INTRODUCTION

Today, many children with hearing loss (CHL) perform within normal limits on standardized measures of reading performance (Moeller et al., 2007), a change from previous decades that should be celebrated. However, CHL, as a group continue to test below classroom peers in both pre-literacy skills (Cupples et al., 2014) and overall reading performance (Antia, Jones, et al., 2009). Moreover, a subset of CHL appear to be driving these results, with as much as 30% of CHL at risk of reading failure (Antia, Jones, et al., 2009). The current study examines reading performance and possible contributing factors (a) across all children with hearing loss in the sample, and, (b) by grouping children with hearing loss by reading performance.

PARTICIPANTS

Children with mild-to-moderate hearing loss (CHL; n=51) were recruited from pediatric audiology clinics and school systems throughout the middle Tennessee area to participate in a larger, ongoing study examining listening effort and fatigue in school-age children with hearing loss. “Mild” hearing loss was defined as a pure tone average (PTA; thresholds at 0.5, 1.0 and 2.0 kHz) between 20 and 40 dB HL or thresholds greater than 25 dB HL at two or more frequencies. Hearing loss in the sample, and, (b) by grouping children with moderate hearing loss (CHL; n=51) 70 dB HL in the better ear. Children in this data set included 26 females and 25 males who were between 6 years, 3 months and 12 years, 11 months. Children qualified for the study if they had no diagnosis of autism spectrum disorder or cognitive impairment as reported by the parents. All children spent at least two hours per day in a general education classroom.

METHODS

Demographic information was collected through parent report. Audiological information was obtained through booth testing by a licensed audiologist or by graduate students supervised by a licensed audiologist. CHL received a comprehensive audiologic examination including air and bone conduction threshold testing and tympanometry to rule out any obvious ear pathology. Language and literacy information was derived from a battery of tests given by a licensed speech language pathologist or by graduate students supervised by a licensed speech language pathologist. Children received the following measures: Test of Nonverbal Intelligence, 4th edition, an untimed test of spatial reasoning; Arizona Articulation Proficiency Scale, 3rd edition, a word-level articulation measure; Clinical Elements of Language Fundamentals, 4th edition, an omnibus test of receptive and expressive language; Peabody Picture Vocabulary Test, 4th edition, a receptive vocabulary test; The Comprehensive Test of Phonological Processing, a test of phonological awareness and memory; and the Woodcock-Johnson Reading Mastery Test, 3rd edition, a measure of reading skills including comprehension and decoding.

RESULTS

Proportion of Children Who Repeated A Grade

50% of CHL-Poor Readers had already repeated at least one grade by age 10. These children are not at risk for academic failure – they are already failing. The relative success of CHL in general classroom settings should not overshadow these individual children.

A key limitation of the data is that it represents a concurrent sample. We therefore cannot test the causal effects of language on reading. A longitudinal assessment of audiologic factors, language factors, and reading factors would allow for a better representation of the effect each variable at an earlier time point has on other variables at a later timepoint.

REFERENCES


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Concurrent Predictors of Reading Performance in Children with Hearing Loss

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Figure 1: Concurrent auditive-average (CHA) thresholds for all (diagonal) and poor (bottom) readers in CHL. Arrows indicate no response obtained at the limits of the audiometer at three frequencies for all those tested.

Figure 2: Relationship between Receptive Language and Reading Scores in CHL (r=.81)

Figure 3: CHL-Good Readers (black diamonds) and CHL-Poor Readers (blue diamonds) appear to belong to different groups on oral language measures: Test of Nonverbal Intelligence, 4th edition, an untimed test of spatial reasoning; Arizona Articulation Proficiency Scale, 3rd edition, a word-level articulation measure; Clinical Elements of Language Fundamentals, 4th edition, an omnibus test of receptive and expressive language; Peabody Picture Vocabulary Test, 4th edition, a receptive vocabulary test; The Comprehensive Test of Phonological Processing, a test of phonological awareness and memory; and the Woodcock-Johnson Reading Mastery Test, 3rd edition, a measure of reading skills including comprehension and decoding.