

Biological Influences

by Sophia Tutorial



WHAT'S COVERED

In this lesson, we'll discuss some of the biological influences and dimensions of developmental psychology, as well as the historical perspective and figures behind those aspects.

The specific areas of focus include:

1. Heredity/Inheritance
2. DNA
3. Effect of Genetics on Psychology

1. Heredity/Inheritance

In the context of psychology, biology is the internal physical and chemical processes that influence the human mind and behaviors.

The first important aspect of biology is **heredity**, which is the passing on of physical and psychological characteristics from parents to their offspring. **Inheritance** is another term for heredity; the two can be used interchangeably.

The important figure to remember in terms of heredity is Gregor Mendel, who is considered to be the father of genetics. Mendel was an Austrian scientist and a monk during the mid to late 1800s. While at his monastery in Austria, he examined the inheritance of certain characteristics of pea plants.

He was looking at how these different characteristics could be passed from one parent plant to its offspring. There were seven particular traits that he studied, each of which only had two forms.

When breeding for certain types of characteristics in pea plants, Mendel noticed that some characteristics showed up more often than others.

🔗 **EXAMPLE** A pea plant would have a flower that was either purple or white, a stem that was either long or short, and seed shapes that were either round or slightly wrinkly.

As he started to record those characteristics, he noted two specific aspects:

- Genotype

- Phenotype

The genotype is the genetic makeup, or the blueprint underlying these physical characteristics. The phenotype is the observable aspect of the characteristics.

🔗 **EXAMPLE** A plant might have the phenotype for purple flower, a long stem, and a wrinkly seed. Then there's a genotype behind each of those characteristics that tells the plant to display those forms of heredity/inheritance.



TERM TO KNOW

Heredity (also referred to as Inheritance)

Genetic material for traits are transmitted from parents to their offspring; these biological influences represent the “nature” aspect of behaviors and cognition

2. DNA

Although Mendel made these observations and discoveries, he wasn't actually recognized for those accomplishments during his lifetime.

It wasn't until the early 1900s when people realized how significantly important these things were, and actively started to study heredity in an attempt to identify the mechanism for passing this information along from parents to offspring. This mechanism wasn't discovered until 1953, when John Watson and Francis Crick published an article called "The Molecular Structure of Nucleic Acids."

This article identified a structure of deoxyribonucleic acid, or what we refer to as **DNA**, which is the biologic basis for heredity and inheritance. It's the structure within the human body and biology that allows certain information to be passed from a parent to an offspring.

One of the important discoveries made about DNA was that its shape is a double helix. That shape allows it to function as the information center for the cells. In this way, DNA is like a zipper--you're able to pull it apart and have two halves, which can be copied and sent down to different cells and to the offspring.

The middle of the DNA contains different nucleotide bases, which are the information for the cells. There are four of these bases:

- Adenine (denoted as A)
- Cytosine (denoted as C)
- Guanine (denoted as G)
- Thymine (denoted as T)

These different types of nucleotides pair together, so that A goes with T, and C goes with G.



TERM TO KNOW

DNA (Deoxyribonucleic Acid)

Genetic blueprint; genetic information is unique except for identical twins

3. Effect of Genetics on Psychology

These biological aspects of heredity and DNA relate to psychology in that psychologists have to think of behavior and mental characteristics as a phenotype, just like the purple flowers and the wrinkled seeds in the pea plants. In other words, behavior and mental characteristics can be passed on in the same method from parent to offspring.

One way to determine how this works in psychology is through experiments, such as those done in twin studies. In twin studies, psychologists study twins that are either identical (sharing almost 100% of the same DNA) or fraternal twins (sharing closer to 50% of the same DNA).

The psychologists look at different mental characteristics to see if there's a genetic basis for the identical twins to have similar types of behaviors. In some aspects, psychologists have found this to be true.

➞ **EXAMPLE** Identical twins tend to have more similar IQs than fraternal twins. Additionally, if an identical twin has autism, the other twin is 60% more likely to also have autism than a fraternal twin would be.

Psychologists also look at identical twins that are separated at birth, as sometimes occurs. There isn't an experiment that they can do under these circumstances; rather, the psychologists simply try to observe any similar characteristics. In some cases, they've found that there are still similar characteristics despite the twins' separation.

While there's some doubt as to the validity of the results of these twin studies, there's also evidence in them of the importance that biology can have on developmental psychology. In this way, it's definitely an area of study that requires further research and understanding.



SUMMARY

In this lesson, you learned about two important aspects of biology: **heredity/inheritance** and **DNA**. While heredity is the passing on of physical and psychological characteristics from parents to their offspring, DNA is the structure in the human body that allows this information to be passed on.

You now understand the **effect of genetics on psychology**. Understanding the way certain behavioral and mental characteristics are passed on will help us understand why people exhibit certain traits over others.

Good luck!

Source: Adapted from Sophia tutorial by Erick Taggart.



TERMS TO KNOW

Chromosomes

Located in the nucleus of each cell (46 total), made up of DNA and carry our genetic information.

DNA (Deoxyribonucleic Acid)

Genetic blueprint; genetic information is unique except for identical twins.

Heredity (also referred to as Inheritance)

Genetic material for traits are transmitted from parents to their offspring; these biological influences represent the “nature” aspect of behaviors and cognition.