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Thank you Chairwoman Sonia Chang-Diaz, Chairwoman Alice Peisch, and Members of the Joint Committee on Education for the opportunity to testify in support of Dyslexia legislation, Bills H. 330, H. 2872, S. 313 and S.294.

My name is John Gabrieli. I live and work in Cambridge. I am in favor of *BILL NUMBERS: H.330, H.2872, S.313, and S.294*

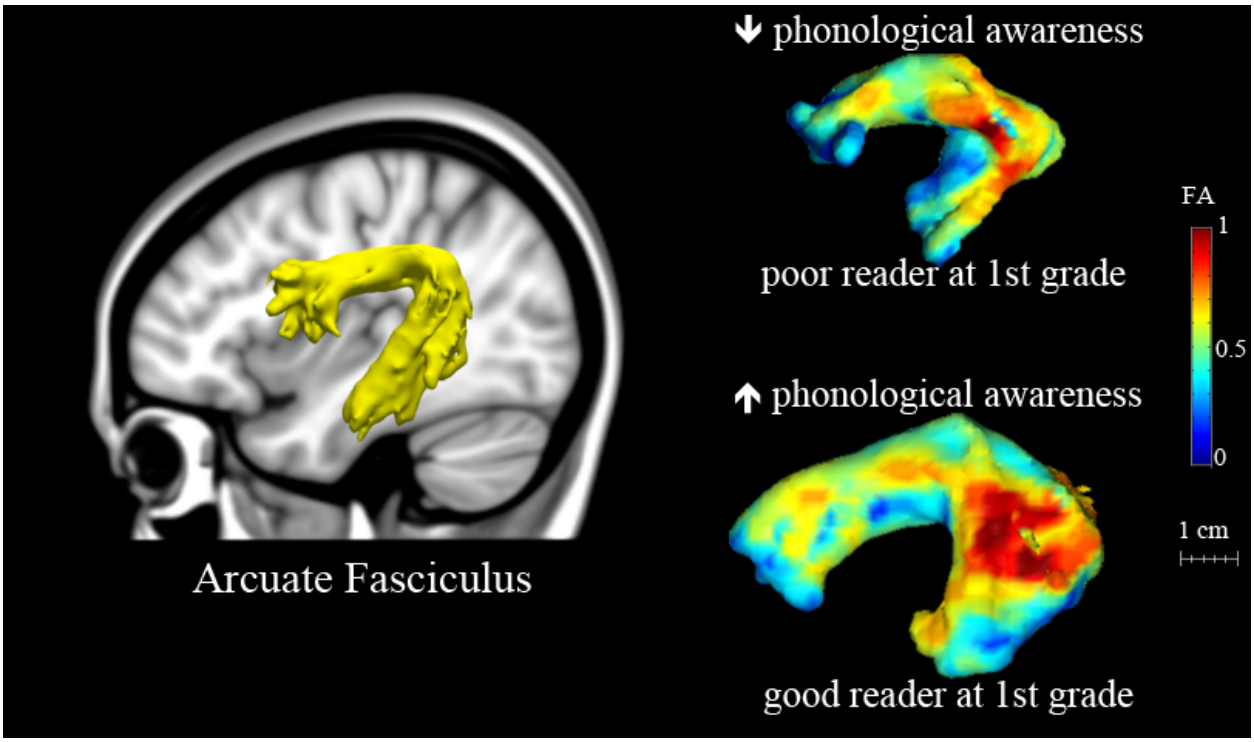
I am a neuroscientist at MIT who has studied brain differences in dyslexia and how effective intervention drives brain plasticity in dyslexia for about 20 years. These studies have included hundreds of children and adults in Massachusetts.

One of our major studies involved nearly 1500 young in children in Eastern Massachusetts who attended 19 diverse schools. This was a collaboration with Dr. Nadine Gaab at Children's Hospital and Harvard Medical School, and supported by the NIH. We used a brief screening battery administered at each school with children entering kindergarten, before schools begin formal reading instruction. We identified about 200 children for in-depth characterization, including brain imaging. We then tracked how these children progressed in reading ability through the end of second grade. We could ask, therefore, if brief behavioral screening at the beginning of kindergarten was a good predictor of how well a child would read by the end of second grade.

We found that the screening measures administered at the beginning of kindergarten were strong predictors of good or bad reading ability at the end of second grade. Indeed, we have published papers in peer-reviewed journals documenting how strongly the initial profiles were stable over time and through the following three years. The specific measures were those that other researchers have recently also reported to be good predictors of reading achievement: (1) tests of phonological awareness for spoken language; (2) tests of letter knowledge; and (3) tests of rapid naming of objects and colors. All of these tests can be administered to children without involving reading and require a modest degree of professional development or training for the test giver. Although further research is likely to improve these measures to a greater degree, the currently available and easy-to-administer measures are already proven to be excellent for identifying children at risk for reading difficulty. Of course, a screener can only be good on behalf of children when the screener includes reliable measures of valid constructs. Therefore, I believe that it will be important that schools are encouraged and supported to use the specific measures that are well supported by many research findings.

After screening, those children at high risk for poor reading will need high-quality, evidence supported interventions. We and others have shown that effective interventions alter brain structure and function. This summer, we reported that children with dyslexia who come from low-income families are especially likely to benefit from such an intervention, in this case provided to them in the summer. Many of the dyslexic children from low-income families exhibited gains in reading skills, and those children also exhibited changes in the anatomies of their brains. These findings are consistent with the observations that current interventions are most effective in beginning readers, and are less effective in later grades.

Massachusetts is famous for its outstanding biomedical research, including brain differences associated with dyslexia. Massachusetts is also famous for its high-quality approach to public education. These two outstanding strengths of Massachusetts can be combined through early screening for dyslexia so that children who are born with brains not well suited for learning to read can get early and effective support, and flourish in their learning and lives.

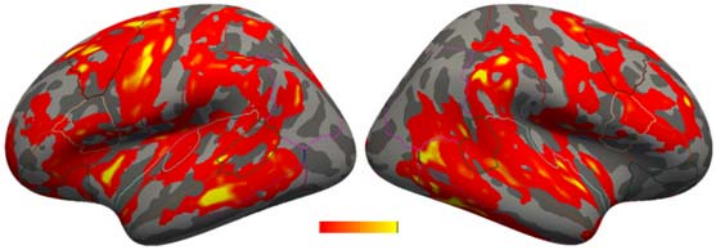


Examples of two children screened in MA near beginning of kindergarten who progressed to be a poor or good reader by end of first grade. These pictures depict the anatomic structure of the left arcuate fasciculus, a white-matter pathway that connects the major language regions of the left hemisphere (left side of figure). One child who exhibited poor phonological awareness for spoken language on the screener near the beginning of kindergarten went on to be a poor reader at end of 1st grade (top right). Another child who exhibited good phonological awareness near the beginning of kindergarten went on to be a good reader at end of 1st grade (bottom right). The size and structural properties of the arcuate fasciculus are clearly different when measured at the beginning of kindergarten; this finding supports the idea that such a screener is sensitive to brain differences related to dyslexia. Full findings reported in Saygin et al., Journal of Neuroscience, 2013.

No Intervention Control

Ineffective Intervention

Effective Intervention



Changes in brain anatomy associated with effective early intervention. Children in 1st and 2nd grades from families with diverse incomes participated in a summer reading intervention at MIT that targeted dyslexia. Children from lower-income families showed the most benefits. In the brain, there no changes from before to after the intervention in a control group (top row) or poor readers who did not benefit from the intervention (middle row). In the half of children who did benefit from the instruction, brain regions shown in red/yellow exhibited significant thickening of the neocortex. Full findings reported in Romeo et al., Cerebral cortex, 2017.