Project ASPIRE: Addressing Language Disparities for Children with Hearing Loss

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Outline

• Impact of poverty on child development and educational attainment
• 30 million word gap: foundational impact on early language development
• Closing the gap: the Thirty Million Words Project
• SES disparities in children with hearing loss
• Project ASPIRE: addressing the disparity
• AG Bell/LSLS: a continued evolution
Children born into poverty

- Income inequality has never been greater in this country
- Children are profoundly impacted: **16.1 million** children live in poverty
- An additional **16.3 million** children are living just above the federal poverty line

(Addy, Engelhardt, & Skinner, 2013)
Children born into poverty: The Stats

- Racial and ethnic minorities are disproportionately affected

- Children under 18 living in low-income families in the United States in 2011:
  - 11 million (65%) of Latino children
  - 6.5 million (65%) of African-American children
  - .4 million (63%) of American Indian children
  - 12.1 million (31%) of white children
  - 1 million (32%) Asian children

(Addy, Engelhardt, & Skinner, 2013)
A life of poverty often means:

- Limited access to
  - health care
  - quality education
  - healthy food
  - safe play and exercise
- Living in more violent and economically depressed neighborhoods
- Precarious or unstable housing
Toxic Stress

• Extreme or prolonged stress can become ‘toxic’ for children and derail healthy development

• ‘Toxic stress’ can negatively impact neural connections in the learning and reasoning parts of the brain

• When experienced in early life, this has long-term consequences on a child’s learning, behavior, and physical and mental health

(Center on the Developing Child, 201; Toxic Stress: the Facts, 2012)
Impact On health

- Impoverished children at greater risk for:
  - Poor physical health
  - Chronic health conditions
  - Behavioral and emotional problems

(Hughes & Simpson, 1995; Morgan, 2009)
Educational attainment

- Only 48% of low-SES children are school-ready by age five

- 80% or more of African-American and Latino public school students can’t read or do math at grade level in 4th, 8th, and 12th grades

(Isaacs, 2012; The state of America’s children, 2011)
Educational attainment

- Dropout rate of low-SES children was 5 times greater than higher-SES children in 2009
- Even the highest-scoring low-SES children are much less likely to finish college than their higher-SES counterparts

(Chapman, Laird, Ifill, & Kewal Ramani, 2011; Roy, J, 2005)
Human Brain Development
Synapse Formation Dependent on Early Experiences
(700 per second in the early years)

Birth | (Months) | (Years)

-8 -7 -6 -5 -4 -3 -2 -1 | 1 2 3 4 5 6 7 8 9 10 11 | 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19

- Language
- Higher Cognitive Function
- Sensory Pathways (Vision, hearing)

(National Scientific Council on the Developing Child, 2007)
Disparities in cognitive development assessment between higher- and lower-SES infants

Mean score for infants above 200% Federal Poverty Line

Disparities in cognitive development assessment between higher- and lower-SES infants

(Halle, et al., 2009)
Child vocabulary development

Cumulative Vocabulary (Words)

- High-SES Parents
- Middle-SES Parents
- Low-SES Parents

Child’s Age (Months)

16 mos.  24 mos.  36 mos.

(Hart & Risley, 1995)
Early language disparities

• Early language disparities play a critical role in the academic achievement gap found in low-SES children

• Language skills are foundational for:
  • Cognitive ability
  • Literacy
  • School readiness

(Forget-Dubois, et al., 2009; Hoff, 2012)
Thirty million word gap

- Hart + Risley:
  - High-SES children: 45 million words by age 3
  - Low-SES children: 13 million words by age 3
- This 30 million word gap profoundly impacts children’s vocabularies, test scores, and IQs

(Hart & Risley, 1995)
Disparities in early language environments

- Both quantitative and qualitative

- Inequities in parents’ language input include:
  - significantly less talk and gesture
  - shorter and less complex phrases
  - less use of open-ended questions
  - greater use of directives

(Hammer, Tomblin, Zhang, & Weiss, 2001; Hoff & Tian, 2005; Huttenlocher, Haight, Selzer, & Lyons, 1991; Reilly et al., 2010; Rowe, 2008; Rowe & Goldin-Meadow, 2009; Hoff, 2012)
Disparities in early language environments

- Decreased parental language input leads to significant disparities in children’s development of:
  - vocabulary
  - grammar
  - narrative skills
  - Early literacy skills

- Disparities in language skills are seen from infancy through high school, and the gap widens with age

(Hoff, 2012; Fernald, Marchman, & Weisleder 2012; Hoff, 2005; Huttenlocher, Waterfall, Vasilyeva, Vevea, Hedges, 2010)
The thirty million words project

- 12-week parent-directed behavioral intervention to equip parents with skills to enrich their children’s language environments
• The disparities noted among typically developing children are compounded in children with hearing loss.

• Early language environments have a profound impact on the outcomes of children with hearing loss, regardless of their communication option.
Disparities in pediatric hearing loss

- A critical factor in these disparate outcomes is a lack of parental knowledge and skills to support child listening and spoken language development

(Evans, et al., 2005; Vohr, et al., 2000)
Targeting the disparity: Project ASPIRE

- Parent-directed program designed to enrich the early language environments of children ages 0-3 with hearing loss
- Listening and spoken language curriculum
- Provided through Early Intervention
- Now funded: Dept. Education IES
Guiding philosophy

- Parents are children’s first and most important teachers

- Enriching a child’s early language environment occurs through promoting parent-child interactions that have been linked to positive child outcomes

- This does NOT require changing cultural practices and values or idiomatic speech
Goals

• Equip parents with knowledge of their child’s brain and language development

• Increase parents’ belief that their words have the power to “build their child’s brain” and positively impact their educational outcome

• Increase parents’ language input to enrich their child’s early language environment
Curriculum

• Multidisciplinary approach, combining research from:
  • Early childhood development
  • Listening and spoken language development
  • Behavioral intervention
  • Health promotion
  • Sociology
  • Health disparities
  • Social marketing
Curriculum

• Extensive formative development and testing with parents, community stakeholders, and interdisciplinary experts

• Culturally-sensitive curriculum focused on increasing parent language input and parent-child interaction

• Presents evidence-based information in an approachable, easy-to-understand manner that is accessible to most literacy levels
Curriculum: more than just “talk”

- Rich early language environment includes:
  - child-directed speech
  - turn taking and wait time
  - description and expansion
  - scaffolding
  - joint attention
  - routines
  - open-ended questions
  - labeling
  - praise and encouragements
  - prompting over commands and prohibitions
  - dialogic book reading
  - decreasing TV and technology time
Intervention elements

- Coaching method
  - One-on-one Home Visiting model
- Educational modules
- Behavioral strategies
  - Video modeling
  - Quantitative Linguistic Feedback
  - Goal setting
Coaching method

- ASPIRE-trained Early Interventionists
- Parents are partners
- Discussion-based, motivational, non-judgmental approach
- Fosters parents’ sense of autonomy and competency
Educational modules

- 10 weekly computer-based modules
- Integrate practical strategies for increasing parent talk and turn taking into routines and everyday activities
- Multimedia platform
- Emphasis on cognitive fluency by teaching through concrete analogies
Educational modules: video

- Video of parent-child interaction illustrates real-life applications of educational content
Educational modules: animation

- Animation conveys scientific concepts that can’t be captured in video in tangible, understandable ways
Behavior strategies: video modeling

- Interventionist and parent practice new skills on video
- Review and discuss using coaching method
- Gives parents immediate concrete feedback on implementing strategies
Behavior strategies: quantitative linguistic feedback

- LENA’s automated technology grants an unprecedented window into a child’s natural language environment
- Records 10-16 hours
- Measures
  - adult words
  - conversational turns
  - child vocalizations
  - TV time

(Automatic language assessment in three easy steps, 2011).
Behavior strategies: quantitative linguistic feedback

- Tool for:
  - awareness of language input
  - feedback
  - motivation
  - goal setting

(Automatic language assessment in three easy steps, 2011).
Average turns per hour

- Oct 16: 71
- Oct 23: 43
- Nov 8: 27
- Nov 18: 55

Your long-term goal
Your short-term goal
Your starting point
Total TV and Media

Minutes

- Oct 16: 7
- Oct 23: 5
- Nov 8: 40
- Nov 18: 2
Pilot study

- Currently ongoing
- 32 families in Chicagoland area
- Quasi-experimental study
- 3-months post-intervention follow up
Project ASPIRE: Next steps

• Longitudinal, multi-institutional study
• Identify potential partners to make curriculum accessible nationwide
• Translate & video into Spanish
• Adapt for Telemedicine
• Comprehensive professional development
• Web-based Community of Practice for ASPIRE Interventionists
Listening and Spoken Language: a continued evolution

- We have come so far
- We must focus our efforts on those children being left behind
- We must disentangle disadvantage from diagnosis
References


• Fernald, A., Marchman, V. A., & Weisleder, A. (2013). SES differences in language processing skill and vocabulary are evident at 18 months. Developmental Science, 16 (2).


