

It is well established that children with Reading Disabilities (RD) have poor phonemic awareness (PA) and that PA is highly correlated with reading success. The proposed study investigates whether a child's reading problems are more fundamental than PA, arising from poor auditory perception of speech sounds (phones), which we call phonetic perception (PP). The study has two aims: (1) to investigate abilities less linguistic and central than PA in children with RD, that may underlie PA and RD, namely more sensory and peripheral abilities of children with RD to aurally perceive speech sounds; and (2) to carefully map individual differences in perceptual confusions. To achieve these aims, we will systematically examine auditory perception of 24 English consonants (C) and 15 vowels (V) in nonsense syllables, to examine specific phonetic, perceptual confusions in children with a history of reading problems. The study addresses four hypotheses: (H1) Auditory perceptual deficits for speech sounds contribute to RD; (H2) Short-term auditory memory difficulties for speech sounds contribute to RD; (H3.) Processing of the auditory and visual streams is not well integrated in children with RD; and (H4) Reading disabilities are plastic, and thus will respond to training focused on a child's observed speech sound confusions. The proposed 2-year study includes three experiments, each with a cohort of 13 children, 8 to 12 years old, with documented histories of RD and 10 control children. Pairs of speech perception tasks will be tested in each experiment. In all experiments, the first task is a combination of two tasks that we explored in preliminary studies. The SCO task is an oddball task in which the child listens to three CV or VC nonsense syllables spoken by different professionally-recorded talkers, and picks the oddball syllable that differs by only one C or V. The NSCM task is an imitation task, where the child hears only one syllable at a time. This task is used to generate matrices of target sounds and the child's confusions. Our preliminary studies suggest that while children with RD do not experience severe consonant and vowel confusions, their confusions are significantly worse than controls' and affect many sounds. Cumulatively, this increased level of confusion could well result in considerable difficulty when learning to reading. Furthermore, patterns of confusion are often child-specific (idiosyncratic), and thus would require identification on an individual basis, for effective intervention. If we find that school children with RD have PP problems, our study could point the way to why and how RD develops and potentially a way to increase the effectiveness of training, by concentrating on the underlying source of problems in PA and reading.