

Genetic basis of behavior

6 Perspectives

There are six perspectives in the study of psychology. Each perspective provide a different conception of human nature& a focus on different causes of behavior.

1-The biological perspective

Views human as complex animals &focus on genetic and physiological influences on behavior, in which **mental events are seen as the outcome of physiological processes.**

2- The cognitive perspective

Views humans as **rational information processor &problem solvers** whose higher mental processes allow them to think, judge, imagine& plan.

3-The behavioral perspective

Behaviorists emphasize the role of external environment & learning in behavior. Watson & Skinner felt that control of the environment was the key to bringing about positive social & personal changes.

4-The psychodynamic perspective

Freud emphasize the role of unconscious impulses, internal needs, conflicts & defense mechanisms in shaping of behavior.

5-The humanistic perspective

Emphasize the role of self-actualization, freedom & choice on behavior.

6-The socio-cultural perspective

Emphasize the role of social factors, values, beliefs, traditions & cultural learning on behavior.

Genetic endowment combines with **environmental forces** to determine our behavior. Psychological working in the field of behavior genetic **study the ways in which favorable or unfavorable environmental conditions can affect the genetically inherited potential of an organism.**

Genotype is the specific genetic make up of the individual while **phenotype** are the observable characteristics of individual produced by that genetic endowment.

Molecular biologists have developed methods for **inserting new genetic materials** into viruses that can infiltrate neurons & modify their genetic structure.

Behavior genetic techniques

The extent to which the degree of variation among a group of people in particular characteristic can be attributed to genetic factors is estimated by means of heritability coefficient. It applied only to differences within groups not to the contribution of genetic factors to any individual within that group.

A-epidemiological studies

1-Adoption studies

In which a person who was adopted early in life is compared on some characteristics with both the **biological parents** & with the **adoptive parents**. If the adopted person is more similar to the biological parents than to the adoptive parents genetic influence is suggested. If greatest similarity is shown with the adoptive parents environmental factors are probably more important.

Seymour kety in 1978 found that **12% of biological family members** of adopted schizophrenic patients has also been diagnosed with schizophrenia compared with a concordance rate of only **3%** of **adoptive family** members suggesting a hereditary link.

2-Twin studies

If the identical twins are far more similar to one another than are the fraternal twins, a genetic factor is likely to be involved. The concordance rate for schizophrenia among monozygotic twins of schizophrenics is 50% compared with 10-12% among dizygotic twins. It is always possible because identical twins are more similar to one another in appearance they are treated more alike & therefore share more similar environment. To rule out this environmental explanation for greater psychological similarity is by compare set of identical twins who were separated very early in life and raised in a different environment.

Many psychological characteristics including intelligence, personality traits & certain psychiatric disorders have a notable genetic contribution.

The higher correlation coefficients for identical twins on the trait of neuroticism & is almost as greater when they are reared in different environments as when they are reared together.

The combined impact of genetic & environmental factors

The environmental factors interact with genetic endowment in important ways for example one adoption study found that a **low** incidence of criminal behavior was found in the sons whose **biological fathers had no criminal records**. In contrast the criminal behavior of sons whose biological father had **criminal records** was **very high** even if their adoptive fathers had no criminal records. This pattern points to a genetic component in criminality. The level of criminality was **highest** for all of those sons whose **both biological and adoptive fathers had criminal records**, suggesting a combined impact of genetic & environmental factors.

B-The molecular genetic studies

The aim of the molecular genetic studies is to identify the genes explaining the inheritance of a phenotype.

1-The genetic linkage studies

If a particular locus of chromosome consistently segregates with the disease then that locus is likely to contain the gene, example the identification of amyloid precursor protein (APP) gene locus on chromosome 21 in familial Alzheimer's disease.

2-The genetic association studies

The genetic association studies is based on existence of **polymorphism** and measurement of its **frequency** in group of people who have the phenotype of interest &compare it with the control group, example **APOE4** association with **Alzheimer's** disease.

Premises of neurogenetics

specific genetic basis will emerge for certain psychiatric disorders.

Schizophrenia

The risk of schizophrenia in the general population is 1% ,in the 1st degree relatives is 10% & that the concordance rate is 50% among the monozygotic twins.

Bipolar I disorder & major depressive disorder

Are 8-18 times more in the 1st degree relatives than in GP & the concordance rate for both disorders is 33%-90% among the monozygotic twins.

Tourettes disorder

In which the mode of transmission is autosomal dominant with penetrance of 99% in males & 70% in females. 10% only of patients do not have an affected family member. so 90% of patients have a family history of the disorder.