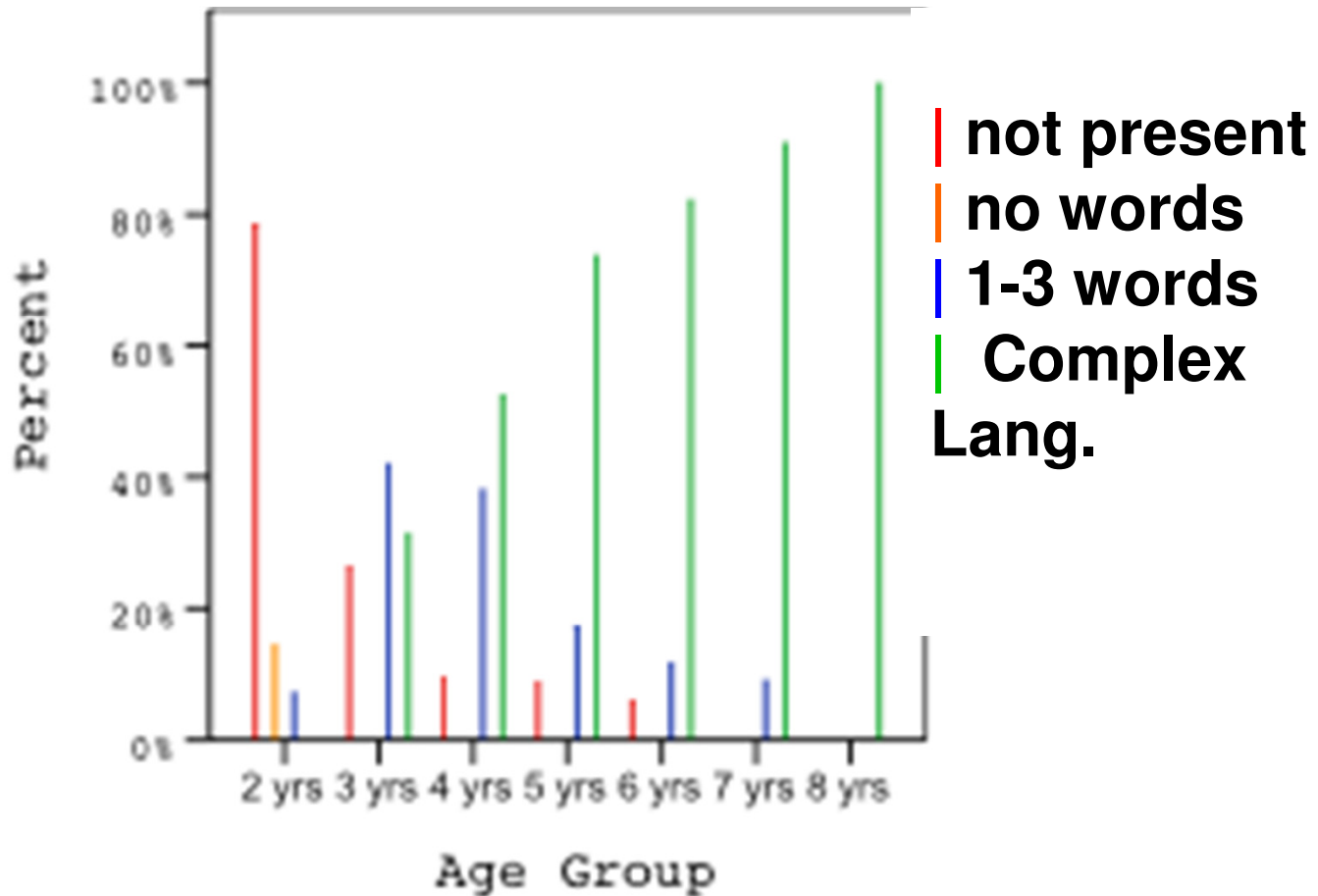# Percentage of Items Mastered by Age for NH and HL groups
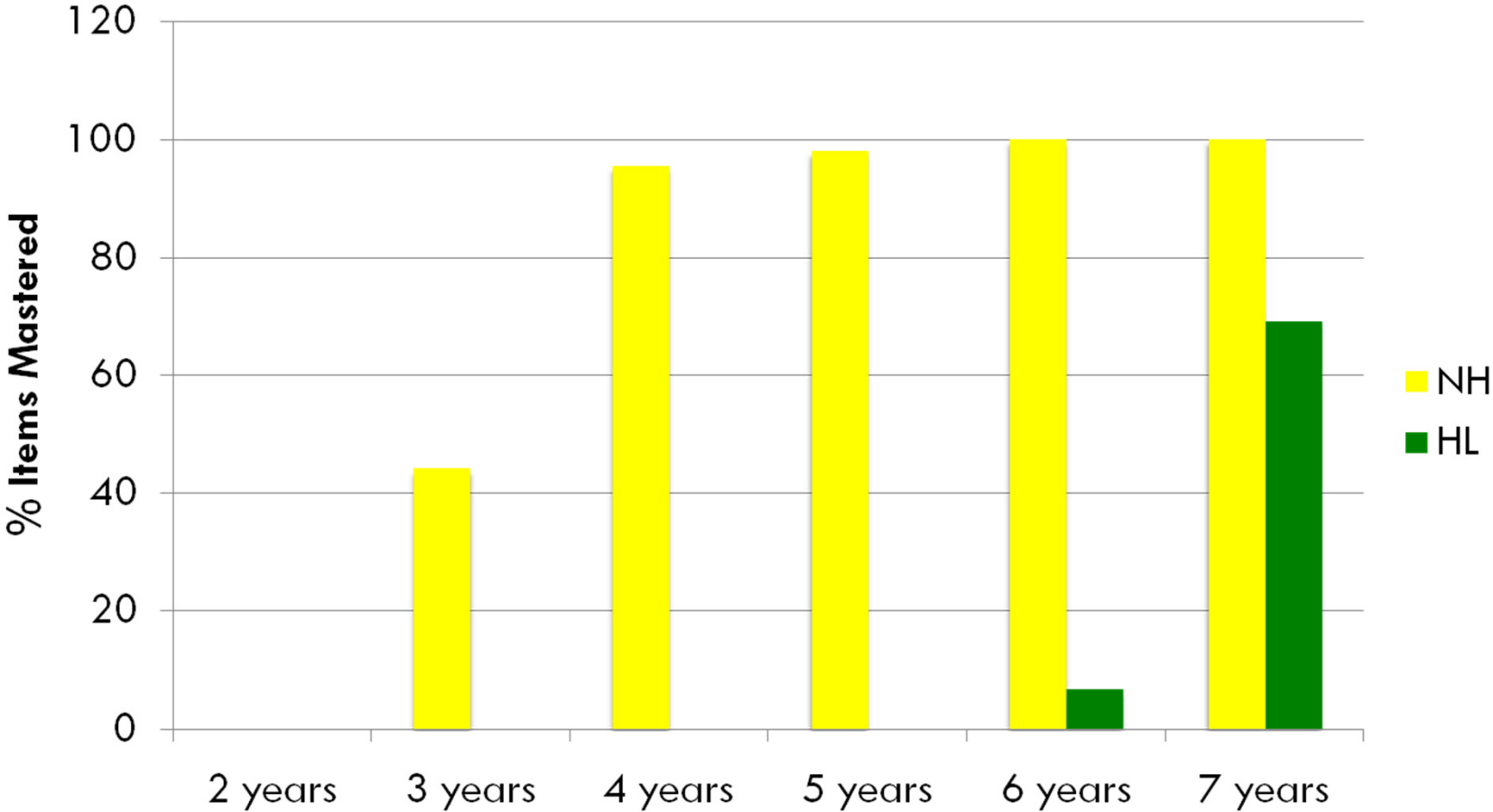
The proportion achieving 50% or more of the items with complex language
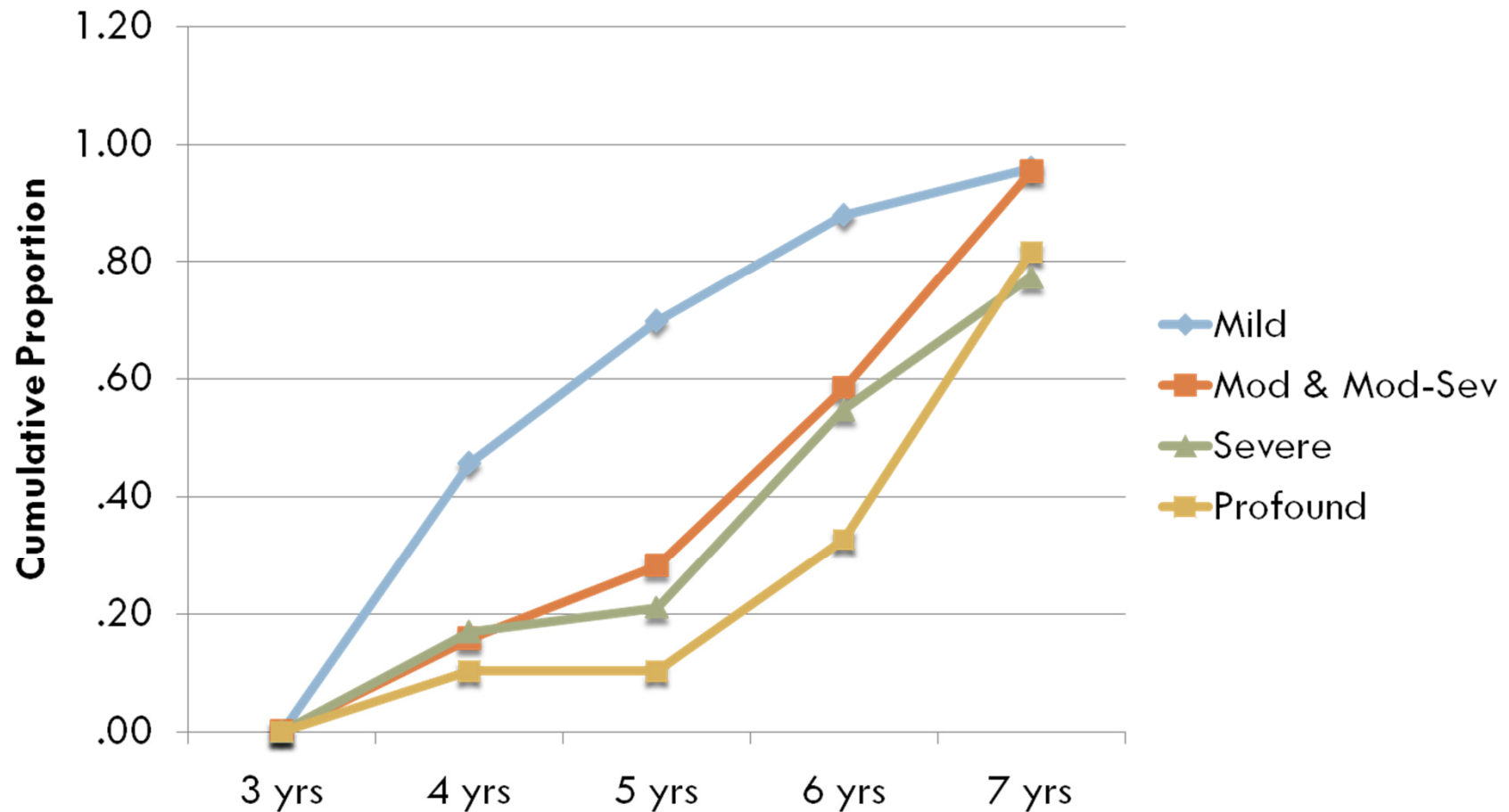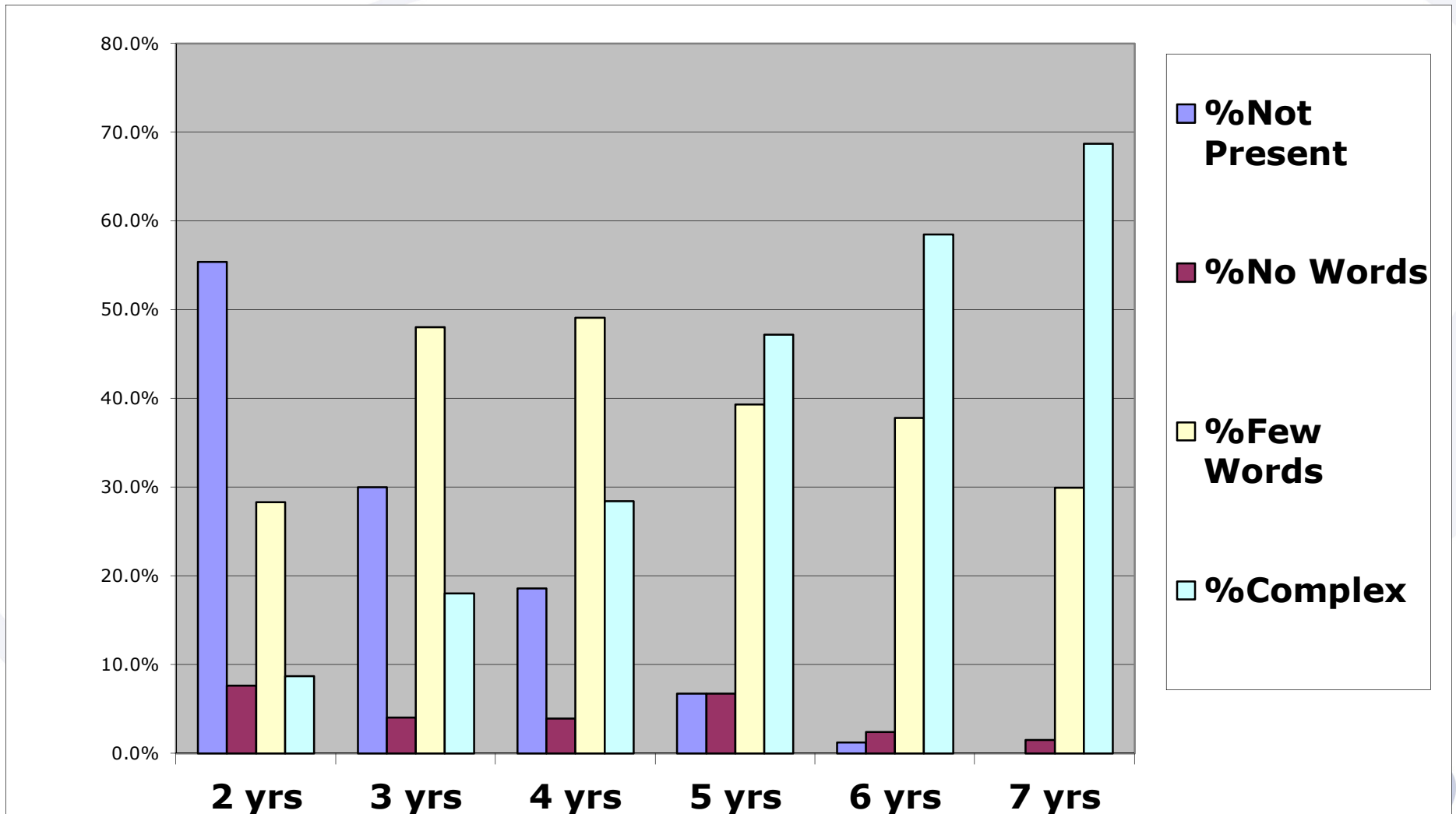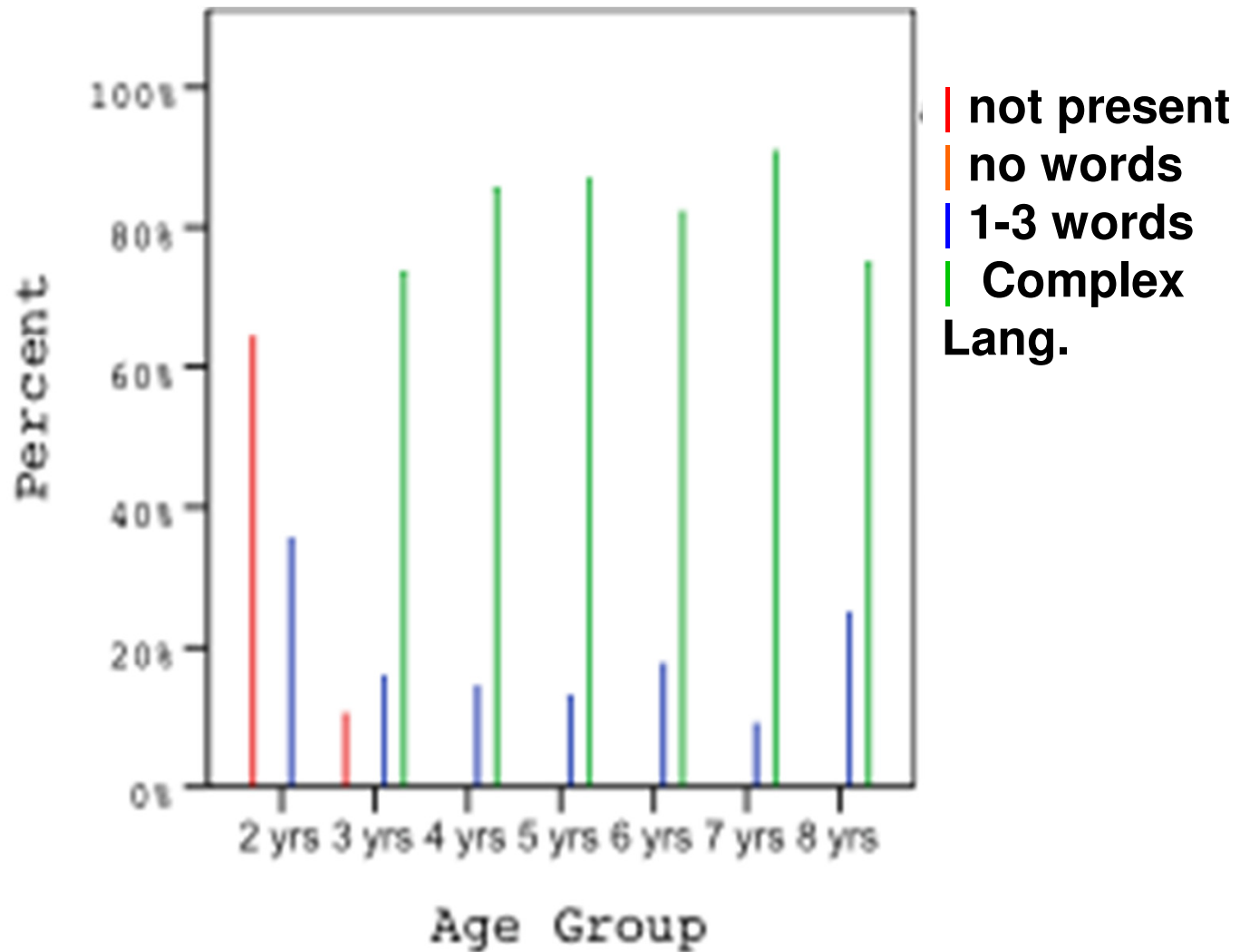
Provides Information on Request
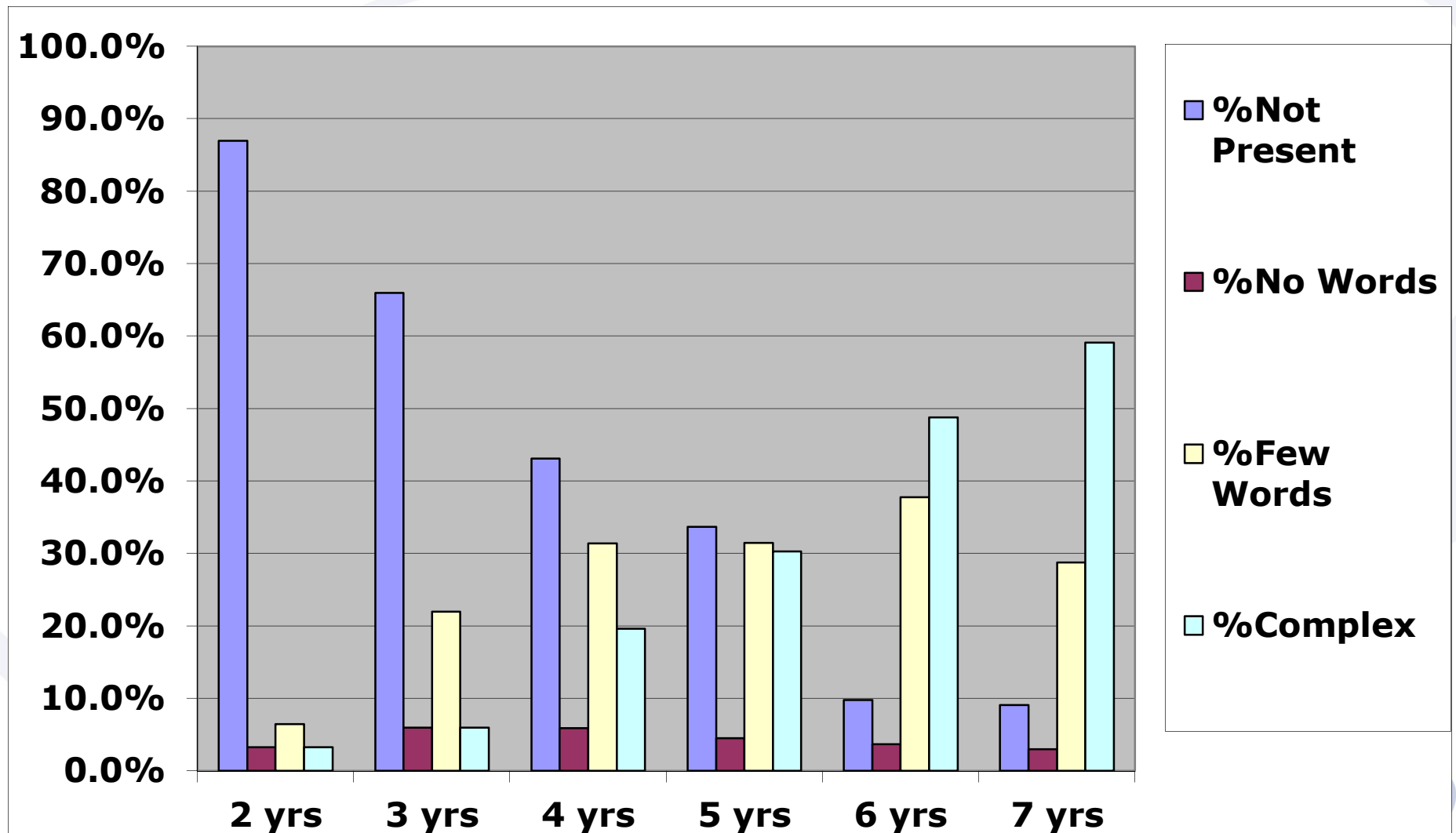
Provides information on request

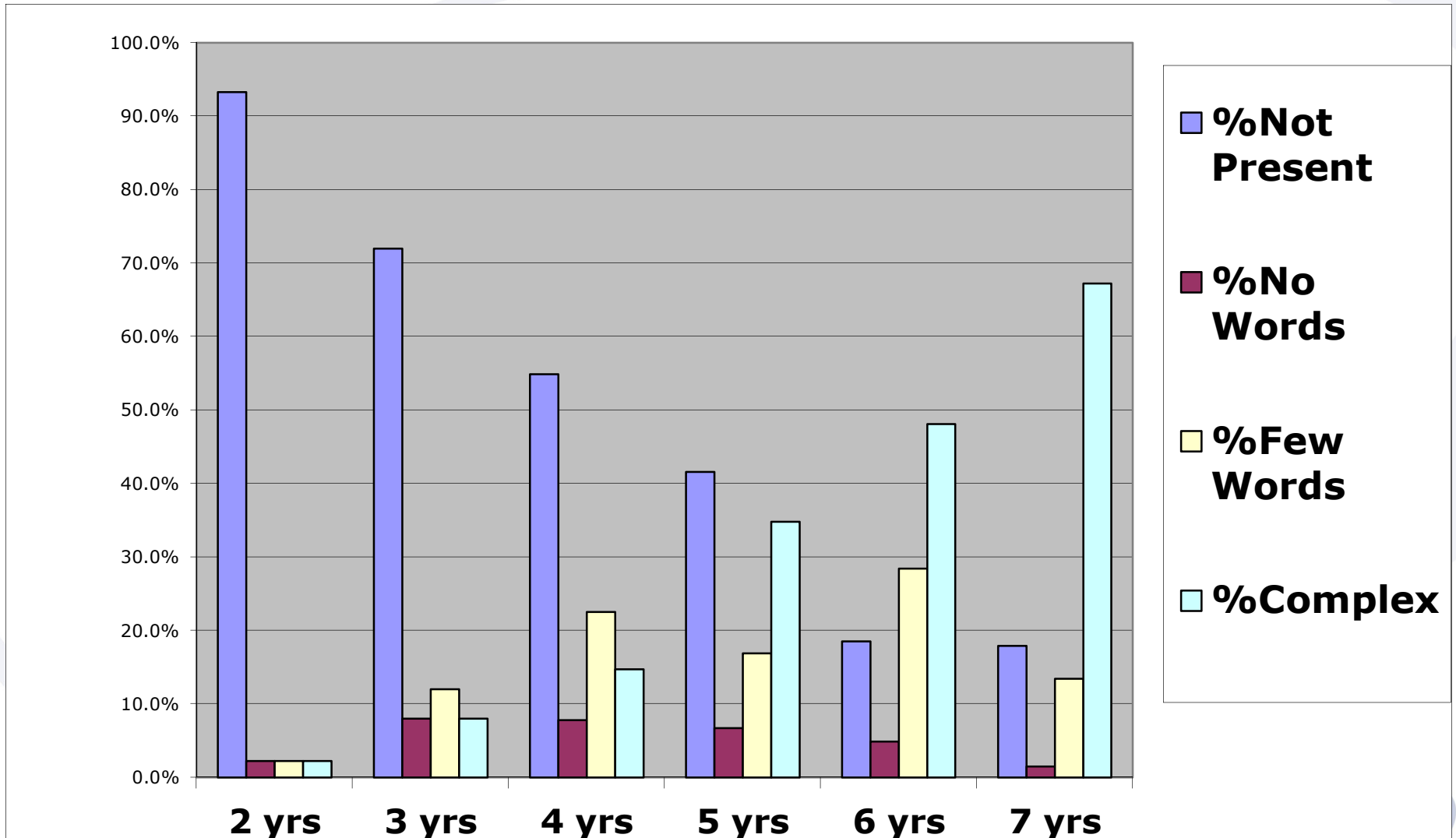# *Makes apologies/explanations*

Legend:
- %Not Present
- %No Words
- %Few Words
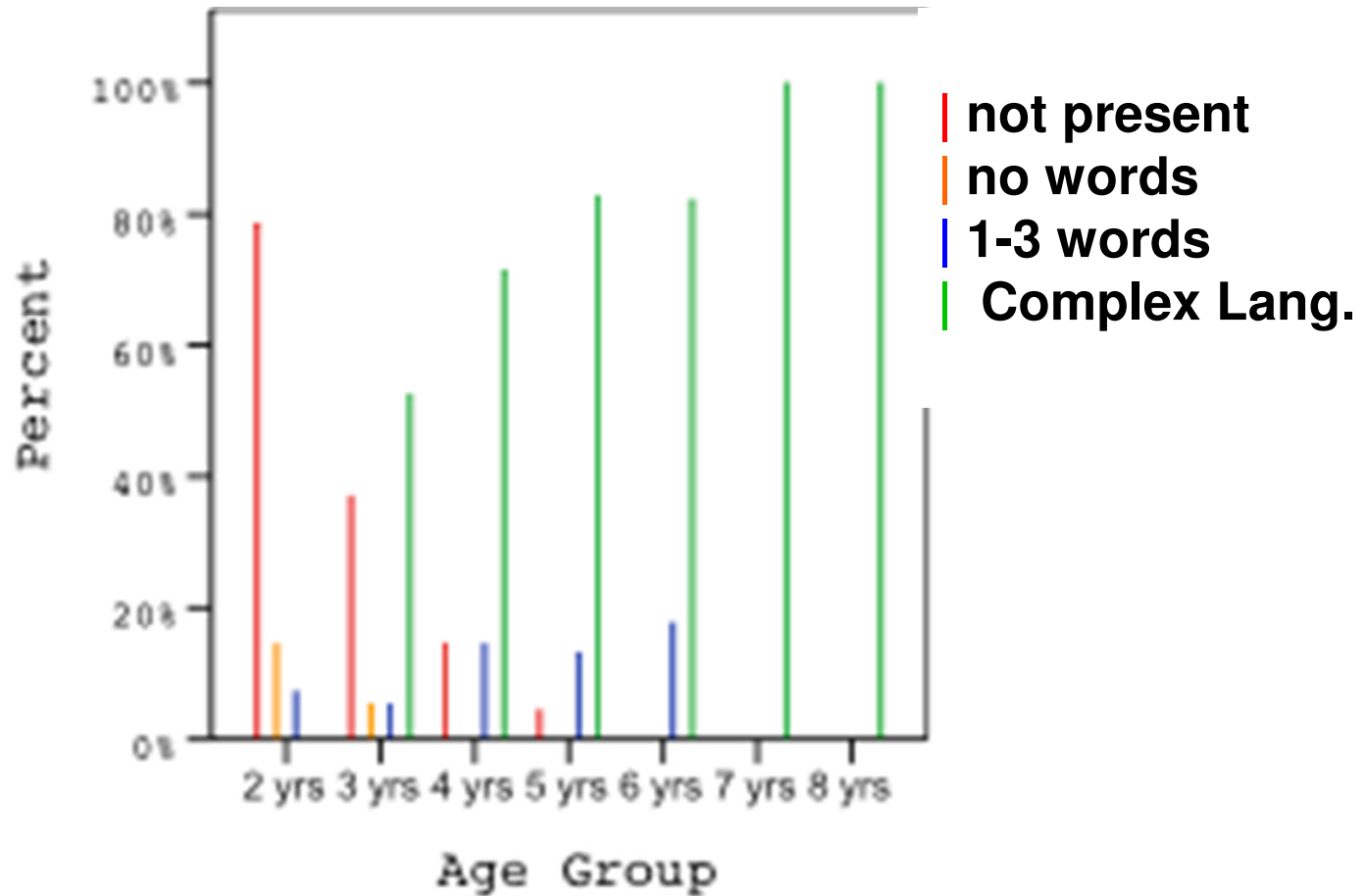- %Complex

Marion Downs
HEARING CENTER

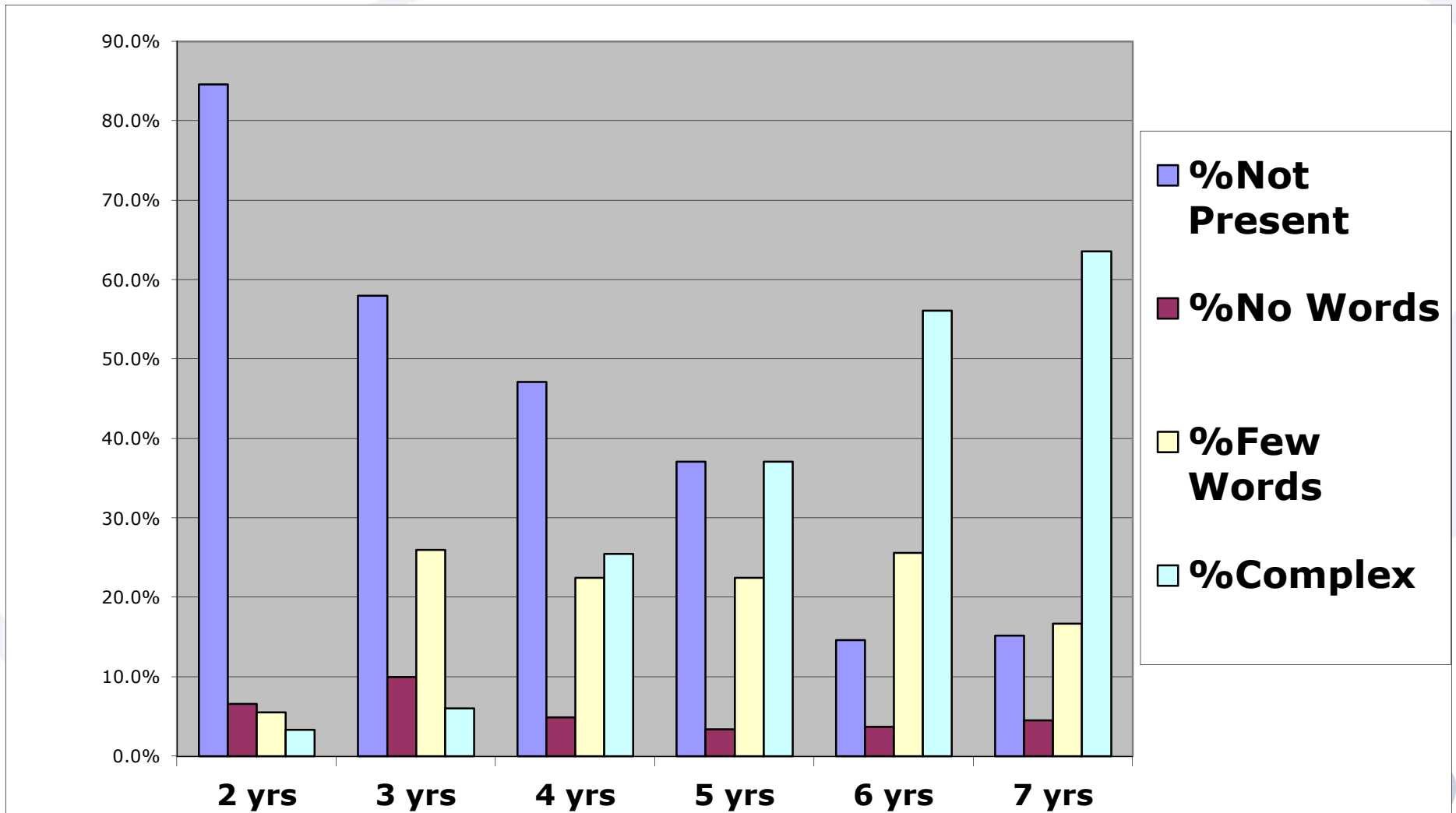# Makes apologies/explanations

Makes Promises
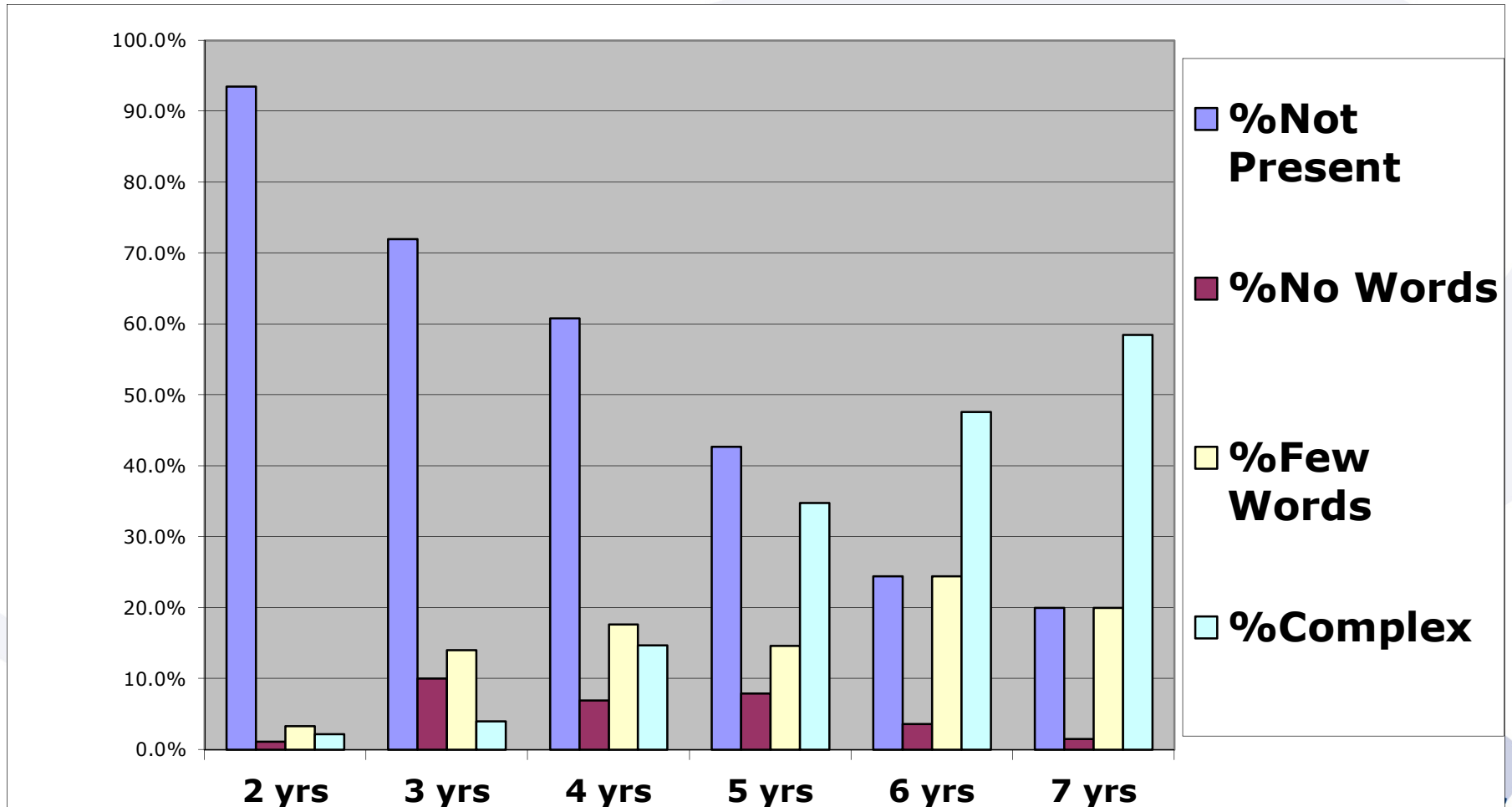
Makes promises

Questions to problem solve

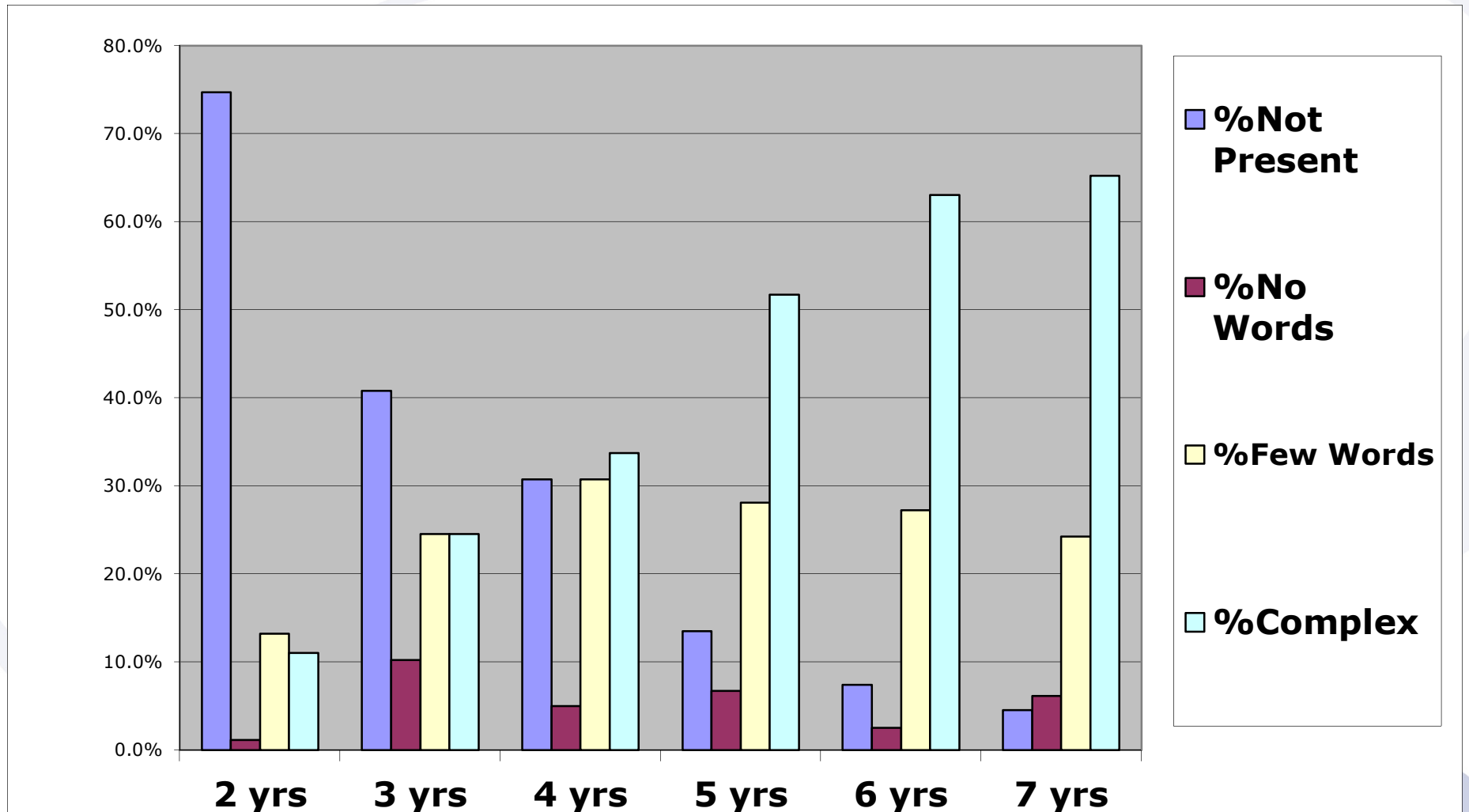# Ask questions to problem solve

Questions to make predictions

Asks questions to make predictions

Correctly retells story

Correctly re-tells a story

Conclusion

☐ Children who are deaf or hard of hearing begin to master pragmatic skills at 6 years of age; 3-year-old peers with normal hearing have already mastered nearly half of the checklist skills.

☐ By age 7, children who are deaf or hard of hearing have mastered approximately 2/3 of the checklist skills; almost all of the skills are mastered by hearing children by age 4.

Future Directions

- Larger sample of normal hearing with better matched experimental and control groups
  - Maternal level of education
  - Age
- Need to support pragmatic skill development in children with hearing loss to reduce risk for socio-emotional deficits and victimization.

Pragmatics

- Children with hearing loss use a lot of resources to simply access information.

- Using language in a socially appropriate manner is the highest level of language functioning and the most difficult

- Most of our children require specific instruction in these issues

Parents

- Don't forget about the parents
- Parents who have been in infant intervention programs are used to focusing on a specific target
- They are eager to know how they can supplement the educational goals

References

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- Nicholas, J.G. (2000). Age differences in the use of informative/heuristic communicative functions in young children with and without hearing loss who are learning spoken language. *Journal of Speech, Language, and Hearing Research, Vol. 43*, 380-394.

- Nicholas, J.G. & Geers, A.E. (1997). Communication of oral deaf and normally hearing children at 36 months of age. *Journal of Speech, Language, and Hearing Research, Vol. 40*, 1214-1327.