GRwHS: Group Ridge within Horseshoe

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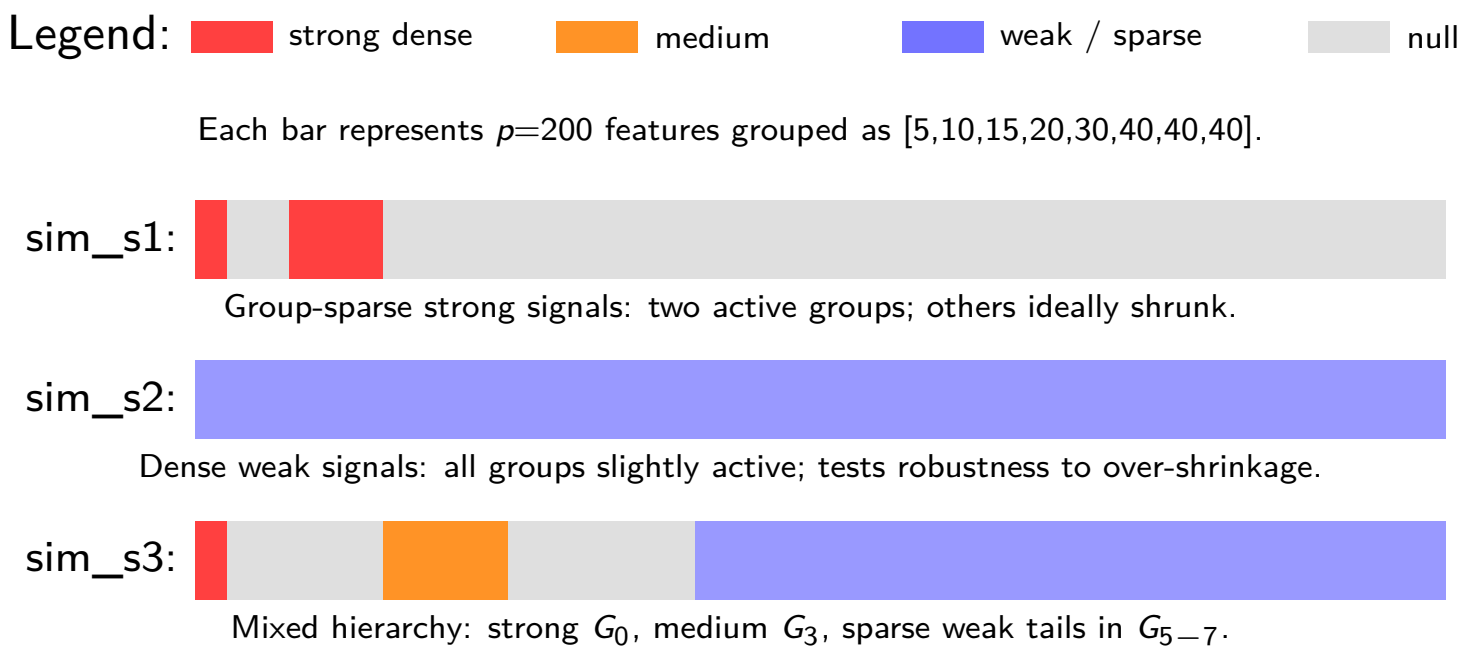
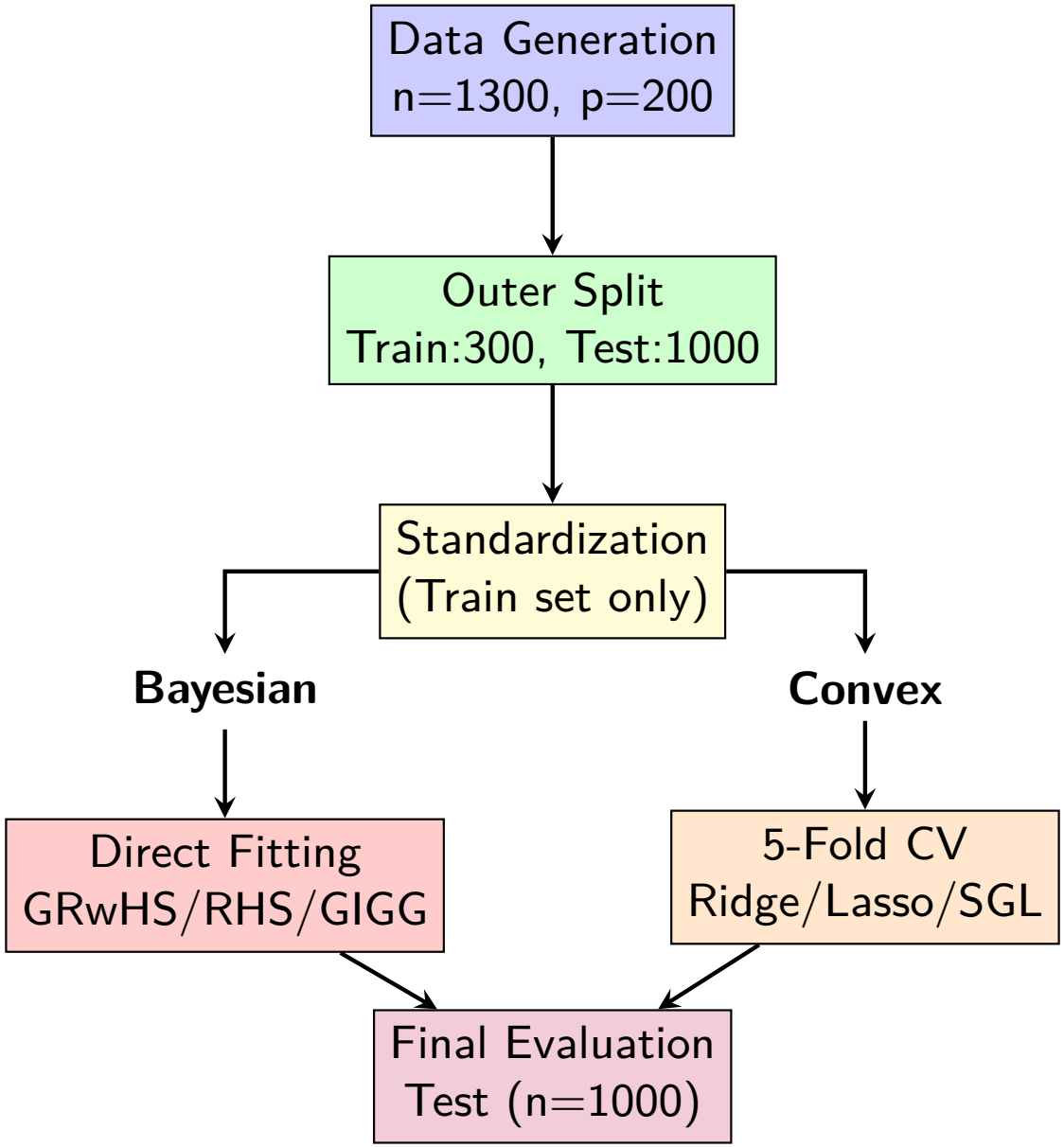
Synthetic Scenarios

- Design: n=1300, Train/test: 300/1000, 5-fold CV, p=200, G=8 groups [5,10,15,20,30,40,40,40]
- Correlation: group block (ρ_{in}=0.7, ρ_{out}=0.1); Signal-to-noise ratio(SNR) $\in \{0.1, 0.5, 1, 3\}$

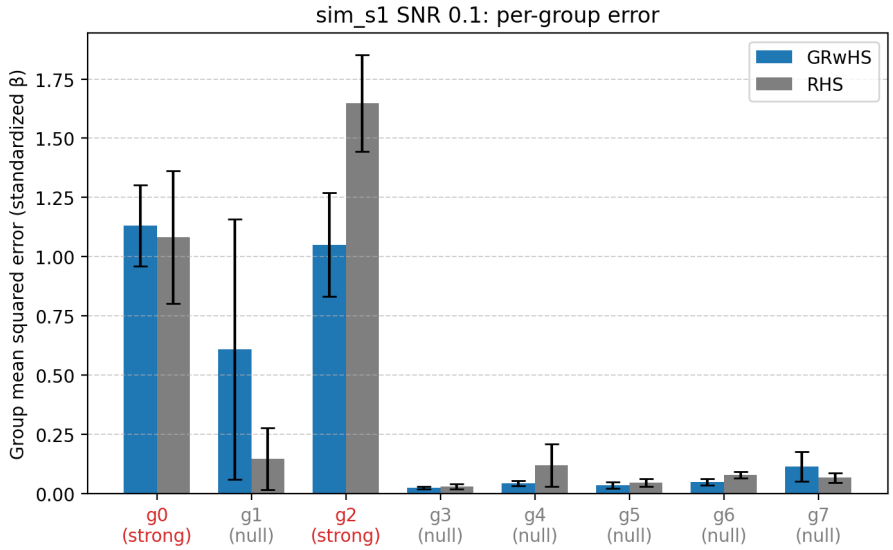


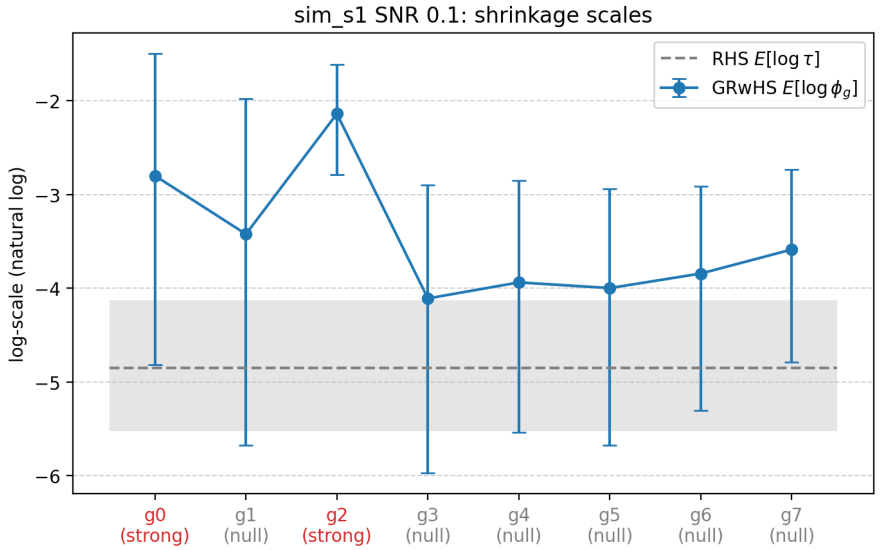
All share identical design, standardization, and evaluation pipeline (RMSE, group edf, posterior shrinkage).

Experimental Design: Nested Data Splitting



Results: sim_s1

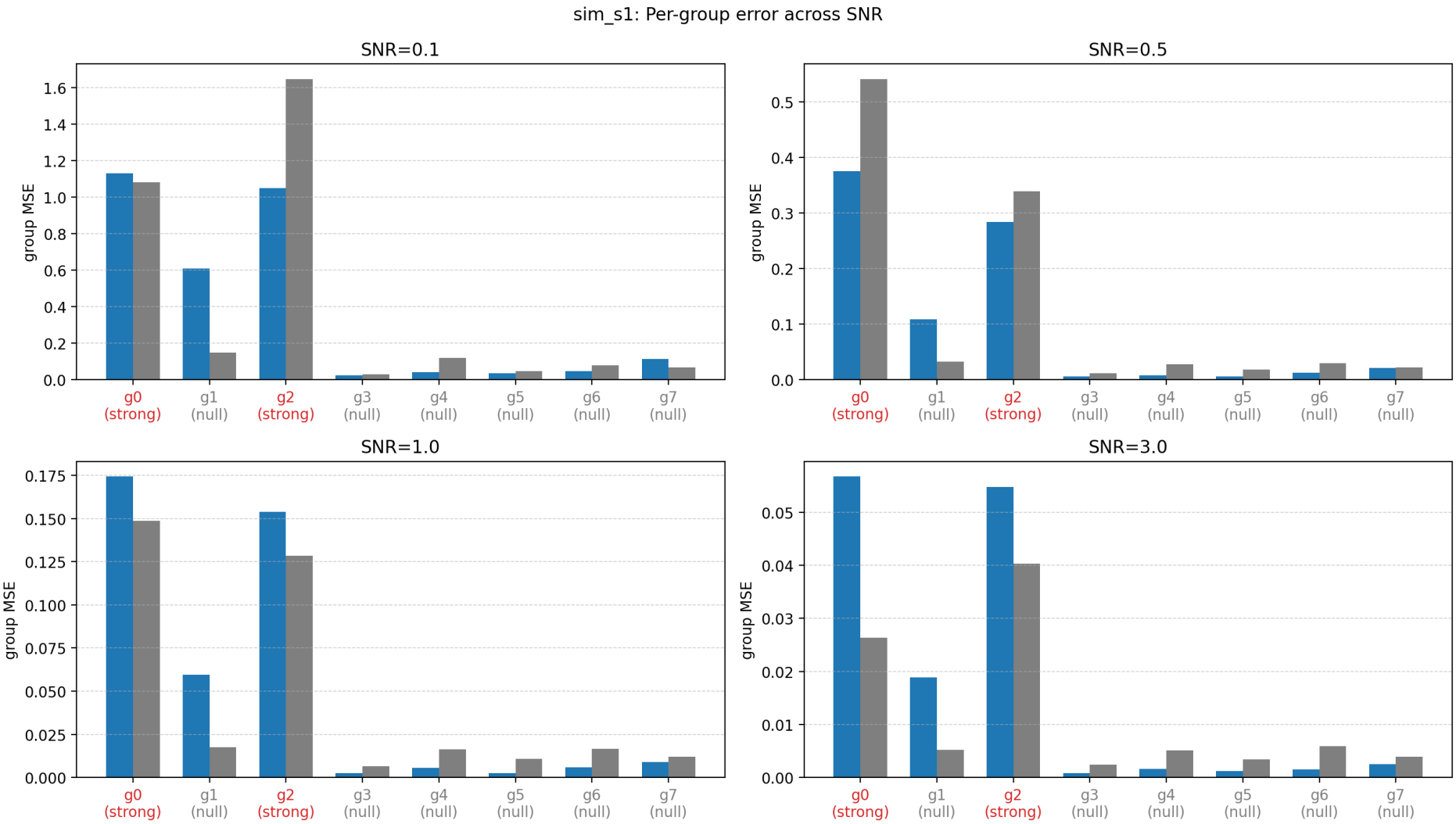




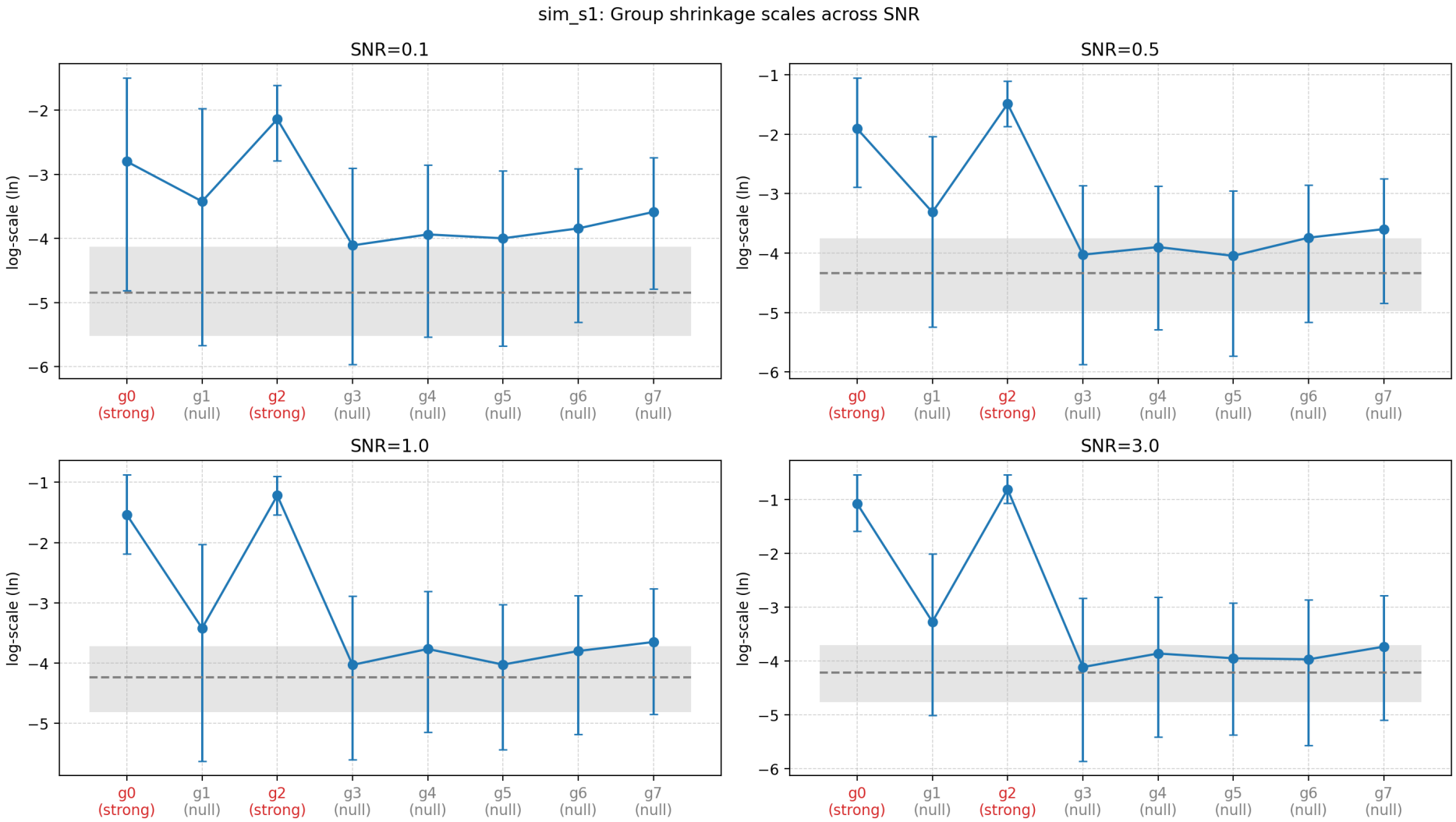
Left: GRwHS lowers error in the strong (g2) groups while matching RHS on weak/null groups.

Right: GRwHS learns larger E[log ϕ_g] for signal groups, whereas RHS uses one global τ (dashed).
This group-aware shrinkage releases true signal and preserves shrinkage on noise, explaining the error gains.

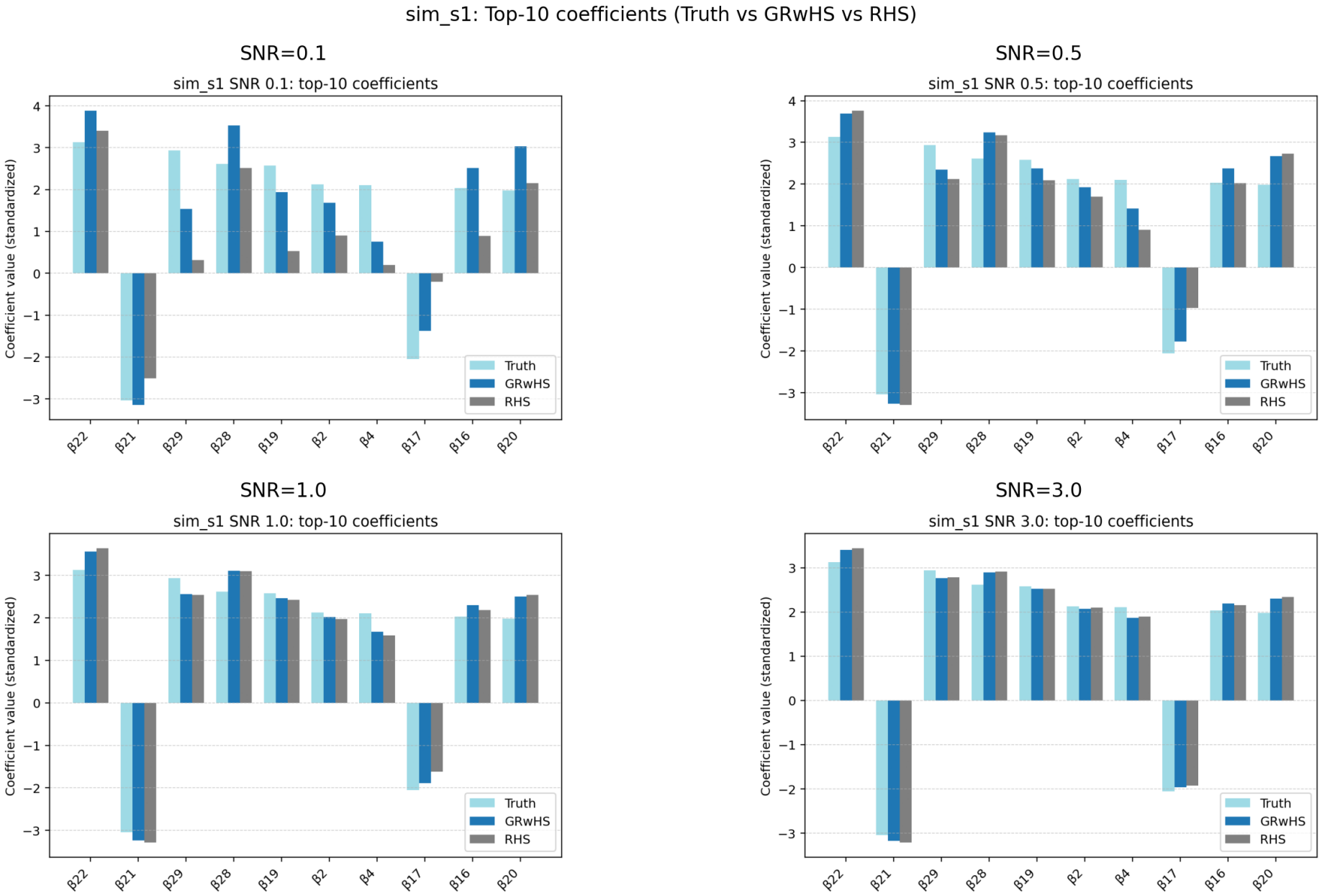
Results: sim_s1



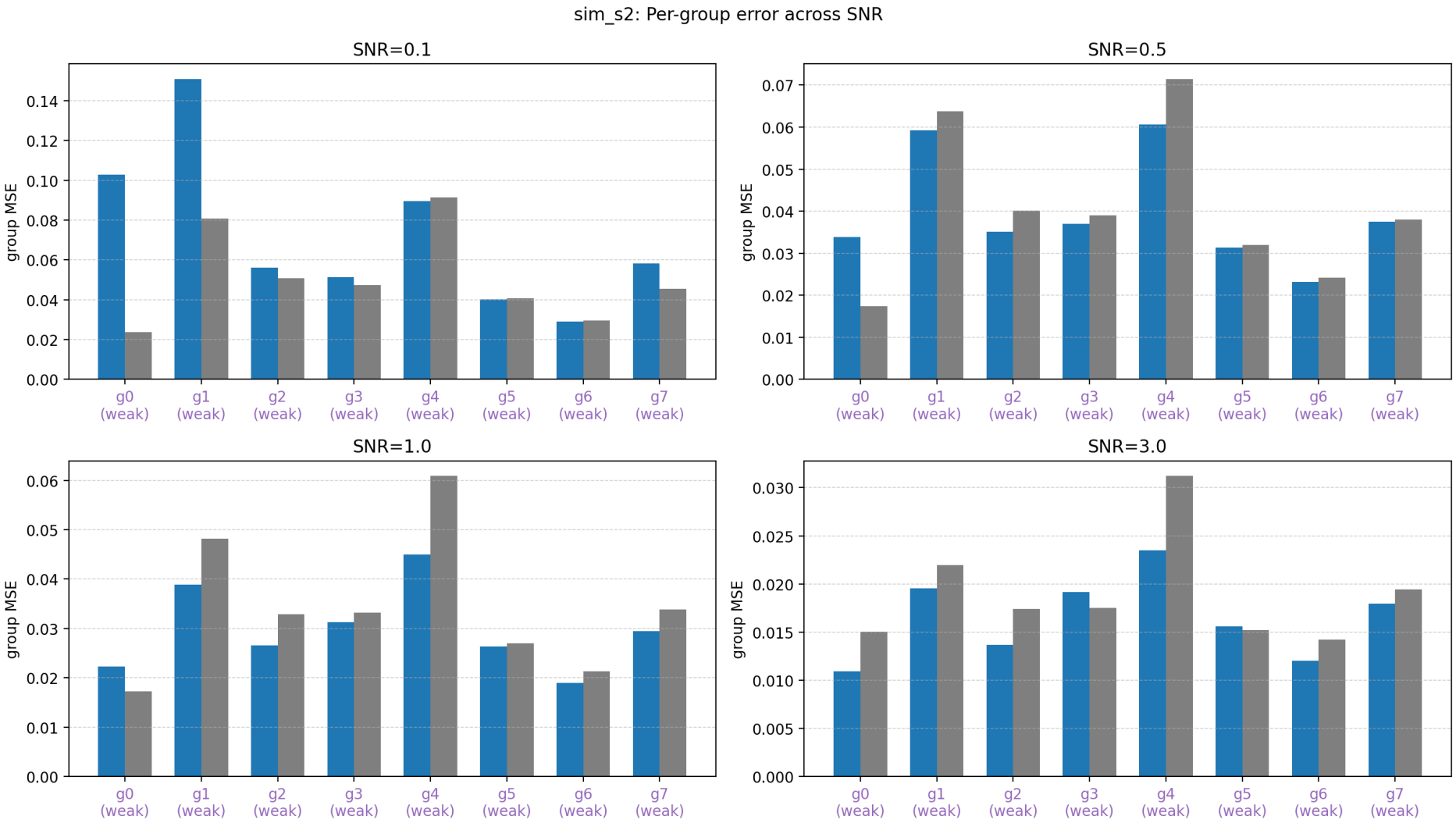
Results: sim_s1



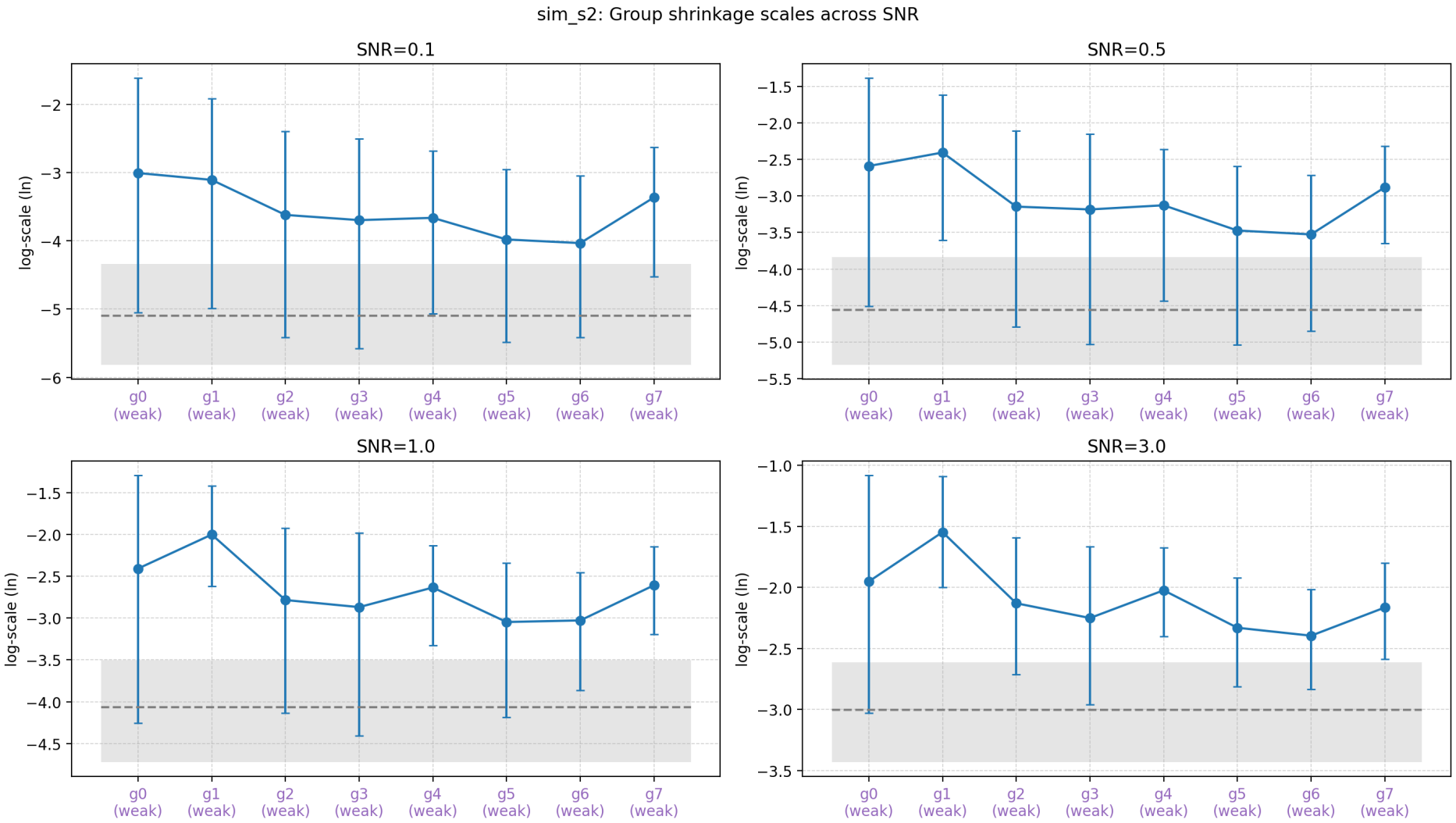
Results: sim_s1



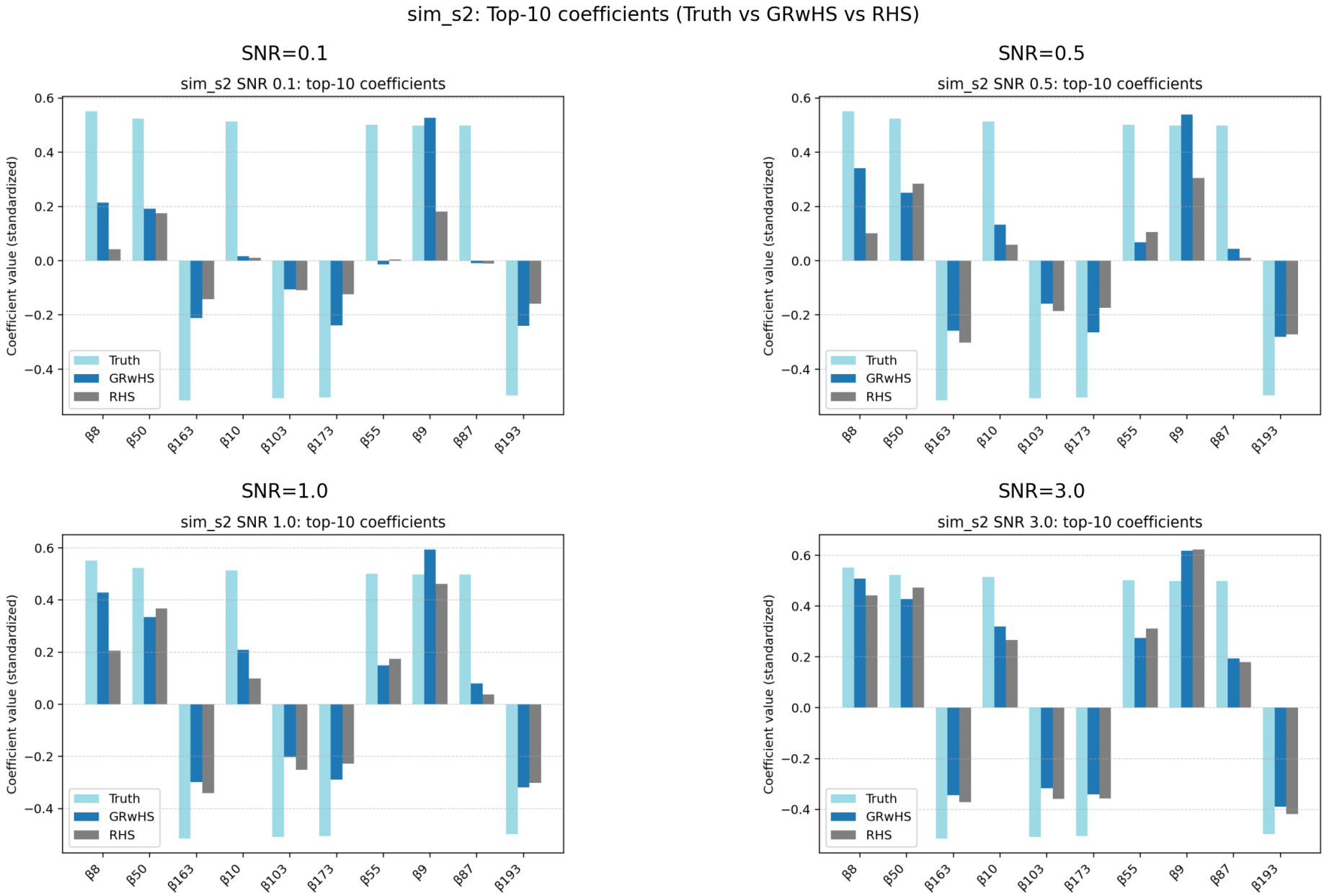
Results: sim_s2



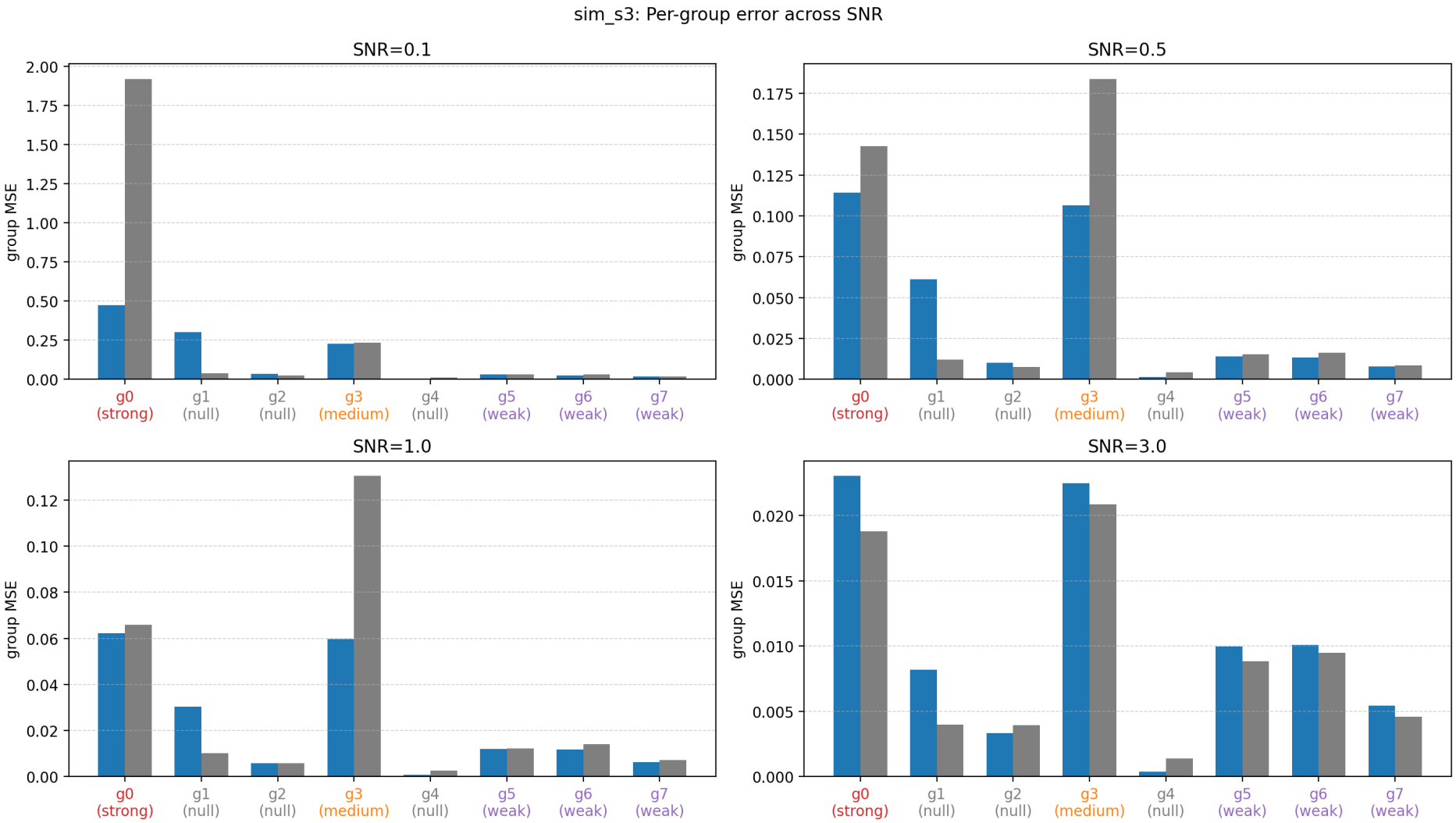
Results: sim_s2



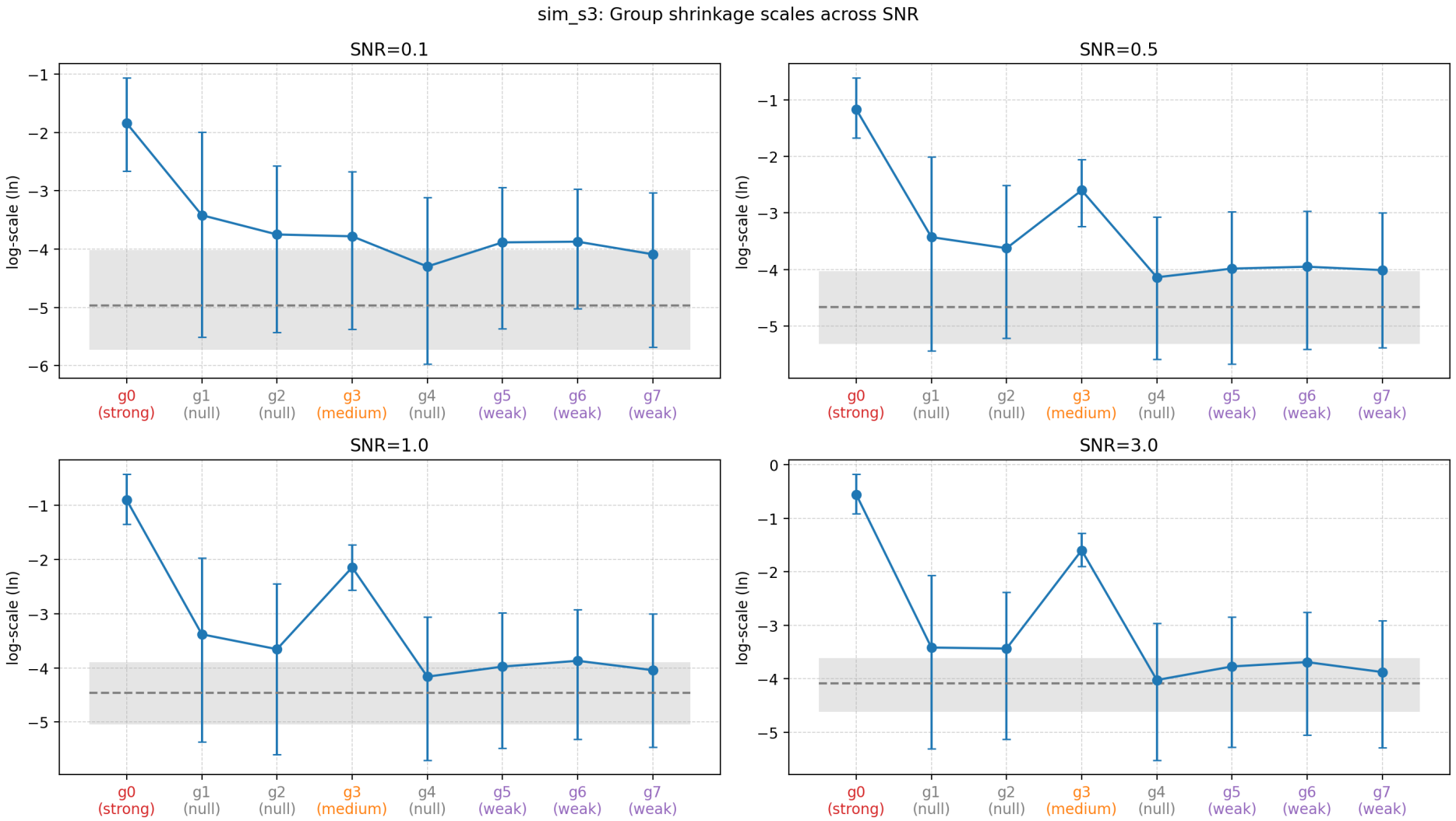
Results: sim_s2



Results: sim_s3



Results: sim_s3



Results: sim_s3