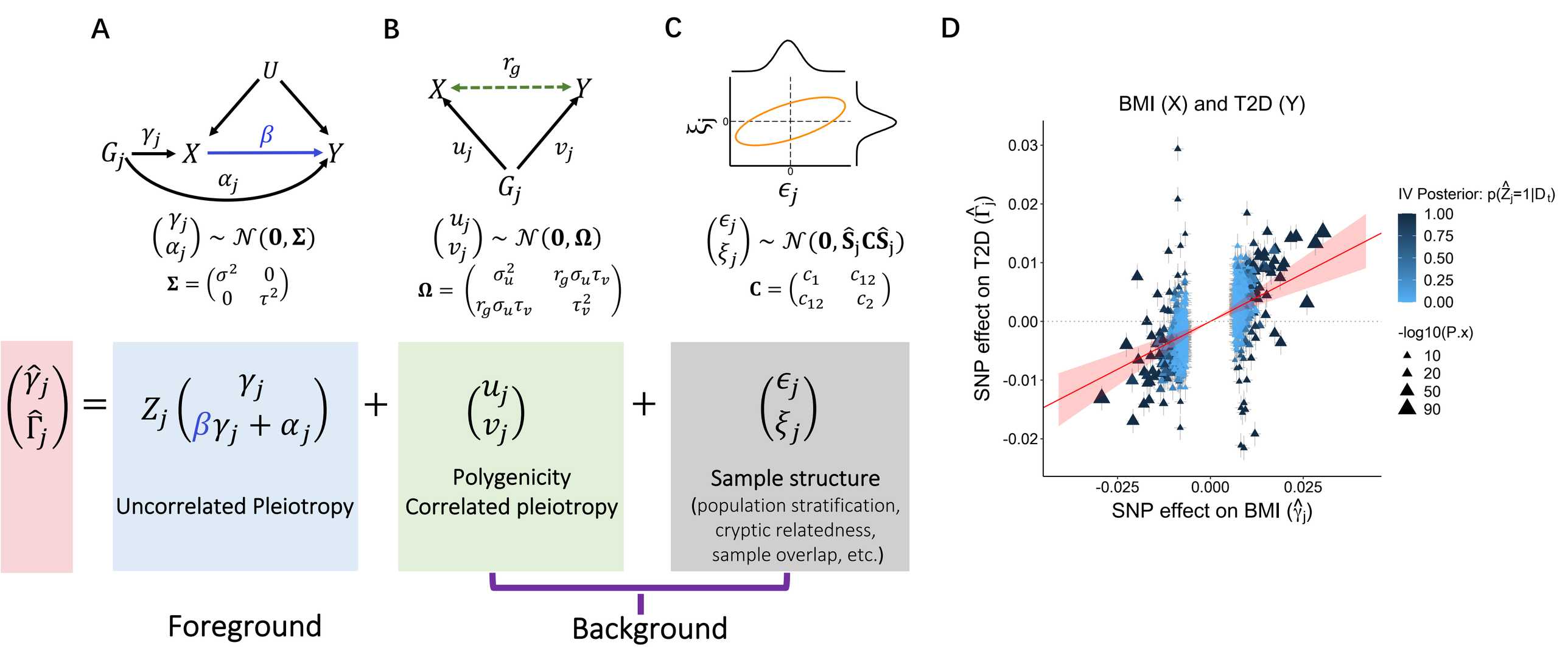
A
B
C
D
$\begin{pmatrix}\gamma_j\\ \alpha_j\end{pmatrix} \sim \mathcal{N}(\mathbf{0}, \mathbf{\Sigma})$
$\mathbf{\Sigma} = \begin{pmatrix}\sigma^2 & 0\\ 0 & \tau^2\end{pmatrix}$
$\begin{pmatrix}u_j\\ v_j\end{pmatrix} \sim \mathcal{N}(\mathbf{0}, \mathbf{\Omega})$
$\mathbf{\Omega} = \begin{pmatrix}\sigma_u^2 & r_g\sigma_u\tau_v\\ r_g\sigma_u\tau_v & \tau_v^2\end{pmatrix}$
$\begin{pmatrix}\epsilon_j\\ \xi_j\end{pmatrix} \sim \mathcal{N}(\mathbf{0}, \hat{\mathbf{S}}_j\mathbf{C}\hat{\mathbf{S}}_j)$
$\mathbf{C} = \begin{pmatrix}c_1 & c_{12}\\ c_{12} & c_2\end{pmatrix}$
$\begin{pmatrix}\hat{\gamma}_j\\ \hat{\Gamma}_j\end{pmatrix} = Z_j\begin{pmatrix}\gamma_j\\ \beta\gamma_j + \alpha_j\end{pmatrix} + \begin{pmatrix}u_j\\ v_j\end{pmatrix} + \begin{pmatrix}\epsilon_j\\ \xi_j\end{pmatrix}$
Uncorrelated Pleiotropy
Polygenicity
Correlated pleiotropy
Sample structure
(population stratification, cryptic relatedness, sample overlap, etc.)
Foreground
Background
BMI (X) and T2D (Y)
SNP effect on T2D
SNP effect on BMI
IV Posterior: p(Ẑj=1|Dt)
-log10(P.x)