Currently we have limited understanding of how adolescents with language impairment process spoken words. Using an eye-tracking paradigm, we monitored eye movements to target, cohort, and rhyme pictures while participants listened to single words. Adolescents with poor language skills showed fewer looks to the target and more fixations to the cohort and rhyme competitors. We compared these results to output from the TRACE computational model (McClelland & Elman, 1986), to test theories of language impairment, e.g. deficits in sensory and phonological processing, vocabulary, or processing speed. Individual variation in lexical decay offered the best fit, contrary to existing theoretical explanations.