

Effective Intervention Strategies for Teaching Early Literacy skills to Deaf and Hard-of-Hearing Children

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Deaf and hard-of-hearing (DHH) children who are acquiring spoken language need the same foundational skills to learn to read as hearing children. Researchers have found that phonological awareness, alphabetic knowledge, and vocabulary predict reading abilities in young deaf children with CIs and hard-of-hearing children with hearing aids (Ambrose, Fey & Eisenberg., 2012; Cupples., Ching, Crowe, Day, & Seeto, 2013; Easterbrooks. Lederberg, Miller, Bergeron, & Connor, 2008; Geers, 2003; Lederberg, Schick & Spencer, 2013; Nittrouer, Caldwell, Lowenstein, Tarr, & Holloman, 2012; Webb & Lederberg, 2014). These studies showed that the majority of DHH children still have deficits in these skills compared to hearing children, with wide individual differences. Therefore, there is a strong need for early intervention with DHH children that focuses on these skills.

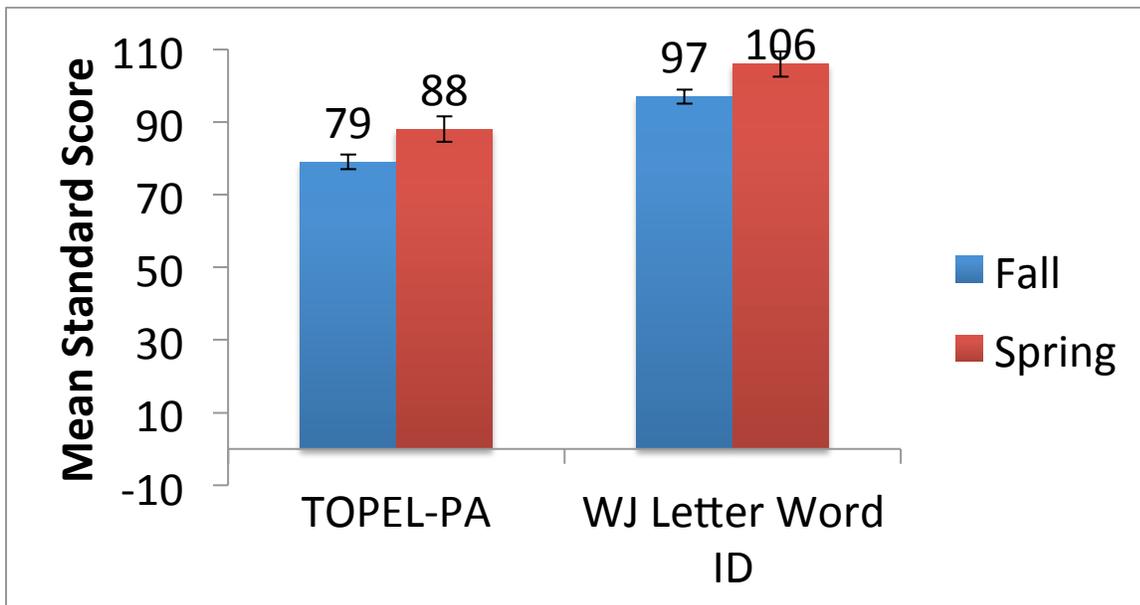
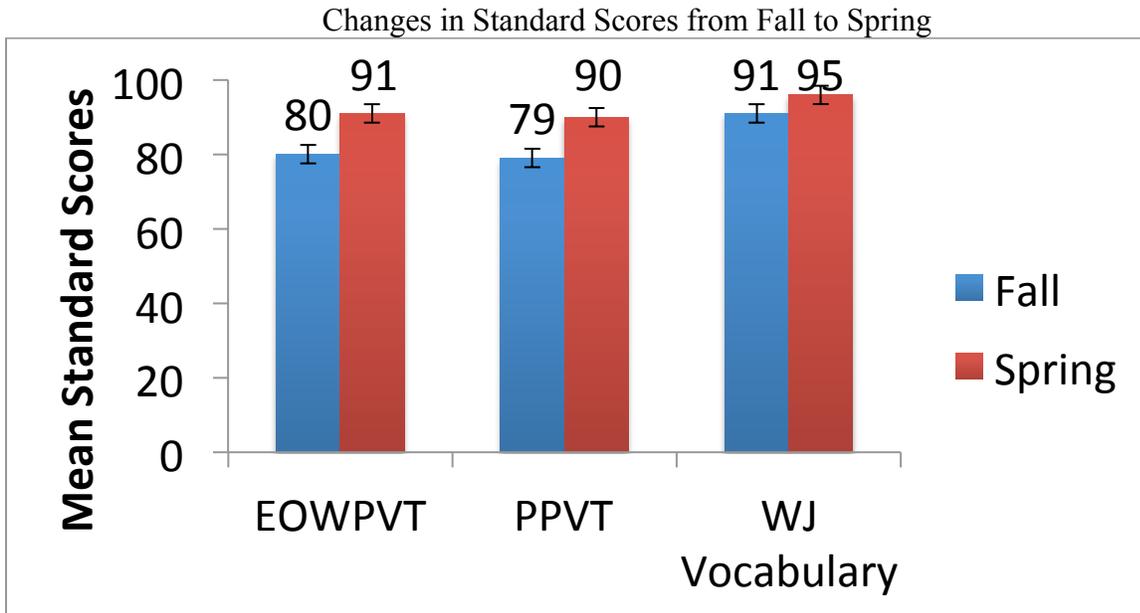
The current study evaluated the efficacy of a new early literacy intervention created specifically for DHH prekindergarten children, called *Foundations for Literacy*. An interdisciplinary team of researchers in collaboration with teachers of DHH children developed this intervention over a period of five years. While adopting the literacy objectives of effective, integrated, code- and meaning-focused prekindergarten programs for hearing children, *Foundations for Literacy* is more systematic and its instruction is more explicit, multi-modal, and intensive than is typical in programs for hearing children. Each lesson also includes strategies for differentiating instruction based on children's speech perception and language abilities.

Foundations for Literacy was developed in two phases. During the first phase, research teachers implemented Foundations for Literacy with 25 DHH children in two schools. They taught children in small groups, 4 days per week, 1 hour per day, throughout the school year. A series of studies indicated that these children made educationally meaningful gains in phonological awareness, alphabetic knowledge, and vocabulary (Beal- Alvarez, Lederberg, & Easterbrooks, 2012; Bergeron, Lederberg, Easterbrooks, Miller, & Connor, 2009; Lederberg, Miller, Easterbrooks, & Connor, 2014; Miller, Lederberg, & Easterbrooks, 2013). During the second phase, 15 classroom teachers in 8 schools implemented *Foundations for Literacy* as part of their classroom instruction, 4 or 5 days a week, 1hr per day, for the school year

This presentation compared gains made by three groups of DHH children who were similar in their audiological and demographic characteristics: (a) 33 children taught by classroom teachers (b) 25 children taught by research teachers and (c) 32 comparison children who received their regular school-selected literacy curriculum. About 60% of children had cochlear implants; the rest were children with moderate-severe hearing loss who wore hearing aids (BEPTA $M = 60\text{dB}$). All children were able to identify monosyllabic words on the Early Speech Perception Test (Moog & Geers, 1990.) A battery of language and literacy tests was administered in the fall

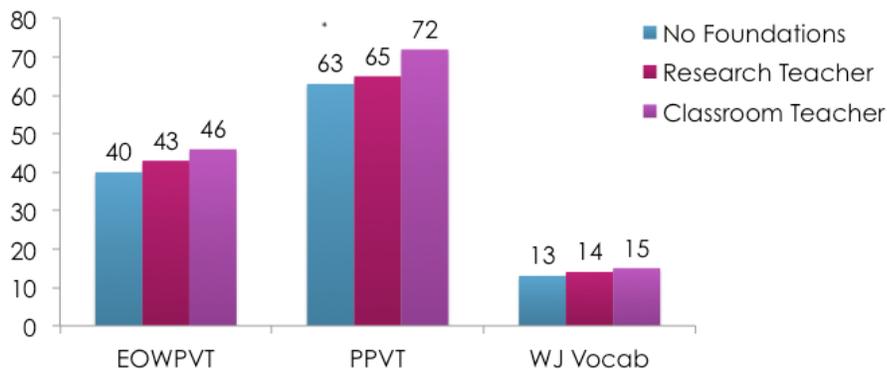
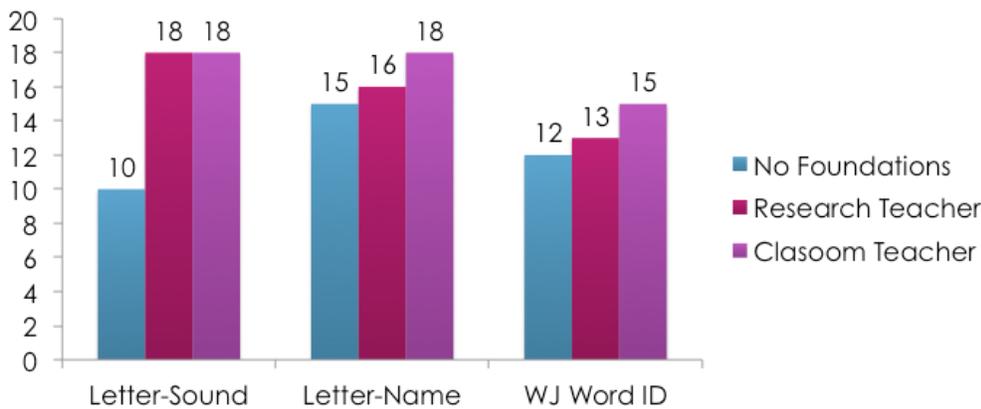
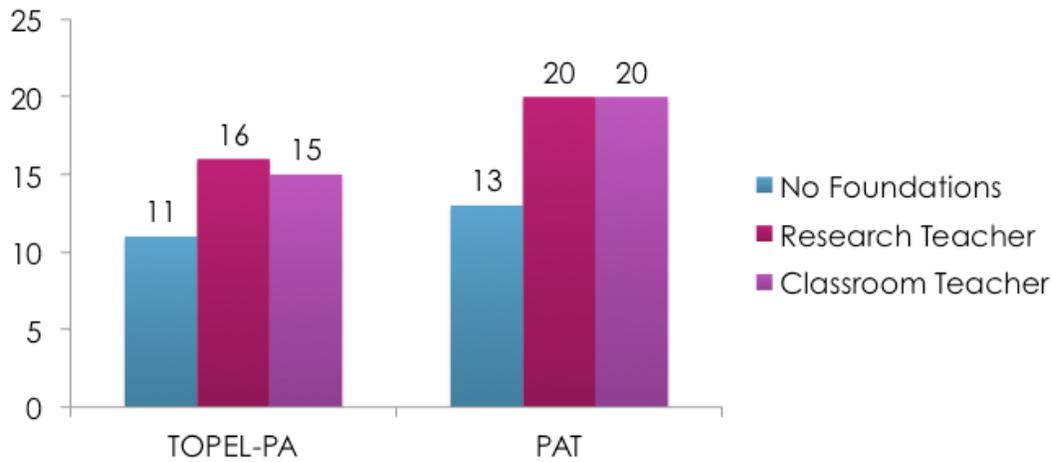
and spring of the school year.

Children taught by classroom teachers increased their average standard scores on phonological awareness and vocabulary assessments such that they ended the year within a standard deviation of the normative average for hearing children.



TOPEL-Phonological Awareness and WJ Letter-Word Identification

Students taught with *Foundations for Literacy* made statistically significant larger gains on tests of phonological awareness, alphabetic knowledge, and vocabulary than the comparison children. Children taught by classroom and research teachers made similar gains in phonological awareness and alphabetic knowledge. Children taught by classroom teachers made larger gains in receptive and expressive vocabulary than children taught by research teachers or children in the comparison group. There were no differences in the gains made by children with cochlear implants and those with moderate-severe hearing loss. The following figures show the gains made by children in the three groups.



This quasi-experimental study suggests that interventions that are specifically designed for DHH children can result in improving early literacy skills of DHH children, ensuring they enter school with the foundational skills needed to learn to read. Furthermore, classroom teachers may be able to have even greater effects on student outcomes, especially language, than specially-trained research teachers. Future research that uses rigorous experimental designs (e.g., randomized controlled trial) will provide even stronger evidence of the efficacy of these types of intervention for DHH children.

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