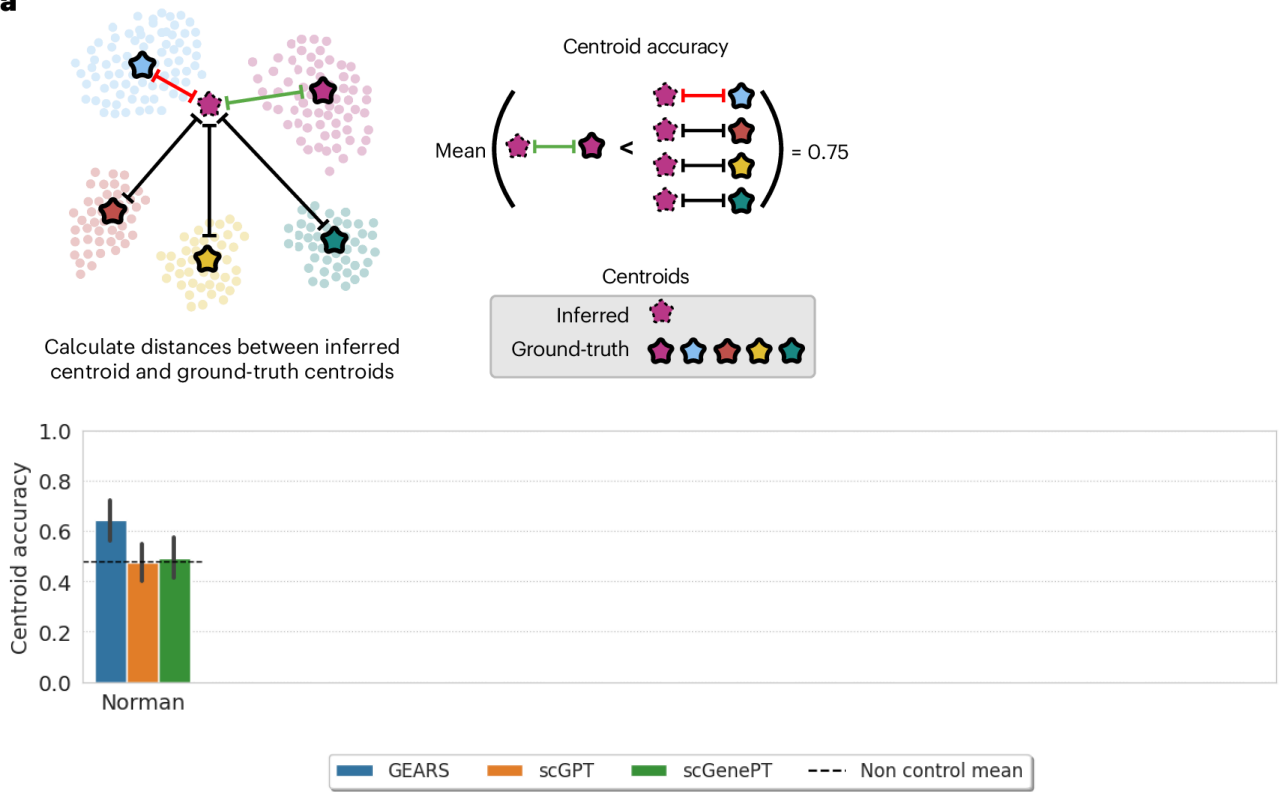
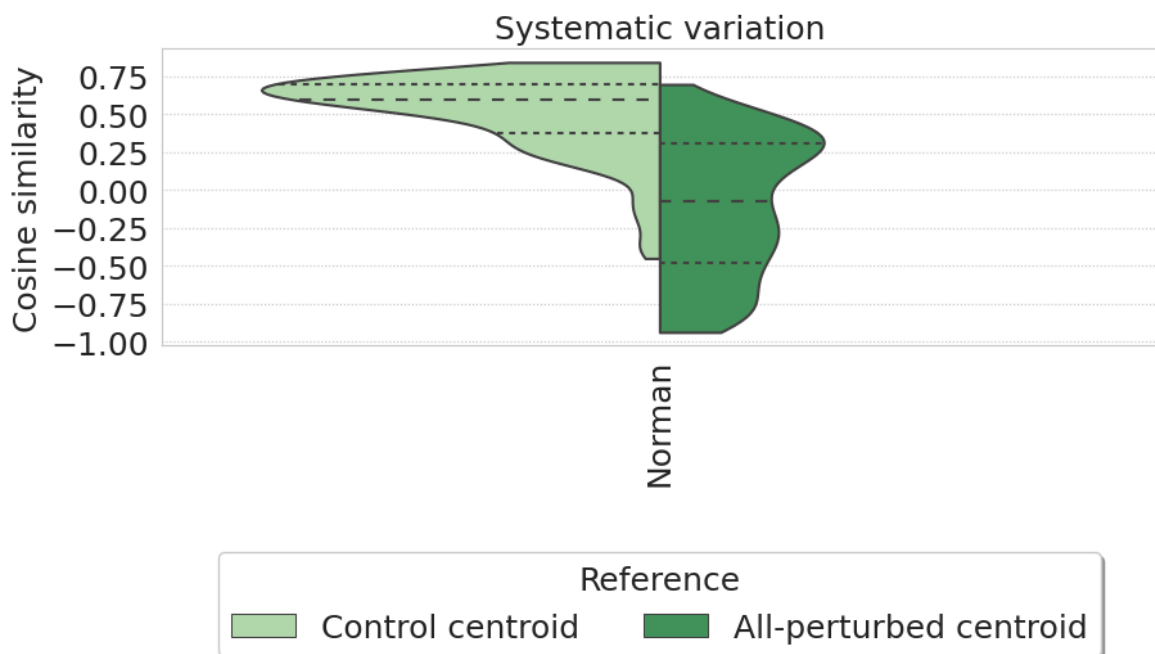


a



centroid accuracy



Pearson	Norman	
	Δ	Δ_{20}
GEARS	0.50	0.65
scGPT	0.13	0.19
scGenePT	0.36	0.49
Non-control mean	0.49	0.50

1 gene perturbation

모든 유전자 / top 20 DEG에 대한 Pearson (control을 레퍼런스로)

RMSE	Norman	
	All	20
GEARS	0.05	0.43
scGPT	0.49	2.14
scGenePT	0.05	0.45
Non-control mean	0.05	0.44

1 gene perturbation

모든 유전자 / top 20 DEG에 대한 RMSE

Pearson Pert. ref.	Norman	
	Δ	Δ_{20}
GEARS	0.19	0.13
scGPT	0.02	0.18
scGenePT	0.07	-0.08
Non-control mean	0.06	-0.32

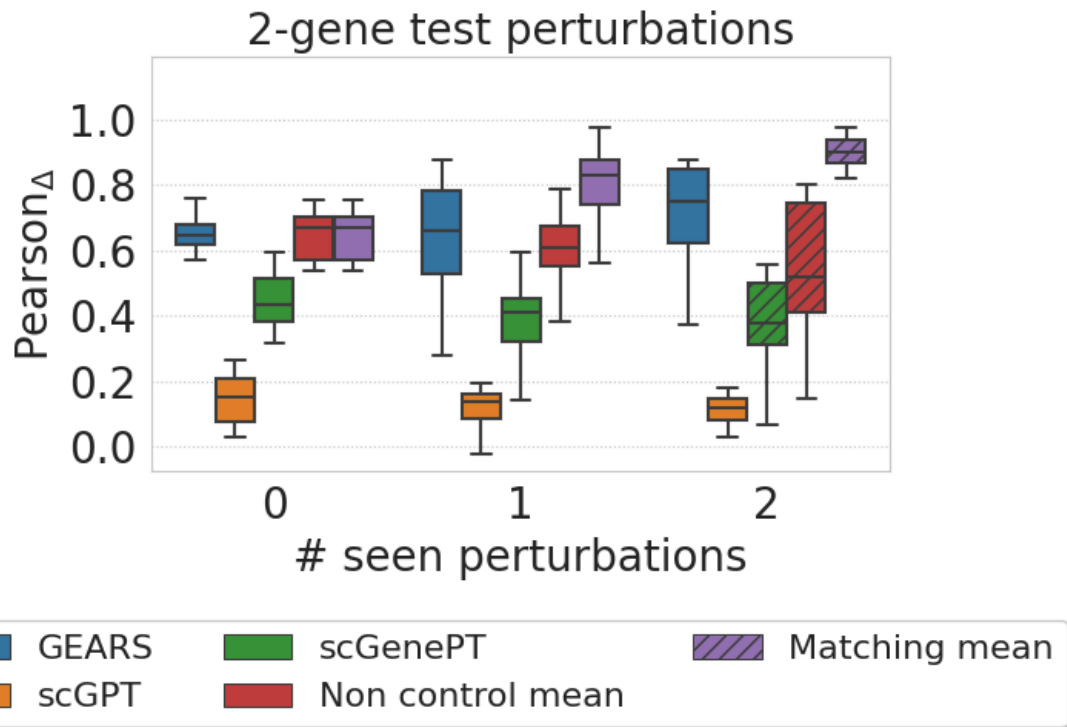
1 gene perturbation

모든 유전자 / top 20 DEG에 대한 Pearson (perturbed을 레퍼런스로)

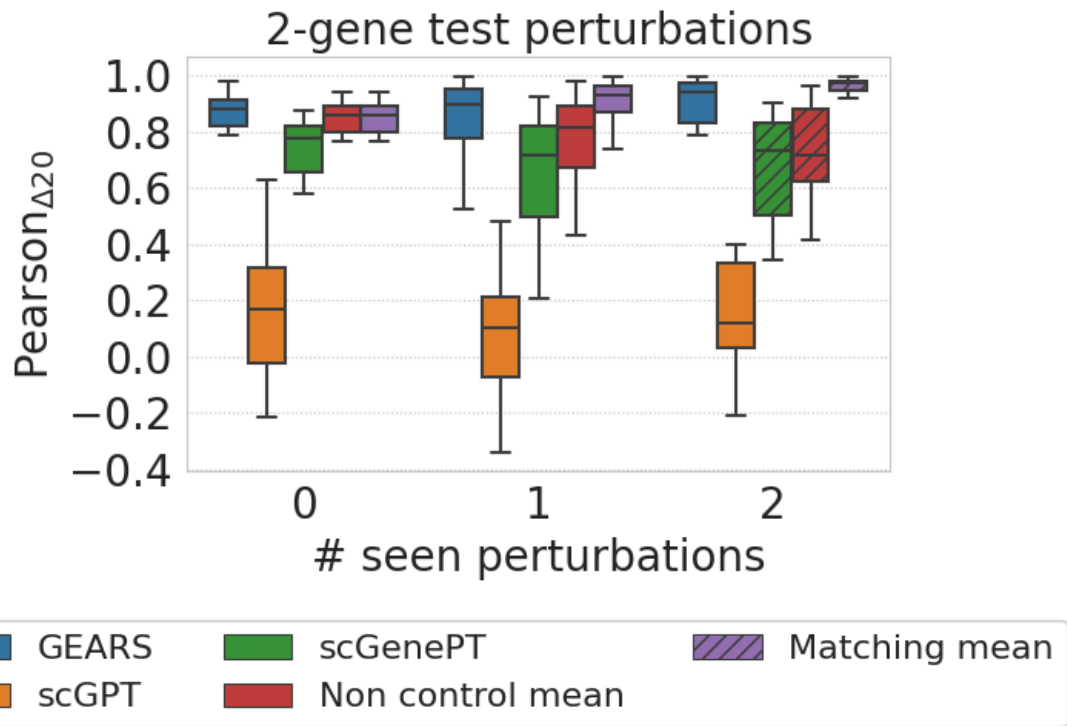
Method	Norman			
	Pearson ↑	Pearson ₂₀ ↑	RMSE ↓	RMSE ₂₀ ↓
GEARS	0.34	0.47	0.06	0.44
scGPT	0.03	0.09	0.49	2.16
scGenePT	-0.03	-0.30	0.07	0.60
Non control mean	-0.12	-0.45	0.06	0.59
Matching mean	0.27	0.15	0.06	0.50

1 gene perturbation & 2 gene perturbation

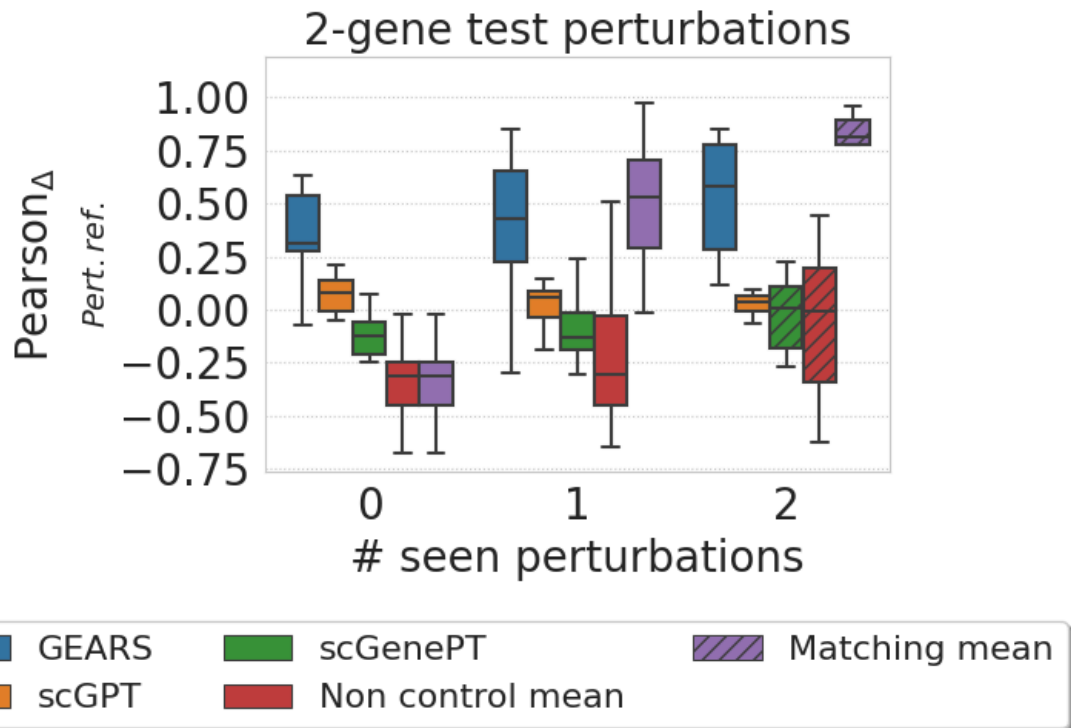
모든 유전자 / top 20 DEG에 대한 Pearson (perturbed을 레퍼런스로), RMSE
초록 - 좋음 / 분홍 - 나쁨



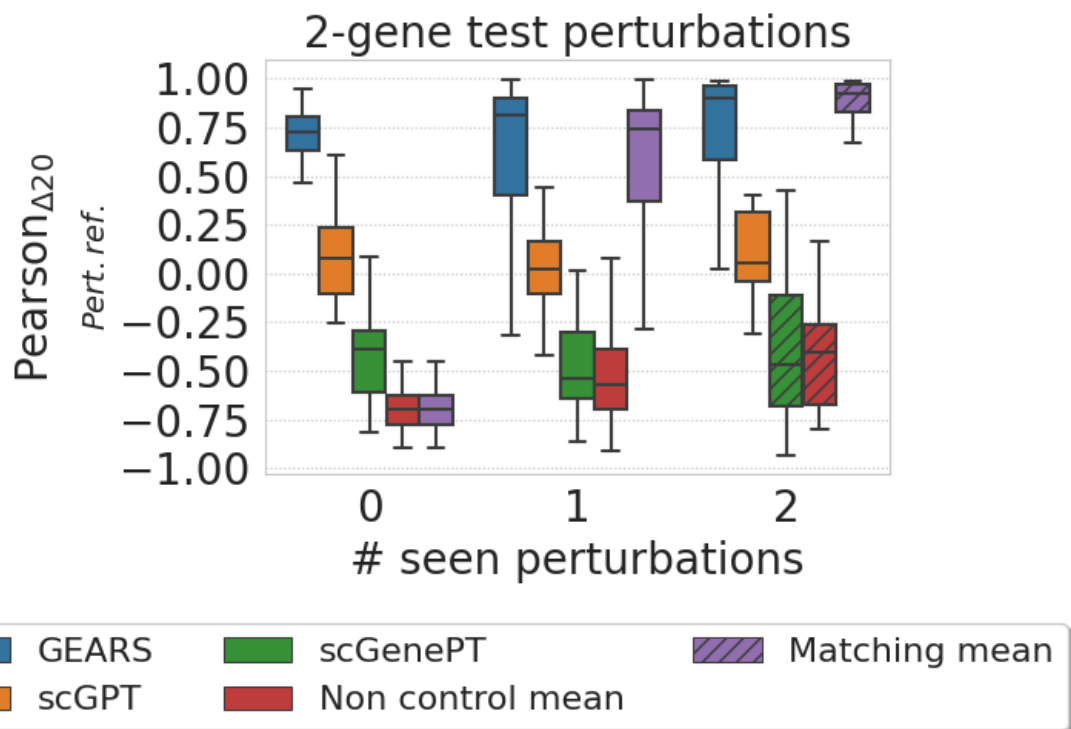
2 gene perturbation
 모든 유전자에 대한 Pearson (control을 레퍼런스로)



2 gene perturbation
 top 20 DEG에 대한 Pearson (control을 레퍼런스로)



2 gene perturbation
모든 유전자에 대한 Pearson (perturbed을 레퍼런스로)



2 gene perturbation
top 20 DEG에 대한 Pearson (perturbed을 레퍼런스로)