



Poverty, Neuroscience and Language in Young Children

NSSLA Jan 2018

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OBJECTIVES FOR TODAY

- Facts and statistics regarding poverty for young children
- What neuroscience reveals about developmental effects on children in poverty
- Definition/discussion of ACEs (Adverse Childhood Experiences)
- Impact of poverty on language of young children
- Key role of the SLP
- Discussion of language/literacy based strategies, including Beginning with Babble, LEAP's free language app for parents/caregivers



Fifty years of research have revealed the sad truth that the children of low-income, less educated parents typically enter school with poorer language skills than their more privileged counterparts. By some measures, 5-year-old children of lower socioeconomic status score more than two years behind on standardized language development tests by the time they enter school.

Stanford Report, Sept 25, 2013

Evidence of Disparities

There are significant disparities in the education, economic well-being, and health of children in the U.S. based on their race-ethnicity and whether or not their parents are immigrants.

(Hernandez & Napierala, 2013)

Disparities in child outcomes between poor, at-risk and more advanced children are evident in cognitive, social, behavioral and health outcomes as early as 9 months and grow larger by 24 months of age. (Halle et al., 2009)

Before entering kindergarten, the average cognitive scores of preschool age children in the highest socioeconomic group are 60% above the average scores of children in the lowest socioeconomic group. (Lee & Burkham, 2002)



The Professional's Responsibility

As the population of US changes, professionals who work with children particularly in public schools are realizing that part of helping these children succeed is recognizing and respecting their ethnic, linguistic, and cultural backgrounds. (Lopez, 2012).

Professionals are increasingly recognizing however, that socioeconomic status (SES) may be an even more important factor in understanding children and families behavior and in helping kids succeed in school and eventually in life. (Paul & Norbury, 2012).



Language Differences Start Early

“Children who come from a lower SES and children who come from homes in which a language other than English is spoken have language trajectories that are different from those of children from middle-class monolingual English speaking homes, and on average, they have different language skills when they reach school age.” (Hoff, 2013).



Language Differences Vary by Linguistic Exposure

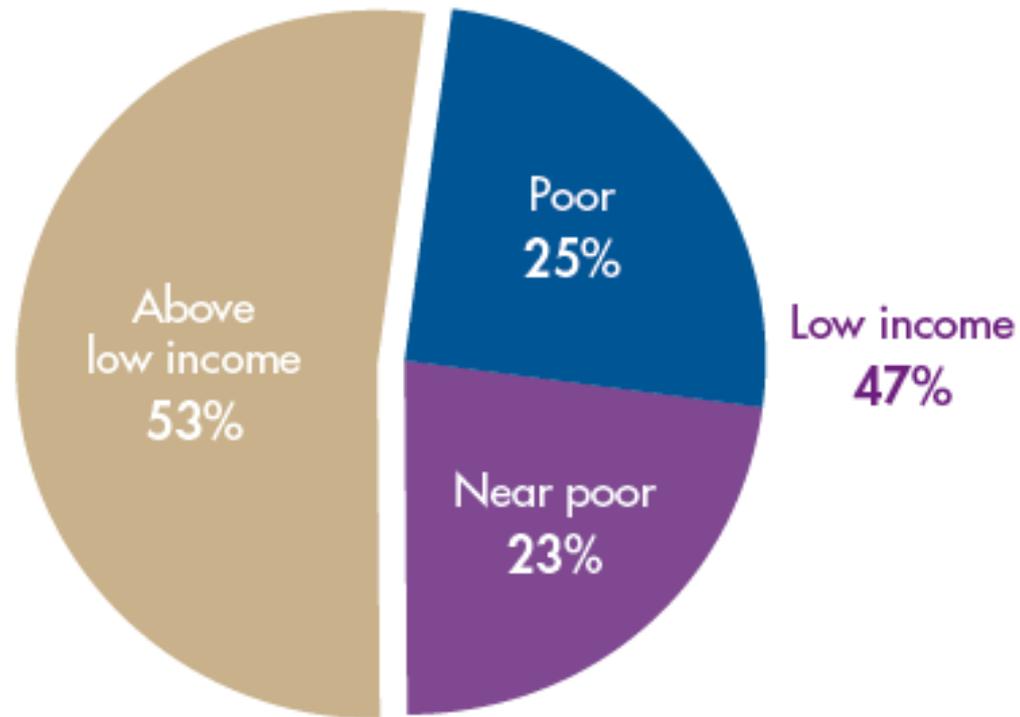
Socioeconomic disparities result in language differences in quality and quantity of linguistic exposure, which in turn lead to differences in the development of language-supporting brain regions.

(Noble, 2014).

Our very youngest children,
infants and toddlers
under age of 3 years
appear to be
particularly
vulnerable.



Figure 1: Infants and toddlers by family income, 2013

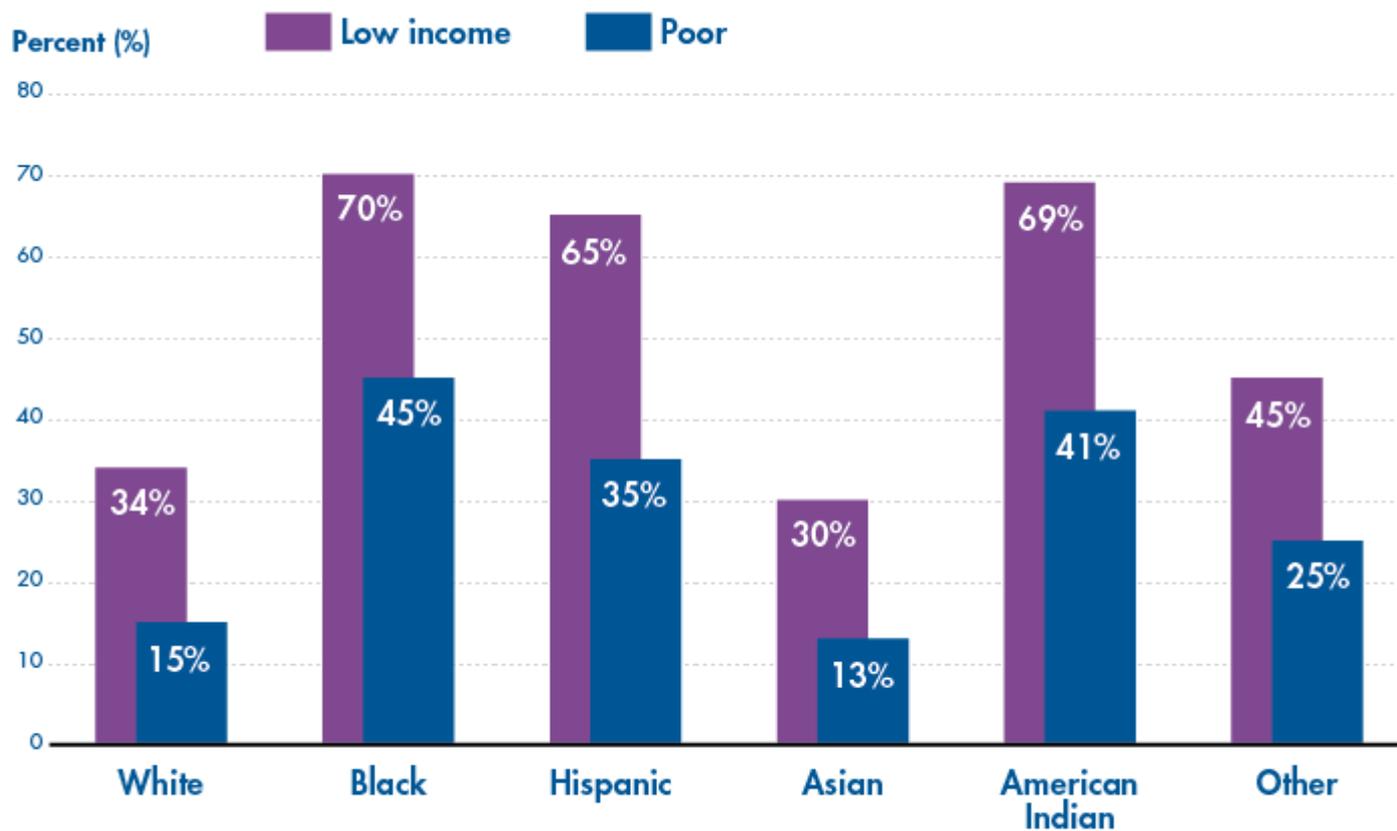


Percentages may not add to 100 due to rounding.

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Basic Facts about Low-Income Children: Children under 3 Years, 2013

Figure 6: Percentage of infants and toddlers in low-income and poor families by race/ethnicity, 2013



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Basic Facts about Low-Income Children: Children under 3 Years, 2013

Situational vs. Generational Poverty

- Situational poverty more common for immigrants.
- Generational poverty may affect a family for two or more generations.
- Language differences in situational versus generational poverty

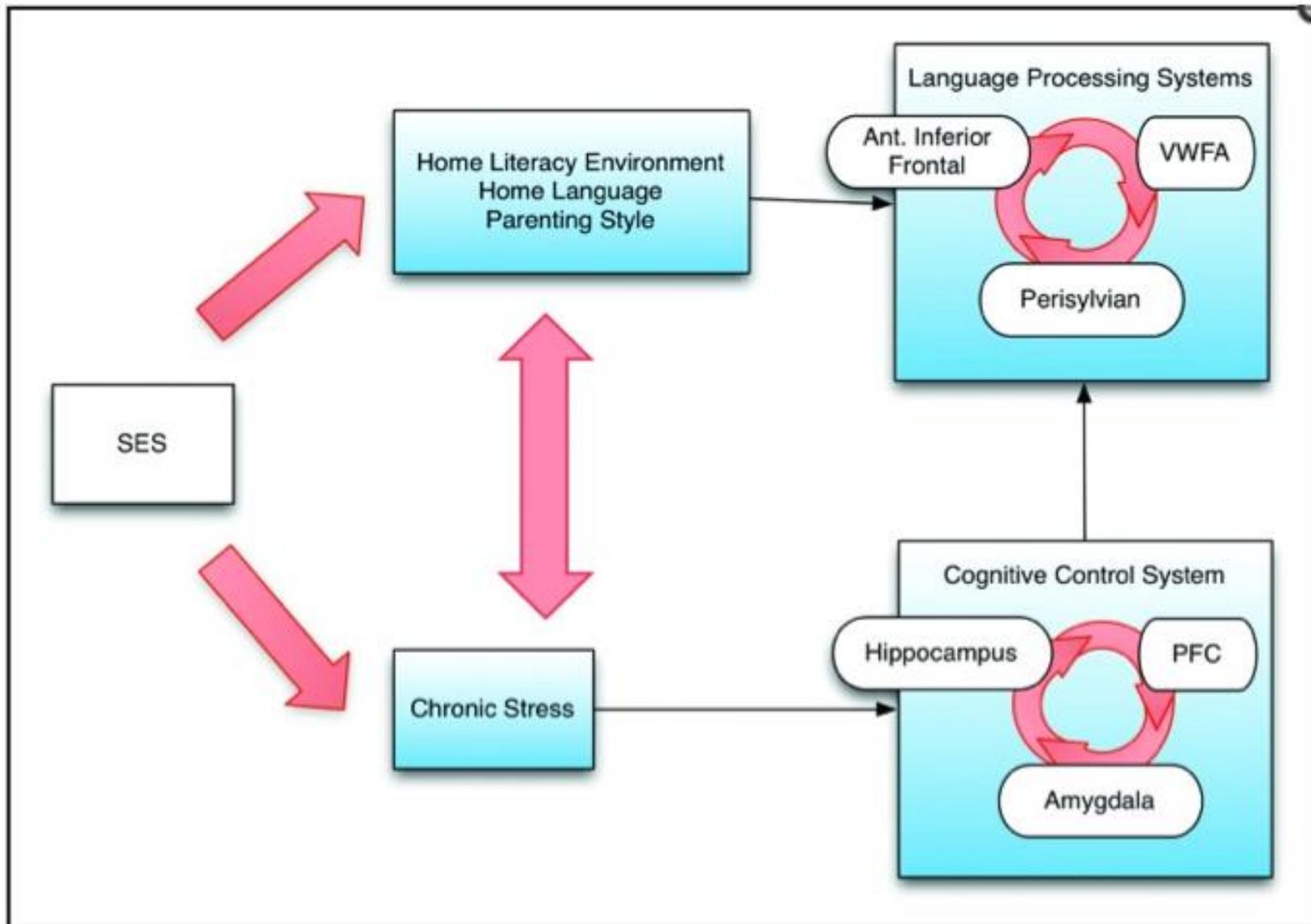


Factors Other Than Money May Matter

“Lack of money alone is not sufficient to put a child at risk for either academic failure or language problems. It is only when lack of money is associated with inadequate nutrition, inadequate medical care or unstable living conditions that poverty becomes a risk factor”.

(Fazio, Naremore and Connell, 1996)

SES, BRAIN and Language





Linking Poverty with Brain Systems Affected in Language Problems (Perkins, Finegood & Swain, April, 2013)

There are three neuroanatomical areas (amygdala, hippocampus and prefrontal cortex) that work together to regulate emotion, in what is termed self control and these areas are also an integral part of healthy language development.(Shaywitz et al., 2008)

Hackman, et al. 2010 identifies these three neuroanatomical areas as vulnerable to effects of low SES.



Stress and Nurturing: Powerful Impacts on the Young Developing Brain (AAAS Briefing, 2012)

When parents spend time talking or reading with a child, the intellectual activity stimulates the brain and helps to activate and build neural connections that link different parts of the brain. Stress can be the counterpoint to nurturing.

Stress causes the body to produce the hormone cortisol and at high levels the stress can become toxic. That can have a direct impact on development of the prefrontal cortex which is the seat of attention, judgment and self-control. The effect is dysregulating. Such stress can leave a physical signature that can be seen on functional brain imaging.

Studies done on the brain function between low-income and higher income children found “highly robust sizeable differences” in the functions of these areas, affecting language, self regulation and working memory.



Poverty & Language Development

(Perkins, Finegood & Swain Innovations in Clinical Neuroscience, April 2013)

Chronic long term poverty of low SES is negatively associated with a variety of mental and physical health outcomes, such as language development.

Indeed, with poverty, disparities in development of language processing are arguably among the most consistently found - with decreases in vocabulary, phonological awareness and syntax at many different developmental stages along with memory and cognitive control mental functions.

Recent research has demonstrated effects of poverty on brain functions and language and executive function areas in particular.



Factors Leading to Cascading Effects on Developing Brain Systems

Mounting evidence suggests that socioeconomic factors—parental education or family income—may lead to differences in the home-language environment or exposure to family stress, which in turn have cascading effects on the development of brain systems that support critical neurocognitive functions such as language, memory and self regulation.

And yet we still do not know the level at which it is most efficacious to intervene.

(Noble, May 2014)

SES, Brain & Language

There is good evidence to show that low SES is a stressful condition associated with deficits in brain physiology in regions associated with typical language development.

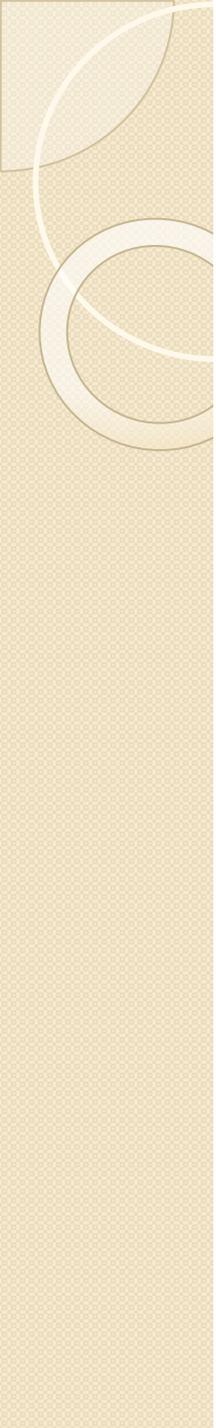
From these studies it may be suggested that social, cognitive and underlying neurobiological influences on reading development are fundamentally related.

(Noble et al., 2006).



Differences in Parent-Child Interactions in Homes of Lower SES

- Quantity/quality difference. Quality is more important than quantity. (Hirsh-Pasek et al.2015)
- Complexity and level of caregiver's language usage and engagement for interaction with the child.
- Differences in parental knowledge related to language development.
- Differences in parent interactional style.



Executive Functioning and Memory

Poverty is also associated with deficits in the psychological underpinnings of language learning which are clearly dependent on executive functioning and memory-both of which are vulnerable to stress.

(Farah et al, 2006; Noble et. al, 2005)

Maternal and/or Environmental Stress

- Maternal stress has been shown to be transmittable to children and to negatively influence infants and small children.
- Multiple sources of stress in the home influence language and cognition (Magill-Evans et al. 2002)
- Stress has been linked to communication and language development. Laplance et al., 2008



Long Term Effects

The result of language delays associated with low SES can have significant far reaching long term effects such as low achievement, mental health issues, high school dropout and low adult income.

On the other hand, a stimulating environment and a sense of security in early childhood can be critically important for healthy brain development, the quality of skills and life prospects of the individual.

European Platform for Investing in Children,2012

Early Adverse Childhood Experiences

While brain development is a natural and sturdy process for many children, early adverse experiences can slow or derail this critical progress. These circumstances are variously called toxic stress, trauma, and Adverse Childhood Experiences (ACEs).

The cumulative impact of these experiences can lead to significant health and mental-health problems over an individual's lifetime.

It is especially troublesome in the first three years of life when the brain is growing the fastest and executive-functioning and self-regulation skills begin to appear. As exposure to these risks increases, the likelihood of developmental delays in the first three years of life grows dramatically.

(Harvard Center on the Developing Child, 2015).

Methods to Mediate the Adverse Effects of Poverty

A parenting style that includes parental warmth, combined with high expectations and clear rules and routines moderates other negative effects of poverty. Parental warmth is associated with positive outcomes including better memory, higher achievement, language ability, better self regulation and eventual higher income (Perkins, Finegood & Swain, 2012)

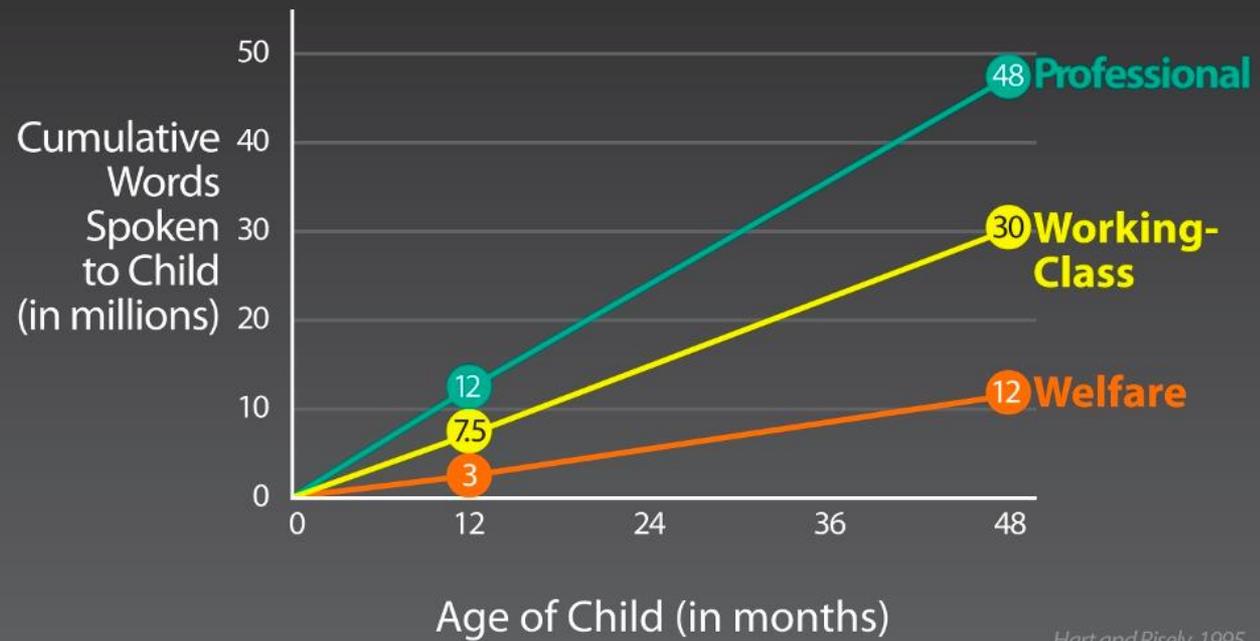
Parental literacy, independent of educational level, may mediate the effects of SES in the development of maternal-infant bonds. (Perkins, Finegood & Swain 2012)

The process of building connections points to the importance of cognitive nurturing. When parents or caregivers spend time talking to or reading with a child, the intellectual activity stimulates the brain, helps to activate and build neural connections that link different parts of the brain. (Griffin, AAAS Briefing, 2012)

“It is speech to the child that matters, not SES. It is important that we give parents knowledge and skills to empower them to help and nourish their child’s brain development” (Fernald, TED talk 2013).

Developmental Trajectory: Vocabulary Input (Hart & Risley 1995)

Cumulative Language Experiences



Hart and Risely, 1995

SES AND Vocabulary Sample: Two Moms

“No, that piece goes here!”

-Low SES mom

“What shape is that piece, can you find a spot that is straight like the piece? Yes, that’s straight but look at the color. Does the color match? No, look again for a straight red piece. Yes, try that one. Good for you. You finished the corner.”

-Middle SES mom

(Woolfolk, cited in Roseberry McKibben 2008)

Language of Poverty

Poverty contributes to linguistic challenges faced by multilingual children because of what we may call “language of poverty”. That is, monolingual children who are reared in poverty receive substantially less input, less varied input and less positive input than their peers in higher SES environments. (Hart & Risley, 1995; Hoff, 2006)

“The result is that their language processing is slower by 18 months of age and that their trajectory for language acquisition is much worse than that of their middle-class peers.”

(Hurtado, Marchman & Fernald, 2008)

Impact of Mother's Educational Background

- The factor most highly related to SES is mother's educational level.
- In terms of educational level of caregiver, research has found that SES is more critical to a child's language development than ethnic background. (Roseberry-McKibbin,2012)
- “The relation of SES to early language also appears within and across different ethnic groups, suggesting that effects of SES are not merely ethnic differences, relabeled.” (Hoff, 2006)

Parenting Style/Quality/Language Environment

- Parent- child interactions have an undeniable influence on developing children at every socioeconomic level. (Perkins, Finegood & Swain, 2012)
- When mother-infant interactions are less positive, receptive and expressive language can be compromised. (Magill-Evans et al., 2002)
- Parenting style has been cited as the single most important factor in explaining the SES gap in cognitive development. (Waldfogel & Washbrook, 2011)

Childhood Experiences are Different for Lower SES

- Children growing up in poverty experience may be more limited in experiences to build background knowledge for language growth.
- Experiences may be limited, so the potential for gaining word knowledge from experiences is reduced.
- Limited economic resources and/or access to outside experiences and enriched environments.
- Early differences in building vocabulary through experiences, have shown that “even a small disadvantage grows into a larger one and becomes difficult to ameliorate without intervention”. (Lovelace & Stewart, 2009)

Early Language Differences Across SES (as reported by numerous researchers)

Infants - 2 years

Differences in number of infant vocalizations during play

Differences in use of gestures in lexicon

Differences in word/conceptual knowledge begins early and continues

Use of less diverse verbal lexicon

Smaller receptive/expressive vocabulary at 3 years of age

2-4 year old's

May produce fewer number and types of complex sentences

Reduced comprehension of complex sentences

Less use of multi-clause sentences

Differences in narrative skills

Metaphonological skills affected.

Language Characteristics of Low SES Children aged 3 years and up

- Overall lower/ different language skills (processing, comprehension, & production)
- Smaller vocabulary size
- Less complex grammatical development (simpler sentences, less syntactic variety)
- Less sophisticated narratives
- Fewer opportunities for open ended questions
- Different language input and experience at home
- Different brain development: “Experience shapes biology.”
- Less opportunity to learn “school language”
- Less opportunity to have developed language underpinnings necessary for math and science.
- Decreased phonological awareness/literacy skills

(Hoff 2013) (Hart & Risley 1995)

Effects of Low-SES on School Success

- Family SES predicts a child's academic skills upon school entry, but also continues to affect that academic trajectory throughout high school.
- Skill differences begin **even before child starts school**, and different language skills are a significant component. Oral language skills are strongly tied to future literacy.
- Nonetheless the effect of low SES on children's early language skills is large, pervasive and robust.

(Hoff 2006)

The Role of SLP

- Understanding sociolinguistic variables and other factors which may impact language trajectories of children from a variety of backgrounds (e.g., cultural, linguistic, socio-economic, ethnic, immigrant status).
- Using knowledge to take a strength-based approach with children.
- Consider using strategies/ materials designed for DLL children for all children with at-risk language concerns.



Understand Factors which Impact Language Development of Children

“The educational performance of children may vary due to many factors: the family’s socio-economic status, educational level of mother, quality of language experiences in the home language, age of exposure to English as well as differences in cultural beliefs and child socialization practices across families.” (Chitester, 2008)



Looking through a strength-based lens at all children and families

- Support home language/ home literacy.
- Family provides the child with “funds of knowledge.” (Sanchez-Lopez, 2013)
- Family engagement practices to be viewed through a “lens of diversity.” (Espinosa, 2014)
- Support of the following concepts-
bilingualism/biculturalism/biliteracy
- Encourage parents to speak their (home) “best” language to their children.

What is a Developmental Language Trajectory?

For young children in the beginning stages of language development:

- Can indicate how child's language develops over time.
- Incorporates many different factors (both intrinsic/extrinsic) to the child.
- Establishes a broad range of what is considered typical language development.
- Allows for individual differences and unique variability.

(Hoff, 2013; Hamayan et al., 2013)



Why Consider using Language Development Trajectories?

The language/early literacy development of children who are culturally, linguistically, socioeconomically diverse can portray an individual based and unique trajectories.

The child's background and developmental characteristics needs to be understood when making judgments about each child's language growth.



Effective Strategies for Promoting Language Development for Monolingual Children's Language can be applied to Multilingual Children (Social Policy Report, Multilingual Children Beyond Myths and Towards Best Practice, 2013)

- More language exposure results in more language learning
- Quantity and quality of parent's child-directed speech predicts vocabulary and processing speed
- A comprehensive language approach to early literacy requires all levels of language should be addressed (vocabulary, grammar, phonology, narrative, pragmatics)
- Parent responsiveness (prompt, contingent, appropriate)
- High quality/rich conversational exchanges between parent/child
- Diversity of parental speech
- Lexical and grammatical properties of input
- Co-construction of narratives with children
- Positive tone (using more referential language, rather than regulatory language)
- Using language within integrated meaningful contexts
- Use of nonverbal behavior (matching gestures to referents)
- Engagement in literacy activities such as book sharing, dialogic reading, etc.

Family Engagement Helps Children to Succeed

- Higher preschool performance and promotion to next grade
- More positive engagement with peers, adults and learning
- Buffers negative impact of poverty on academic and behavioral outcomes

(Harvard Family Research Project, 2006)

AAAS Briefing: Links Between Poverty, Brain Development Raise Key Policy Issues

(July 2012, Edward W. Lempinen)

<http://www.aaas.org/4Nc>

Brain areas such as the prefrontal cortex that govern more complex functions - language, problem-solving, self-regulation and social bonding tend to develop between 1 ½ and 4 years. This really is a crucial period in brain development we need to take full advantage of what we can do for children (at that age) so they reach their full potential. The process of building connections points to the importance of cognitive nurturing by talking reading and providing everyday experiences to the child. (Griffin)

Stressful lives can cause parents to engage less with children, nurturing can offset the effects of stress, in effect making the child more resilient.(Farah)



When Brain Science Meets Public Policy: Strategies for Building Executive Function Skills in the Early Years

(Institute for Child Success, by Janice Gruendel, PhD, Jan 2015)

Scientific advances over the past decade confirm how critical a child's first five years are to health, well-being and early school success. One key area of growth during this period-executive functioning and self-regulatory skills-sets the stage for subsequent learning and successful adult outcomes.

Unfortunately, these skills are thought to develop between the ages of 18 months and four years, long before most early education and educational policies are focused.