a

Y — Subtract fixed effect → R — Crossproduct → RR^T = $\sigma_1^2 \times$ *kinship* $+ \sigma_2^2 \times$ *household* $+ \dots$

Recast as a linear regression problem →

$\tilde{Y}$ = $\tilde{X}$ $\times \begin{pmatrix} \sigma_1^2 \\ \sigma_2^2 \\ \dots \end{pmatrix}$
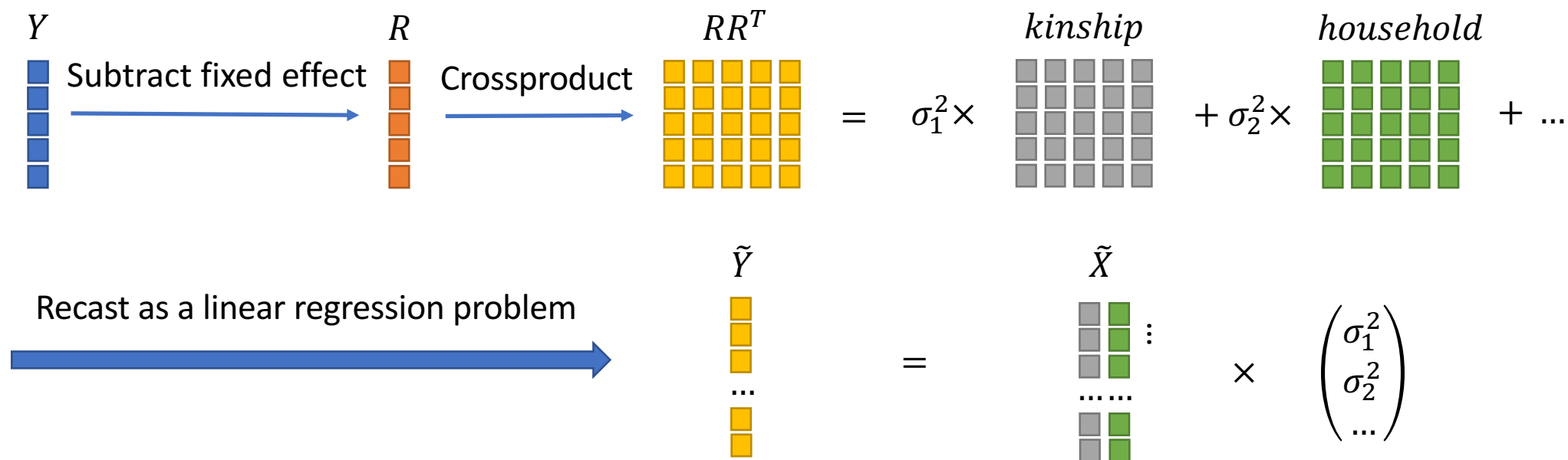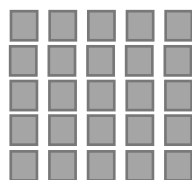
b

Correlation matrix (dense) — thresholding / rearranging → *Correlation matrix (sparse)*