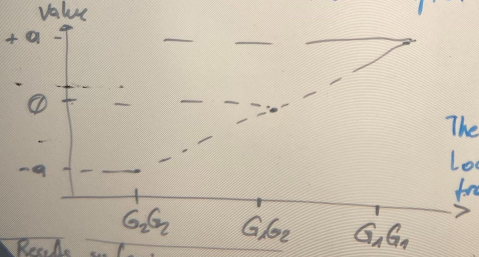
$$\Delta_1 = BV_{11} - BV_{12} = 2q\alpha - [(q-p)\alpha]$$
$$= 2q\alpha - q\alpha + p\alpha$$
$$= q\alpha + p\alpha = \underbrace{(p+q)}_{=1}\alpha = \alpha$$

$$\Delta_2 = BV_{12} - BV_{22} = (q-p)\alpha - [-2p\alpha]$$
$$= q\alpha - p\alpha + 2p\alpha$$
$$= q\alpha + p\alpha = (p+q)\alpha = \alpha$$

- The effect of substituting a G_2-allele by a G_1 allele on the breeding value is a constant and corresponds to α. Hence, α is called Allele Substitution Effect

- Special case for $\alpha = a + (q-p)d$ occurs when $d = 0 \Rightarrow \alpha = a$ (Assumption is used in Genomic Selection in Swiss Dairy Cattle Breeding)



⇓

The effect of a single locus on a quantitative trait is determined by just one parameter a.

Results so far:

Genotype | BV