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# GWAS identifies genomic locations linked to personality traits and psychiatric disorders

Dec 9 2016

A meta-analysis of genome-wide association studies (GWAS) has identified six loci or regions of the human genome that are significantly linked to personality traits, report researchers at University of California San Diego School of Medicine in this week's advance online publication of *Nature Genetics*. The findings also show correlations with psychiatric disorders.

"Although personality traits are heritable, it has been difficult to characterize genetic variants associated with personality until recent, large-scale GWAS," said senior author Chi-Hua Chen, PhD, assistant professor in the Department of Radiology at UC San Diego School of Medicine.

## **Five psychological factors are commonly used to measure individual differences in personality:**

- Extraversion (versus introversion) reflects talkativeness, assertiveness and a high activity level
- Neuroticism (versus emotional stability) reflects negative affect, such as anxiety and depression
- Agreeableness (versus antagonism) measures cooperativeness and compassion
- Conscientiousness (versus undependability) indicates diligence and self-discipline
- Openness to experience (versus being closed to experience) suggests intellectual curiosity and creativity

Psychologists and others define personality phenotypes -- sets of observable characteristics -- based upon quantitative scoring of these five factors. Past meta-analyses of twin and family studies have attributed approximately 40 percent of variance in personality to genetic factors. GWAS, which look for genetic variations across a large sampling of people, have discovered several variants associated with the five factors.

In their new paper, Chen and colleagues analyzed genetic variations among the five personality traits and six psychiatric disorders, using data from

23andMe, a privately held personal genomics and biotechnology company, the Genetics of Personality Consortium, a European-based collaboration of GWAS focusing on personality questions, UK Biobank and deCODE Genetics, an Iceland-based human genetics company.

The researchers found, for example, that extraversion was associated with variants in the gene WSCD2 and near gene PCDH15; neuroticism was associated with variants on chromosome 8p23.1 and gene L3MBTL2. Personality traits were largely separated genetically from psychiatric disorders, except for neuroticism and openness to experience, which clustered in the same genomic regions as the disorders.

In addition, there were high genetic correlations between extraversion and attention deficit hyperactivity disorder (ADHD) and between openness and schizophrenia and bipolar disorder. Neuroticism was genetically correlated with internalized psychopathologies, such as depression and anxiety.

"We identified genetic variants linked to extraversion and neuroticism personality traits," said Chen. "Our study is in an early stage for genetic research in personality and many more genetic variants associated with personality traits are to be discovered. We found genetic correlations between personality traits and psychiatric disorders, but specific variants underlying the correlations are unknown."

The authors note that while the sample size of the meta-analyses was large (123,132 to 260,861 participants in different studies), they used only GWAS summary statistics and cannot estimate all genetic variance factors; some studies also used different methodologies.

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**Source:**

University of California - San Diego

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