



# LENA<sup>®</sup>

## Proving the Power of Talk

*10 Years of Research on the Impact of Language on Young Children*

In 1995, Betty Hart and I released the findings of a longitudinal research study that we had conducted for over a decade. We learned that the most important ingredient in the recipe for a child's future academic success is the sheer volume of talk that the child's parents have with the child—from the child's birth until age three. We discovered that race and ethnicity has no bearing on a child's academic success. In fact, even disadvantages attributed to socioeconomic status can be overcome. Of course, it is critical that parents know they are talking enough with their children. And that's where LENA comes in. LENA makes it possible for parents to know exactly how much they talk with their child. It was professionally satisfying and exciting, as you might imagine, generating a study that educators, speech professionals, pediatricians, government officials, and parents have come to find important. And it's equally satisfying and exciting to see our study confirmed — and new findings unveiled — with the use of a revolutionary new tool such as LENA.

*-Todd Risley, PhD, December 2006 (1937–2007)*

### The Gathering Consensus

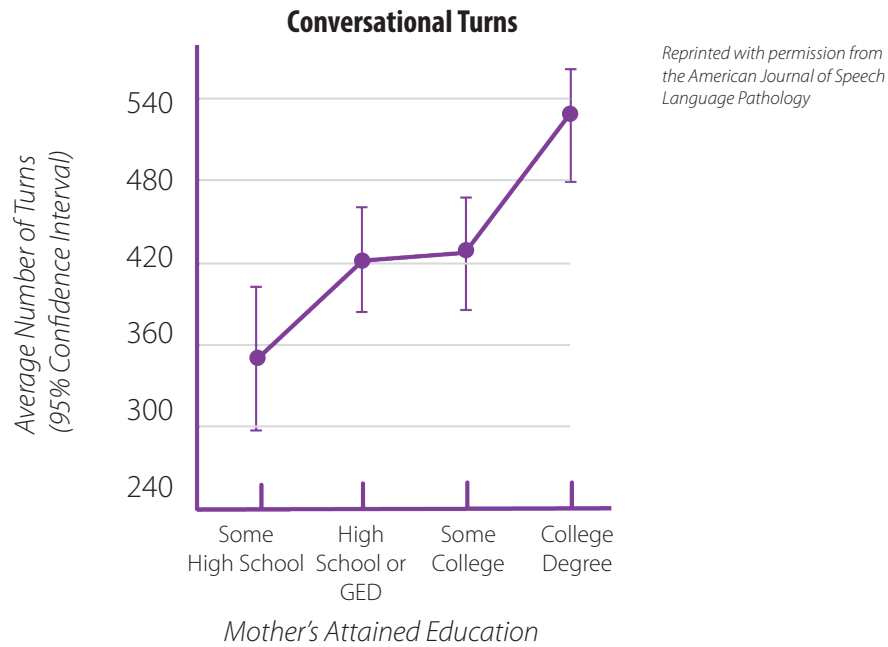
The past decade has seen widespread acceptance that early language plays a critical role in babies' brain growth, and in their subsequent success in school and in life. The groundbreaking research of Drs. Betty Hart and Todd Risley in 1995 first established the link between talk and cognitive and social development. They showed that differences in the language environment of young children — related to, though not necessarily caused by, differences in socioeconomic status (SES) — strongly correlate to later measures of cognitive and language ability.

The 1995 publication reflected a single study with a relatively small sample size. But since then, researchers have verified and extended Hart & Risley's conclusions through a vast number of studies, using a range of technologies not available in the 1990s. Brainwave recordings and brain imaging, for example, have identified exactly how, and in what areas of the brain, early talk has its positive effect. And LENA technology, with its ability to record many hours of the natural talk environment and quickly generate data about it, has led to many discoveries of exactly how different types of adult talk behavior affect children and what works best to make a difference.

The following summarizes key research findings using LENA technology in the past 10 years, then applies these and other findings to a logic model that points the way to solving problems of inequity. Please refer to the bibliography at the end for full citations.

### Revelations from LENA Research

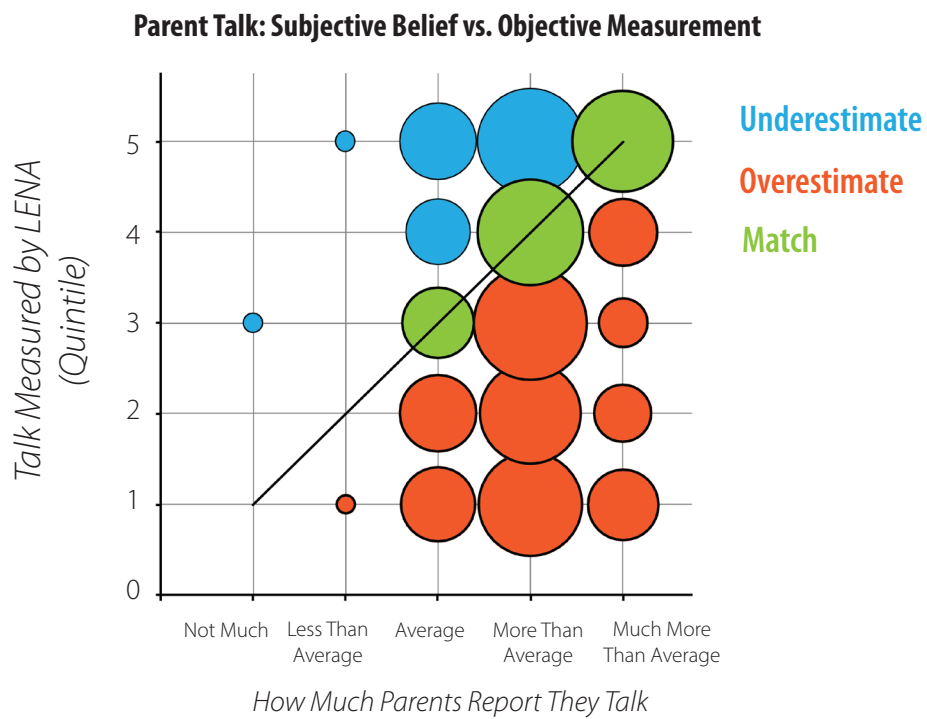
**The SES-linked "word gap" has been confirmed** by much larger amounts of talk data than Hart and Risley were able to collect. Using LENA technology over 3,000 full-day recordings were analyzed. This analysis has shown that the mother's education level, in particular, correlates to differences in early talk, especially child vocalizations and conversational turns, shown in the graph on the next page. (Gilkerson et al., 2017)



**Conversational turns are much more important than adult words alone.** In an 18-month study measuring language development in relation to adult words, TV exposure, and adult-child conversations, conversations demonstrated by far the most powerful impact on language. (Zimmerman et al., 2009) A study using neural imaging, assessments of cognitive skills, and LENA showed brain activity and verbal skills were significantly influenced by conversational turns, independent of socio-economic status or number of adult words. Composite verbal scores increased by a point for every 11 turns per hour! (Romeo et. al, 2018) Finally, a 10-year longitudinal study found that the amount of conversational turns children experienced between 18-24 months was related to their IQ, verbal comprehension, and language skills 10 years later. (Gilkerson, et. al, 2018)

**Child-directed adult speech improves language and vocabulary.** Improving the talk environment is not just about adults talking more, it's about meaningful interactions with the child. (Weisleder & Fernald, 2013)

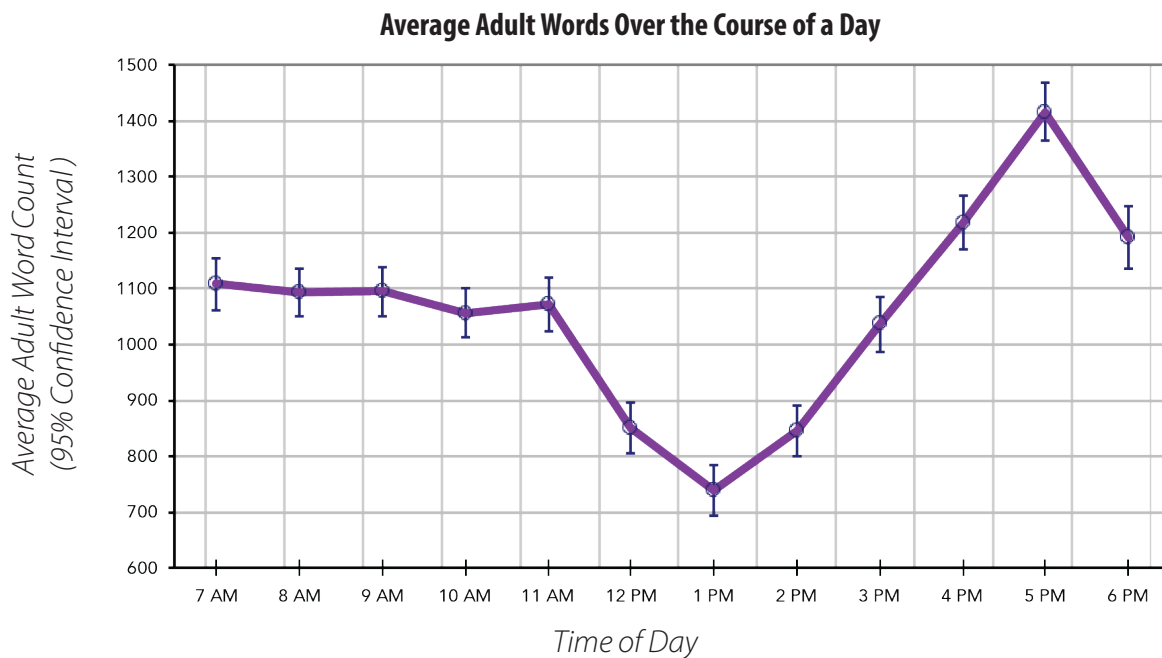
**Objective feedback is necessary** because parents have no real way of measuring how much they talk. In fact, parents who ranked lowest in amount of talk were most likely to over-estimate – as shown by the red bubbles in the chart below. (Richards, Gilkerson, Xu, & Topping, 2017)



**Objective feedback by itself helps adults improve language behavior**, though other program elements such as video examples are also helpful. (Gilkerson, Richards, & Topping, 2017a)

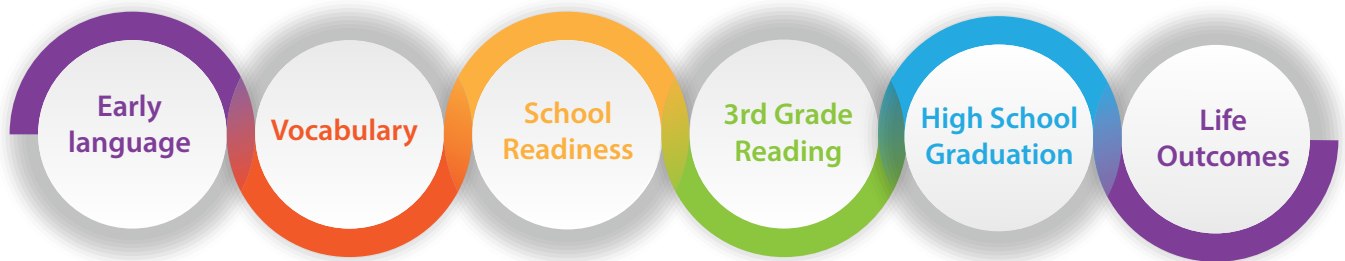
**Book reading** is a powerful tool for increasing language interactions. Not only do children hear more adult words when being read to, but they experience more conversational turns. (Gilkerson, Richards, & Topping, 2017b)

**Talk varies significantly at different times of day.** The ability to analyze full-day recordings — impossible for Hart and Risley — has revealed how words and turns naturally vary with the rhythm of a day (see graph below). In addition to adding to overall understanding of talk behavior, this observation gives parents a powerful tool for reflection, as they identify which activities with their children resulted in higher levels of language stimulation, and can apply those learnings to improving future interactions. (Gilkerson & Richards, 2008)



## Harnessing the Power of Talk

Ten years of research have at last pointed a way forward toward closing opportunity gaps, and a logic model for crafting evidence-informed programs.



Regular feedback to caregivers on the early language environment has been shown to increase interactive talk and child language ability. (Gilkerson, Richards, et al., 2017a; Hernandez, 2011) Early language is the strongest single predictor of cognitive development. (Capute, Shapiro, & Palmer, 1987; Gilkerson & Richards, 2008; Hart & Risley, 1999) The amount of language a child hears affects brain processing speed and subsequent vocabulary acquisition. (Fernald, 2009, June; Saffran, Aslin, & Newport, 1996) Vocabulary at age 3, in turn, drives language and reading skills at age 9-10, which strongly predict high school graduation. (Hernandez, 2011)

LENA wearable technology has not only contributed to the research that supports this logic model, it also offers part of the solution by providing the regular feedback caregivers need. More than 20 years after Hart and Risley made their breakthrough, we have an increasing tool set to make a meaningful difference.

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