

As much as 19 million school age children are blind and they acquire reading in a different than usual modality – tactile instead of visual. At the same time we know almost nothing how braille reading acquisition looks like. Does it cause behavioral and neural changes similarly to print reading in sighted subjects? Thus the first aim of the current project is to examine **how braille-reading acquisition changes the brain structure and function in blind children and compare it to print-reading acquisition in sighted children**. It was shown that some of the brain structures known to play a role in visual reading such as visual word form area, are also active during braille reading by skilled blind adult readers. The question thus arise, **is there a universal reading network irrespective of reading modality that emerges with literacy?** We hypothesize that both the tactile modality and the serial nature of braille (one has to scan every letter) as compared to simultaneous and parallel visual processing will affect the reading network and that we will find brain areas uniquely engaged in print vs. braille reading as well as other areas common for print and braille. To meet the first aim of the project children will be recruited at the entry of formal education with no literacy experience (25 blind and 25 sighted) and tracked longitudinally for 2 years (tested with behavioral tests and MRI every 6 months) to uncover behavioral and neural plastic changes due to literacy acquisition. Additionally, although some researchers suggested the possible existence of braille dyslexia, the research on braille reading so far has been restricted to few studies conducted on small samples of adult skilled braille readers. Therefore the second aim of the project is to **describe the cognitive nature of braille reading difficulties and compare it with cognitive nature of print reading difficulties**. Like many sighted children who struggle with learning to read, a proportion of blind children have specific difficulties related to reading braille that cannot be easily explained. The current project proposes a comprehensive comparison between reading difficulties in sighted children and reading difficulties in blind braille readers on both behavioral and neural levels. We plan to uncover whether atypical braille reading is characterized by similar to dyslexia in sighted functional and structural alterations. For the second aim, older typical and atypical print (N=60) and braille (N=60) readers will be recruited. This will be a cross-sectional study in which children with different literacy experience (3rd to 6th grade) will be tested. Sighted children will be recruited in a manner that they match the blind in terms of age, sex and parental socioeconomic status. Behaviorally we will assess reading skills, phonological processing, verbal short-term memory, cognitive skills such as attention shifting, anchoring, rise time and implicit learning as well as tactile sensitivity. As the braille reading system is linguistically identical to classical print reading, the findings on braille reading can contribute to understanding the process of reading in general.