

□ Genotypic Values V_{ij} for animal with genotype $G_i G_j$

Genotype	V_{ij}	BV_{ij}	Difference $V_{ij} - BV_{ij}$
$G_1 G_1$	a	$2q\alpha$	$a - 2q\alpha = 1 - 2q^2d$
$G_1 G_2$	d	$(q-p)\alpha$	$d - (q-p)\alpha$
$G_2 G_2$	$-a$	$-2p\alpha$	$-a - (-2p\alpha)$

$$\begin{aligned}
 V_{11} - BV_{11} &= a - 2q\alpha \\
 &= a - 2q[a + (q-p)d] \\
 &= a - 2qa - 2q^2d + 2pqd \\
 &= a(1-2q) - 2q^2d + 2pqd \\
 &= \underbrace{[(p-q)a + 2pqd]}_{\mu} - 2q^2d
 \end{aligned}$$

$$= \mu + D_{11} \text{ where } D_{11} = \underbrace{-2q^2d}_{\text{Dominance deviation of } G_1 G_1}$$