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# Key Elements of Poverty Influencing Language Development and Academic Achievement

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# KEY ELEMENTS OF POVERTY INFLUENCING LANGUAGE DEVELOPMENT AND ACADEMIC ACHIEVEMENT

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Abstract

This paper investigates central issues surrounding poverty and how it influences a child's language development and academic achievement. It examines the differences in amounts of language input in the home environments of children from varying socioeconomic statuses and how this shapes their language acquisition. The research also explores the exposure to prenatal teratogens in addition to environmental toxins associated with poverty that may play a role in disparities in development, such as lead exposure. Furthermore, the issue of unequal healthcare and educational access between individuals of differing income levels is addressed. Ultimately, the purpose of this research is to call attention to the widening achievement gap and the unjust circumstances that impoverished children face, which have the potential to significantly impede their language skills and performance in school.

*Keywords:* poverty, language input variation, environmental toxins, unequal access

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# INTRODUCTION

In the words of Noam Chomsky (1972), a prominent linguist and cognitive scientist, "When we study human language, we are approaching what some might call the 'human essence,' the distinctive qualities of mind that are, so far as we know, unique to man" (p. 88). Language, the "human essence," pertains to what is spoken, read, written, understood, and gestured (Hamaguchi, 2001). Our world is surrounded by language. Approximately 7,000 languages exist that are employed by humans as we communicate with our family, co-workers, and friends (Bleile, forthcoming). We communicate by talking face-to-face, sending emails, talking on the phone, texting, and writing letters. We hear language as we listen to the radio, watch a movie, or overhear the conversations of those nearby. We talk to our pets, to ourselves, and even out loud during our sleep. Language is inescapable, and it is the means by which we communicate our thoughts, feelings, values, and ideas as we build relationships and seek to understand and be understood (Fromkin, Rodman, & Hyams, 2011).

*Imagine being in a foreign country with no prior experience or exposure to the native* language and no one to help translate. Imagine the feelings of helplessness and utter isolation in being surrounded by such strange sounds and unfamiliar symbols. A scenario such as this demonstrates the impossibility of thriving in a society without knowing its language. We need language for survival, everyday functioning, and success in school. In fact, children with strong oral language skills tend to be more successful learners because oral language is used as a foundation for learning how to read and write. Fluent oral language enables a child to communicate thoughts and ideas, and ask questions for clarification. Language comprehension facilitates learning as it influences children's ability to understand their teachers' explanations and instructions. Language comprehension is crucial for the ways in which it allows children to absorb information and obtain knowledge. Furthermore, language competency is important for children's skills in social interaction. Understanding how to

differentiate the use of language in a variety of settings influences their ability to request assistance from teachers in addition to successfully participating in classroom activities. Language impacts peer relationships, and according to Otto (2006):

> Children who have difficulty communicating may be ignored by peers or excluded from informal social or collaborative interactions. The inability to participate successfully in a conversation or the inability to articulate the sounds in words clearly may decrease the likelihood that other children will attempt to speak or play with them. (p. 19)

In order to demonstrate the importance of oral and written language and how they are interrelated, a study was conducted by Loban in 1976. In this study, Loban followed 211 children as they progressed from kindergarten to 12$^{th}$ grade. Each year their reading, writing, listening, and additional language-related behaviors were studied and assessed. The kindergarten children in the group with high-language abilities were stronger in expressing their ideas and engaging in conversation, exhibited more extensive vocabularies, and displayed higher reading and writing competencies (Otto 2006).

Without a doubt, language is a fundamental component for normal functioning. The process of acquiring language is also a critical period in a child's development. The age-old controversy over nature versus nurture applies to language development: Do children's experiences in their environment determine their acquisition of language, or are they preprogrammed for it?

**Purpose**

This paper explores the relationship between language development and poverty. It investigates whether or not children from an impoverished or low-socioeconomic status background are at a greater risk for delayed or impaired language development. Additionally,

it seeks to determine some of the key factors leading to a disparity in the language acquisition of children in varying socioeconomic statuses.

In order to first establish an understanding of language development, an explanation will be given on what takes place at the neurological level when humans are acquiring language and how we progress during the stages of language development. Next, poverty will be defined, and statistics will be presented on the prevalence of poverty in the United States, in addition to giving a picture of what poverty looks like in the lives of Americans. Upon providing this information, the paper will explore four areas of poverty that may contribute to a delay in the language development and lower academic achievement of low-income children. These include the following: language input variation; teratogens, or substances that may interfere with a developing fetus; toxicity in the environment; and unequal healthcare and educational access. This paper will analyze the influence of these factors on language learning and school performance, and it will strive to draw conclusions about how this may negatively impact a low-income child.

**Methodology**

Research consisted mainly of extensive literature review. The topics of both poverty and language development are extremely dense, and many studies have been conducted addressing both issues. Due to limited time, resources, and expertise, I chose to examine the information and studies published by other researchers on this topic. Primary search engines or databases include Google Scholar, PubMed, PsycINFO, and ComDisDome, which is a tool covering research within the fields of speech-language pathology and audiology. Using these databases, I conducted searches using the following keywords: "language development and poverty," "teratogens and language development," "poverty and unequal healthcare access," "poverty and language input," "lead exposure and language," etc. When reviewing the articles, I paid close attention to the authors' explanations of how the different factors

(language input variation, teratogens, etc.) may interfere with language development. I also looked for articles presenting objective information and including limitations of their research. Upon completing the literature review, I sought to piece together the different research results to determine if they support the argument that children reared in poverty do indeed experience greater developmental delay in language in comparison to middle- and high-socioeconomic status children.

# REVIEW OF LITERATURE

## Neurological Basis of Learning

Years of research have revealed that there is an inseparable and interconnected relation between children's genetic predisposition to language learning and the environment in which they are reared (Otto, 2006). The two central ideas revolving around the process of language development are that the majority of the brain development takes place after birth, and language development is a result of the brain and the environment interacting and working together. At birth, a baby's brain is about one-fourth of its adult size. Within the first three years of life, 85% of the adult weight is achieved, and the remaining growth is completed as a young adult (Bleile, forthcoming).

At the neurological level, knowledge and learning occurs when cells connect. Although the human brain is prewired for language development, the early experiences are what facilitate neural connections (Otto, 2006). One brain cell is capable of connecting to between 12,000 and 15,000 other brain cells. Each of these cell connections makes it possible to learn, remember, think, and stretch our brain's capacity. There are two basic processes in which cells connect: selective elimination and growth and elaboration. In the late 1980s, a scientist by the name of Norman Geschwind introduced the idea of pruning, which is now referred to as selective elimination (Bleile, forthcoming). As McLeod and Bleile (2003) explained, "in areas of the brain responsible for speech learning as in other domains, a brain begins with 'extra' cell connections" (McLeod & Bleile, 2003). In selective elimination, the brain prunes and eliminates unused cells while strengthening those in use. This allows the brain to be shaped to the environment in which the child lives.

In all of the world's languages, there are approximately 600 consonants and 200-300 vowel sounds. The remarkable thing about the brain being prewired for learning language is that babies are born with the capacity to hear all of these sounds. However, during the process

of selective elimination, babies lose the ability to perceive sounds they are not exposed to, which is consistent with the "use it or lose it" principle. This principle is demonstrated in looking at second language acquisition of Asians learning English and vice versa. A Chinese speaker has difficulty perceiving a difference in the sounds /l/ and /r/, although it is readily noticeable for an English speaker. Thus, the words "pray" and "play" would both be distinguished and pronounced as "play." In turn, an English speaker has a hard time distinguishing the tones that characterize the Chinese language, while it is second nature for a Chinese speaker to hear them. Without exposure to other languages during the first year of life, the perceptual areas matured and, due to selective elimination, the ability to perceive sounds outside of their native language was lost (Bleile, forthcoming).

As McLeod and Bleile (2003) stated, "Approximately one-third of cells are lost between birth and adulthood. Selective elimination occurs early in sensory areas and later in areas involved in higher cortical functions. The number of cell connections remains stable throughout much of adulthood" (p. 1). For example, the auditory cortex achieves a mature number of synapses around the age of 6-12 months. As a result, a child will already have adult-like hearing abilities at this age, which is important for hearing and learning the accurate production of different words. On the contrary, higher cortical functions that take place in the prefrontal lobe and influence speech and language, including planning and high order reasoning, reach maturity at age 25 for women and 30 for males (Bleile, forthcoming).

In a second process called growth and elaboration, cells connect at the neural synapses as learning occurs, including connections needed for learning speech and language (Bleile, forthcoming). When the brain and environment work together, "The sights, sounds, smells, touches, language, and eye contact help the brain connections take place" (Otto, 2006, p. 36). An enriched environment facilitates cell connections, whereas environmental deprivation impedes them (McLeod & Bleile, 2003). As we age, the number of brain cells decreases, but

the number of connections with other brain cells drastically increases given the fact that a single cell is capable of connecting to up to 15,000 other cells. Practically applied, when comparing the number of synapses between the brains of two different people, an individual with a doctorate will have far more synapses than that of a high school graduate (Bleile, forthcoming). Because of the brain's ability to increase a neuron's number of synapses, humans have the capacity to enjoy lifelong learning (McLeod & Bleile, 2003).

**Regions of the Brain Involved in Learning Language**

There are several other major aspects of brain development that are influenced by a child's growth and interaction with the environment. Myelin sheath is a fatty, white substance that speeds the conduction of electrical impulses and acts as an insulator. Before the end of the first year of life, approximately 90% of myelin is laid down. The remaining 10% is completed between the ages of 1 and 18. Without myelin sheath, speech and other motor activities would be very slow and difficult (Bleile, forthcoming).

Wernicke's area is "a functional region in the left temporal lobe critical for language comprehension" (McLeod & Bleile, 2003, p. 1), which reaches a mature number of synapses during the second half of the child's first year of life. Because of its early maturation, an infant's ability to perceive speech becomes advanced starting at a young age. On the other hand, Broca's area, which is located in the left frontal lobe and is responsible for speech production, does not mature until a child is between the ages of 6 and 8 years. As a result, there is an initial gap between a child's advanced ability to perceive or understand speech and their limited ability to produce speech. Not until a child's early years in school will his speech production become more adult-like (Bleile, forthcoming).

The hippocampus is "critical to working memory and such important speech activities as memory retention and word retrieval" (McLeod & Bleile, 2003, p. 2), which achieves a mature number of cell connections around 18 months. During the period in which the

hippocampus develops, more words are being acquired and language acquisition overall is speeding up. The prefrontal cortex is very important to cognitive abilities influencing speech and language, including judgment, planning, higher order reasoning, and organization. Again, this area of the cortex develops slowly and reaches maturity at age 25 for females and age 30 for men (Bleile, forthcoming).

**The Stages of Language Development**

In the first year of life, an infant learns the foundations of language. The infant learns basic, fundamental things while listening and making sounds during daily routines of playing, changing diapers, eating, and being held. As Otto (2006) stated, "This process of getting an infant's attention and maintaining that attention in a communicative interaction is critical to creating a setting in which linguistic exchanges can occur" (p. 96). As the infant experiences these interactions with adults and children, his brain begins to be shaped toward learning language. Also during the infancy period, sensory and motor areas important for discovering and learning about the environment are developed. This enables the infant to perceive sounds in his or her community's language and begin to produce sounds resembling those of the language's consonants and vowels (Bleile, forthcoming).

Prespeech vocalizations are stepping stones to a child's eventual speech development. A major milestone during infancy is when the infant babbles. In normal development, a child begins to babble around the age of seven to eight months. Babbling is an important step toward speech development because it sets the foundation of organizing vowels and consonants into syllables. These syllables are building blocks for children's first words a few months later. Additionally, babbling sounds start to mimic the language surrounding the baby, which shows that he is starting to adapt to the environment. When infants begin life, they produce sounds only while breathing and wriggling about. By the end of infancy, they are able to produce a small amount of vowels, consonants, stress patterns, and syllables.

Through the process of growth and elaboration, perception and production become connected as a link is established between Broca's area (speech production) and Wernicke's area (language comprehension). The infant begins to learn that sounds have a special relationship to meaning, and upon repeated exposure to certain words, the infant learns the meaning of particular words. Furthermore, infants begin to understand the "my turn-your turn" process of having a conversation (Bleile, forthcoming).

Between the ages of 12 and 24 months, the hallmark of the toddler period is word learning. Because the hippocampus is developing, which is responsible for laying down memories, the toddler is able to retain and remember words. Although Broca's area, critical for producing language, is still largely undeveloped, the toddler increasingly communicates using words to express wants and feelings. Perception continues to develop, enabling the toddler to tell word meanings apart based on the sequence of sounds. The oral tract also becomes much more adult-like, which is important for speech development. At the age of 12-13 months a toddler's vocabulary may consist of two to three words. However, by the time the toddler reaches 16 to 18 months, words become the main form of communication, and the vocabulary will have grown to 200 to 300 words by 24 months. A link between advanced perception abilities and limited speech production abilities develops: for example, a toddler may understand "boot" when the word is spoken because his speech perception is mature. However, because of his limited ability to produce speech, he may delete part of the word and say "boo." Other examples of toddlers simplifying words because of their minimal production abilities include repetitions (i.e., "wawa" for "water") and substitutions (i.e., "weed" for "read"), (Bleile, forthcoming).

Between the ages of two and five years, a preschooler's language development accelerates while learning the rules that underlie language in addition to speaking in sentences, telling stories, and following directions. During the preschool years, a child's

vocabulary expands rapidly at a rate of nine new words per day. At four years, not only will a preschooler's vocabulary grow to around 1,500 to 2,000 words, but his or her speech is also 100% intelligible, or comprehensible. By the time a preschooler turns five, 90% of the language's grammar and major speech elements are mastered. As preschoolers begin to encounter less familiar people, they are put in positions where they must acquire and use new words to communicate effectively. This challenges their speech production, allowing them to grow and expand in both their vocabulary and their ability to interact and socialize in different contexts. Now that the child is rapidly acquiring language, he has a firm foundation and is ready for reading acquisition. The next stage of language development is the school years. As Bleile (forthcoming) stated, "The school years is an active period in speech development: a student learns to read, masters a language's most challenging consonants and consonant clusters, learns to pronounce reading-based vocabulary, and comprehends and uses increasingly complicated intonation and stress patterns in discourse" (p. 3)

**Language Disorders**

The process of language acquisition is indeed complex and extremely important in a child's development. Unfortunately, not everyone is able to learn language equally well as many individuals experience language problems and disorders. Hicks (1996) defined language disorders as an impairment in "comprehension and/or use of a spoken, written, and/or other symbol system. The disorder may involve (1) the form of language (phonologic, morphologic, and syntactic systems), (2) the content of language (semantic system), and/or (3) the function of language in communication (pragmatic system), in any combination" (p. 10). Children with any form of language disorder may experience significant language deficits in comparison to environmental expectations and performance levels of children who are on the same developmental level. For example, some may have receptive language problems and experience difficulty comprehending and understanding language, whereas

other children may have expressive language problems, resulting in trouble articulating and using language to express what they mean (Hamaguchi, 2001). Not only are these language deficits large enough to be noticed by parents and teachers, but they also affect "how the child functions socially or academically in the world in which he or she lives" (Paul 2007, p. 4).

Communication disorders certainly exist in the United States; in fact, 21% of children of the ages 3 to 21 receiving services under the Individuals with Disabilities Education Act, Part B (services for school-aged children) do so for speech and language disorders. Furthermore, 50 to 70% of high school students who had speech disorders as a child experience academic difficulty. Given the significance of language and communication, "A communication disorder, including one in speech, can significantly affect education, employment, and the well-being of an individual" (Bleile, forthcoming, p. 30).

There are three reasons as to why a child may experience difficulty making cell connections necessary for speech and language learning: normal variation, physical damage, and environmental deficits. In normal variation, children may simply exhibit differing levels of ability to make cell connections for speech and language learning, just like there are varying levels of capability in other activities such as music, sports, and mathematics. Physical damage includes medical or developmental limitations in making cell connections, such as Down syndrome or Rett syndrome, in addition to the disruption or reduction of cell connections due to traumatic brain injury. Finally, an environmental deficit means that a child's environment was not enriched enough to stimulate cell connections crucial for speech and language learning (Bleile, forthcoming). The relationship between physical damage and environmental deficits as a result of poverty and its impact on language development will be basis of this paper.

The three reasons mentioned for impeding synaptic conditions have resulted in the formation of several subgroups of the general population that are especially vulnerable to language developmental delay. Some of these subgroups include those born with genetic conditions, prenatal drug exposure, low birth weight, and premature birth. In such cases, the health conditions of these infants increase their risk for experiencing both language and learning delay. Additionally, infants confined to a hospital nursery due to illness may not receive as much stimulation from their parents as infants who are born in good health, which may disrupt facilitating language development. Autism is also a developmental disorder characterized by delayed development of language skills and little use of language for social interactions (Plante & Beeson, 2008).

According to the World Health Organization (WHO) Report on Disability (2011), *speech and language difficulties are considered a disability. As the WHO (2011) described,*

> Disability is the umbrella term for impairments, activity limitations and participation restrictions, referring to the negative aspects of the interaction between an individual (with a health condition) and that individual's contextual factors (environmental and personal factors)...Disability results from the interaction between persons with impairments and attitudinal and environmental barriers that hinder their full and effective participation in society on an equal basis with others. (p. 4)

In addition to communication, a disability encompasses a wide variety of conditions, including seeing, hearing, mobility, cognition, and self-care. The environment plays a huge role in the severity of individuals' disability, and the likelihood of negative attitudes toward the disability may subject them to inequalities. For example, people with disabilities are at a greater risk of being denied equal access to health care, education, and employment in addition to discrimination and reduced accessibility (World Health Organization, 2011).

**Poverty Defined**

A large factor in the onset of disability is poverty. According to the WHO (2011), "Disability is a development issue, because of its bidirectional link to poverty: disability may increase the risk of poverty, and poverty may increase the risk of disability" (p. 10). Unfortunately, increasing amounts of evidence are revealing that people with disabilities are at a greater disadvantage economically and socially than those without a disability. Reasons for such include how they are discriminated against in employment, are less likely to attend school, and have greater costs as a result of their disability including medical bills, assistive living devices, and personal care. Not only do people with disabilities experience a lack of material resources, but they are also disempowered socially. The WHO (2011) featured a young student by the name of Jackline who shared:

> What makes me to feel not included in this school is because my parents are poor, they can't provide me with enough books. This makes my life difficult in the school. They also can't buy me everything which I am supposed to have, like clothes. Being in school without books and pens also makes me feel not included, because teachers used to send me out because I don't have books to write in. (p. 20)

Jackline's description of her experience with poverty helps depict what poverty is and what it looks like. Defined, poverty is economic or income deprivation, and it can be viewed in both absolute and relative measures. Absolute measures of poverty are constant over time and define an absolute needs standard. Below this level of income a person or family is at risk for being without adequate food, shelter, or clothes. However, relative measures of poverty were defined by Iceland (2006) as conditions of "comparative disadvantage, to be assessed against some relative, shifting, or evolving standard of living" (p. 21). Relative poverty takes into account the acceptable quality of life changes that take place over time and the necessities required for living a normal life in society. As Galbraith (1958) stated:

> People are poverty-stricken when their income, even if adequate for survival, falls markedly behind that of the community. Then they cannot have what the larger community regards as the minimum necessary for decency; and they cannot wholly escape, therefore, the judgment of the larger community that they are indecent. (p. 251)

In order to further demonstrate the meaning of relative poverty, one can consider how in some countries it is viewed as a luxury to own a car, but in other countries, the majority of families may own a car. In the latter example, it may be necessary to own a car in order to commute to work, especially in a city with fewer public transportation options. This kind of situation, then, would be taken into consideration when determining the income level of relative poverty. Relative poverty measures may rise as a society's standard of living rises, and these figures are valuable in demonstrating income inequality (Iceland, 2006).

The United States official poverty measure in 2000 revealed that 11.3% of all people were poor. The relative poverty measure indicated that this figure was 17%. Poverty encompasses a number of circumstances, including food insecurity, financial instability, insufficient health care, inadequate child care, housing problems, etc. Although the United States has the highest Gross National Product per capita in the entire world, both the absolute and relative poverty levels are higher than most other rich countries across Europe (Iceland, 2006). Given the prevalence of poverty within our country and the negative consequences that result, it is imperative to focus our time and attention on this significant issue.

**Poverty and Cognitive/Language Development**

According to Iceland (2006), "Children raised in poor families are less healthy and worse off in terms of their cognitive development" (p. 2). In fact, the World Health Organization (2011) explained that children who were at a greater risk of disability also came from poorer households. In general, the relationship between poverty and cognitive

development is well understood based on earlier studies. In fact, in 1981 Ramey and Finkelstein's work showed that by the age of two, children from a low socioeconomic (low-SES) background already begin to score lower when participating in standardized tests of intelligence. In 1997, Smith et al. investigated the influence of poverty on cognitive potential and found that children living in families with an income falling below .5 of the poverty level had IQ scores six to 13 points lower than children whose family income was 1.5 to 2 times the poverty level (Petterson & Albers, 2001). Finally, a study conducted by the Economic Policy Institute revealed that high socioeconomic (high-SES) children's average cognitive score was 60 percent higher than that of children in the lowest SES group (Arrighi & Maume, 2007). Arrighi and Maume (2007) further stated:

> Children from lower socioeconomic backgrounds are intertwined in a matrix of negative physical and social factors- food insecurity, dilapidated housing, violent neighborhoods, lead paint poisoning, lack of health and dental care, asthma, perhaps homelessness- education is some nebulous thing vying for their attention. Kids living in impoverished families live in the practical world, a concrete world; their lives revolve around scrounging for money for rent, food, gas, heat, water, clothing...Children living in poverty arrive at school prepared for 'concrete' thinking, not the abstract- what Bordieu calls 'symbolic mastery' that children of higher socioeconomic status (SES) are prepared to tackle. Because higher SES families have a surplus of resources to ensure their basic physical needs, their children are able to turn their attention to higher-level thinking. (p. 1)

Language is one of the primary cognitive functions, and over the years research has consistently supported that cognition is heavily influenced by poverty. Although the relationship between poverty and cognition is relatively well understood, researchers have much more ground to cover in terms of how poverty and language development are

interrelated. If poverty does negatively influence language development, one can only speculate as to the reasons behind it. As Ginsborg (2006) stated, "There has long been concern that children from low-SES backgrounds underachieve academically in comparison to more privileged children. Academic underachievement has often been attributed to language skills inadequate for accessing the curriculum (p. 10)." Ginsborg (2006) further explained that a family's level of income is more accurate in predicting a five-year-old's non-verbal and verbal IQ than other prevalent factors including ethnicity, single motherhood, and maternal education. Studies by Ginsborg (2006) as well as Locke, Ginsborg, and Peers (2002) have also suggested that children reared in low-SES environments have a stunted rate of vocabulary growth and higher rates of expressive and receptive language delay than children from mid- and high-SES backgrounds.

**Language Input Variations**

Researchers are exploring the underlying causes of such language disparities. One important observation is that there are variations in the language environment of low-, mid-, and high-SES backgrounds, which influence the rate and quality of a child's language acquisition. As discussed before, the "quantity and quality of the stimuli in the linguistic environment in which the individual interacts have a major impact on the acquisition of language" (Otto, 2006, p. 39). Language is acquired through interaction with the environment, especially as a mother and child interact with each other. Words are learned more quickly the more frequently children hear a word, which supports how children are more likely to learn the words they hear their parent(s) say the most often. In fact, based off of a study in 1998 by Bornstein, Haynes, and Painter, Ginsborg (2006) explained that "the size of children's comprehension and production vocabularies was related to the number of word types used by their mothers when talking to them as well as their [mean length of utterance, or] MLU" (p. 13). It is oftentimes the reality that a low-SES mother has less time

and energy to play or engage her child in conversation, which may impede language development.

In order to demonstrate SES-related differences in the quantity of child-directed speech, Hart and Risley (1992, 1995, 1999) conducted research on 42 children and their families. Thirteen families were identified as belonging to the professional class; 23 were categorized as working class; and six were receiving welfare benefits. Researchers visited each family once a month as the child aged from eight months to three years, and every utterance was documented during this hour-long visit. Upon compiling their data, the average number of words spoken each hour to children was assessed. Strikingly, a total of 2,100 words were addressed each hour to children from professional families; 1,200 words were spoken to working class children; and 600 words were addressed to the children in welfare families. Adults in professional families also spent twice as long interacting with their children as the adults in welfare families. Not only did the quantity of words differ between families of different classes, but the nature of their interactions, as well. Ginsborg (2006) explained, "In professional families, affirmative feedback was offered more than 30 times. In working-class families, affirmative feedback was offered 15 times. However, in welfare families, affirmative feedback was offered only six times per hour, and children were twice as likely to hear a prohibition" (p. 14).

Bleile (2010) shared the cumulative amounts of child-directed speech over the course of an entire year. Children reared in a professional class home environment have 11 million words spoken to them in a year; working class children have six million words addressed to them in one year; and children raised on welfare have three million words spoken to them in a year. Furthermore, in the professional class a child will receive 166,000 encouragements versus 26,000 discouragements; a working class child will have 62,000 encouragements versus 36,000 discouragements; and a welfare child will receive 26,000 encouragements

versus 57,000 discouragements. As expected, the result of Hart and Risley's study revealed that children's vocabulary expansion was positively correlated with the amount of language input they received. Hart and Risley (1999) concluded their study in explaining that "the most important difference among families was not the relative advantages conferred by education and income but the amount of talking the parents did with their children" (p. 181).

An additional study examined the significance of children's early environments on language development. From 1998 to 1999, the expressive and receptive language skills of 240 children enrolled in four primary schools located in areas of economic deprivation were assessed and compared to the general population. When Locke et al. (2001) considered age-equivalent language scores, they explained that "very nearly half experienced moderate, moderate-to-severe or severe receptive or expressive language delay, and well over half experienced moderate, moderate-to-severe, or severe overall language delay...The data from this study support existing evidence for a link between low socio-economic status and language delay" (p. 9, 11). These findings also suggest that young children's early linguistic environments have a long-term influence on their language development and academic performance because language skills lay the foundation for effective writing, reading, and spelling. Although these individuals have the potential to reach language developmental norms, they have "lacked the input and opportunities to acquire vital linguistic skills" (Locke et al., 2001, p. 13), which puts them at a disadvantage for developing strong language skills and overall educational progress.

There are many interventions in the United States, such as Project Head Start, to address issues such as the disparity in language input to children across varying socioeconomic statuses and the potential harmful effects of their economic disadvantage. Hart and Risley (1995) argued, however, that the lowest-income child would require a minimum of 41 hours of high-quality intervention each week in order to be addressed the

same amount of utterances as the highest-income children. Despite these enormous differences in children's language environments, many researchers are optimistic that low-income children may grow and acquire language at an equally proficient level as high-income children if, through intervention, they are able to take full advantage of the oral and literacy opportunities that are offered (Ginsborg, 2006).

**Maternal Depression**

Supporting Ginsborg's findings that a low-SES mother has less time and energy to spend speaking to and interacting with her children, Petterson and Albers (2001) further explored the joint impact of poverty and maternal depression on young children. In their research they found that poor mothers are "more likely to experience psychological problems compared with other women" (Petterson & Albers 2001, p.1795). In one particular study, researchers found that almost half of low-income mothers reported to have depression. Additionally, Liaw and Brooks-Gunn (1994) discovered that 28% of poor mothers had high maternal depression in comparison to 17% of nonpoor mothers (as cited in Petterson & Albers, 2001). The Children's Defense Fund (2006) found even more alarming statistics and shared that low-income women are two times more likely to experience depression than middle- and upper-income women. These increased levels of maternal depression are of concern to a child's language and cognitive development and social interaction abilities because as Wilson (1974) found, poor parents experiencing high levels of stress reported to be less happy and involved in the lives of their children than poor parents with less stress (Petterson & Albers, 2001). As demonstrated before, parental involvement and high levels of language input is imperative as the child is acquiring language and developing cognitively.

Clearly, a mother's psychological state of being heavily influences both the quality and quantity of stimulating interactions with her children. As Petterson and Albers (2001) shared, "Compared with nondepressed women, depressed women's maternal behavior is

variously characterized as less responsive, more helpless, hostile, critical, alternatively disengaged or intrusive, disorganized and less active, avoidant of confrontation, and generally less competent" (p. 1795). Evidence in a study by Longfellow, Zelkowitz, and Saunders (1982) further revealed that very depressed and poor mothers yelled and hit their children more often in addition to having less nurturing communication and tendencies (as cited in Petterson & Albers, 2001).

Unfortunately, economic stress is notorious for disturbing a parent's mood and behavior. In turn, these financial stresses exacerbate parents' challenges in child-rearing, which leads to deleterious consequences on a child's development. Infants of depressed mothers are found to spend less time looking at their mother, engage less with toys and other objects, and have a more insecure attachment to their mother. Overall, "These higher levels of depression among poor mothers are of concern because maternal depression is associated with a host of adverse outcomes in infancy, such as language and cognitive problems" (Petterson & Albers 2001, p.1795). Language acquisition is contingent upon an environment in which a child is bathed in constant interactions and stimulation, and research supports the fact that a depressed mother is less likely to have the means to provide this for her children.

**Reading Books with Children**

Another important component of parent-child interactions is reading books together. Through book reading, children are taught the syntactic structure of language and are introduced to new vocabulary words that normally do not come up in daily conversation. When parents read to their children, interactions are not limited to the text as books provide an opulent context for discussing the content of the book. Wasik and Bond (2001) explained that "children whose parents engage in conversations that go beyond the explicit information presented in the story performed better on vocabulary measures as compared with children whose parents focused primarily on the explicit message of the story" (p. 1). Reading and

dialoging about the story's plot and characters invites children to participate in high-level conversations and expand their vocabularies.

In 1991, Hoff-Ginsberg studied the interactions of mothers with their children from both working and upper-middle class backgrounds. The observations of these interactions took place in four different settings: while dressing, eating, playing with toys, and reading books. Of the four settings, Hoff-Ginsberg (1991) noted that "reading stood out as the most different...mothers' child-directed speech had the greatest lexical diversity, the greatest syntactic complexity, and the highest rate of topic-continuing replies" (p. 793). In a setting where mothers read their children books, Hoff-Ginsberg also observed that it was among the highest settings in regards to the overall amount of child-directed speech, which supports how reading to children is a crucial component of language development.

In the case of children reared in poverty, there are fewer opportunities to be read to. In fact, in 2006 the Children's Defense Fund reported that poor children are three times less likely to be read to than non-poor children. One of the primary reasons for this is because children reared in poverty have far less access to material resources, including books. When families are struggling day to day to even put food on the table, purchasing books and other academic resources gets moved to bottom of the priority list. Think back to Jackline's powerful confession featured by the World Health Organization (2011) of why she feels excluded and left out in school: her parents are unable to buy her books, pens, clothes, and other school supplies essential to learning and growing. On the other hand, higher-income children have a plethora of opportunities to explore and take advantage of the resources in their environment. In fact, as the Children's Defense Fund (2006) explained, "children from the top fifth of all families have three times as many books at home, are read to more often, watch far less television, are four times more likely to have a computer in the home, and are more likely to visit museums or libraries" (p. 3).

These statistics pertaining to maternal depression, access to resources, and child-mother interactions through book reading are in no way meant to portray low-income parents as immoral, lazy, or insufficient to raise their children. Regrettably, this is the misinformed opinion and attitude that many individuals hold not only in the United States, but worldwide. Jonathan Kozol, a widely-renowned author and advocate for social justice, continually addressed this problem in his 1995 book; *Amazing Grace.* In this book, Kozol recounted his riveting experiences and eye-opening conversations with residents of the South Bronx, an area of New York City ravaged with pollution, poverty, crime, and overpopulation. To demonstrate these misconceptions toward poor people, Kozol (1995) shared a quote from his interview with Lawrence Mead, a political science professor at New York University: "If poor people behaved rationally, they would seldom be poor for long in the first place" (as cited in Kozol, 1995, p. 21). Mead represents the misinformed opinion that many individuals hold about how poor people's socioeconomic status can be blamed on their "behaviors." However, the purpose of presenting these statistics and findings must instead draw attention to the many stresses and obstacles they must overcome to provide for their children. When Kozol (1995) interviewed a South Bronx security director, he shared,

> If you ask some tenants, "Is your life worth living?"...some of them, I think, might not know how to answer. Some, too, walk right through the gloom without it touching them. Others won't let you get inside of them to know. The depression is always there, though, as an undercurrent, and sometimes it's not just an undercurrent. Sometimes it's so thick it feels like you could cut it with a knife. (as cited in Kozol, 1995, p. 63)

**Prenatal Drug and Alcohol Exposure**

In the myriad of factors that greatly influence a child's speech and language development, an additional factor poses a serious problem: prenatal drug or alcohol exposure.

Between 36 to 41% of pregnant women in the United States use alcohol, illicit drugs, or smoking at some point in their pregnancy (Bleile, forthcoming). Research has consistently shown that such consumption often causes brain abnormalities and cognitive impairment, which may delay language development. Although drug and/or alcohol addiction doesn't recognize socioeconomic status, individuals living in poverty are at a greater disadvantage because they have little to no access to prenatal health care or treatment for their substance abuse. When combining the effects of prenatal exposure to teratogens such as alcohol, drugs, and smoking with poverty, the outcome may be more harmful to the child's health (Cone-Wesson, 2005).

Fetal alcohol syndrome (FAS) is a result of alcohol, a fetal toxin, causing abnormal development of the fetus. Physical features that are readily perceived on an infant with FAS include epicanthal folds, a beak-like nose, a thin upper lip, a broad nasal bridge, and a flattened midface. Cognitively, a child with FAS may experience weaknesses or disabilities in "arithmetic skills, spatial memory and integration, verbal memory, attention, problem-solving, grammar, information retention and comprehension, and reading" (Cone-Wesson, 2005, p. 282).

The auditory system is also adversely affected by alcohol exposure, which was demonstrated in a study by Strasnick and Jacobson (1995) who fed ethanol to rodents during their pregnancies. In this study, they found that 18 to 20% of the offspring experienced sensorineural hearing loss because the alcohol exposure damaged the cells developing into the auditory nerve. The amount of data representing the relationship between FAS and sensorineural hearing loss in humans is limited. However, two clinics in Denver and Detroit found that 10 out of 36 (28%) of the children with FAS also experienced sensorineural hearing loss. Even more alarming, 83% of these children were reported to have conductive hearing loss. In concluding their Denver-Detroit study, Church and Kaltenbach (1997)

explained that impaired hearing may help lay the foundation for language deficits in children with fetal alcohol syndrome: "Such a hearing disability can make language seem chaotic and incomprehensible and can lead to speech and language pathology, inattention, learning problems, and disruptive behaviors" (p. 508).

Language stimulation and an enriched environment may ameliorate the negative effects of prenatal alcohol exposure. However, certain stressors, such as financial instability and higher instances of family violence are oftentimes factors that drive mothers to use alcohol before and after pregnancy and cause them to be inconsistent caregivers. In combination with this and the fact that there is a greater incidence of fetal alcohol syndrome in low socioeconomic groups, children reared in poverty with FAS may be at an even higher risk for language delay or disorder (Cone-Wesson 2005).

**Prenatal Cocaine Exposure**

Another teratogen that is understood to impair the developing fetus is cocaine. Cocaine, a neurotoxic and psychoactive drug, crosses the placenta to reach the fetus during gestation, which may result in premature delivery, low birth weight, strokes, brain malformations, and smaller head circumference. Decreased head size is significant because it is a sign that the infant's neurodevelopment may be impaired long-term. Although there are a host of adverse outcomes when infants are prenatally exposed to cocaine, some researchers believe that the media and some policy-makers have exaggerated the negative effects. Rather, as Cone-Wesson (2005) explained, these researchers "suggest that cocaine is no more or less teratogenic than other substances, including tobacco and/or alcohol…The problem is that cocaine-exposure does not occur in isolation, it occurs in a milieu that can include poverty, poor nutrition, and prenatal care and use of other teratogenic substances" (p. 286).

Regardless of how popular opinion views the issue, prenatal cocaine exposure is just one of many illicit drugs that have been investigated in order to determine the long-term

cognitive and language outcomes on children. In 2004, Singer, Minnes, Short, Arendt, Farkas, Lewis, Klein, and Kirchner studied a non-exposed control group of 186 children as comparison to the 190 prenatally cocaine-exposed children. As infants, they were evaluated at the ages of 6, 12, and 24 months in addition to a final evaluation at age four. Women who consumed cocaine during pregnancy were less likely to have received a high school diploma, had greater emotional and psychological distress, scored lower on vocabulary tests, and were more likely to use alcohol, marijuana, and tobacco than women who refrained from using cocaine while pregnant. These are all major factors that influence parenting style, parent-child interactions, and the overall environment in which the infants were reared. In turn, infants prenatally exposed to cocaine "were of lower gestational age, birth weight, head circumference, and length than the non-exposed, control group infants" (Cone-Wesson 2005, p. 287).

The home environment of participants was also assessed using The Home Observation for Measurement of the Environment (HOME). This proved to be beneficial because researchers found that the most accurate predictor of the infants' outcome was the quality of the home environment, especially when cocaine-exposed infants were raised in foster or adoptive care. Foster or adoptive caregivers had higher HOME scores than biological parents or relatives, and the cocaine-exposed children raised by foster or adoptive parent(s) had higher IQ and vocabulary scores than the cocaine-exposed children in the care of their biological mother or relatives. The study revealed that cocaine-exposed children reared in a foster or adoptive home environment scored the same on IQ and vocabulary as non-exposed children and significantly higher than cocaine-exposed children living with biologic or relative caregivers (Cone-Wesson, 2005).

This finding is ironic because the children who were most severely exposed to cocaine were the ones placed in adoptive or foster care. Despite the teratogenic effects of cocaine,

these children still "benefited from the treatment/intervention of growing up in a more stimulating, language proficient home environment" (Cone-Wesson 2005, p. 287). On the other hand, children who were prenatally exposed to cocaine and reared by biologic or relative caregivers had the highest instances of mental retardation (25%). These findings demonstrate that prenatal cocaine-exposure may indeed result in cognitive and language impairment, but the effects of such exposure may be counteracted if the child is raised in a home environment that is stimulating and committed to "cognitive, language, and social-emotional habilitation" (Cone-Wesson, 2005, p. 287). For children prenatally exposed to cocaine and reared in low socioeconomic or impoverished families, it is more difficult for them to be provided with an enriched environment due to a lack of resources and a number of other interferences. As Heckman (2008) stated,

> Children in affluent homes are bathed in financial and cognitive resources...More educated women marry later, have more resources, fewer children, and provide much richer child rearing environments that produce dramatic differences in child vocabulary and intellectual performance. (p. 289)

The impact of prenatal cocaine-exposure on a child's language development was further investigated by Morrow, Bandstra, Anthony, Ofir, Xue, and Reyes in 2003. Enrolled in this longitudinal study were 250 prenatally cocaine-exposed and 214 non-exposed children. Consistent with the findings of other prenatal cocaine-exposure studies, prenatally-exposed infants were born with smaller head circumferences and a lower birth weight. The mothers of prenatally-exposed children were less likely to have access to prenatal health care, had fewer instances of prenatal visits, and had higher rates of unemployment than the mothers of non-exposed infants. The Bayley Scales of Infant Development charted language at the ages of 4, 8, 12, 16, 20, and 24 months of age, and at age 3 years, the Clinical Evaluation of Language Fundamentals- Preschool was assessed. These assessments revealed

that a large proportion of the prenatally cocaine-exposed children had language scores two standard deviations below average. Likewise, Morrow et al. (2003) measured a significant effect of prenatal cocaine-exposure on language development, and the infants' birth weight was positively correlated with language scores.

Interestingly, the language scores for both the exposed and non-exposed children decreased over time, which is demonstrated in the Clinical Evaluation of Language Fundamentals- Preschool assessed at age three. A normal score for a child of three years is 100, but the standard score for both groups in this study was below 80. Morrow et al. (2003) claimed that these scores expose the effects of poverty and unemployment in the language development of not only the prenatally cocaine-exposed children, but also the non-exposed children. Readers are reminded that prenatal cocaine-exposure means children are likely to be at a cumulative risk from not only the physical damage of cocaine, but also the impoverished environment and the challenges of being raised by a parent with a substance abuse problem. As Cone-Wesson (2005) stated in concluding the study conducted by Morrow et al. (2003),

> Although the "cocaine effect" on language is subtle, when considered on a population basis, the costs for providing special education for those affected are huge. Similarly, even a subtle deficit at three years may fester into larger problems in reading, writing, and academic performance. Thus, early intervention may be recommended for infants born into poverty and parental drug use (p. 292).

**Lead Exposure**

Not only do illicit drugs and alcohol interfere with a child's cognitive and language development, but exposure to lead is known to have harmful effects, as well. Lead is a natural element found in the earth's crust and other activities within our environment, including mining and manufacturing. The deleterious effects of lead have been known for a long time. In fact, in the year 200 B.C., a Greek physician by the name of Dioscorides stated that "lead

makes the mind give way" (as cited in Koller, Brown, Spurgeon, & Levy, 2004, p. 987). The World Health Organization and Centers for Disease Control and Prevention defines lead poisoning, a result of consumption, as 10 mg/dL or more present in an individual's blood. As early as the 1890s, lead paint poisoning was first noted, and today the persistent, worldwide public health problem of childhood lead poisoning has been thoroughly investigated. (Koller et al., 2004).

Health concerns related to lead resulted in lead-based paint used in houses being banned in 1978 in addition to the presence of lead in gasoline being banned in 1996 in the United States (ATSDR, 2007). Unfortunately, the houses that were built prior to 1978 and are still inhabited today most likely contain lead-based paint (Change.org, 2010). The Center for Disease Control (2009) estimates that approximately 38 million homes built prior to the year 1950 still contain lead-based paint. This poses a threat to health when the lead deteriorates into lead dust and is inhaled or swallowed. This ingestion of lead can cause damage in nearly every part of an individual's body, but it is most toxic to the nervous system (ATSDR, 2007). Lead-induced brain damage may impede or slow the brain's ability to make cell connections for speech, language, and learning. As a result, lead-exposure may be a factor in a child's speech and language disorder or lowered intelligence. In fact, children with lead poisoning experience a drop in 7.4 average intelligence points in comparison to children exposed to one mg/dL of lead (Bleile, forthcoming).

Although lead exposure poses a threat to adults, children are the most vulnerable to the damaging effects. As Koller et al. (2004) explained, "Young children are more at risk of ingesting environmental lead through normal mouthing behaviors, absorption from the gastrointestinal tract is higher in children than adults, and the developing nervous system is thought to be far more vulnerable to the toxic effects of lead than the mature brain" (p. 988). Although there have been significant reductions in the levels of lead exposure over the years,

childhood lead poisoning continues to be a major threat to children's health worldwide. In the United States alone, the Center for Disease Control projected that approximately 4.4% of children between the ages of one to five have 10 or more micrograms per deciliter of lead in their blood level. In New Orleans, Louisiana, blood lead levels were significantly higher with 29% of children between six months and five years of age at 10 or more mg/dL. In other parts of the world the following percentages of lead-poisoned children were found: 27% of children ages one to five in Wuxi City, China; 78% of all schoolchildren in Johannesburg, South Africa; and 87% of children ages four to 12 in Dhaka, Bangladesh. These are unethically high levels of childhood lead poisoning, and the detrimental effects are being seen worldwide (Koller et al., 2004).

Another crucial factor related to childhood lead poisoning is if the child is reared in an impoverished environment. According to New York State's Department of Health (2004),

> Because poverty limits housing choices, available housing for low-income families is generally found in communities with the oldest housing and the most deferred maintenance. As a result, these children are more likely to live in older deteriorated housing with lead paint hazards. The Federal General Accounting Office has estimated that 85% of lead poisoned children are eligible for Medicaid (p. 1).

Change.org (2010) further explained this disproportionate amount of low-income children exposed to lead. In Detroit, Michigan, a city with a high prevalence of poverty, six in every 10 children are suffering from lead-related brain damage. Many factors have been identified as the source of poor academic performance for children in Detroit, such as unsafe environments, poor health conditions, and high teacher migration. However, lead poisoning has not received nearly enough attention from experts and policy makers, considering the irreversible damage to children's IQ, language proficiency, and memory skills. Change.org (2010) shared that "the scale of this crisis cannot be overstated" (p. 1). In the Detroit school

system, a shocking 99.9% of the 39,000-plus students tested were found to have lead in their bodies (Change.org, 2010). Although the official threshold for lead poisoning is 10 micrograms per deciliter, Bleile (forthcoming) shared that "even low levels of exposure to lead may result in lowered intelligence, speech and language disorders, and behavior problems" (p. 34).

The disturbing issue of lead poisoning is yet another demonstration of the many injustices surrounding children reared in poverty. Higher socioeconomic status provides a protective effect, meaning that despite higher SES children's exposure to lead, the harmful effects are ameliorated by their stimulating environment. As Koller et al. (2004) explained, "Children from socially disadvantaged backgrounds are apparently more sensitive to the effects of lead than children from higher SES families... [There is a] powerful influence of SES on developmental outcome" (p. 992). Overall, Koller et al. argued that lead exposure poses a great threat to public health and the language and cognitive outcomes of children; obviously there must be a continued effort to minimize children's lead exposure. However, they recognize that socioeconomic status and the quality of the home environment have far greater effects on a child's language development. Some have argued that rather than chasing after lowering the lead threshold, most of the attention should instead be turned to "the more complex social ills that are associated with continued lead exposure" (Koller et al., 2004, p. 994).

**Environmental Deprivation**

Koller et al. (2004) have reason in calling attention to a wider range of problems, especially with respect to environmental injustice. Deprivation of resources and the presence of toxins other than lead in the living environments of low-SES communities can also have negative repercussions on children's language development. Living in poverty usually includes living in a structurally weak neighborhood. These neighborhoods oftentimes receive

emission from nearby industrial plants, have more crowded living environments, provide substandard housing, have greater instances of degraded parks, and have less access to green space and high-quality health facilities. Environmental injustice surrounds the daily living environment of low-income children. This is further demonstrated by the fact that waste facilities and industrial plants emitting high amounts of pollution as well as roads with high concentrations of traffic are typically located near or in low-income communities. As Hornberg and Pauli (2007) described, "Compared to residents in affluent areas, these social groups are likelier to be exposed to health-threatening environmental conditions and tend to be more susceptible to adverse health effects from environmental exposures- all this in addition to the already heavy burden of social inequality" (p. 573).

The sad reality is that many low-income families are trapped in these neighborhoods with lower environmental quality because they are unable to afford housing elsewhere. Low-income housing tends to have the highest levels of toxins and other harmful substances (e.g.- carbon monoxide, soil pollution, mold, radiation, traffic pollution, etc.), which places vulnerable children at a cumulative risk of chronic diseases, not to mention psychological stress, as well. Political and public health officials absolutely must direct more attention to improving the living environments of low-income communities because the living circumstances are unacceptable for any human being to be subjected to (Hornberg & Pauli, 2007).

As in the case of lead poisoning, continuous exposure to such environmental toxins may be detrimental to both a child's health and learning. Children's organs are not fully mature, causing them to be extremely sensitive along with the fact that they absorb more toxic materials externally (Grigg, 2012). As Lanphear et al. (2005) described, "Exposure to environmental toxins have been linked with higher rates of mental retardation, intellectual impairment, and behavioral problems" (p. 1). It is evident that environmental toxins impede

learning, including speech and language learning, because they interfere with the brain's ability to make the necessary cell connections for speech and language development (Bleile, forthcoming). As stated before, a disproportionate amount of low-income children are surrounded by unsafe living conditions, which puts them at an unfair advantage to fully reach their cognitive and language development. Wood (1998) explained that language and cognition "are fused in verbal reasoning. Comprehension problems...act as a barrier to learning and understanding" (p. 180).

**Malnutrition and Unequal Healthcare Access**

Environmental deprivation is only the beginning of the social ills surrounding children reared in poverty. Hatton and Emerson (2009) enumerated additional issues:

> It is clear that the negative outcomes associated with exposure to low socio-economic position and/or poverty are mediated through a multiplicity of pathways, including increased risk of exposure to a range of material and psychosocial hazards such as adverse birth outcomes, exposure to a range of toxins and teratogens, poorer nutrition, poor housing conditions, exposure to less than optimal parenting, poorer educational and occupational opportunities, injury and accidents, adverse life events, poorer health and welfare services, and poorer quality neighborhoods. (p. 436)

To describe this laundry list of social inequalities in greater detail, malnutrition and reduced access to health care are two very key factors that negatively impact the language development of children. The increased incidence of inadequate nutrition for children living in poverty has been associated with cognitive deficits (Brooks-Gunn & Duncan, 1997). Research supports the fact that as a result of malnutrition, some aspects of damage in brain growth, such as the speeding up of information transmission through myelination, are irreversible. This is linked to deficits in child functioning later in life, including functions necessary for speech and language (Yaqub, 2002). Further, in the 2011 Report on Disability

by the World Health Organization, authors described that for children under the age of five in developing countries, when combining the many risks of malnutrition, poverty, and deprived home environments, these children's motor, cognitive, language, social, and emotional development may be greatly impaired. The cumulative effect has lead researchers to estimate that nearly 200 million impoverished children worldwide from birth to age five are unable to achieve their full potential in these areas of growth.

An additional problem that is especially prevalent in the United States is that children reared in poverty are less likely to be in good health and have access to health care. In fact, one in every five low-income children does not have health insurance in comparison to one in ten non-poor children. Furthermore, low-income children are three times more likely than non-poor children to be in fair or poor health. Even when low-income children have similar health problems as high-income children, they fare worse in regards to the severity of the health issue (Children's Defense Fund, 2008). Because of these factors, poor children are unable to consistently seek medical help for smaller health problems, allowing these health issues to intensify. According to Woolf et al. (2006), "The quality of care that they do receive is compromised by the fragmented infrastructure in underserved communities, where facilities and clinicians are often lacking in number, resources, and cultural sensitivity" (p. 338). For these reasons, poor individuals typically receive substandard health care, which contributes to their deteriorating health status.

Sickness adversely affects a child's ability to learn. Being sick draws from our mental capacity to learn because the sickness is mentally taxing, and the simultaneous demands on the child complicate a child's ability to lay down memories when building vocabulary, comprehension, and all other aspects of learning language (Hageman, 2012). Other factors in addition to sickness that may detract from a low-income child's ability to concentrate and learn include fatigue, hunger, or frustration from the lack of material resources. Regardless of

whether or not low-income children want to learn, they must first overcome huge obstacles to basic life necessities—ones that middle- and higher-income children take for granted—before they are able to truly develop their language proficiency and thrive in school (Gorski, 2007).

**Maslow's Hierarchy of Needs**

Children's difficulty in learning due to obstacles is demonstrated by Maslow's Hierarchy of Needs, an attempt by Abraham Maslow in 1954 to explain what directs and motivates human behavior. Maslow created a pyramid consisting of levels describing human needs; individuals must have their lower level needs met before they are able to advance to the next higher level. The levels of needs, in order from lowest to highest level, are: physiological, safety, belongingness and love, esteem, cognitive (the need to know and understand), aesthetic, self-actualization, and transcendence (Huitt, 2007). According to Maslow's perspective, when impoverished children are unable to meet their basic, physiological needs, they are prevented from being able to fulfill higher-level needs. These higher-level needs include, but are not limited to, the ability to know, learn, explore, and understand. As Arrighi and Maume (2007) explained, "Humans can't achieve beyond the concrete level until the basics are assured" (p. 1). The outcome for low-SES children may involve fewer opportunities to learn and explore at a higher level due to their preoccupation with satisfying immediate needs, such as food and clothing. This may also interfere with the children's ability to lay a strong foundation for language and to build up their language skills.

**Unequal Educational Access**

Malnutrition and unequal healthcare access are not the only barriers to a child's language learning. Unequal educational access only adds to the list of the many injustices that children living in poverty face. In the United States, education is largely funded by local property tax. The logical result is that schools located in high-income communities are able to afford a wealth of resources whereas schools in low-income communities scavenge for

enough money to get by, hoping that state funding will fill in the gaps. Illinois is a prime example of this problem where several rich suburban districts may receive $17,000 in funds for each student. On the other hand, poor urban communities may spend less than $6,000 per student (Lockette, 2009).

Lockette (2009) painted a picture of what this disparity in funding looks like for students' educational experience. At Morgan Park High School, a low-income school in Chicago, IL, it is all too common for students to have to share textbooks, parents are asked to supply the school with toilet paper, students roast in their building without air-conditioning, and "new teachers seem to come and go as if through a revolving door" (Lockette, 2009, p. 1). Just a short train ride away is New Trier High School, located in a wealthy community, where student opportunities abound: tennis courts, an art gallery, highly-qualified teachers, and a richly-supplied theatre. The American education system has an inequitable distribution of student opportunities and material resources. This comes at the expense of low-income children, robbing them of the chance to take advantage of these opportunities and to achieve full cognitive and linguistic potential. Kozol (1995) expanded upon these inequalities:

> Many of the schools with the most devastating academic records are also physically offensive places. At Morris High School, where less than 70 of 1,700 children in the building qualified for graduation in the spring of 1993, barrels were filling up with rain in several rooms...Green fungus molds were growing in the corners of the room in which the guidance counselor met kids who were depressed. Many of these schools quite literally stink. (p. 151)

Indeed, many schools located in low-income communities have inadequate facilities and suffer from high teacher migration, which are factors contributing to their low academic achievement. These poor physical conditions and challenges undermine the children's attitude toward learning and their self-esteem. Kozol (1995) explained that at Taft High

School in the New York City Bronx, students even ridicule themselves, bitterly joking that their school's name, Taft, is an acronym for "Training Animals for Tomorrow."

Unfortunately, children attending low-income schools are oftentimes distracted from learning due to such grave environmental circumstances. Such obstacles interfere with children's mental capacity to learn, including language learning. Strong language skills are the foundation of learning how to read, write, and understand their teachers' explanations and instruction. Language comprehension enables children to soak up information and construct knowledge and understanding. Without an environment that is rich in academic resources and conducive to learning, children profit less from their education.

**Neural Plasticity**

In presenting the many factors that may impede low-income children's language acquisition and school performance, it is also necessary to address the influence of plasticity and resilience in children's functioning. Woolf and Salter (2000) defined neural plasticity as "the capacity of neurons to change their function, chemical profile, or structure (p. 1765). When developmental foundations are disrupted due to poverty, the brain may be damaged. Some of this damage may be permanent and negatively influence children over the course of their lives. However, despite the brain's sensitivity, it can also be very adaptable and resilient. When damage occurs, there may be plasticity or reversibility in some areas of brain growth and permanence in others. As Schaffer (1992) described, "Whatever stresses an individual may have encountered in early years, he or she need not be forever at the mercy of the past...children's resilience must be acknowledged every bit as much as their vulnerability" (p. 40).

Childhood experiences have the potential to direct children's futures and lifetime achievements. Damage to the brain's functions as a result of poverty may be permanent, but not always. Children can bounce back from adverse experiences, especially when given the

right resources and their environment is improved. For these reasons, there is a great need for antipoverty interventions in order to counteract the negative developmental outcomes of poverty. Children from disadvantaged backgrounds are gifted and capable of succeeding, but they must be given the chance to grow and capitalize on different opportunities. In the case of language development, if early intervention takes place and low-SES children are provided with language stimulation and resources; such as books, then they can certainly expand their vocabulary, refine their language skills, and be successful learners.

## SIGNIFICANCE AND CONCLUSION

There are large bodies of evidence that support that exposure to poverty may be associated with impaired language development and poor performance in school. This paper presents four key elements of poverty that disrupt the brain's ability to make cell connections necessary for speech and language development: lower amounts of language input, teratogens, exposure to environmental toxins, and unequal access to healthcare and educational opportunities. Numerous studies have revealed that enormous differences exist in the linguistic environments of low-income children in comparison to children from more advantaged backgrounds. Studies consistently support the claim that low-income children have less exposure to language and words spoken to them. Children learn language by the frequency and repetition with which they hear words, making it no surprise that their vocabulary expansion is positively correlated to the amount of language input they receive (Ginsborg, 2006). Children reared in poverty have just as much potential to reach language developmental norms as any other child. However, because they have fewer opportunities for language input and resources, such as books and being spoken to, they are at risk for experiencing language delay.

Prenatal drug and alcohol exposure is observed to cause brain abnormalities and cognitive impairment, which may contribute to language delay. In combination with exposure to poverty, the outcome may be even more severe because of the environmental deprivation. On the other hand, despite the harmful effects of prenatal drug or alcohol exposure, an enriched and stimulating environment has been shown to counteract and mend a prenatally teratogen-exposed child's cognitive and language damage. Once again, the importance of a stimulating childhood is demonstrated, especially when a child begins life at a physical disadvantage for normal development. However, in the case of impoverished families, it is

more challenging to provide a language proficient home environment due to fewer resources and economic stresses (Cone-Wesson, 2005).

One can also speculate that exposure to environmental toxins and unequal access to healthcare and education are factors working against a child's ability to learn and develop both cognitively and linguistically. Environmental disadvantages experienced by low-income children accumulate and result in them being unprepared for academic learning, especially when considering Maslow's perspective of how children cannot achieve beyond the lower levels until basic needs are met (Arrighi & Maume, 2007). Necessary steps must be taken to better the quality of low-income schools, such as improving the experience and instruction of teachers, creating an environment where a wealth of information is provided for all children, building a strong community conducive to learning, and granting more funding for resources (American Psychological Association, 2012). All of these things are necessary in order to increase both the language skills and opportunities for academic achievement of low-income children. Georges (2007) suggested that "policies should seek to minimize the disadvantages that undermine the academic potentials of children in poverty before they begin school" (as cited in Arrighi & Maume, 2007, p. 42) because the achievement gap in America is not only persisting, but it is also widening. Gorski (2007) is in agreement, believing that systemic reform and a fair distribution of resources is imperative. Every single child is valuable and has the right to life, to live healthy, and to succeed on a personal and academic level. As teachers, policy-makers, speech-language pathologists, or individuals in any profession, it is our responsibility to fight the injustices that arise from poverty. This must be done in order to assure these low-income children the chance to develop the language skills necessary for normal functioning, success in school, strong interpersonal relationships, and overall a brighter future.

**Limitations and Future Research**

Limitations of this paper include the fact that the issue of poverty is extremely complex and far-reaching. Poverty is everywhere, and its influence can be clearly seen in our politics, economy, social groups, etc. The number of factors surrounding the issue is innumerable, and it was difficult to narrow it down to four of the primary factors as the focus for my paper. Initially, I considered focusing on one specific aspect of the interrelationship between poverty and language development, but decided that it would not do justice to helping others understand the breadth of this topic. By incorporating information about language input variation, teratogens, environmental toxins, and disparate amounts of access to healthcare and education, my hope was to give individuals a thorough overview of the ways in which poverty may impede a child's language development.

An additional limitation is that I could not be in the field to conduct my own research. This is also due to the fact that the issue of poverty is so extensive. For this reason, it was more sensible to focus on literature and published studies to get more depth of coverage rather than splitting my focus. This ended up being very beneficial because it enabled me to combine my resources, make connections between the studies and information, and compile a comprehensive overview for others to understand the relationship between poverty and language development more clearly. A final limitation is that, in general, there is a lack of international data. Very small amounts of research have been gathered from other parts of the world where poverty is endemic from generation to generation.

Despite the scarcity of research in impoverished countries to explore how the brain is affected by poverty, it is very likely that greater amounts of future studies will begin to be conducted in this area. This is significant because in countries where malnutrition, inadequate sanitation, clean water shortages, and unsafe living conditions are a reality for the common citizen, the onset of health conditions affiliated with disabilities is very likely (World Health

Organization 2011). As more research is conducted regarding language development in countries with high rates of poverty, we will be able to take bigger steps in our global effort to eliminate poverty, equip all individuals with more equal opportunities and resources, and provide the enriched language environment that is necessary for the development of proficient language skills.

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