Putting Dyslexia in Context

Learning disabilities are common, with as much as 20% of the US population suffering from one or more learning disabilities to some degree (Handler et. al, 2011). In 2007, 5.5% of US public school students were found to have a learning disability severe enough to qualify them for specialized instruction under the Individuals with Disabilities Education Act (Handler et. al, 2011). Although learning disabilities are diverse, including disabilities affecting reading (dyslexia), writing (dysgraphia), and mathematics (dyscalcula), dyslexia is by far the most common learning disability, being found in approximately 80% of those individuals who suffer from a learning disability.

The etiology of learning disabilities is complex, including contributions from genetics, neurodevelopment, with specific disabilities linked closely to dysfunction in specific brain systems. Contrary to widespread misconceptions, dyslexia (and other learning disabilities) are unrelated to intelligence or to visual deficits. Instead, dyslexia seems to be closely linked to an individual's ability to parse the phonemes that comprise words and subsequently recombining them into the linguistic code that underlies reading (related functional deficits underlie other learning disabilities). This ability is linked to the functionality of specific brain regions, such as the word form area (found in the left parietal cortex). While the abnormalities in this area are driven by genetics and neurodevelopment, once the deficit is in place and student falls behind, their lack of progress can lead to emotional and psychological problems that further hinder learning (Handler et. al, 2011).

Much has been learned about how altered brain structure coincides with dyslexia from neuroimaging studies, especially studies of both function and structure involving magnetic resonance imaging. The most significant alterations have to do with left hemisphere differences

in the frontal, temporal, and inferior frontal cortex, as well as the white matter pathways connecting these areas with other brain regions. Notably, while unaffected individuals exhibit significant left hemisphere asymmetry with regard to the language centers, persons with dyslexia display a far less pronounced asymmetry in this regard. Functional MRI studies have also shown that persons with dyslexia seem to rely while reading on brain areas different from the ones that that unaffected individuals rely on, a sign that they may be engaging in more effortful processing (Ashkenazi et al, 2013).

With regard to treatment, early intervention is critical, as deficits tend to accumulate as the individual falls farther and farther behind. Most individuals with dyslexia can benefit substantially from intensive instruction, especially with regard to personalized instruction about phoneme parsing. For older individuals, there is software available that can convert text to speech, which is often quite helpful in aiding comprehension. Recording re-listening to lectures is also useful. Instructors are cautioned that a wide variety of ineffective interventions are common, such as visual training or colored lenses. Finally, it is worth remembering that because of the psychological effects of the disability, individuals with dyslexia may benefit from substantial encouragement regarding their intellectual abilities.

Bibliography

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