Selection Index:

- later used to predict aggregate genotype (Gesamtzuchtwert)
- Generic method useful to combine different sources of information into one summary quantity

- Before the method BLUP was invented, selection index theory was used to predict breeding values for a single trait.

- Idea:
  - Combine all sources of phenotypic information, e.g.
    - > own performance (one, repeated)
    - > half-sib
    - > full-sib
    - > offspring
    - > parent
  - Assume: general principle of prediction: $\hat{u} = b(\overbrace{y - \mu}^{y^*}) = by^*$

⇒ Index of merit I:

$$I = b_1(y_1 - \mu_1) + b_2(y_2 - \mu_2) + \ldots + b_k(y_k - \mu_k)$$
$$= b_1 y_1^* + b_2 y_2^* + \ldots + b_k y_k^*$$
$$= b^T y^*$$

(vector-dot product with $b^T = [b_1 \; b_2 \; b_3 \ldots b_k]$; $y^* = \begin{bmatrix} y_1^* \\ y_2^* \\ \vdots \\ y_k^* \end{bmatrix}$)