



The Power of Language Nutrition for Children's Brain Development, Health, and Future Academic Achievement **CE**

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ABSTRACT

Language Nutrition, a term created to describe language exposure that is rich in quality and quantity and delivered in the

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Conflicts of interest: None to report.

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context of social interactions, is crucial for a child's development and is strongly associated with his/her future literacy, academic achievement, and health. However, significant differences in children's early language environments contribute to disparities in their educational and health trajectories. Interventions, including book distribution programs, coaching parents to enrich their child's language environment, and public awareness campaigns, have all been shown to positively influence a child's access to language-rich interactions. Incorporating Language Nutrition coaching and literacy promotion into pediatrics is a promising platform for building the capacity of parents to provide language exposure to their children. By teaching parents both how and why to treat their child as a conversational partner and by modeling such interactions, pediatric health care providers can help parents set their children on a pathway toward literacy, educational success, and health. *J Pediatr Health Care.* (2017) 31, 493-503.

KEY WORDS

Child development, Language Nutrition, language-rich interactions, literacy promotion

OBJECTIVES

1. Describe the role of pediatric providers in literacy and promotion of Language Nutrition.
2. Understand the influence of Language Nutrition on a child's future education and health outcomes.
3. Develop skills to teach parents why and how to engage in language-rich interactions and to provide Language Nutrition to their children.

Early childhood is a critical period for developing language skills, including learning to understand and speak language (Shonkoff & Phillips, 2000). Language enables a child to communicate and interact with others, which encourages both social and cognitive development and is a prerequisite of school readiness and literacy (Dickinson & Porche, 2011; Forget-Dubois et al., 2009; Hart & Risley, 1995; Rowe, Raudenbush, & Goldin-Meadow, 2012; Weisleder & Fernald, 2013). Neural networks for language acquisition are fully formed before birth; babies are able to perceive and react to sound as early as at 24 weeks gestation and begin to learn language in utero by 35 weeks gestation, suggesting that newborn infants' brains are primed to learn language (Kisilevsky et al., 2009; Perani et al., 2011). In fact, growth in synapses responsible for language learning peaks at 6 months of age (Shonkoff & Phillips, 2000). This synaptic growth is influenced by auditory stimuli in the child's early language environment (Hoff & Naigles, 2002; Shonkoff & Phillips, 2000). Given this robust neuroplasticity, early childhood is a time of both significant vulnerability and immense opportunity for establishing the foundational neural circuitry necessary for higher learning (Shonkoff & Phillips, 2000).

LANGUAGE NUTRITION

Early exposure to language-rich interactions between adults and children forms the basis of Language Nutrition, a term created to describe the use of language sufficiently rich in engagement, quality, quantity, and context that it nourishes the child neurologically, socially, and linguistically (Head Zauche, Thul, Darcy Mahoney, & Stapel-Wax, 2016; Weldon, 2014). Just as a child needs an adequate amount of nutritious food for physical growth, so too does a child need language for his or her brain development (Weldon, 2014). Evidence indicates that both the quantity and quality of words spoken to a child in the first 3 years of life predict a child's language and emerging literacy skills more strongly than socioeconomic status, parent level of education, and race/ethnicity (Dickinson & Porche, 2011; Hart & Risley, 1995; Hoff, 2003, 2013; Hurtado, Marchman, & Fernald, 2008; Huttenlocher, Waterfall, Vasilyeva, Vevea, & Hedges, 2010; Rowe, 2012; Weisleder & Fernald, 2013). A higher number of words spoken to a child contributes to increased vocabulary development, enhanced language and speech processing, and improved literacy outcomes (Hoff & Naigles, 2002; Hurtado et al., 2008; Huttenlocher, Haight, Bryk, Seltzer, & Lyons, 1991; Weisleder & Fernald, 2013; Zimmerman et al., 2009). Remarkably, the quantity of words spoken to a child has been shown to mediate the relationship between social risk factors, such as low socioeconomic status and low levels of parent education, and language outcomes (Burchinal, Vernon-Feagans, & Cox, 2008).

Greater reciprocity in speech, or conversational turns, also promotes language outcomes and may even be more influential than the quantity of words (Ambrose, VanDam, & Moeller, 2014; Kuhl, 2007; Zimmerman et al., 2009). A *conversational turn* is defined as back-and-forth communication, or adult speech followed by a child's vocalization within 5 seconds or vice versa. Conversational turns invite children into the conversation regardless of whether they are able to communicate verbally or through nonverbal signals and provide children with the opportunity to build their communication skills in the context of an engaged social relationship (Kuhl, 2007; Zimmerman et al., 2009). The importance of social engagement through conversational turns is highlighted by studies showing that media exposure and overheard speech not directed toward the child offer no support for a child's early lexical development (Ambrose et al., 2014; Christakis et al., 2009; Mendelsohn et al., 2010; Weisleder & Fernald, 2013). This research suggests that the words a child hears need to be directed at the child for them to have developmental benefits. As a result, language-rich interactions with an engaged caregiver provide children with an environment that is conducive to language learning.

There are a number of programs across the United States that have begun to incorporate Language Nutrition as a concept into pediatric health care. Language Nutrition coaching can be executed in different programs, by different pediatric providers, and in a variety of settings with the same goal of improving rich parent/adult-child interaction.

THIRTY MILLION-WORD GAP

Variations in the language environments of young children have been well documented (Greenwood, Thiemann-Bourque, Walker, Buzhardt, & Gilkerson, 2011; Hart & Risley, 1995; Hoff, 2003). Socioeconomic status has been shown to be a key determinant of the language input parents provide for their children (Hart & Risley, 1995; Hoff, 2003, 2013; Rowe, 2008). Although all families communicate with their children, children who live in low-income families generally are more likely to hear shorter sentences and phrases and are less likely to hear words of encouragement and prompts that encourage the child's participation in the conversation (Fernald, Marchman, & Weisleder, 2013; Hart & Risley, 1995; Hoff, 2003). In addition to the quality of the language input, the quantity of words spoken to a child has substantial differences across socioeconomic groups (Fernald et al., 2013; Hart & Risley, 1995; Hoff, 2003). In a renowned study by Hart and Risley, children growing up in low-income families were found to hear 600 words per hour, whereas children growing up in middle- to high-income families heard 2,000 words per hour (Hart & Risley, 1995). Over the course of the first 3 years of life, this accumulates into a thirty million-word gap

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