# Genotypic Value $V_{ij}$ is a random variable

- Properties of $V_{ij}$:

  Population mean $(\mu)$ corresponds to the expected value of $V_{ij}$

$$\mu = E(V_{ij}) = V_{11} \cdot f(G_1 G_1) + V_{12} \cdot f(G_1 G_2) + V_{22} \cdot f(G_2 G_2)$$

with Hardy-Weinberg:

$$\mu = V_{11} \cdot p^2 + V_{12} \cdot 2pq + V_{22} \cdot q^2$$

$$= a \cdot p^2 + d \cdot 2pq + (-a) \cdot q^2$$

$$= \underbrace{(p^2 - q^2)}_{(p-q)\underbrace{(p+q)}_{=1}} a + 2pq d = \underbrace{(p-q)a + 2pqd}$$

Population specific