**The measures included in LSI\_ClaytonHulme\_Study1.dta**

One hundred and fifty-five children were individually tested in two sessions each lasting approximately 30 minutes. All testing was completed in school. There was small amount of missing data where children were unable to complete all reading-related measures due to time constraints.

## Tests and Materials

The children completed an experimental task designed to measure automatic letter-sound integration and a range of measures of reading development.

Letter-sound priming task. This task involved the successive presentation of a visual letter prime and an auditory phoneme target. Children were required to decide on each trial whether the second stimulus (the ‘target’) was a ‘real’ speech-sound or not. Fifty percent of trials consisted of speech sounds; the other 50% of trials involved the presentation of a non-speech sound. Response time (RT) was measured to the auditory stimuli (speech/non-speech decision RT). Figure 1 details the trial structure across the three experimental conditions.

**Stimuli.** Stimuli in this task were recordings of the 5 phonemes /tə/ (293ms), /də/ (263ms), /və/ (428ms), /zə/ (413ms) and /dʒə/ (357ms). Non-speech versions of these stimuli were created in Matlab by randomly assembling 5ms segments of the original signal (Ellis, 2010). These non-speech sounds were identical in length, energy and spectral composition but sounded completely unlike speech. The lower case letters corresponding to the phonemes used were presented in Ariel font (approximately 23 x 20mm). On 50% of trials a letter was presented and on the other 50% of trials one of five novel letter-like forms (adapted from Taylor, Plunkett, & Nation, 2011) was presented.

**Apparatus.** Stimuli were presented and responses recorded (speed and accuracy) using E-Prime Software (version 2.0) using a Psychology Software Tools Serial Response Box (SRB; model 200a) and a laptop running Windows 7. Auditory stimuli were presented through headphones.

**Procedure.** Children were instructed to attend to both the letter and speech-sound and decide whether the sound was a ‘real’ speech-sound using “yes” and “no” response keys on the response box. Before the task began children were familiarized with the procedure in thirteen practice trials.

On each trial a centrally located fixation point was presented for 1000ms, followed by the letter or non-letter stimulus, presented in black and appearing on a white screen for 500ms. The auditory target was presented over headphones and its onset was synchronous with the offset of the visual letter. Each trial was followed by the visual prompt “Real sound?” Response times from the response box were recorded from the onset of the auditory target. The experimenter monitored the child’s performance, controlling the presentation of trials.

There were six conditions in the letter-sound priming task. In the congruent condition, the prime and target were the same letter/sound. In the incongruent condition the prime and target were not the same letter/sound. In the baseline condition, the prime was a novel letter and the target was a speech-sound. There were three additional control conditions to prevent children detecting the relationship between primes and targets and generating expectancies. In these control conditions the target was a non-speech sound. Novel symbols and scrambled speech-sounds were yoked to create pseudo baseline, congruent and incongruent control conditions.

There were 20 trials for each condition, and each condition included four trials of each pairing, apart from the incongruent condition where each letter prime was presented once and paired with all other speech sounds. There were 135 trials in total, including 15 “catch” trials to ensure children were attending to the screen. On catch trials, the same letters were presented in a black-and-white animal print (e.g., zebra stripes) and children were instructed to make a different response (using a button on the response box).

Letter-sound knowledge. Children completed the letter-sound knowledge (LSK) subtest from the York Assessment of Reading for Comprehension (YARC; Hulme et al., 2009). This test required children to say the sound corresponding to 32 letters and digraphs.

Reading. Children completed the timed word and nonword reading subtests from the Test of Word Reading Efficiency (Torgesen, Wagner, & Rashotte, 1999) and the Single Word Reading Test (Foster, 2007) where they were required to read aloud a list of words of increasing difficulty without time pressure.

Phoneme awareness. Children completed the sound deletion subtest from the YARC (Hulme et al., 2009). In this test children heard a word (and saw an accompanying picture) and were required to repeat it and then repeat it again after deleting a sound (for example “Can you say seesaw? Can you say it again but this time don’t say saw?”). Practice trials ensured children understood the instructions.

Rapid Automatised Naming (RAN). Children completed the digit RAN subtest from the Comprehensive Test of Phonological Processing (Wagner, Torgesen, & Rashotte, 1999). This test required children to name two 9 x 4 arrays of six digits as quickly and accurately as possible.

**The measures included in LSI\_ClaytonHulme\_Study2.dta**

One hundred thirty-one children participated in the study. Children were tested individually in a 20-minute session. Tasks were completed in a fixed order. There were 20 children with dyslexic difficulties between 9 and 11 years of age, 20 typically developing chronological-age-matched (CAmatched) controls, and 91 typically developing reading-age-matched (RA-matched) controls between 6 and 7 years of age. The dyslexic group were recruited from specialist schools for children with dyslexia in North London and Surrey. Fifteen children in this group had received a formal diagnosis of dyslexia from an educational psychologist; the remaining five children in the dyslexic group had reading and/or spelling standard scores 1.5 SD below average. Data from 91 typically developing children in Study 1 were used to form the RA control group. The CA-matched group were recruited from mainstream schools in Greater London.

**Reading**. Children in the dyslexic and CA-matched groups completed the Word Reading subtest from the Wechsler Individual Achievement Test II (Wechsler, 2005). Children in the RA- and CA matched groups completed the Single Word Reading Task (Foster, 2007). Both measures required children to read aloud a list of words that became increasingly difficult. Age equivalent scores allowed us to match dyslexic and typically developing children for reading ability.

**Letter-sound priming task.** The task used was identical to the priming task described in Study 1.