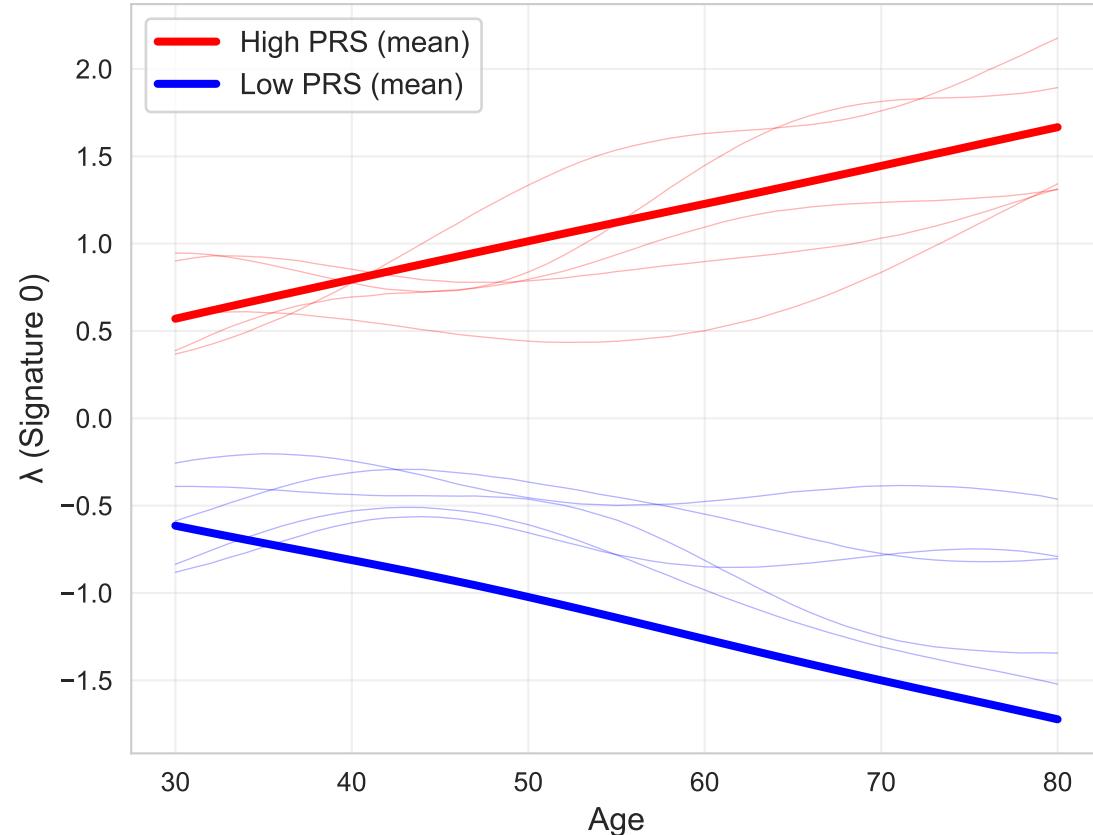
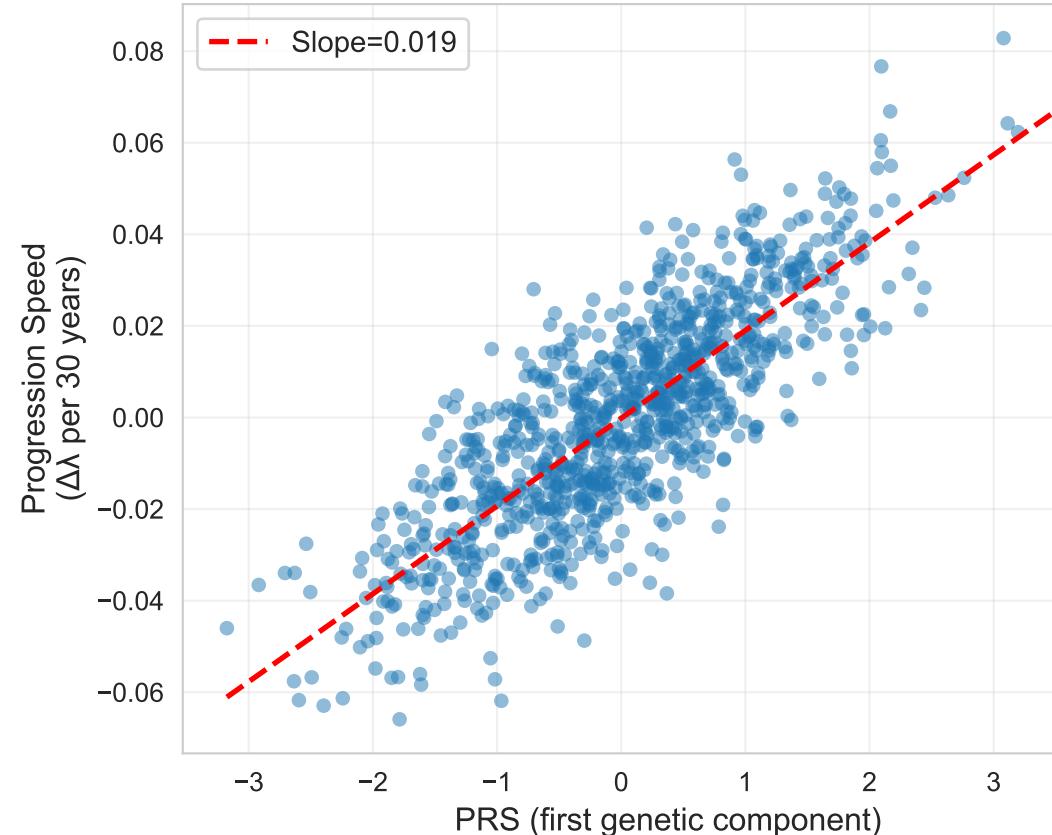


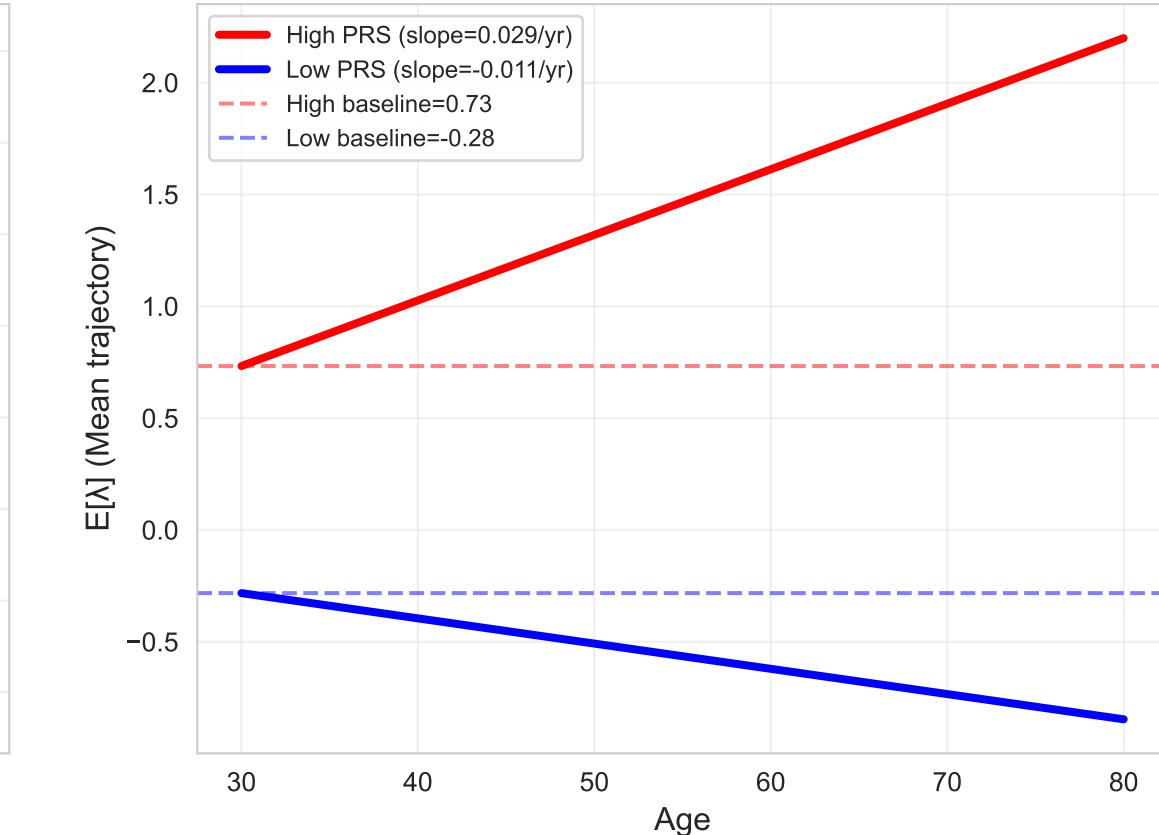
**Lambda Trajectories: HIGH vs LOW PRS
(Notice DIFFERENT SLOPES!)**



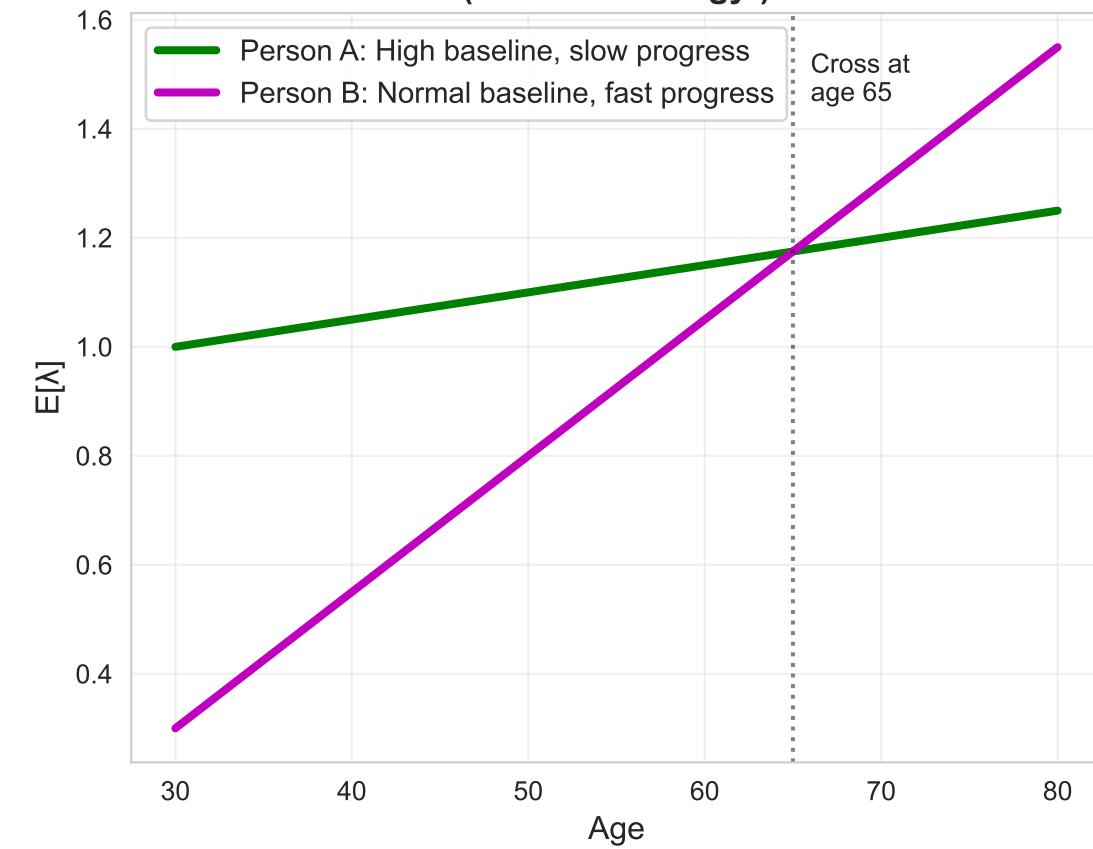
**Genetic Effect on Slope
(Correlation $r=0.811$)**



Decomposition: Level + Slope



**Two Routes to High Risk
(Different biology!)**



KEY INSIGHT

Mean and Variance are INDEPENDENT

- Systematic effects → MEAN

- γ_{level} : baseline

- γ_{slope} : progression speed

- Random variation → VARIANCE

- Ω_λ : same for all individuals

→ These are SEPARABLE → IDENTIFIABLE!

TRUE PARAMETERS:

$\Gamma_{level}[0,:]$:
[0.5 0.3 0.1]

$\Gamma_{slope}[0,:]$:
[0.02 0.015 0.005] /year

GROUPS:
High PRS: 307 indiv
Low PRS: 305 indiv

EFFECT SIZES:
Level diff: 1.185
Slope diff: 2.205
Over 50 years!