



# CHDD Outlook 2012 Issue #8

News from the Center on Human Development and Disability at the University of Washington  
Health Sciences Center

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## New Center on Written and Oral Language to Help Children with Specific Learning Disabilities

by Joel Schwarz

One of every five children in school is thought to struggle learning to read or write because of a learning disability, and Federal laws guarantee a free and appropriate public education for students with a specific learning disability. However, states vary greatly in implementing these laws, focusing on categories of eligibility for services rather than treatment-relevant diagnoses of specific learning disabilities in students whose development is otherwise typical, according to Virginia Berninger, Ph.D., professor of educational psychology and research affiliate of the Center on Human Development and Disability (CHDD). She is the principal investigator of a five-year, \$8.1 million Eunice Kennedy Shriver National Institute of Child Health and Human Development grant that created a new Center for Defining and Treating Specific Learning Disabilities in Written Language at the University of Washington.



Virginia Berninger (center left) meets with graduate students participating in the newly created Center for Defining and Treating Specific Learning Disabilities in Written Language.

The center aims to define specific learning disabilities in writing and/or reading on the basis of what they are and how they differ from each other and from specific developmental disabilities or other disorders. A related goal is to evaluate instructional interventions tailored to the nature of individual learning profiles of both typically developing writers and readers and those with handwriting disability (dysgraphia), reading and spelling disability (dyslexia), or reading comprehension and written expression disability often associated with oral language problems that emerge during the preschool years (oral and written language learning disability or OWL LD).

Research no longer supports IQ-achievement discrepancy as the definition of a specific learning disability. Students may struggle with reading and writing for many reasons, and not all reading and writing problems are specific learning disabilities. "Our prior research showed that these disabilities are invisible because of problems in working memory architecture that impair oral and/or written language skills in predictable ways, and which working memory components are impaired in individuals whose development is otherwise typical," said Berninger. "The goal of the new center is to link diagnoses that pinpoint specific language and working memory impairments with specific instructional interventions." The new center will use both clinical assessment and response to instruction to study effective ways to help those with and without specific learning disabilities learn written language required in 21<sup>st</sup> century schools and to do well on high stakes tests and meet common core standards. Over the next five years

more than 500 fourth through ninth grade students will be recruited from schools in the local area, but in the first year only students in grades 6 or 9 are being recruited. Parents interested in having a child participate in the research may contact Berninger at (206) 616-6372.

The new center's research program will be divided into three major projects that will involve researchers from across the UW including CHDD research affiliates Wendy Raskin, M.D., Ph.D.; Thomas Grabowski, Jr., M.D.; and Todd Richards Ph.D. Collaborators at Seattle Pacific University also will participate. Berninger is the lead investigator of project one, which is designed to explore the effectiveness of computerized lessons tailored to each of the four grades being studied. Steven Tanimoto, Ph.D., a UW professor of computer science and engineering, is heading an effort to develop innovative computer platforms. Berninger and colleagues at Seattle Pacific University are writing the lessons that will be taught by the computer teacher. Raskin will explore whether gene variants reported for specific learning disabilities predict response to the specialized instruction. Susan Nolen, Ph.D., professor of educational psychology, will study how instruction may change students' motivation to read and write. One reason for computerizing the first project's interventions is so they can be later used at schools showing the largest achievement gaps as well as at schools serving students whose first language is not English or who are Native Americans living in urban areas or reservations.

Project two will be headed by Deborah McCutchen, Ph.D., associate dean of research in the College of Education. It will focus on effective instruction for teaching fourth through ninth graders how to read and spell the school vocabulary encountered in the upper grade levels and compose and understand text across the curriculum in those grades. Academic language can be very different from the language used in conversation, and learning this difference can help students in the upper grades do better in school. "One of the things she will be looking at is to see if the same instructional approaches that work with students with specific learning disabilities also work with typically developing students or those with normal development who struggle for other reasons," said Berninger. Although much has been learned about effective early intervention, there is increasing recognition of the need for literacy instruction geared to the upper grades and adolescent learners.

In project three, Richards, professor of radiology, working with Grabowski, director of UW's Integrated Brain Imaging Center and professor of radiology and neurology, will use functional imaging (fMRI) and structural imaging (DTI) to study project one students before and after they participate in the computerized instructional intervention. They will use functional magnetic fMRI connectivity to measure which brain regions activate at the same time during writing and reading tasks. Although research has shown that instruction may normalize certain brain regions of interest, little is known about whether instruction normalizes temporal connectivity of brain regions, leading to fluency in reading and writing. In addition, they will assess structural connections and the relationship of these to the functional connections. DTI computes water diffusion along white matter tracks which are like telephone wires connecting different parts of the brain. In addition, both projects one and three will use eye-tracking to measure where an individual's gaze and attention are focused while writing or reading.

The new center will also follow some students across grades and provide professional development for educators to share what is learned. "One of our end goals is to stop the teacher bashing – blaming teachers when all students do not meet the same standards," said Berninger. "There are huge differences among children based on biology, experience in and out of school, and culture that make it unrealistic for all students to reach the same learning outcome at the same rate and in same way. Teachers can be part of the solution if we share with them effective ways to teach students in the later grades when curricula and assignments become more complex. We want to define what works for whom. We think that by doing so within the general education classroom we can show schools how to save money in financially challenging times by reducing costly pull out services and yet help more students achieve and succeed."

CHDD is an interdisciplinary center dedicated to the prevention and amelioration of developmental disabilities through research, training, clinical service, and community outreach. CHDD includes the University Center of Excellence in Developmental Disabilities and the Eunice Kennedy Shriver Intellectual and Developmental Disabilities Research Center.

#### **CHDD Outlook**

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