Children with speech-language impairment (S-LI) are at particular risk for reading difficulty (Aram & Nation, 1980; Catts, 1993; Schuele, 2004). Children with S-LI begin kindergarten with poor literacy skills relative to typical peers (Boudreau & Hedberg, 1999). Early reading deficits persist throughout elementary school; children with S-LI perform poorly relative to peers in second and fourth grades (Catts et al., 2002).

Previous investigations have examined reading outcomes in children with S-LI. The present study uses individual growth modeling to describe the trajectory of reading growth.

**METHODS**

The Early Childhood Longitudinal Study – Kindergarten Cohort (ECLS-K)

**PARTICIPANT DATA**

- An ongoing study sponsored by the U.S. Department of Education.
- Following a representative sample of the kindergarten class of 1998-99.
- Used in the study of reading achievement (e.g., Kaplan & Wajcman, 2005).
- Not yet used to explore reading achievement for children with speech-language impairments.

**PARTICIPANTS**

S-LI
- children with speech-language impairment
  - n = 1,116
- identified using information from the parent interview in fall of kindergarten

TL
- children with typical speech-language development, comparison group
  - n = 9,547
- parents did not report a diagnosis of speech-language impairment or other disability

**MEASURES**

Each child received an individually administered reading assessment at each data collection point. The design of the reading assessment was guided by the National Assessment of Educational Progress to create an assessment that was linked to curricula. The reading assessment included items drawn from other standardized measures (e.g., Peabody Individual Achievement Test – Revised) as well as items created specifically for the reading assessment.

Reading outcome scores were derived using an adapted item response theory (IRT) scale. IRT estimates a given child's performance on the entire reading assessment from the child's responses to a limited set of items. The reading IRT scale is continuous over time and allows for measurement of longitudinal growth. Proficiency probability scores for individual literacy skills are derived from the overall reading assessment based on a cluster of four items of similar content and difficulty. Each proficiency probability score, calculated using IRT, is an estimate of the likelihood that a child has mastered a particular skill.

**METHOD**

The study used individual growth modeling (Singer & Willett, 2003) to examine reading outcomes and rate of reading growth.

Six data collection points were included in the study.

**RESULTS**

A Level 1 (within-person) question focused on individual change in reading ability over time:

\[ \text{READING}_{i} = \beta_0 + \beta_1 \text{TIME}_{i} + \epsilon_{i} \]

A Level 2 (between-person) question focused on how these growth trajectories varied between children with or without a diagnosis of S-LI and with good and poor Beginning Sounds scores at fall of kindergarten:

\[ \text{S-LI status} = \text{S-LI diagnostic code} \]

\[ \text{BEGINNING SOUNDS} = \text{Beginning Sounds score} \]

BEGINNING SOUNDS

Beginning Sounds also contributed significantly to prediction in the model. Each point above the Beginning Sounds mean predicted a reading IRT score 9.76 points higher in fall of kindergarten, and an increase in rate of reading growth of 0.51 points.

The figure below projects the growth trajectories for four prototypical groups of children: children with TL, high Beginning Sounds scores, children with TL and low Beginning Sounds scores, children with S-LI and high Beginning Sounds scores, and children with S-LI and low Beginning Sounds scores. The figure provides an illustration of the effect of S-LI and Beginning Sounds scores on initial literacy ability and rate of reading growth.

**DISCUSSION**

The findings of the present study confirm previous research demonstrating that children with S-LI are at high risk of reading difficulties. Children with S-LI began kindergarten with poor literacy skills and demonstrated a slower rate of reading growth relative to peers with typically developing language.

The slower rate of reading growth estimated in the model of the present study suggests that, as a group, children with S-LI have trouble learning to read and supports a model of deficiency. Of the children with S-LI, even those children with superior early literacy skills (as measured by Beginning Sounds) demonstrate a rate of reading growth which is slower than typical peers.

**IMPLICATIONS**

The present investigation was limited by broad definition of speech-language impairment. Education policy and practice often groups children with a wide variety of impairments into the single category of speech-language impairment. IDEA legislation defines a speech-language impairment as a “communication disorder, such as stuttering, impaired articulation, a language impairment, or a voice impairment, that adversely affects a child’s educational performance.” U.S. Department of Education, 2004

However, ample evidence exists for the distinct risk factors and outcomes for subgroups of children within the broad category of speech-language impairment.

- Children with oral language impairment are 6 times more likely to have reading difficulty than children with typical language (Catts, et al., 2002).
- Children with [only] speech-sound disorders appear to be at no greater risk than typical children for reading difficulties (Bishop & Adams, 1990).

It is critical that we identify those children who are at greatest risk of reading difficulty to effectively allocate the limited resources of the educational system.

Children with oral language impairments may be at particular risk for comprehension-based reading difficulties (Nation, et al., 2004). Speech-language pathologists (SLPs) play a critical role in identifying children with oral language impairments who are high risk of reading difficulty and in ensuring that those children receive adequate support. Early reading screenings most often target decoding skills and may not identify children who will have comprehension difficulties. SLPs might collaborate with other educators to implement screenings of skills that contribute to reading comprehension, such as oral vocabulary and listening comprehension.

For children with oral language impairments who are receiving services, SLPs might incorporate comprehension-based literacy skills into language therapy. Comprehension difficulties may not emerge until late elementary; SLPs might continue intervention over a longer period of time or provide follow up and consultation into the late elementary and middle school years.