

Genetics, Psychopathology and Cognition

KIBRA and Memory (Papassotiropoulos et al. 2006) Kidney and BRain. A genome wide scan of 351 subjects and word recall. C carriers perform worse than T carriers. This is quite robust.

Gene Chips (Microarrays) – 500,000 polymorphisms at a time. They require large samples but are atheoretical. Squares represent a single polymorphism and generated by fluorescent tags on the DNA.

Many Functional Polymorphisms
This is comparing thousands of polymorphisms at one time.

Given certain assumptions (e.g. the equal environments assumption), behavioural traits appear to be at least partly heritable.

However, when considering evidence, we must remember there is/are: **failures to replicate, publication bias** (positive associations more likely to be reported), **ethnicity effects, genetic complexity, gene x environment interaction.**

More than 99.9% of human DNA sequence is the same across the population. The 0.01 accounts for individual differences. These individual differences allow for the individual differences in **risk** for certain psychiatric disorders.

There are three approaches we can use when hunting for genes. We can look for: **linkage mapping, specific candidate polymorphisms and many functional polymorphisms.**

Specific Candidate Polymorphisms
Using the polymerase chain reaction, an individuals allele type can be ascertained. Polymorphisms change the amino acid sequence and may or may not have an affect on the protein.

Linkage Mapping This tells you about the location of the gene on the chromosome. Those genes closer together on the chromosome are more likely to be carried over to the next generation.

FOXP2 (Fisher et al 1998) This is on chromosome 7 and indicate a responsibility for speech and language **production.**

Huntington's Disease – A wholly genetic effect, characterised by movement problems, cognitive impairment and personality change. Mapped to **Chromosome 4.** Impaired cognitive ability is a strong predictor of Huntington's.

ApoEs and Alzheimer's Disease (Corder 1993)
Three polymorphisms affect protein structure; ApoE3 (normal), ApoE2 (high lipid levels), ApoE4 (AD risk=memory loss), Two copies of ApoE4 raises AD risk by 10–30 times in 75 year olds (though most patients carry one copy).

Dopamine Receptor 4 (DRD4) and Personality (Okuyama 2000) C-521T polymorphism. Gene affects protein structure. **Higher novelty seeking** is correlated with T allele carriers.

Serotonin Transporter Gene (Lesch et al. 1996)
– This recycles serotonin. 1 allele is more efficient at producing serotonin transporter. Those with **s allele** score higher on neuroticism, have an elevated risk of depression but have better visual and working memory.

'**Thrifty Genes**' linked to cholesterol levels. Under selection (arguably) in low nutritional environments and in Brazilian favellas.

Linked to ADHD.