Genetic Markers and Dyslexia
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Introduction
- Dyslexia is a specific reading disability caused by a defect in the brain's processing of graphic symbols.
- Recent scientific advances have introduced a new approach in understanding mental disorders.
- Many disorders are polygenic.
  - Polygenic genes are multiple genes that affect one type of trait.
  - New discoveries in behavioral genetics include the idea that the accumulation of DNA differences among individuals will be responsible for the variation in many of the traits.
- Every trait in every organism is heritable, including behavior. The extent of the environment's influence will vary among different regions.

Background
- Diagnosing individuals using their genetic information and comparing it to a mass majority of the population has been both successful and inconsistent.
- Finding a link between a disorder and a gene has few well-established protocols—first you must find a genetic marker.
- A genetic marker is any DNA variation with a known location on a chromosome that can be observed and followed from generation to generation.
- Familial hypercholesterolemia is a good example of the successful attempt to link a disorder and the genes that code for it. It is like dyslexia; it is also a polygenic disease.

Can Genetic Markers Help Diagnose Dyslexia?
- Strong conclusions of whether or not someone is more likely to be genetically disposed to dyslexia could be achieved by using whole-exome sequencing (WES) data and compare it to electronic health records of patients with dyslexia.
- When looking at the electronic health records and the WES data the main focus is to code for the SNPs that are in both affected and unaffected individuals. Mapping the differences makes it possible to deduce which polymorphisms or mutations are linked to the dyslexia disorder.
- The comparisons will most likely show which SNPs are linked to dyslexia.
- This will give information on which mutated genes code for the mutated proteins.

Diagnosing Dyslexia
- The earlier dyslexia is diagnosed the more profound an effect interventions are to have on the person's life.
- Cognitive and reading skills may enhanced by up to 25%
- With early intervention, people with dyslexia adapt to their condition at a younger age, allowing them to manipulate the environment in ways that will maximize their abilities to learn.
- About 70-90% of all reading, writing, and spelling difficulties are due to dyslexia. In America it is thought that up to 17% of the population has some type of dyslexic disorder.

Conclusion
- Understanding the genetic markers that are linked with dyslexia will give insight on who might be predisposed to the disorder well before birth.
- This information will allow families to manipulate their child’s environment in beneficial ways that will help them learn to their optimal capacity.
- Early diagnosis will help parents plan to deal with the issues of:
  - Reading and comprehension
  - Physical movement
  - Speech
  - Concentration
- There are many therapy treatments for different age groups for people with dyslexia. Knowing that a child has dyslexia early in life will help shape health and intervention plans significantly.

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