SUPPORTING INFORMATION

Methods

Artificial Letter Training

The artificial letter training consisted of ten training units containing six to 30 trials each, during which two to six grapheme-phoneme correspondences were trained. For each unit, we used a critical cut-off of one error per item. Additionally, a critical cut-off was introduced for the total number of errors within each unit ranging from one to three, depending on the amount of presented trials. If one of these cut-offs was reached, up to three additional training units were introduced to explicitly train items with a high error rate. After the third repetition the training continued, regardless of the performance level achieved. In total, 15 to 172 additional trials were presented (m=92.1±41.8) in two to 18 additional training units.

To account for the varying number of presented items per trial, accuracy was calculated using the following equation:

$$\boldsymbol{Aw = \frac{I}{Imax}\, A}$$

where Aw is the weighted accuracy, I is the number of presented items, $Imax$ is the maximum possible number of presented items, and A is the unweighted accuracy of the trial.

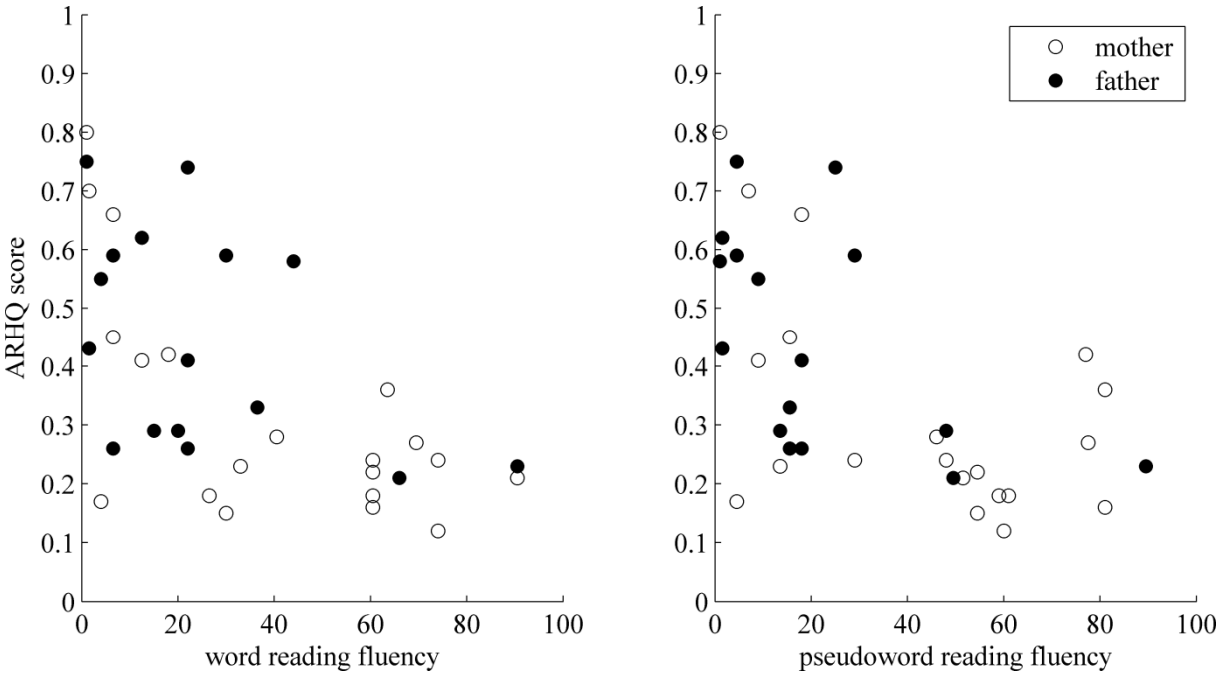
EEG Results

To investigate ERP differences around 180 ms, we defined a time window as the interval +/- 30 ms around the peak of the mean negative deflection of the bilateral frontotemporal electrodes over all conditions (peak: 172 ms; interval: 142-202 ms). The linear mixed model with fixed factors hemisphere (left vs. right), condition (trained vs. untrained), and

congruency (congruent vs. incongruent) did not result in any significant main effect or interaction for the mean amplitude values of the frontotemporal clusters during this time window.

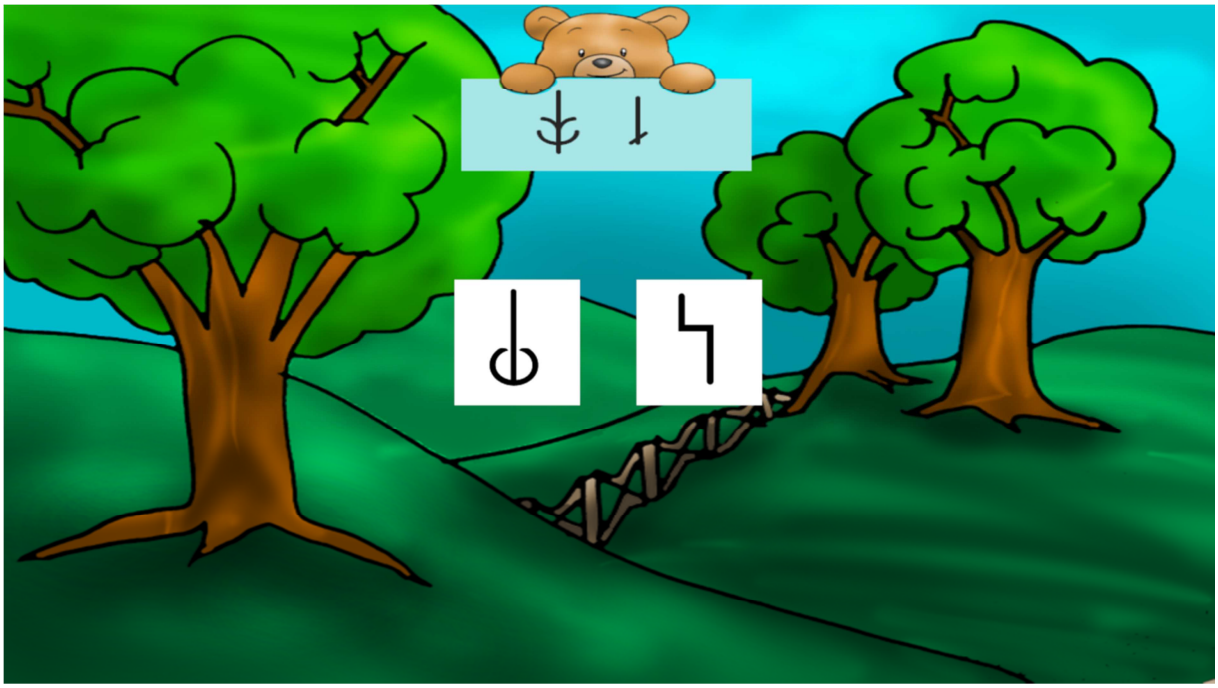
To investigate ERP differences between 500 and 600 ms, we analyzed the time window from 520 to 580 ms, which was defined as the interval +/-30 ms around the GFP maximum of the Ucong condition at 550 ms. The linear mixed model with fixed factors hemisphere (left vs. right), condition (trained vs. untrained), and congruency (congruent vs. incongruent) did not result in any significant main effect or interaction for the mean amplitude values of the parietooccipitotemporal and frontotemporal clusters.

Figure 1S



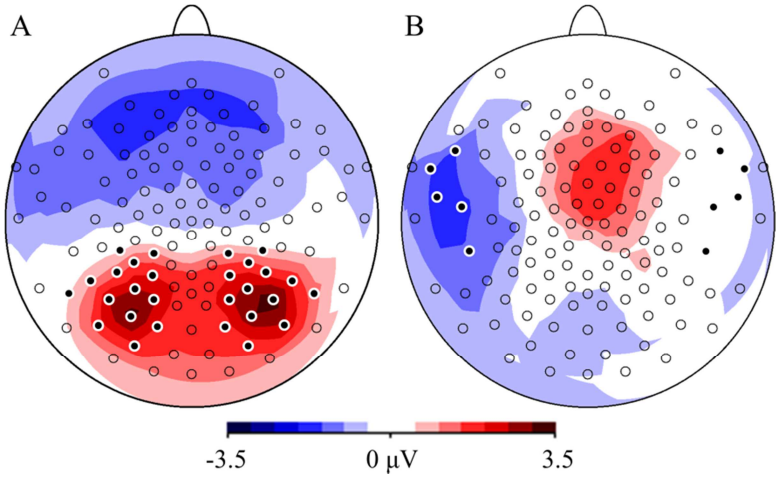
Correlations of ARHQ scores and reading fluency measures (SLRT II). Higher parental word and pseudoword reading fluency (percentile scores of 1-minute reading fluency test) was significantly related to lower self-reported risk for dyslexia (ARHQ scores).

Figure 2S



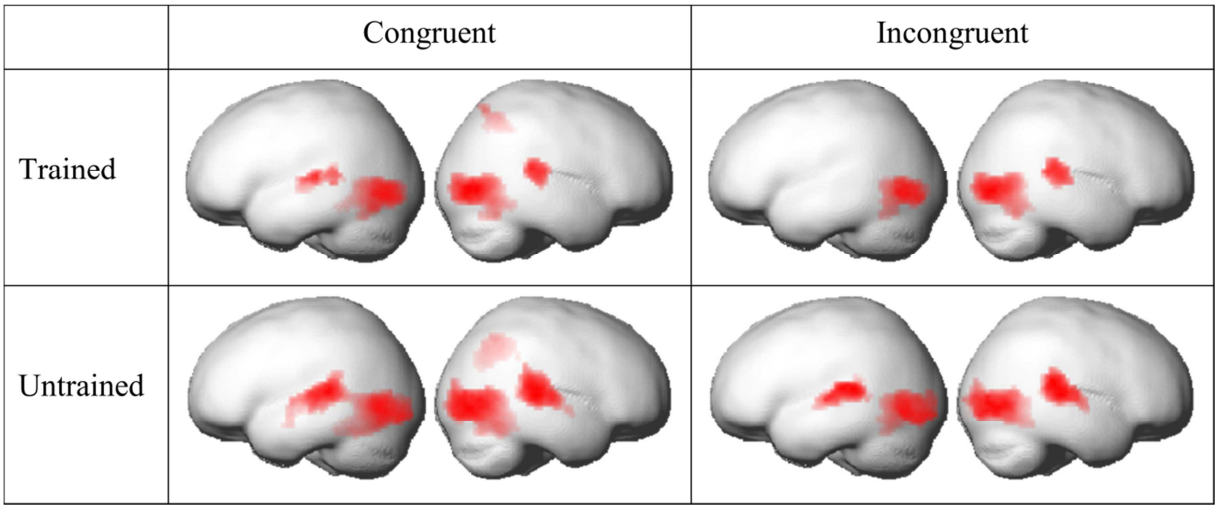
Artificial letter training. During each trial the target and distractor false font characters were presented in the middle of the screen. Each false font character of the training material was accentuated by a white box. Neutral, child friendly drawings were used as background images. In each trial, the matched untrained false font characters appeared in a box matching the colours of the background images, held by a bear, and located above the training material. Children were instructed to look at the middle of the screen, listen to the speech sound presented, and choose the correct grapheme while ignoring the additionally presented information in the background.

Figure 3S



Electrode clusters of interest were defined based on the mean topographic maps over all conditions. A. The parietooccipitotemporal (POT) electrode cluster was defined by averaging activation of the time windows S1, S3, S4, S5, and the inverted activation of S6 over all conditions. This resulted in a mean topographic map revealing 14 electrodes of interest over each hemisphere (left POT: E47, E50, E51, E52 [=P3], E53, E57, E58 [=T5], E59, E60, E64, E65, E66, E69, E70 [=O1]; right POT: E83 [=O2], E84, E85, E86, E89, E90, E91, E92 [=P4], E95, E96 [=T6], E97, E98, E100, E101). B. The frontotemporal (FT) electrode cluster was defined based on the average activation of time window S2 over all conditions. Five electrodes of interest were identified over the left (LFT: E38, E39, E43, E44, E45 [=T3]) and right (RFT: E108 [=T4], E114, E115, E120, E121) hemisphere.

Figure 4S



fMRI activation patterns of single regressors. Bilateral activations of all experimental conditions against rest are projected on the rendered surface of a pediatric brain template (Wilke and Holland, 2003; $P < 0.001$ uncorrected; cluster level FWE corrected $P < 0.05$).