

# COMPLEX OR MULTIFACTORIAL TRAITS

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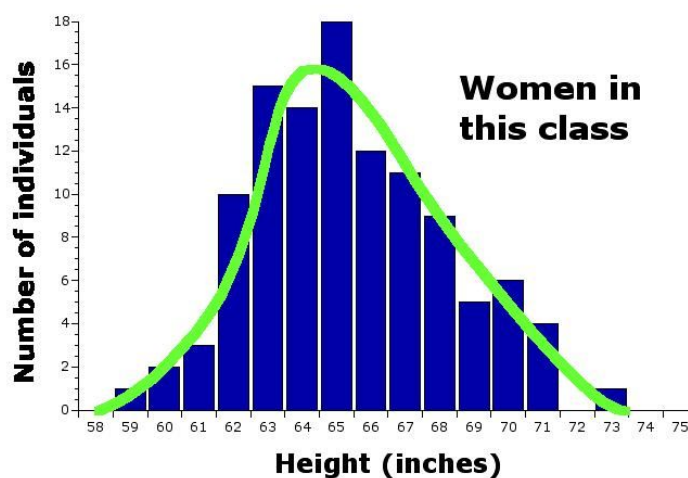
## INTRODUCTION

Mendelian genetics put forward the concept of dominant and recessive traits, where the phenotypes are controlled by single genes. These traits are known as monogenic or Mendelian traits. Though there are many genes that control Mendelian traits, in contrast, there are features or traits in human genetics which are controlled by multiple genes and whose inheritance does not follow the rules of Mendelian genetics. Such traits are known as complex traits.

## FEATURES OF COMPLEX TRAIT

1. **Complex or multifactorial traits** result from a combination of **multiple genetic and environmental factors** (such as *lifestyle choices about diet and exercise*), only some of which might be known. Accordingly, no single gene or environmental factor causes a complex trait.
2. **Complex traits**, also known as **quantitative traits**, are traits that *do not behave according to simple Mendelian inheritance laws*. More specifically, their inheritance cannot be explained by the genetic segregation of a single gene.
3. Such traits show a **continuous range of variation** and are influenced by both environmental and genetic factors. Compared to strictly Mendelian traits, complex traits are far more common, and because they can be **hugely polygenic**.

### Continuous variation



4. Complex traits are believed to result from variation within multiple genes and their interaction with behavioral and environmental factors. Complex traits *do not follow readily predictable patterns of inheritance*.

5. Complex trait is likely derived from multiple genes, and exhibits a *large variety of phenotypes*.
6. Complex traits are believed to *result from gene-gene and gene-environment interactions, genetic heterogeneity, and potentially other yet unknown reasons*.

### **EXAMPLE**

Many birth defects, such as cleft lip and cleft palate, as well as many adult disorders, such as heart disease and diabetes, are examples of complex traits.