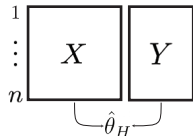


# The mixed subjects design decreases costs of precise estimates and maintains validity

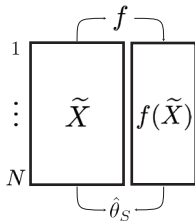
Human Subjects



Estimate  $\hat{\theta}_H$  with classic inference, e.g. by using OLS to regress observed outcome  $Y$  on  $X$ .

- ✓ valid estimate
- ✗ precise estimate
- ✗ inexpensive data

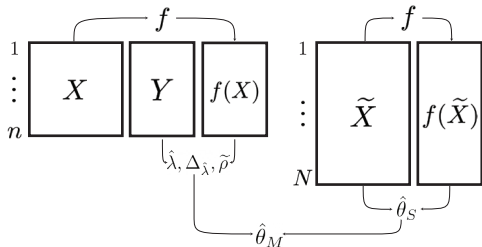
Silicon Subjects



Estimate  $\hat{\theta}_S$  with classic inference, e.g. by using OLS to regress outcome  $f(\tilde{X})$  predicted by LLM  $f$  on  $\tilde{X}$ .

- ✗ valid estimate
- ✓ precise estimate
- ✓ inexpensive data

Mixed Subjects



Estimate  $\hat{\theta}_M$  by correcting a possibly inaccurate estimate  $\hat{\theta}_S$  from LLM predictions with a rectifier  $\Delta_{\hat{\lambda}}$  from data on human subjects. Estimate a tuning parameter  $\hat{\lambda}$  for increased statistical precision and the predictive accuracy measure  $\tilde{\rho}$  for conducting power analyses.

- ✓ valid estimate
- ✓ precise estimate
- ✓ inexpensive data