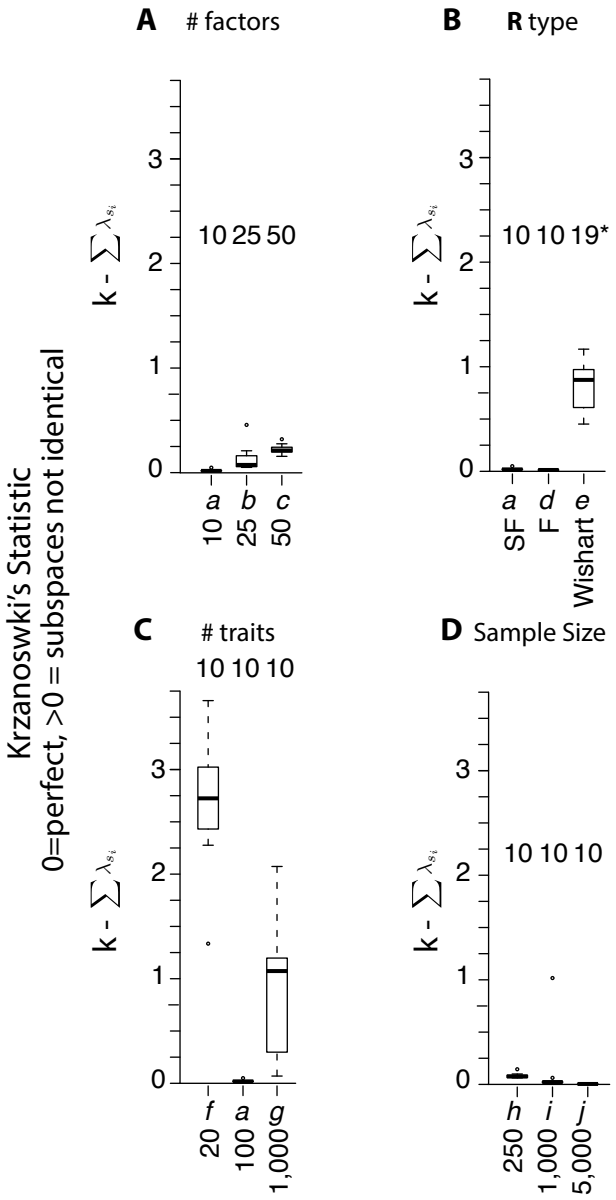

FIGURE S1. **P-matrix subspaces were accurately recovered.** This figure is identical to Figure 1 but for **P**. Each subplot shows the distribution of Krzanowski's statistics ($\sum \lambda_{s_i}$) calculated for posterior mean estimates of **P** across a related set of scenarios. The value of k used in each scenario is listed inside each boxplot. The simulation parameter varied in each set of simulations is described at the bottom. (A) Increasing numbers of simulated factors. (B) Different properties of the **R** matrix. "SF": a sparse-factor form for **R**. "F": a (non-sparse) factor form for **R**. "Wishart": **R** was sampled from a Wishart distribution. In scenario *e*, the residual matrix did not have a factor form. We set $k = 19$ for the Krzanowski's statistics because the corresponding eigenvectors of the true **P** each explained $> 1\%$ of total phenotypic variation. (C) Different numbers of traits. (D) Different numbers of sampled individuals. Complete parameter sets describing each simulation are described in Table 1.