Supplemental Material

This document shows the simulation results for the unequal group sizes given in Table 1; all other settings were identical to the simulation with equal group sizes. The relative group size is constant across conditions: For $J = 3$ groups relative group sizes are given by $3/15 = 0.20$, $5/15 = 0.33$, and $7/15 = 0.47$, for group 1, 2, and 3, respectively. In the $J = 5$ groups case the relative group sizes are $3/25 = 0.12$, $4/25 = 0.16$, $5/25 = 0.20$, $6/25 = 0.24$, and $7/25 = 0.28$, for group 1, 2, 3, 4, and 5, respectively.

Table 1
Sample sizes in the simulation with an unbalanced design for $J = 3$ and 5 groups.

		Condition									
Number of groups	n_j	1	2	3	4	5	6	7	8	9	10
$J = 3$ groups	n_1	3	6	12	30	60	120	300	600	1200	3000
	n_2	5	10	20	50	100	200	500	1000	2000	5000
	n_3	7	14	28	70	140	280	700	1400	2800	7000
$J = 5$ groups	n_1	3	6	12	30	60	120	300	600	1200	3000
	n_2	4	8	16	40	80	160	400	800	1600	4000
	n_3	5	10	20	50	100	200	500	1000	2000	5000
	n_4	6	12	24	60	120	240	600	1200	2400	6000
	n_5	7	14	28	70	140	280	700	1400	2800	7000
Average sample size	n	5	10	20	50	100	200	500	1000	2000	5000

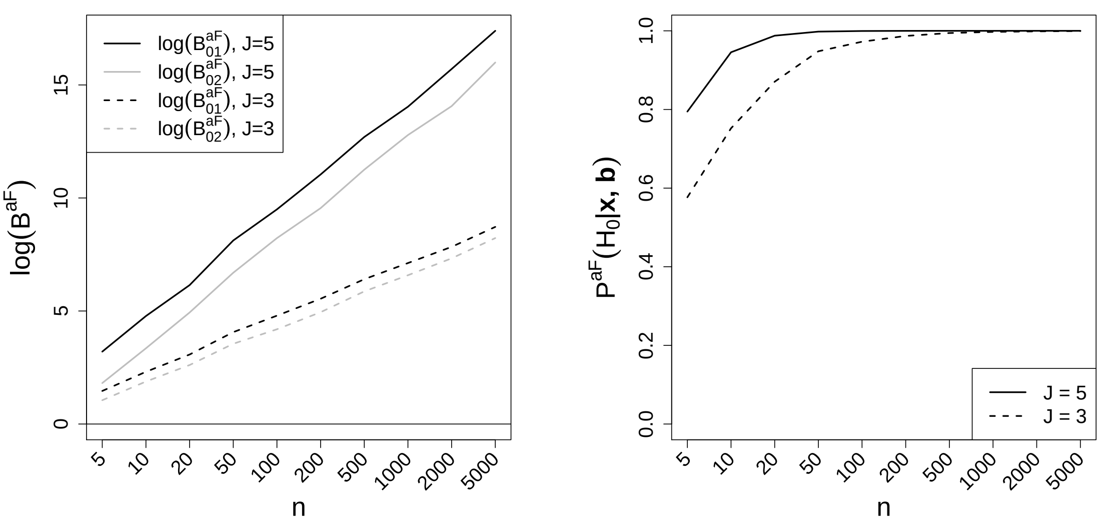

Figure 1. Simulation results for a null population in which all population variances were equal, $\sigma_1^2 = \cdots = \sigma_J^2$, for $J = 3$ groups (dashed lines) and $J = 5$ groups (solid lines). We tested the true hypothesis $H_0\colon \sigma_1^2 = \cdots = \sigma_J^2$ against the two competing hypotheses $H_1\colon \sigma_1^2 < \cdots < \sigma_J^2$ and H_2: not $\sigma_1^2 < \cdots < \sigma_J^2$. The plots show the median log Bayes factors (left-hand column) testing H_0 against H_1 (black lines) and H_0 against H_2 (gray lines) and the median posterior probability of H_0 (right-hand column) as a function of the average sample size n.

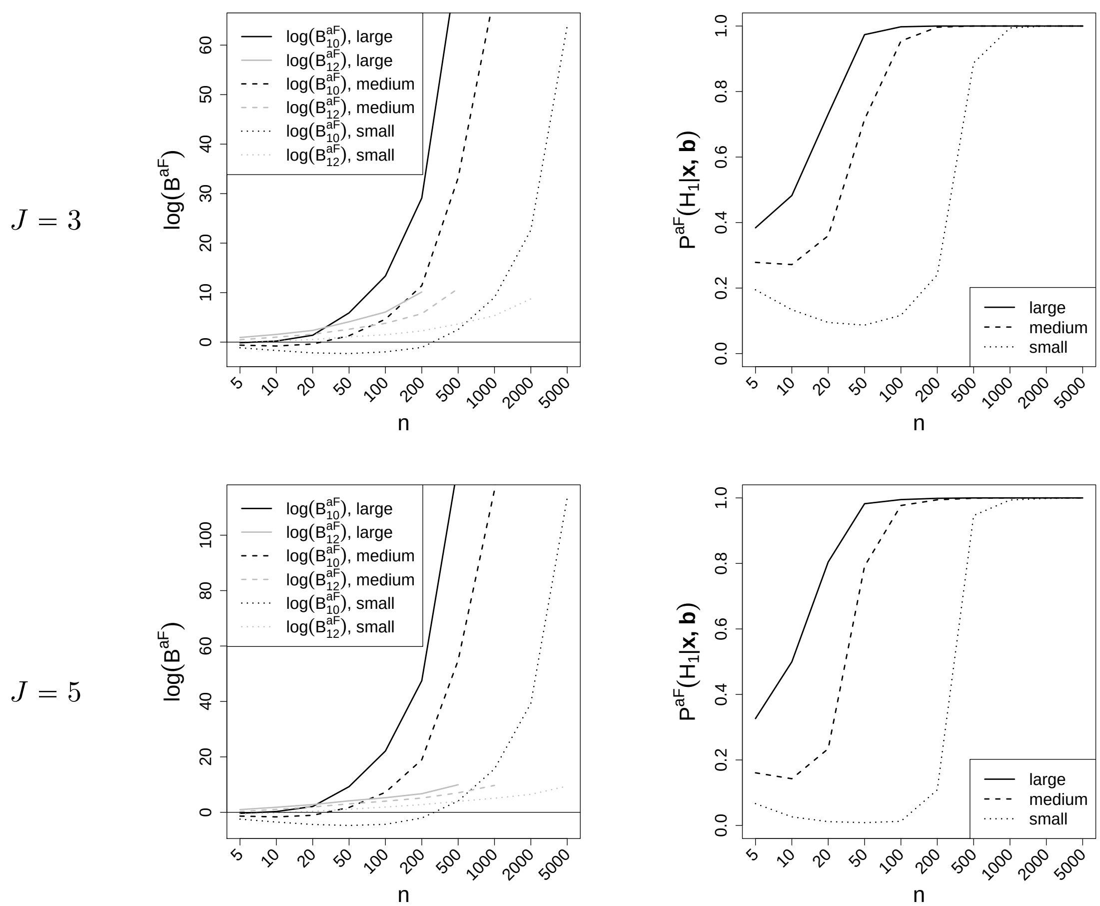

Figure 2. Simulation results for an order population in which the structure of the population variances was $\sigma_1^2 < \cdots < \sigma_J^2$, with $J \in \{3, 5\}$. We considered three effect sizes: small (dotted lines), medium (dashed lines), and large (solid lines). We tested the true hypothesis $H_1\colon \sigma_1^2 < \cdots < \sigma_J^2$ against the two competing hypotheses $H_0\colon \sigma_1^2 = \cdots = \sigma_J^2$ and $H_2\colon$ not $\sigma_1^2 < \cdots < \sigma_J^2$. The plots show the median log Bayes factors (left-hand column) testing H_1 against H_0 (black lines) and H_1 against H_2 (gray lines) and the median posterior probability of H_1 (right-hand column) as a function of the average sample size n. In the log Bayes factors plots the gray lines are discontinued due to numerical reasons (see text).

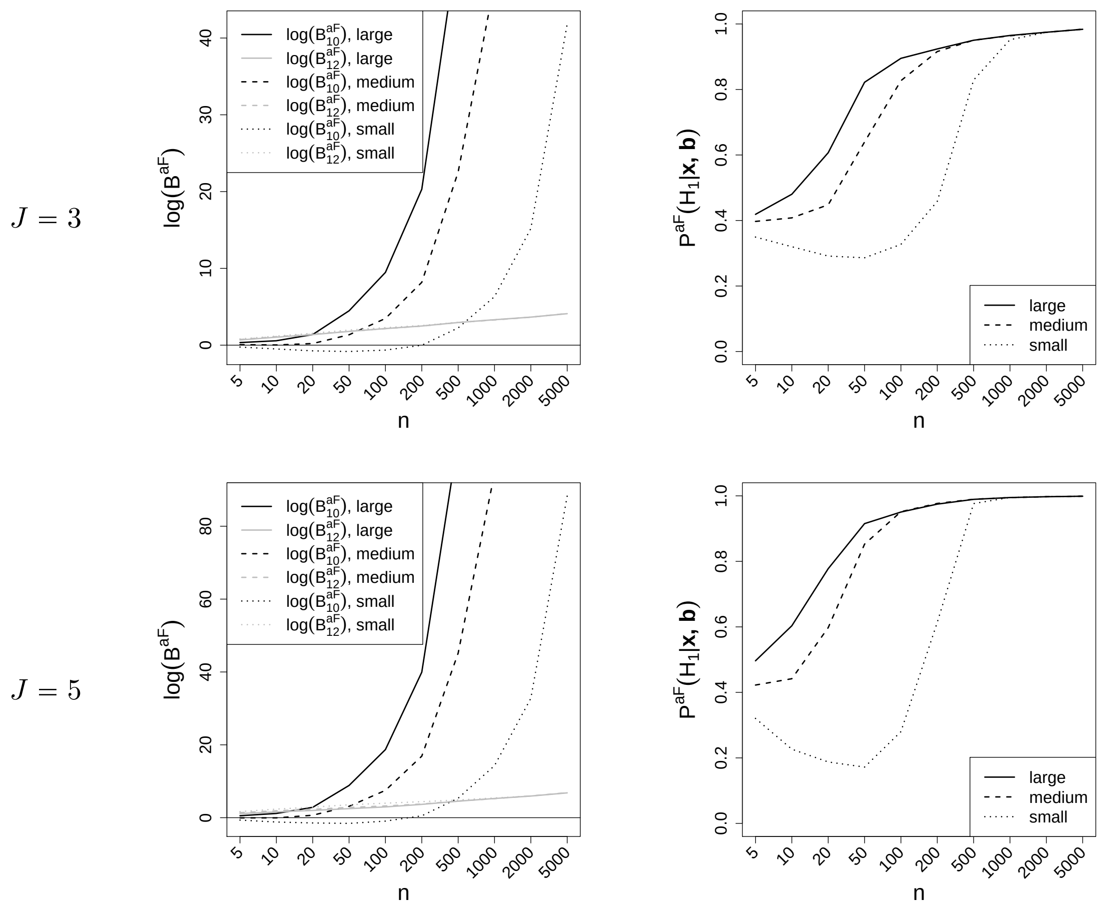

Figure 3. Simulation results for a mixed population. For $J = 3$ groups the structure of the population variances was $\sigma_1^2 < \sigma_2^2 = \sigma_3^2$, whereas for $J = 5$ groups it was $\sigma_1^2 < \sigma_2^2 = \sigma_3^2 < \sigma_4^2 = \sigma_5^2$. We considered three effect sizes: small (dotted lines), medium (dashed lines), and large (solid lines). For $J = 3$ groups we tested the true hypothesis $H_1\colon \sigma_1^2 < \sigma_2^2 = \sigma_3^2$ against the two competing hypotheses $H_0\colon \sigma_1^2 = \sigma_2^2 = \sigma_3^2$ and $H_2\colon \sigma_1^2 < \left(\sigma_2^2, \sigma_3^2\right)$. For $J = 5$ groups we tested the true hypothesis $H_1\colon \sigma_1^2 < \sigma_2^2 = \sigma_3^2 < \sigma_4^2 = \sigma_5^2$ against $H_0\colon \sigma_1^2 = \cdots = \sigma_5^2$ and $H_2\colon \sigma_1^2 < \left(\sigma_2^2, \sigma_3^2\right) < \left(\sigma_4^2, \sigma_5^2\right)$. The plots show the median log Bayes factors (left-hand column) testing H_1 against H_0 (black lines) and H_1 against H_2 (gray lines) and the median posterior probability of H_1 (right-hand column) as a function of the average sample size n.

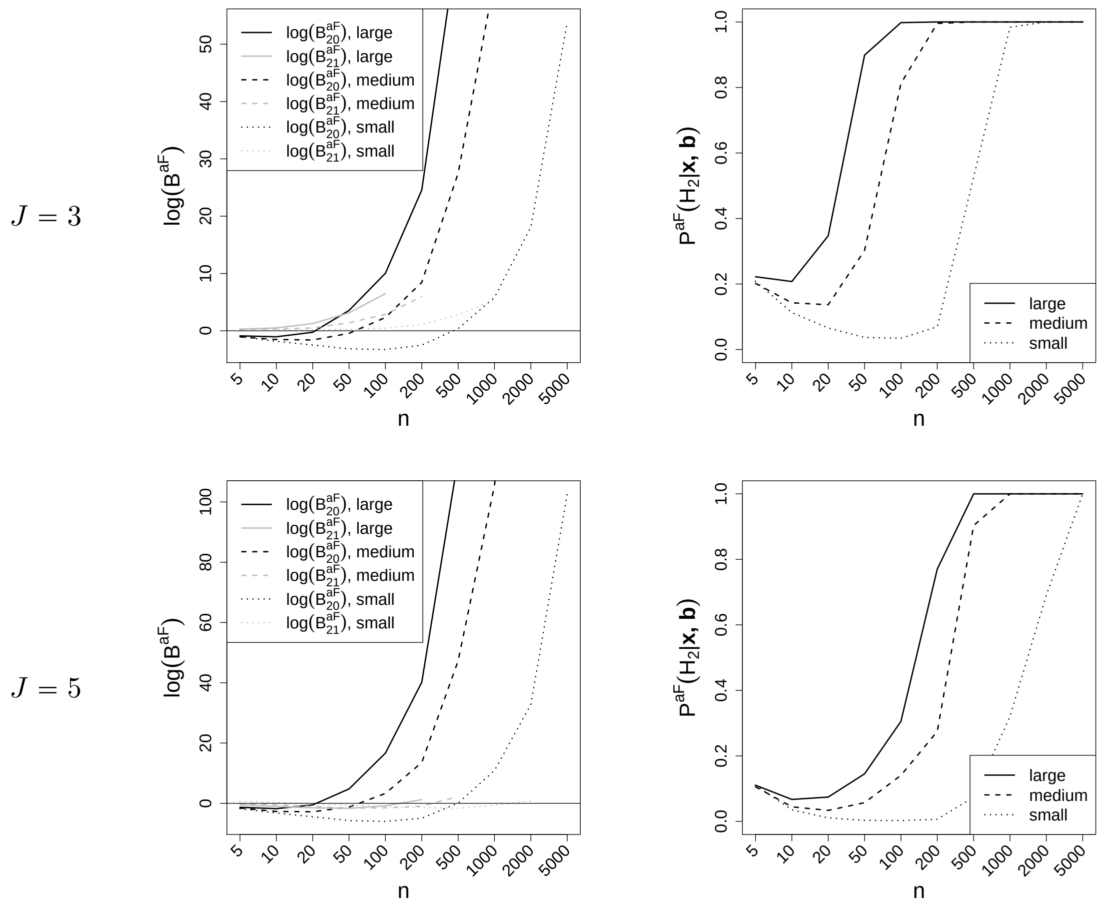

Figure 4. Simulation results for a near order population in which the structure of the population variances was $\sigma_1^2 < \cdots < \sigma_J^2 < \sigma_{J-1}^2$, with $J \in \{3, 5\}$. We considered three effect sizes: small (dotted lines), medium (dashed lines), and large (solid lines). We tested three hypotheses: $H_0\colon \sigma_1^2 = \cdots = \sigma_J^2$, $H_1\colon \sigma_1^2 < \cdots < \sigma_J^2$, and $H_2\colon$ not $\sigma_1^2 < \cdots < \sigma_J^2$. Note that the true hypothesis is the complement H_2. The plots show the median log Bayes factors (left-hand column) testing H_2 against H_0 (black lines) and H_2 against H_1 (gray lines) and the median posterior probability of H_2 (right-hand column) as a function of the average sample size n. In the log Bayes factors plots the gray lines are discontinued due to numerical reasons (see text).

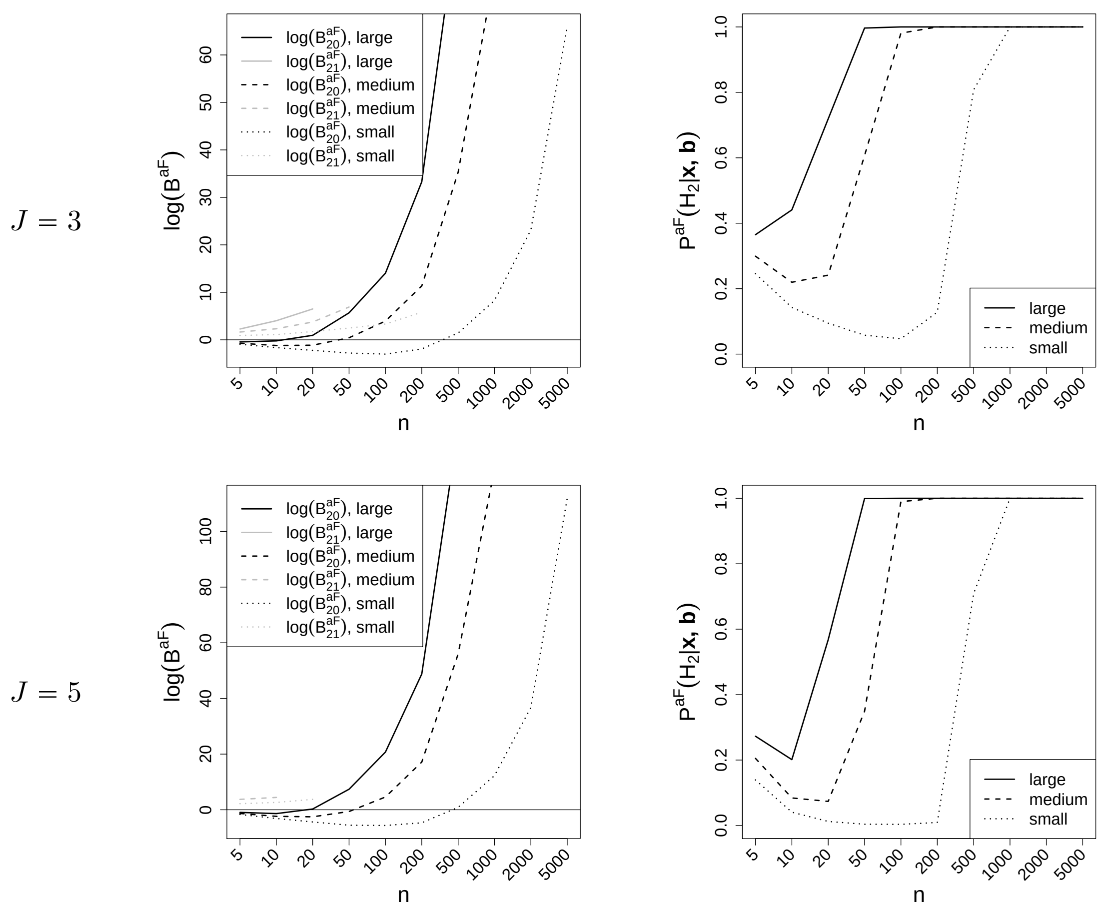

Figure 5. Simulation results for a reverse order population in which the structure of the population variances was $\sigma_J^2 < \cdots < \sigma_1^2$, with $J \in \{3, 5\}$. We considered three effect sizes: small (dotted lines), medium (dashed lines), and large (solid lines). We tested three hypotheses: $H_0\colon \sigma_1^2 = \cdots = \sigma_J^2$, $H_1\colon \sigma_1^2 < \cdots < \sigma_J^2$, and H_2: not $\sigma_1^2 < \cdots < \sigma_J^2$. Note that the true hypothesis is the complement H_2. The plots show the median log Bayes factors (left-hand column) testing H_2 against H_0 (black lines) and H_2 against H_1 (gray lines) and the median posterior probability of H_2 (right-hand column) as a function of the average sample size n. In the log Bayes factors plots the gray lines are discontinued due to numerical reasons (see text).