Table S1. Summary statistics of simulation results for $V(\mathbf{S})$. Analytical expectation (E[$V(\mathbf{S})$]) and standard deviation (SD[$V(\mathbf{S})$]), as well as empirical median, mean, standard deviation (ESD), bias in standard error unit ($T = \sqrt{5000}\{\text{Mean} - \text{E}[V(\mathbf{S})]\} / \text{ESD}$, which should roughly follow t_{4999} if the expectation is exact), and critical points or power (for null and non-null conditions, respectively) at $\alpha = 0.05$ and 0.01 (CP/Pow. 5% and 1%; the latter obtained from the former with same N and p) from 5000 simulation runs are shown.

	E[$V(\mathbf{S})$]	SD[$V(\mathbf{S})$]	Median	Mean	ESD	T	CP 5%	CP 1%
$p = 2$, $V(\mathbf{\Sigma}) = 0$								
$N = 4$	0.6667	1.0184	0.3299	0.6857	1.0338	1.2996	2.5760	5.0374
$N = 8$	0.2857	0.3582	0.1731	0.2876	0.3464	0.3845	0.9689	1.6625
$N = 16$	0.1333	0.1501	0.0876	0.1330	0.1466	−0.1703	0.4143	0.6728
$N = 32$	0.0645	0.0686	0.0438	0.0646	0.0689	0.0489	0.1959	0.3342
$N = 64$	0.0317	0.0327	0.0221	0.0315	0.0315	−0.6336	0.0947	0.1414
$N = 128$	0.0157	0.0160	0.0109	0.0155	0.0152	−1.3106	0.0463	0.0692
$N = 256$	0.0078	0.0079	0.0054	0.0079	0.0079	0.5012	0.0234	0.0367
$p = 4$, $V(\mathbf{\Sigma}) = 0$								
$N = 4$	0.5000	0.4811	0.3536	0.5028	0.4889	0.4064	1.4161	2.3918
$N = 8$	0.2143	0.1551	0.1734	0.2131	0.1534	−0.5437	0.5055	0.7688
$N = 16$	0.1000	0.0602	0.0861	0.0996	0.0603	−0.4826	0.2148	0.3091
$N = 32$	0.0484	0.0261	0.0429	0.0481	0.0261	−0.8676	0.0972	0.1385
$N = 64$	0.0238	0.0120	0.0216	0.0239	0.0119	0.5321	0.0461	0.0605
$N = 128$	0.0118	0.0058	0.0107	0.0118	0.0059	−0.1839	0.0229	0.0297
$N = 256$	0.0059	0.0028	0.0054	0.0058	0.0028	−1.0280	0.0110	0.0141
$p = 8$, $V(\mathbf{\Sigma}) = 0$								
$N = 4$	0.4167	0.2651	0.3540	0.4186	0.2654	0.5067	0.9252	1.2858
$N = 8$	0.1786	0.0811	0.1654	0.1793	0.0806	0.6594	0.3282	0.4431
$N = 16$	0.0833	0.0297	0.0790	0.0835	0.0296	0.4185	0.1382	0.1726
$N = 32$	0.0403	0.0121	0.0390	0.0407	0.0124	1.9188	0.0629	0.0766
$N = 64$	0.0198	0.0054	0.0193	0.0199	0.0053	0.2683	0.0297	0.0351
$N = 128$	0.0098	0.0025	0.0096	0.0098	0.0025	−0.6006	0.0144	0.0167
$N = 256$	0.0049	0.0012	0.0048	0.0049	0.0012	0.5840	0.0071	0.0083
$p = 16$, $V(\mathbf{\Sigma}) = 0$								
$N = 4$	0.3750	0.1616	0.3480	0.3792	0.1663	1.7786	0.6905	0.9197
$N = 8$	0.1607	0.0477	0.1559	0.1614	0.0478	1.0293	0.2488	0.3007
$N = 16$	0.0750	0.0166	0.0737	0.0752	0.0168	0.8714	0.1055	0.1231
$N = 32$	0.0363	0.0064	0.0358	0.0362	0.0064	−0.6019	0.0478	0.0545
$N = 64$	0.0179	0.0027	0.0177	0.0179	0.0027	0.9825	0.0228	0.0253
$N = 128$	0.0089	0.0012	0.0088	0.0088	0.0012	−0.6922	0.0110	0.0120
$N = 256$	0.0044	0.0006	0.0044	0.0044	0.0006	1.3830	0.0054	0.0059
$p = 32$, $V(\mathbf{\Sigma}) = 0$								
$N = 4$	0.3542	0.1053	0.3436	0.3559	0.1051	1.1876	0.5454	0.6531
$N = 8$	0.1518	0.0304	0.1482	0.1510	0.0307	−1.8948	0.2065	0.2322
$N = 16$	0.0708	0.0102	0.0702	0.0708	0.0102	−0.0003	0.0890	0.0971
$N = 32$	0.0343	0.0038	0.0341	0.0342	0.0037	−0.4806	0.0405	0.0437
$N = 64$	0.0169	0.0015	0.0168	0.0169	0.0015	−0.6023	0.0194	0.0206
$N = 128$	0.0084	0.0006	0.0083	0.0084	0.0006	1.0563	0.0094	0.0100
$N = 256$	0.0042	0.0003	0.0042	0.0042	0.0003	0.0593	0.0046	0.0049

(*continued*)

Table S1. (*continued*)

	E[$V(\mathbf{S})$]	SD[$V(\mathbf{S})$]	Median	Mean	ESD	T	CP 5%	CP 1%
$p = 64$, $V(\mathbf{\Sigma}) = 0$								
$N = 4$	0.3438	0.07123	0.3388	0.3445	0.07210	0.7602	0.4670	0.5373
$N = 8$	0.1473	0.02028	0.1464	0.1477	0.02043	1.2947	0.1836	0.2027
$N = 16$	0.0688	0.00665	0.0688	0.0689	0.00663	1.7306	0.0801	0.0856
$N = 32$	0.0333	0.00236	0.0332	0.0333	0.00238	0.6721	0.0374	0.0391
$N = 64$	0.0164	0.00089	0.0163	0.0164	0.00088	−0.4407	0.0178	0.0184
$N = 128$	0.0081	0.00036	0.0081	0.0081	0.00036	−1.3996	0.0087	0.0090
$N = 256$	0.0040	0.00015	0.0040	0.0040	0.00016	0.6570	0.0043	0.0044
$p = 128$, $V(\mathbf{\Sigma}) = 0$								
$N = 4$	0.3385	0.04924	0.3373	0.3390	0.04854	0.7364	0.4213	0.4614
$N = 8$	0.1451	0.01392	0.1446	0.1451	0.01379	0.1097	0.1684	0.1793
$N = 16$	0.0677	0.00450	0.0676	0.0677	0.00450	0.4354	0.0753	0.0788
$N = 32$	0.0328	0.00156	0.0328	0.0328	0.00155	2.7368	0.0354	0.0366
$N = 64$	0.0161	0.00057	0.0161	0.0161	0.00057	−0.2231	0.0171	0.0175
$N = 128$	0.0080	0.00022	0.0080	0.0080	0.00022	−1.7313	0.0084	0.0085
$N = 256$	0.0040	0.00009	0.0040	0.0040	0.00009	−0.0648	0.0041	0.0042
$p = 256$, $V(\mathbf{\Sigma}) = 0$								
$N = 4$	0.3359	0.03442	0.3340	0.3354	0.03447	−1.1403	0.3932	0.4240
$N = 8$	0.1440	0.00969	0.1436	0.1440	0.00993	0.1215	0.1608	0.1691
$N = 16$	0.0672	0.00311	0.0672	0.0672	0.00307	0.9739	0.0722	0.0744
$N = 32$	0.0325	0.00106	0.0325	0.0325	0.00106	−0.8132	0.0343	0.0350
$N = 64$	0.0160	0.00038	0.0160	0.0160	0.00038	0.0842	0.0166	0.0169
$N = 128$	0.0079	0.00014	0.0079	0.0079	0.00014	0.0262	0.0082	0.0083
$N = 256$	0.0040	0.00005	0.0040	0.0040	0.00005	−0.3846	0.0040	0.0041
$p = 1024$, $V(\mathbf{\Sigma}) = 0$								
$N = 4$	0.3340	0.01706	0.3342	0.3343	0.01717	1.2126	0.3628	0.3745
$N = 8$	0.1431	0.00479	0.1430	0.1431	0.00480	−0.6874	0.1510	0.1550
$N = 16$	0.0668	0.00153	0.0668	0.0668	0.00151	1.7324	0.0694	0.0705
$N = 32$	0.0323	0.00052	0.0323	0.0323	0.00052	0.3227	0.0332	0.0336
$N = 64$	0.0159	0.00018	0.0159	0.0159	0.00018	0.3522	0.0162	0.0163
$N = 128$	0.0079	0.00006	0.0079	0.0079	0.00006	−1.1216	0.0080	0.0080
$N = 256$	0.0039	0.00002	0.0039	0.0039	0.00002	0.7640	0.0040	0.0040

(*continued*)

Table S1. (*continued*)

	E[$V(\mathbf{S})$]	SD[$V(\mathbf{S})$]	Median	Mean	ESD	T	Pow. 5%	Pow. 1%
$p = 2, q = 1, V(\mathbf{\Sigma}) = 0.1$								
$N = 4$	0.7667	1.2893	0.3299	0.7801	1.2981	0.7327	0.0658	0.0182
$N = 8$	0.3857	0.5163	0.2079	0.3837	0.5087	−0.2776	0.0888	0.0314
$N = 16$	0.2333	0.2592	0.1451	0.2223	0.2419	−3.2291	0.1566	0.0528
$N = 32$	0.1645	0.1496	0.1244	0.1667	0.1497	1.0124	0.3126	0.1190
$N = 64$	0.1317	0.0943	0.1124	0.1327	0.0954	0.6805	0.5860	0.3762
$N = 128$	0.1157	0.0626	0.1055	0.1145	0.0623	−1.3981	0.8884	0.7414
$N = 256$	0.1078	0.0429	0.1042	0.1090	0.0429	1.9180	0.9972	0.9806
$p = 2, q = 1, V(\mathbf{\Sigma}) = 0.2$								
$N = 4$	0.8667	1.5241	0.3716	0.9230	1.6659	2.3912	0.0866	0.0248
$N = 8$	0.4857	0.6465	0.2615	0.4777	0.6313	−0.8980	0.1372	0.0500
$N = 16$	0.3333	0.3429	0.2311	0.3257	0.3300	−1.6266	0.2760	0.1186
$N = 32$	0.2645	0.2067	0.2101	0.2633	0.2065	−0.4030	0.5362	0.2804
$N = 64$	0.2317	0.1341	0.2066	0.2312	0.1350	−0.2979	0.8704	0.7194
$N = 128$	0.2157	0.0907	0.2048	0.2160	0.0899	0.1913	0.9952	0.9814
$N = 256$	0.2078	0.0627	0.2028	0.2084	0.0625	0.5752	1.0000	1.0000
$p = 2, q = 1, V(\mathbf{\Sigma}) = 0.4$								
$N = 4$	1.0667	1.9368	0.4120	1.0723	1.8519	0.2145	0.1132	0.0376
$N = 8$	0.6857	0.8717	0.3967	0.6901	0.8663	0.3572	0.2302	0.0964
$N = 16$	0.5333	0.4852	0.3972	0.5426	0.4981	1.3183	0.4828	0.2758
$N = 32$	0.4645	0.3023	0.3936	0.4616	0.3011	−0.6854	0.8316	0.5958
$N = 64$	0.4317	0.2002	0.4044	0.4337	0.2019	0.6886	0.9944	0.9722
$N = 128$	0.4157	0.1369	0.3983	0.4142	0.1346	−0.8153	1.0000	1.0000
$N = 256$	0.4078	0.0952	0.3994	0.4071	0.0957	−0.5627	1.0000	1.0000
$p = 2, q = 1, V(\mathbf{\Sigma}) = 0.6$								
$N = 4$	1.2667	2.3068	0.4407	1.2057	2.1608	−1.9958	0.1300	0.0474
$N = 8$	0.8857	1.0743	0.5312	0.8717	1.0467	−0.9497	0.2988	0.1446
$N = 16$	0.7333	0.6131	0.5716	0.7383	0.6161	0.5690	0.6422	0.4196
$N = 32$	0.6645	0.3882	0.5839	0.6640	0.3847	−0.1014	0.9538	0.8224
$N = 64$	0.6317	0.2594	0.5896	0.6302	0.2601	−0.4312	0.9998	0.9982
$N = 128$	0.6157	0.1783	0.5994	0.6151	0.1753	−0.2601	1.0000	1.0000
$N = 256$	0.6078	0.1243	0.5978	0.6063	0.1218	−0.9039	1.0000	1.0000
$p = 2, q = 1, V(\mathbf{\Sigma}) = 0.8$								
$N = 4$	1.4667	2.6522	0.5269	1.4956	2.9055	0.7042	0.1656	0.0716
$N = 8$	1.0857	1.2651	0.6587	1.0792	1.3030	−0.3520	0.3674	0.1988
$N = 16$	0.9333	0.7343	0.7440	0.9364	0.7250	0.3003	0.7620	0.5484
$N = 32$	0.8645	0.4698	0.7732	0.8675	0.4675	0.4571	0.9878	0.9220
$N = 64$	0.8317	0.3157	0.7840	0.8333	0.3172	0.3574	1.0000	0.9998
$N = 128$	0.8157	0.2176	0.7915	0.8154	0.2182	−0.1085	1.0000	1.0000
$N = 256$	0.8078	0.1519	0.7970	0.8111	0.1515	1.5198	1.0000	1.0000

(*continued*)

Table S1. (*continued*)

	E[$V(\mathbf{S})$]	SD[$V(\mathbf{S})$]	Median	Mean	ESD	T	Pow. 5%	Pow. 1%
$p = 4, q = 1, V(\mathbf{\Sigma}) = 0.1$								
$N = 4$	0.6167	0.7999	0.3641	0.6246	0.8476	0.6598	0.1002	0.0352
$N = 8$	0.3214	0.3225	0.2245	0.3334	0.3544	2.3979	0.1866	0.0862
$N = 16$	0.2033	0.1646	0.1606	0.2052	0.1617	0.8205	0.3528	0.1910
$N = 32$	0.1500	0.0968	0.1288	0.1513	0.0974	0.9326	0.6670	0.4546
$N = 64$	0.1246	0.0619	0.1130	0.1253	0.0633	0.7650	0.9492	0.8778
$N = 128$	0.1122	0.0415	0.1069	0.1129	0.0420	1.2435	0.9994	0.9976
$N = 256$	0.1061	0.0286	0.1030	0.1056	0.0284	−1.1421	1.0000	1.0000
$p = 4, q = 1, V(\mathbf{\Sigma}) = 0.2$								
$N = 4$	0.7333	1.0876	0.3700	0.7096	1.0191	−1.6486	0.1308	0.0552
$N = 8$	0.4286	0.4692	0.2755	0.4334	0.4851	0.7103	0.2700	0.1490
$N = 16$	0.3067	0.2532	0.2379	0.3087	0.2541	0.5529	0.5504	0.3758
$N = 32$	0.2516	0.1546	0.2207	0.2512	0.1517	−0.1925	0.8916	0.7652
$N = 64$	0.2254	0.1012	0.2085	0.2257	0.1016	0.1918	0.9976	0.9908
$N = 128$	0.2126	0.0688	0.2031	0.2112	0.0683	−1.4846	1.0000	1.0000
$N = 256$	0.2063	0.0477	0.2029	0.2069	0.0478	0.9460	1.0000	1.0000
$p = 4, q = 1, V(\mathbf{\Sigma}) = 0.4$								
$N = 4$	0.9667	1.6064	0.4096	0.9742	1.5788	0.3372	0.1936	0.1026
$N = 8$	0.6429	0.7343	0.3949	0.6372	0.7364	−0.5426	0.4134	0.2690
$N = 16$	0.5133	0.4137	0.3968	0.5132	0.4183	−0.0225	0.7684	0.6234
$N = 32$	0.4548	0.2598	0.3937	0.4544	0.2661	−0.1087	0.9888	0.9584
$N = 64$	0.4270	0.1728	0.4025	0.4292	0.1756	0.8791	1.0000	0.9998
$N = 128$	0.4134	0.1185	0.4011	0.4122	0.1168	−0.7078	1.0000	1.0000
$N = 256$	0.4067	0.0825	0.3970	0.4038	0.0806	−2.5084	1.0000	1.0000
$p = 4, q = 1, V(\mathbf{\Sigma}) = 0.6$								
$N = 4$	1.2000	2.0850	0.4763	1.1770	2.0466	−0.7938	0.2426	0.1370
$N = 8$	0.8571	0.9812	0.5485	0.8444	0.9432	−0.9582	0.5276	0.3806
$N = 16$	0.7200	0.5643	0.5634	0.7104	0.5573	−1.2209	0.8732	0.7710
$N = 32$	0.6581	0.3589	0.5820	0.6539	0.3516	−0.8294	0.9970	0.9882
$N = 64$	0.6286	0.2405	0.5917	0.6291	0.2451	0.1460	1.0000	1.0000
$N = 128$	0.6142	0.1655	0.5923	0.6084	0.1634	−2.5079	1.0000	1.0000
$N = 256$	0.6071	0.1154	0.5971	0.6067	0.1175	−0.2168	1.0000	1.0000
$p = 4, q = 1, V(\mathbf{\Sigma}) = 0.8$								
$N = 4$	1.4333	2.5407	0.5520	1.3960	2.4201	−1.0902	0.2744	0.1672
$N = 8$	1.0714	1.2182	0.6903	1.0730	1.2081	0.0917	0.6150	0.4626
$N = 16$	0.9267	0.7096	0.7454	0.9328	0.7139	0.6117	0.9306	0.8646
$N = 32$	0.8613	0.4549	0.7682	0.8585	0.4565	−0.4368	0.9994	0.9978
$N = 64$	0.8302	0.3061	0.7903	0.8350	0.3069	1.1137	1.0000	1.0000
$N = 128$	0.8150	0.2111	0.7929	0.8139	0.2120	−0.3642	1.0000	1.0000
$N = 256$	0.8075	0.1474	0.7948	0.8079	0.1470	0.2033	1.0000	1.0000

(*continued*)

Table S1. (*continued*)

	E[$V(\mathbf{S})$]	SD[$V(\mathbf{S})$]	Median	Mean	ESD	T	Pow. 5%	Pow. 1%
$p = 4$, $q = 2$, $V(\mathbf{\Sigma}) = 0.1$								
$N = 4$	0.6167	0.7295	0.3864	0.6220	0.7469	0.5028	0.0982	0.0316
$N = 8$	0.3214	0.2772	0.2483	0.3227	0.2693	0.3344	0.1798	0.0652
$N = 16$	0.2033	0.1318	0.1731	0.2031	0.1311	−0.1489	0.3632	0.1676
$N = 32$	0.1500	0.0725	0.1380	0.1510	0.0723	1.0047	0.7642	0.4980
$N = 64$	0.1246	0.0441	0.1186	0.1251	0.0455	0.7961	0.9920	0.9602
$N = 128$	0.1122	0.0286	0.1099	0.1127	0.0288	1.1330	1.0000	1.0000
$N = 256$	0.1061	0.0193	0.1041	0.1054	0.0193	−2.5193	1.0000	1.0000
$p = 4$, $q = 2$, $V(\mathbf{\Sigma}) = 0.2$								
$N = 4$	0.7333	0.9288	0.4256	0.7380	0.9311	0.3541	0.1418	0.0488
$N = 8$	0.4286	0.3717	0.3198	0.4179	0.3578	−2.1073	0.2826	0.1270
$N = 16$	0.3067	0.1855	0.2651	0.3085	0.1873	0.7019	0.6378	0.3982
$N = 32$	0.2516	0.1061	0.2384	0.2556	0.1084	2.6090	0.9726	0.8884
$N = 64$	0.2254	0.0664	0.2173	0.2260	0.0666	0.6088	1.0000	1.0000
$N = 128$	0.2126	0.0439	0.2088	0.2128	0.0453	0.3361	1.0000	1.0000
$N = 256$	0.2063	0.0300	0.2050	0.2064	0.0300	0.3695	1.0000	1.0000
$p = 4$, $q = 2$, $V(\mathbf{\Sigma}) = 0.4$								
(This comformation is impossible)								

(*continued*)

Table S1. (*continued*)

	E[$V(\mathbf{S})$]	SD[$V(\mathbf{S})$]	Median	Mean	ESD	T	Pow. 5%	Pow. 1%
$p = 8, q = 1, V(\mathbf{\Sigma}) = 0.1$								
$N = 4$	0.5417	0.5946	0.3545	0.5388	0.6115	−0.3270	0.1390	0.0752
$N = 8$	0.2893	0.2455	0.2127	0.2849	0.2393	−1.3039	0.2810	0.1660
$N = 16$	0.1883	0.1281	0.1522	0.1860	0.1272	−1.2985	0.5616	0.4194
$N = 32$	0.1427	0.0766	0.1271	0.1425	0.0758	−0.2525	0.9044	0.8270
$N = 64$	0.1210	0.0495	0.1122	0.1213	0.0498	0.3606	0.9984	0.9950
$N = 128$	0.1104	0.0334	0.1061	0.1098	0.0333	−1.3971	1.0000	1.0000
$N = 256$	0.1052	0.0231	0.1030	0.1054	0.0236	0.5513	1.0000	1.0000
$p = 8, q = 1, V(\mathbf{\Sigma}) = 0.2$								
$N = 4$	0.6667	0.8974	0.3775	0.6835	0.9034	1.3184	0.2118	0.1336
$N = 8$	0.4000	0.3948	0.2819	0.4013	0.3782	0.2518	0.4278	0.3112
$N = 16$	0.2933	0.2163	0.2323	0.2891	0.2124	−1.4124	0.7642	0.6644
$N = 32$	0.2452	0.1335	0.2173	0.2469	0.1372	0.8894	0.9836	0.9652
$N = 64$	0.2222	0.0880	0.2090	0.2224	0.0903	0.1113	1.0000	0.9998
$N = 128$	0.2110	0.0600	0.2055	0.2122	0.0592	1.3676	1.0000	1.0000
$N = 256$	0.2055	0.0416	0.2026	0.2054	0.0417	−0.1800	1.0000	1.0000
$p = 8, q = 1, V(\mathbf{\Sigma}) = 0.4$								
$N = 4$	0.9167	1.4545	0.4073	0.8964	1.3932	−1.0283	0.2758	0.2010
$N = 8$	0.6214	0.6726	0.3993	0.6180	0.6724	−0.3572	0.5748	0.4674
$N = 16$	0.5033	0.3821	0.3975	0.5043	0.3798	0.1820	0.9124	0.8712
$N = 32$	0.4500	0.2412	0.4025	0.4510	0.2414	0.2901	0.9990	0.9964
$N = 64$	0.4246	0.1610	0.4031	0.4243	0.1586	−0.1199	1.0000	1.0000
$N = 128$	0.4122	0.1105	0.3995	0.4130	0.1108	0.5315	1.0000	1.0000
$N = 256$	0.4061	0.0770	0.3993	0.4053	0.0762	−0.7337	1.0000	1.0000
$p = 8, q = 1, V(\mathbf{\Sigma}) = 0.6$								
$N = 4$	1.1667	1.9793	0.4641	1.1773	2.0289	0.3698	0.3310	0.2544
$N = 8$	0.8429	0.9374	0.5468	0.8327	0.9047	−0.7964	0.6726	0.5776
$N = 16$	0.7133	0.5415	0.5891	0.7236	0.5308	1.3632	0.9568	0.9324
$N = 32$	0.6548	0.3454	0.5764	0.6494	0.3566	−1.0725	0.9998	0.9988
$N = 64$	0.6270	0.2318	0.5906	0.6254	0.2324	−0.4722	1.0000	1.0000
$N = 128$	0.6134	0.1596	0.5988	0.6135	0.1565	0.0522	1.0000	1.0000
$N = 256$	0.6067	0.1114	0.5957	0.6051	0.1106	−0.9916	1.0000	1.0000
$p = 8, q = 1, V(\mathbf{\Sigma}) = 0.8$								
$N = 4$	1.4167	2.4862	0.5572	1.4707	2.7285	1.3993	0.3852	0.3018
$N = 8$	1.0643	1.1954	0.6913	1.0524	1.1663	−0.7186	0.7356	0.6420
$N = 16$	0.9233	0.6977	0.7348	0.9074	0.6883	−1.6414	0.9750	0.9562
$N = 32$	0.8597	0.4477	0.7714	0.8582	0.4380	−0.2392	1.0000	1.0000
$N = 64$	0.8294	0.3015	0.7840	0.8222	0.2990	−1.6841	1.0000	1.0000
$N = 128$	0.8146	0.2080	0.7942	0.8167	0.2067	0.7183	1.0000	1.0000
$N = 256$	0.8073	0.1453	0.7949	0.8054	0.1443	−0.9026	1.0000	1.0000

(*continued*)

Table S1. (*continued*)

	E[$V(\mathbf{S})$]	SD[$V(\mathbf{S})$]	Median	Mean	ESD	T	Pow. 5%	Pow. 1%
$p = 8, q = 2, V(\mathbf{\Sigma}) = 0.1$								
$N = 4$	0.5417	0.5297	0.3831	0.5358	0.5142	−0.8102	0.1444	0.0754
$N = 8$	0.2893	0.2070	0.2363	0.2909	0.2077	0.5498	0.3160	0.1700
$N = 16$	0.1883	0.1021	0.1667	0.1870	0.0997	−0.9397	0.6386	0.4742
$N = 32$	0.1427	0.0583	0.1334	0.1435	0.0597	0.9048	0.9594	0.9088
$N = 64$	0.1210	0.0365	0.1158	0.1195	0.0358	−2.9783	0.9998	0.9990
$N = 128$	0.1104	0.0242	0.1089	0.1106	0.0242	0.4686	1.0000	1.0000
$N = 256$	0.1052	0.0165	0.1044	0.1052	0.0164	0.0586	1.0000	1.0000
$p = 8, q = 2, V(\mathbf{\Sigma}) = 0.2$								
$N = 4$	0.6667	0.7567	0.4338	0.6849	0.7664	1.6786	0.2248	0.1390
$N = 8$	0.4000	0.3138	0.3126	0.3976	0.3228	−0.5188	0.4742	0.3170
$N = 16$	0.2933	0.1629	0.2554	0.2901	0.1616	−1.4358	0.8592	0.7680
$N = 32$	0.2452	0.0966	0.2299	0.2446	0.0962	−0.3991	0.9990	0.9944
$N = 64$	0.2222	0.0620	0.2144	0.2215	0.0629	−0.8630	1.0000	1.0000
$N = 128$	0.2110	0.0417	0.2077	0.2108	0.0413	−0.3914	1.0000	1.0000
$N = 256$	0.2055	0.0287	0.2044	0.2057	0.0284	0.5480	1.0000	1.0000
$p = 8, q = 2, V(\mathbf{\Sigma}) = 0.4$								
$N = 4$	0.9167	1.1622	0.5207	0.9034	1.1518	−0.8149	0.3152	0.2154
$N = 8$	0.6214	0.5071	0.4870	0.6244	0.5230	0.4001	0.6742	0.5432
$N = 16$	0.5033	0.2744	0.4443	0.5015	0.2685	−0.4783	0.9794	0.9514
$N = 32$	0.4500	0.1675	0.4209	0.4491	0.1695	−0.3959	0.9998	0.9998
$N = 64$	0.4246	0.1095	0.4105	0.4212	0.1079	−2.2123	1.0000	1.0000
$N = 128$	0.4122	0.0744	0.4086	0.4131	0.0736	0.8143	1.0000	1.0000
$N = 256$	0.4061	0.0515	0.4028	0.4054	0.0514	−0.9666	1.0000	1.0000
$p = 8, q = 4, V(\mathbf{\Sigma}) = 0.1$								
$N = 4$	0.5417	0.4697	0.4193	0.5603	0.4833	2.7253	0.1542	0.0784
$N = 8$	0.2893	0.1721	0.2525	0.2901	0.1715	0.3491	0.3180	0.1606
$N = 16$	0.1883	0.0787	0.1754	0.1887	0.0785	0.3747	0.7164	0.5158
$N = 32$	0.1427	0.0417	0.1381	0.1435	0.0423	1.2407	0.9950	0.9750
$N = 64$	0.1210	0.0245	0.1193	0.1215	0.0246	1.2929	1.0000	1.0000
$N = 128$	0.1104	0.0156	0.1098	0.1107	0.0155	1.2881	1.0000	1.0000
$N = 256$	0.1052	0.0104	0.1046	0.1049	0.0103	−1.9227	1.0000	1.0000
$p = 8, q = 4, V(\mathbf{\Sigma}) = 0.2$								
(This comformation is impossible)								

(*continued*)

Table S1. (*continued*)

	E[$V(\mathbf{S})$]	SD[$V(\mathbf{S})$]	Median	Mean	ESD	T	Pow. 5%	Pow. 1%
$p = 16, q = 1, V(\mathbf{\Sigma}) = 0.1$								
$N = 4$	0.5042	0.4994	0.3516	0.5085	0.5040	0.6104	0.2026	0.1218
$N = 8$	0.2732	0.2102	0.2165	0.2773	0.2092	1.3950	0.4158	0.3142
$N = 16$	0.1808	0.1114	0.1518	0.1799	0.1115	−0.6051	0.7332	0.6342
$N = 32$	0.1391	0.0673	0.1257	0.1393	0.0685	0.1796	0.9782	0.9564
$N = 64$	0.1192	0.0438	0.1121	0.1196	0.0443	0.5738	0.9998	0.9998
$N = 128$	0.1095	0.0297	0.1063	0.1097	0.0302	0.3760	1.0000	1.0000
$N = 256$	0.1048	0.0205	0.1034	0.1048	0.0205	0.3061	1.0000	1.0000
$p = 16, q = 1, V(\mathbf{\Sigma}) = 0.2$								
$N = 4$	0.6333	0.8077	0.3713	0.6342	0.8024	0.0729	0.2688	0.1880
$N = 8$	0.3857	0.3598	0.2756	0.3878	0.3671	0.3950	0.5466	0.4586
$N = 16$	0.2867	0.1990	0.2375	0.2847	0.1933	−0.7042	0.8770	0.8272
$N = 32$	0.2419	0.1235	0.2168	0.2395	0.1226	−1.3960	0.9970	0.9930
$N = 64$	0.2206	0.0817	0.2092	0.2206	0.0817	−0.0454	1.0000	1.0000
$N = 128$	0.2102	0.0558	0.2030	0.2087	0.0554	−1.9179	1.0000	1.0000
$N = 256$	0.2051	0.0388	0.2015	0.2050	0.0385	−0.1718	1.0000	1.0000
$p = 16, q = 1, V(\mathbf{\Sigma}) = 0.4$								
$N = 4$	0.8917	1.3811	0.4263	0.8759	1.2652	−0.8801	0.3518	0.2774
$N = 8$	0.6107	0.6427	0.4130	0.6165	0.6509	0.6282	0.6822	0.6172
$N = 16$	0.4983	0.3668	0.4060	0.5036	0.3748	0.9922	0.9542	0.9330
$N = 32$	0.4476	0.2322	0.4057	0.4492	0.2314	0.5001	0.9998	0.9994
$N = 64$	0.4234	0.1552	0.4005	0.4227	0.1546	−0.3205	1.0000	1.0000
$N = 128$	0.4116	0.1067	0.4036	0.4144	0.1082	1.8203	1.0000	1.0000
$N = 256$	0.4058	0.0743	0.4000	0.4056	0.0753	−0.2074	1.0000	1.0000
$p = 16, q = 1, V(\mathbf{\Sigma}) = 0.6$								
$N = 4$	1.1500	1.9274	0.4797	1.1959	2.0814	1.5607	0.4140	0.3374
$N = 8$	0.8357	0.9159	0.5480	0.8416	0.9194	0.4545	0.7496	0.7020
$N = 16$	0.7100	0.5304	0.5720	0.7164	0.5430	0.8347	0.9762	0.9668
$N = 32$	0.6532	0.3388	0.5914	0.6559	0.3432	0.5582	1.0000	1.0000
$N = 64$	0.6262	0.2275	0.5929	0.6268	0.2284	0.1861	1.0000	1.0000
$N = 128$	0.6130	0.1568	0.6006	0.6158	0.1603	1.2290	1.0000	1.0000
$N = 256$	0.6065	0.1094	0.5974	0.6048	0.1087	−1.0764	1.0000	1.0000
$p = 16, q = 1, V(\mathbf{\Sigma}) = 0.8$								
$N = 4$	1.4083	2.4591	0.5328	1.3669	2.3491	−1.2462	0.4438	0.3742
$N = 8$	1.0607	1.1840	0.6778	1.0687	1.1804	0.4765	0.8080	0.7666
$N = 16$	0.9217	0.6917	0.7517	0.9147	0.6842	−0.7221	0.9876	0.9814
$N = 32$	0.8589	0.4442	0.7847	0.8683	0.4387	1.5248	1.0000	1.0000
$N = 64$	0.8290	0.2992	0.7925	0.8358	0.3067	1.5855	1.0000	1.0000
$N = 128$	0.8144	0.2065	0.7840	0.8075	0.2054	−2.3764	1.0000	1.0000
$N = 256$	0.8072	0.1442	0.7955	0.8072	0.1452	0.0030	1.0000	1.0000

(*continued*)

Table S1. (*continued*)

	E[$V(\mathbf{S})$]	SD[$V(\mathbf{S})$]	Median	Mean	ESD	T	Pow. 5%	Pow. 1%
$p = 16$, $q = 2$, $V(\mathbf{\Sigma}) = 0.1$								
$N = 4$	0.5042	0.4346	0.3721	0.4893	0.4066	−2.5905	0.2082	0.1128
$N = 8$	0.2732	0.1733	0.2255	0.2702	0.1699	−1.2467	0.4370	0.3182
$N = 16$	0.1808	0.0874	0.1631	0.1813	0.0871	0.3576	0.8220	0.7294
$N = 32$	0.1391	0.0508	0.1323	0.1398	0.0516	0.9766	0.9976	0.9928
$N = 64$	0.1192	0.0322	0.1162	0.1195	0.0325	0.5145	1.0000	1.0000
$N = 128$	0.1095	0.0215	0.1078	0.1091	0.0214	−1.3660	1.0000	1.0000
$N = 256$	0.1048	0.0148	0.1036	0.1045	0.0148	−1.3745	1.0000	1.0000
$p = 16$, $q = 2$, $V(\mathbf{\Sigma}) = 0.2$								
$N = 4$	0.6333	0.6717	0.4132	0.6307	0.6606	−0.2827	0.3020	0.2034
$N = 8$	0.3857	0.2838	0.3111	0.3877	0.2868	0.4978	0.6306	0.5186
$N = 16$	0.2867	0.1500	0.2536	0.2841	0.1491	−1.2343	0.9478	0.9116
$N = 32$	0.2419	0.0902	0.2291	0.2414	0.0899	−0.4062	0.9998	0.9994
$N = 64$	0.2206	0.0585	0.2120	0.2185	0.0582	−2.6399	1.0000	1.0000
$N = 128$	0.2102	0.0395	0.2068	0.2095	0.0396	−1.3000	1.0000	1.0000
$N = 256$	0.2051	0.0273	0.2042	0.2057	0.0265	1.5602	1.0000	1.0000
$p = 16$, $q = 2$, $V(\mathbf{\Sigma}) = 0.4$								
$N = 4$	0.8917	1.1035	0.5242	0.8854	1.0836	−0.4089	0.4082	0.3040
$N = 8$	0.6107	0.4889	0.4676	0.6002	0.4853	−1.5280	0.7828	0.7114
$N = 16$	0.4983	0.2682	0.4488	0.5020	0.2713	0.9563	0.9924	0.9860
$N = 32$	0.4476	0.1654	0.4249	0.4473	0.1616	−0.1307	1.0000	1.0000
$N = 64$	0.4234	0.1089	0.4093	0.4237	0.1108	0.1666	1.0000	1.0000
$N = 128$	0.4116	0.0742	0.4045	0.4114	0.0739	−0.2290	1.0000	1.0000
$N = 256$	0.4058	0.0515	0.4017	0.4057	0.0523	−0.1365	1.0000	1.0000
$p = 16$, $q = 4$, $V(\mathbf{\Sigma}) = 0.1$								
$N = 4$	0.5042	0.3844	0.4028	0.5101	0.3902	1.0802	0.2238	0.1162
$N = 8$	0.2732	0.1449	0.2417	0.2711	0.1416	−1.0800	0.4776	0.3316
$N = 16$	0.1808	0.0688	0.1713	0.1819	0.0702	1.1022	0.8972	0.7998
$N = 32$	0.1391	0.0379	0.1335	0.1376	0.0372	−2.8589	0.9998	0.9986
$N = 64$	0.1192	0.0232	0.1172	0.1190	0.0229	−0.8179	1.0000	1.0000
$N = 128$	0.1095	0.0151	0.1089	0.1097	0.0151	0.7823	1.0000	1.0000
$N = 256$	0.1048	0.0102	0.1041	0.1047	0.0101	−0.5139	1.0000	1.0000
$p = 16$, $q = 4$, $V(\mathbf{\Sigma}) = 0.2$								
$N = 4$	0.6333	0.5660	0.4525	0.6217	0.5592	−1.4728	0.3164	0.2102
$N = 8$	0.3857	0.2250	0.3395	0.3867	0.2277	0.3213	0.6996	0.5818
$N = 16$	0.2867	0.1122	0.2670	0.2853	0.1118	−0.8900	0.9872	0.9702
$N = 32$	0.2419	0.0644	0.2345	0.2422	0.0650	0.2472	1.0000	1.0000
$N = 64$	0.2206	0.0404	0.2167	0.2201	0.0406	−1.0141	1.0000	1.0000
$N = 128$	0.2102	0.0268	0.2086	0.2103	0.0266	0.0662	1.0000	1.0000
$N = 256$	0.2051	0.0183	0.2042	0.2045	0.0179	−2.2267	1.0000	1.0000

(*continued*)

Table S1. (*continued*)

	E[$V(\mathbf{S})$]	SD[$V(\mathbf{S})$]	Median	Mean	ESD	T	Pow. 5%	Pow. 1%
$p = 32$, $q = 1$, $V(\mathbf{\Sigma}) = 0.1$								
$N = 4$	0.4854	0.4534	0.3382	0.4789	0.4380	−1.0575	0.2604	0.1900
$N = 8$	0.2652	0.1932	0.2038	0.2590	0.1893	−2.3033	0.4940	0.4178
$N = 16$	0.1771	0.1033	0.1546	0.1794	0.1038	1.5962	0.8460	0.8034
$N = 32$	0.1373	0.0628	0.1262	0.1378	0.0615	0.6141	0.9940	0.9912
$N = 64$	0.1184	0.0410	0.1127	0.1186	0.0411	0.4012	1.0000	1.0000
$N = 128$	0.1091	0.0278	0.1060	0.1082	0.0278	−2.1710	1.0000	1.0000
$N = 256$	0.1045	0.0193	0.1025	0.1040	0.0189	−2.1023	1.0000	1.0000
$p = 32$, $q = 1$, $V(\mathbf{\Sigma}) = 0.2$								
$N = 4$	0.6167	0.7641	0.3490	0.5908	0.7234	−2.5279	0.3270	0.2640
$N = 8$	0.3786	0.3427	0.2744	0.3799	0.3437	0.2828	0.6380	0.5822
$N = 16$	0.2833	0.1905	0.2312	0.2778	0.1862	−2.1149	0.9294	0.9080
$N = 32$	0.2403	0.1186	0.2181	0.2423	0.1215	1.1513	0.9994	0.9980
$N = 64$	0.2198	0.0786	0.2093	0.2206	0.0778	0.6652	1.0000	1.0000
$N = 128$	0.2098	0.0537	0.2050	0.2107	0.0533	1.1501	1.0000	1.0000
$N = 256$	0.2049	0.0374	0.2027	0.2053	0.0369	0.6690	1.0000	1.0000
$p = 32$, $q = 1$, $V(\mathbf{\Sigma}) = 0.4$								
$N = 4$	0.8792	1.3449	0.4175	0.8790	1.3001	−0.0111	0.4194	0.3640
$N = 8$	0.6054	0.6280	0.4080	0.5999	0.6307	−0.6167	0.7424	0.7020
$N = 16$	0.4958	0.3592	0.4030	0.4931	0.3599	−0.5428	0.9756	0.9694
$N = 32$	0.4464	0.2278	0.4061	0.4517	0.2342	1.6000	0.9998	0.9996
$N = 64$	0.4228	0.1523	0.4014	0.4228	0.1509	−0.0001	1.0000	1.0000
$N = 128$	0.4113	0.1047	0.4027	0.4142	0.1061	1.9386	1.0000	1.0000
$N = 256$	0.4056	0.0730	0.3990	0.4049	0.0720	−0.7666	1.0000	1.0000
$p = 32$, $q = 1$, $V(\mathbf{\Sigma}) = 0.6$								
$N = 4$	1.1417	1.9016	0.4839	1.1495	1.8884	0.2917	0.4702	0.4220
$N = 8$	0.8321	0.9053	0.5361	0.8252	0.8771	−0.5637	0.8144	0.7848
$N = 16$	0.7083	0.5248	0.5752	0.7099	0.5382	0.2084	0.9886	0.9850
$N = 32$	0.6524	0.3355	0.5899	0.6548	0.3395	0.4951	1.0000	1.0000
$N = 64$	0.6258	0.2254	0.5960	0.6286	0.2259	0.8767	1.0000	1.0000
$N = 128$	0.6128	0.1553	0.5927	0.6096	0.1548	−1.4599	1.0000	1.0000
$N = 256$	0.6064	0.1084	0.5992	0.6061	0.1086	−0.1815	1.0000	1.0000
$p = 32$, $q = 1$, $V(\mathbf{\Sigma}) = 0.8$								
$N = 4$	1.4042	2.4456	0.5315	1.3706	2.3694	−1.0015	0.4940	0.4506
$N = 8$	1.0589	1.1784	0.6869	1.0663	1.1907	0.4355	0.8458	0.8238
$N = 16$	0.9208	0.6888	0.7275	0.9046	0.6664	−1.7216	0.9912	0.9894
$N = 32$	0.8585	0.4424	0.7738	0.8625	0.4476	0.6339	1.0000	1.0000
$N = 64$	0.8288	0.2981	0.7822	0.8223	0.2880	−1.5782	1.0000	1.0000
$N = 128$	0.8143	0.2057	0.7978	0.8180	0.2054	1.2902	1.0000	1.0000
$N = 256$	0.8071	0.1437	0.7946	0.8046	0.1438	−1.2523	1.0000	1.0000

(*continued*)

Table S1. (*continued*)

	E[$V(\mathbf{S})$]	SD[$V(\mathbf{S})$]	Median	Mean	ESD	T	Pow. 5%	Pow. 1%
$p = 32$, $q = 2$, $V(\mathbf{\Sigma}) = 0.1$								
$N = 4$	0.4854	0.3879	0.3699	0.4765	0.3649	−1.7243	0.2934	0.2140
$N = 8$	0.2652	0.1567	0.2254	0.2620	0.1560	−1.4249	0.5638	0.4812
$N = 16$	0.1771	0.0800	0.1596	0.1752	0.0797	−1.6907	0.9106	0.8708
$N = 32$	0.1373	0.0469	0.1300	0.1365	0.0469	−1.1689	0.9994	0.9986
$N = 64$	0.1184	0.0300	0.1151	0.1183	0.0298	−0.1368	1.0000	1.0000
$N = 128$	0.1091	0.0201	0.1071	0.1089	0.0200	−0.6488	1.0000	1.0000
$N = 256$	0.1045	0.0138	0.1043	0.1048	0.0138	1.3050	1.0000	1.0000
$p = 32$, $q = 2$, $V(\mathbf{\Sigma}) = 0.2$								
$N = 4$	0.6167	0.6296	0.4145	0.6196	0.6367	0.3310	0.3856	0.3140
$N = 8$	0.3786	0.2686	0.3172	0.3827	0.2633	1.1072	0.7300	0.6708
$N = 16$	0.2833	0.1433	0.2560	0.2838	0.1414	0.2470	0.9806	0.9714
$N = 32$	0.2403	0.0867	0.2278	0.2410	0.0876	0.5138	1.0000	1.0000
$N = 64$	0.2198	0.0565	0.2149	0.2211	0.0577	1.5370	1.0000	1.0000
$N = 128$	0.2098	0.0382	0.2064	0.2095	0.0381	−0.5589	1.0000	1.0000
$N = 256$	0.2049	0.0265	0.2032	0.2047	0.0261	−0.4954	1.0000	1.0000
$p = 32$, $q = 2$, $V(\mathbf{\Sigma}) = 0.4$								
$N = 4$	0.8792	1.0734	0.5075	0.8708	1.0767	−0.5475	0.4758	0.4150
$N = 8$	0.6054	0.4790	0.4807	0.6065	0.4766	0.1723	0.8488	0.8144
$N = 16$	0.4958	0.2645	0.4407	0.4946	0.2639	−0.3404	0.9966	0.9944
$N = 32$	0.4464	0.1638	0.4192	0.4468	0.1675	0.1846	1.0000	1.0000
$N = 64$	0.4228	0.1081	0.4109	0.4226	0.1077	−0.1262	1.0000	1.0000
$N = 128$	0.4113	0.0738	0.4060	0.4117	0.0747	0.3552	1.0000	1.0000
$N = 256$	0.4056	0.0512	0.4035	0.4066	0.0512	1.3117	1.0000	1.0000
$p = 32$, $q = 4$, $V(\mathbf{\Sigma}) = 0.1$								
$N = 4$	0.4854	0.3402	0.4019	0.4886	0.3388	0.6713	0.3194	0.2274
$N = 8$	0.2652	0.1302	0.2360	0.2642	0.1296	−0.5586	0.6138	0.5124
$N = 16$	0.1771	0.0629	0.1674	0.1779	0.0631	0.9277	0.9636	0.9400
$N = 32$	0.1373	0.0353	0.1328	0.1367	0.0352	−1.1192	1.0000	1.0000
$N = 64$	0.1184	0.0218	0.1165	0.1184	0.0220	0.1788	1.0000	1.0000
$N = 128$	0.1091	0.0144	0.1083	0.1090	0.0145	−0.2811	1.0000	1.0000
$N = 256$	0.1045	0.0098	0.1040	0.1045	0.0097	−0.4697	1.0000	1.0000
$p = 32$, $q = 4$, $V(\mathbf{\Sigma}) = 0.2$								
$N = 4$	0.6167	0.5314	0.4570	0.6124	0.5398	−0.5531	0.4180	0.3282
$N = 8$	0.3786	0.2145	0.3322	0.3764	0.2149	−0.6987	0.7890	0.7306
$N = 16$	0.2833	0.1087	0.2658	0.2811	0.1065	−1.4855	0.9964	0.9934
$N = 32$	0.2403	0.0633	0.2333	0.2405	0.0644	0.2077	1.0000	1.0000
$N = 64$	0.2198	0.0402	0.2162	0.2190	0.0398	−1.5583	1.0000	1.0000
$N = 128$	0.2098	0.0268	0.2084	0.2094	0.0268	−1.0612	1.0000	1.0000
$N = 256$	0.2049	0.0184	0.2043	0.2051	0.0184	0.6105	1.0000	1.0000

(*continued*)

Table S1. (*continued*)

	E[$V(\mathbf{S})$]	SD[$V(\mathbf{S})$]	Median	Mean	ESD	T	Pow. 5%	Pow. 1%
$p = 64$, $q = 1$, $V(\mathbf{\Sigma}) = 0.1$								
$N = 4$	0.4760	0.4308	0.3333	0.4758	0.4454	−0.0458	0.3174	0.2566
$N = 8$	0.2612	0.1848	0.2043	0.2593	0.1808	−0.7361	0.5748	0.5076
$N = 16$	0.1752	0.0994	0.1502	0.1743	0.0977	−0.6293	0.8884	0.8608
$N = 32$	0.1364	0.0606	0.1243	0.1368	0.0603	0.4427	0.9986	0.9970
$N = 64$	0.1179	0.0396	0.1123	0.1179	0.0407	−0.0656	1.0000	1.0000
$N = 128$	0.1089	0.0269	0.1062	0.1088	0.0268	−0.2292	1.0000	1.0000
$N = 256$	0.1044	0.0187	0.1031	0.1046	0.0188	0.7075	1.0000	1.0000
$p = 64$, $q = 1$, $V(\mathbf{\Sigma}) = 0.2$								
$N = 4$	0.6083	0.7426	0.3491	0.6187	0.7564	0.9699	0.3862	0.3406
$N = 8$	0.3750	0.3342	0.2724	0.3693	0.3084	−1.2970	0.6930	0.6404
$N = 16$	0.2817	0.1862	0.2395	0.2846	0.1881	1.0946	0.9514	0.9416
$N = 32$	0.2395	0.1162	0.2189	0.2410	0.1161	0.8880	0.9998	0.9998
$N = 64$	0.2194	0.0770	0.2075	0.2185	0.0768	−0.8362	1.0000	1.0000
$N = 128$	0.2096	0.0527	0.2032	0.2090	0.0534	−0.8819	1.0000	1.0000
$N = 256$	0.2048	0.0366	0.2024	0.2051	0.0368	0.5577	1.0000	1.0000
$p = 64$, $q = 1$, $V(\mathbf{\Sigma}) = 0.4$								
$N = 4$	0.8729	1.3270	0.4193	0.8856	1.3267	0.6763	0.4664	0.4264
$N = 8$	0.6027	0.6206	0.4227	0.6052	0.5988	0.2997	0.7806	0.7568
$N = 16$	0.4946	0.3554	0.4061	0.5021	0.3631	1.4613	0.9818	0.9778
$N = 32$	0.4458	0.2255	0.4003	0.4445	0.2244	−0.4124	1.0000	1.0000
$N = 64$	0.4225	0.1509	0.3986	0.4237	0.1546	0.5322	1.0000	1.0000
$N = 128$	0.4112	0.1038	0.4015	0.4125	0.1038	0.9057	1.0000	1.0000
$N = 256$	0.4056	0.0724	0.4003	0.4058	0.0718	0.1941	1.0000	1.0000
$p = 64$, $q = 1$, $V(\mathbf{\Sigma}) = 0.6$								
$N = 4$	1.1375	1.8888	0.4781	1.1311	1.8346	−0.2450	0.5040	0.4696
$N = 8$	0.8304	0.8999	0.5503	0.8546	0.9505	1.8043	0.8352	0.8128
$N = 16$	0.7075	0.5220	0.5693	0.7136	0.5361	0.8002	0.9914	0.9892
$N = 32$	0.6520	0.3338	0.5899	0.6555	0.3387	0.7324	1.0000	1.0000
$N = 64$	0.6256	0.2243	0.5963	0.6275	0.2229	0.6155	1.0000	1.0000
$N = 128$	0.6127	0.1546	0.5961	0.6119	0.1532	−0.3828	1.0000	1.0000
$N = 256$	0.6063	0.1079	0.5985	0.6067	0.1078	0.2554	1.0000	1.0000
$p = 64$, $q = 1$, $V(\mathbf{\Sigma}) = 0.8$								
$N = 4$	1.4021	2.4389	0.5397	1.3796	2.3986	−0.6620	0.5362	0.5010
$N = 8$	1.0580	1.1756	0.6979	1.0755	1.2081	1.0231	0.8678	0.8528
$N = 16$	0.9204	0.6873	0.7463	0.9304	0.7024	1.0083	0.9940	0.9934
$N = 32$	0.8583	0.4415	0.7643	0.8495	0.4352	−1.4315	1.0000	1.0000
$N = 64$	0.8287	0.2975	0.7873	0.8292	0.2977	0.1296	1.0000	1.0000
$N = 128$	0.8142	0.2053	0.7973	0.8192	0.2071	1.6973	1.0000	1.0000
$N = 256$	0.8071	0.1434	0.7976	0.8060	0.1420	−0.5233	1.0000	1.0000

(*continued*)

Table S1. (*continued*)

	E[$V(\mathbf{S})$]	SD[$V(\mathbf{S})$]	Median	Mean	ESD	T	Pow. 5%	Pow. 1%
$p = 64$, $q = 2$, $V(\mathbf{\Sigma}) = 0.1$								
$N = 4$	0.4760	0.3647	0.3655	0.4774	0.3706	0.2548	0.3576	0.2884
$N = 8$	0.2612	0.1484	0.2234	0.2611	0.1483	−0.0339	0.6472	0.5736
$N = 16$	0.1752	0.0763	0.1602	0.1761	0.0777	0.8173	0.9538	0.9342
$N = 32$	0.1364	0.0450	0.1300	0.1364	0.0459	−0.0466	1.0000	0.9998
$N = 64$	0.1179	0.0288	0.1151	0.1178	0.0284	−0.3278	1.0000	1.0000
$N = 128$	0.1089	0.0194	0.1076	0.1090	0.0193	0.4459	1.0000	1.0000
$N = 256$	0.1044	0.0133	0.1037	0.1045	0.0133	0.1905	1.0000	1.0000
$p = 64$, $q = 2$, $V(\mathbf{\Sigma}) = 0.2$								
$N = 4$	0.6083	0.6086	0.4144	0.6043	0.5838	−0.4854	0.4464	0.3862
$N = 8$	0.3750	0.2610	0.3152	0.3799	0.2633	1.3251	0.7896	0.7500
$N = 16$	0.2817	0.1398	0.2526	0.2804	0.1409	−0.6185	0.9872	0.9804
$N = 32$	0.2395	0.0849	0.2266	0.2399	0.0865	0.3471	1.0000	1.0000
$N = 64$	0.2194	0.0554	0.2136	0.2187	0.0554	−0.9000	1.0000	1.0000
$N = 128$	0.2096	0.0376	0.2069	0.2100	0.0379	0.7484	1.0000	1.0000
$N = 256$	0.2048	0.0260	0.2037	0.2047	0.0260	−0.3568	1.0000	1.0000
$p = 64$, $q = 2$, $V(\mathbf{\Sigma}) = 0.4$								
$N = 4$	0.8729	1.0582	0.5340	0.8914	1.0620	1.2328	0.5470	0.4978
$N = 8$	0.6027	0.4740	0.4713	0.5962	0.4669	−0.9845	0.8740	0.8518
$N = 16$	0.4946	0.2625	0.4487	0.4998	0.2602	1.4063	0.9984	0.9982
$N = 32$	0.4458	0.1629	0.4222	0.4444	0.1605	−0.6045	1.0000	1.0000
$N = 64$	0.4225	0.1076	0.4081	0.4211	0.1085	−0.8938	1.0000	1.0000
$N = 128$	0.4112	0.0735	0.4061	0.4104	0.0715	−0.7768	1.0000	1.0000
$N = 256$	0.4056	0.0511	0.4024	0.4048	0.0512	−1.0341	1.0000	1.0000
$p = 64$, $q = 4$, $V(\mathbf{\Sigma}) = 0.1$								
$N = 4$	0.4760	0.3178	0.3945	0.4743	0.3195	−0.3833	0.3938	0.3076
$N = 8$	0.2612	0.1226	0.2379	0.2603	0.1197	−0.5099	0.7108	0.6280
$N = 16$	0.1752	0.0598	0.1658	0.1756	0.0600	0.4656	0.9836	0.9720
$N = 32$	0.1364	0.0338	0.1325	0.1363	0.0341	−0.0890	1.0000	1.0000
$N = 64$	0.1179	0.0211	0.1167	0.1182	0.0214	0.8725	1.0000	1.0000
$N = 128$	0.1089	0.0139	0.1082	0.1087	0.0139	−1.0247	1.0000	1.0000
$N = 256$	0.1044	0.0095	0.1041	0.1044	0.0094	0.1697	1.0000	1.0000
$p = 64$, $q = 4$, $V(\mathbf{\Sigma}) = 0.2$								
$N = 4$	0.6083	0.5135	0.4635	0.6089	0.5082	0.0738	0.4944	0.4314
$N = 8$	0.3750	0.2089	0.3325	0.3748	0.2074	−0.0607	0.8514	0.8052
$N = 16$	0.2817	0.1067	0.2634	0.2821	0.1090	0.2833	0.9986	0.9978
$N = 32$	0.2395	0.0625	0.2332	0.2399	0.0631	0.4617	1.0000	1.0000
$N = 64$	0.2194	0.0398	0.2163	0.2193	0.0391	−0.1922	1.0000	1.0000
$N = 128$	0.2096	0.0266	0.2082	0.2097	0.0269	0.2535	1.0000	1.0000
$N = 256$	0.2048	0.0183	0.2041	0.2048	0.0180	−0.0932	1.0000	1.0000

(*continued*)

Table S1. (*continued*)

	E[$V(\mathbf{S})$]	SD[$V(\mathbf{S})$]	Median	Mean	ESD	T	Pow. 5%	Pow. 1%
$p = 128$, $q = 1$, $V(\mathbf{\Sigma}) = 0.1$								
$N = 4$	0.4714	0.4196	0.3291	0.4669	0.4247	−0.7376	0.3562	0.3112
$N = 8$	0.2592	0.1806	0.2074	0.2641	0.1886	1.8401	0.6340	0.5912
$N = 16$	0.1743	0.0974	0.1518	0.1752	0.0980	0.7020	0.9224	0.9012
$N = 32$	0.1359	0.0595	0.1265	0.1368	0.0594	0.9989	0.9992	0.9986
$N = 64$	0.1177	0.0389	0.1114	0.1171	0.0390	−0.9930	1.0000	1.0000
$N = 128$	0.1088	0.0265	0.1056	0.1084	0.0266	−1.1044	1.0000	1.0000
$N = 256$	0.1044	0.0183	0.1033	0.1043	0.0182	−0.1878	1.0000	1.0000
$p = 128$, $q = 1$, $V(\mathbf{\Sigma}) = 0.2$								
$N = 4$	0.6042	0.7319	0.3521	0.5941	0.7030	−1.0089	0.4288	0.3906
$N = 8$	0.3732	0.3300	0.2737	0.3806	0.3437	1.5247	0.7364	0.7076
$N = 16$	0.2808	0.1841	0.2350	0.2831	0.1925	0.8332	0.9602	0.9538
$N = 32$	0.2391	0.1150	0.2179	0.2394	0.1158	0.1938	1.0000	1.0000
$N = 64$	0.2192	0.0763	0.2096	0.2198	0.0762	0.5014	1.0000	1.0000
$N = 128$	0.2095	0.0522	0.2045	0.2108	0.0529	1.7078	1.0000	1.0000
$N = 256$	0.2048	0.0363	0.2012	0.2045	0.0363	−0.5260	1.0000	1.0000
$p = 128$, $q = 1$, $V(\mathbf{\Sigma}) = 0.4$								
$N = 4$	0.8698	1.3180	0.4240	0.8793	1.3211	0.5077	0.5012	0.4752
$N = 8$	0.6013	0.6170	0.4109	0.6010	0.6166	−0.0393	0.8032	0.7886
$N = 16$	0.4940	0.3536	0.3964	0.4838	0.3447	−2.0799	0.9856	0.9832
$N = 32$	0.4455	0.2244	0.4018	0.4478	0.2249	0.7386	1.0000	1.0000
$N = 64$	0.4224	0.1502	0.3989	0.4221	0.1513	−0.1182	1.0000	1.0000
$N = 128$	0.4111	0.1033	0.4000	0.4103	0.1041	−0.5203	1.0000	1.0000
$N = 256$	0.4055	0.0720	0.4015	0.4075	0.0718	1.8953	1.0000	1.0000
$p = 128$, $q = 1$, $V(\mathbf{\Sigma}) = 0.6$								
$N = 4$	1.1354	1.8824	0.4797	1.1748	1.9845	1.4033	0.5288	0.5084
$N = 8$	0.8295	0.8973	0.5462	0.8334	0.8762	0.3179	0.8454	0.8346
$N = 16$	0.7071	0.5206	0.5797	0.7083	0.5151	0.1716	0.9932	0.9926
$N = 32$	0.6518	0.3330	0.5881	0.6544	0.3402	0.5470	1.0000	1.0000
$N = 64$	0.6255	0.2238	0.5970	0.6273	0.2257	0.5778	1.0000	1.0000
$N = 128$	0.6126	0.1543	0.5996	0.6139	0.1541	0.5810	1.0000	1.0000
$N = 256$	0.6063	0.1077	0.5977	0.6059	0.1071	−0.2419	1.0000	1.0000
$p = 128$, $q = 1$, $V(\mathbf{\Sigma}) = 0.8$								
$N = 4$	1.4010	2.4355	0.5423	1.3818	2.6633	−0.5106	0.5578	0.5376
$N = 8$	1.0576	1.1742	0.6488	1.0314	1.1393	−1.6229	0.8726	0.8598
$N = 16$	0.9202	0.6865	0.7373	0.9009	0.6625	−2.0655	0.9960	0.9958
$N = 32$	0.8582	0.4411	0.7650	0.8551	0.4435	−0.4819	1.0000	1.0000
$N = 64$	0.8286	0.2972	0.7932	0.8344	0.2987	1.3577	1.0000	1.0000
$N = 128$	0.8142	0.2051	0.7948	0.8175	0.2073	1.1298	1.0000	1.0000
$N = 256$	0.8071	0.1433	0.7941	0.8035	0.1427	−1.7684	1.0000	1.0000

(*continued*)

Table S1. (*continued*)

	E[$V(\mathbf{S})$]	SD[$V(\mathbf{S})$]	Median	Mean	ESD	T	Pow. 5%	Pow. 1%
$p = 128$, $q = 2$, $V(\mathbf{\Sigma}) = 0.1$								
$N = 4$	0.4714	0.3532	0.3619	0.4658	0.3508	−1.1137	0.4058	0.3562
$N = 8$	0.2592	0.1443	0.2255	0.2602	0.1458	0.4873	0.7038	0.6668
$N = 16$	0.1743	0.0744	0.1585	0.1736	0.0734	−0.6676	0.9692	0.9588
$N = 32$	0.1359	0.0440	0.1292	0.1347	0.0428	−2.0088	1.0000	1.0000
$N = 64$	0.1177	0.0283	0.1151	0.1181	0.0284	1.0985	1.0000	1.0000
$N = 128$	0.1088	0.0190	0.1073	0.1089	0.0190	0.6346	1.0000	1.0000
$N = 256$	0.1044	0.0131	0.1033	0.1043	0.0130	−0.1708	1.0000	1.0000
$p = 128$, $q = 2$, $V(\mathbf{\Sigma}) = 0.2$								
$N = 4$	0.6042	0.5982	0.4138	0.6028	0.6034	−0.1628	0.4912	0.4532
$N = 8$	0.3732	0.2572	0.3105	0.3757	0.2607	0.6690	0.8210	0.7964
$N = 16$	0.2808	0.1381	0.2512	0.2803	0.1416	−0.2466	0.9918	0.9896
$N = 32$	0.2391	0.0840	0.2269	0.2387	0.0826	−0.3229	1.0000	1.0000
$N = 64$	0.2192	0.0549	0.2138	0.2191	0.0556	−0.2106	1.0000	1.0000
$N = 128$	0.2095	0.0372	0.2063	0.2095	0.0378	−0.0391	1.0000	1.0000
$N = 256$	0.2048	0.0258	0.2036	0.2047	0.0259	−0.1840	1.0000	1.0000
$p = 128$, $q = 2$, $V(\mathbf{\Sigma}) = 0.4$								
$N = 4$	0.8698	1.0506	0.5457	0.8847	1.0750	0.9798	0.5790	0.5540
$N = 8$	0.6013	0.4714	0.4772	0.6031	0.4732	0.2588	0.9008	0.8864
$N = 16$	0.4940	0.2615	0.4404	0.4875	0.2552	−1.7810	0.9990	0.9988
$N = 32$	0.4455	0.1625	0.4232	0.4457	0.1604	0.0840	1.0000	1.0000
$N = 64$	0.4224	0.1074	0.4136	0.4238	0.1074	0.9228	1.0000	1.0000
$N = 128$	0.4111	0.0734	0.4042	0.4099	0.0734	−1.1445	1.0000	1.0000
$N = 256$	0.4055	0.0510	0.4026	0.4058	0.0508	0.3393	1.0000	1.0000
$p = 128$, $q = 4$, $V(\mathbf{\Sigma}) = 0.1$								
$N = 4$	0.4714	0.3065	0.3956	0.4754	0.3052	0.9466	0.4594	0.4060
$N = 8$	0.2592	0.1187	0.2303	0.2571	0.1193	−1.2327	0.7618	0.7164
$N = 16$	0.1743	0.0582	0.1659	0.1748	0.0586	0.6611	0.9918	0.9884
$N = 32$	0.1359	0.0331	0.1314	0.1355	0.0331	−0.9953	1.0000	1.0000
$N = 64$	0.1177	0.0206	0.1160	0.1174	0.0208	−1.0099	1.0000	1.0000
$N = 128$	0.1088	0.0137	0.1078	0.1087	0.0136	−0.3031	1.0000	1.0000
$N = 256$	0.1044	0.0093	0.1040	0.1041	0.0093	−1.8770	1.0000	1.0000
$p = 128$, $q = 4$, $V(\mathbf{\Sigma}) = 0.2$								
$N = 4$	0.6042	0.5044	0.4654	0.5986	0.4922	−0.8044	0.5486	0.5040
$N = 8$	0.3732	0.2059	0.3269	0.3715	0.2029	−0.5889	0.8868	0.8642
$N = 16$	0.2808	0.1056	0.2666	0.2834	0.1064	1.7057	0.9996	0.9988
$N = 32$	0.2391	0.0621	0.2328	0.2400	0.0629	1.0371	1.0000	1.0000
$N = 64$	0.2192	0.0396	0.2166	0.2192	0.0400	−0.0044	1.0000	1.0000
$N = 128$	0.2095	0.0265	0.2077	0.2093	0.0261	−0.7459	1.0000	1.0000
$N = 256$	0.2048	0.0183	0.2044	0.2049	0.0183	0.5881	1.0000	1.0000

(*continued*)

Table S1. (*continued*)

	E[$V(\mathbf{S})$]	SD[$V(\mathbf{S})$]	Median	Mean	ESD	T	Pow. 5%	Pow. 1%
$p = 256$, $q = 1$, $V(\mathbf{\Sigma}) = 0.1$								
$N = 4$	0.4690	0.4140	0.3288	0.4640	0.3993	−0.8845	0.3936	0.3548
$N = 8$	0.2581	0.1786	0.1992	0.2538	0.1758	−1.7463	0.6480	0.6122
$N = 16$	0.1738	0.0964	0.1501	0.1722	0.0929	−1.2156	0.9370	0.9300
$N = 32$	0.1357	0.0589	0.1226	0.1338	0.0571	−2.3990	0.9986	0.9984
$N = 64$	0.1176	0.0386	0.1122	0.1177	0.0384	0.1675	1.0000	1.0000
$N = 128$	0.1087	0.0262	0.1063	0.1086	0.0261	−0.1824	1.0000	1.0000
$N = 256$	0.1043	0.0182	0.1027	0.1043	0.0184	−0.2755	1.0000	1.0000
$p = 256$, $q = 1$, $V(\mathbf{\Sigma}) = 0.2$								
$N = 4$	0.6021	0.7265	0.3493	0.5926	0.7138	−0.9406	0.4574	0.4288
$N = 8$	0.3723	0.3279	0.2676	0.3679	0.3236	−0.9750	0.7410	0.7150
$N = 16$	0.2804	0.1831	0.2332	0.2806	0.1813	0.0870	0.9712	0.9664
$N = 32$	0.2389	0.1144	0.2166	0.2377	0.1138	−0.7437	1.0000	1.0000
$N = 64$	0.2191	0.0759	0.2104	0.2196	0.0772	0.4276	1.0000	1.0000
$N = 128$	0.2095	0.0519	0.2059	0.2104	0.0518	1.2576	1.0000	1.0000
$N = 256$	0.2047	0.0361	0.2017	0.2050	0.0361	0.5110	1.0000	1.0000
$p = 256$, $q = 1$, $V(\mathbf{\Sigma}) = 0.4$								
$N = 4$	0.8682	1.3136	0.4188	0.8545	1.2792	−0.7569	0.5160	0.4972
$N = 8$	0.6007	0.6151	0.4140	0.6076	0.6137	0.7995	0.8272	0.8158
$N = 16$	0.4936	0.3526	0.4000	0.4873	0.3492	−1.2751	0.9882	0.9872
$N = 32$	0.4453	0.2239	0.4068	0.4465	0.2213	0.3813	1.0000	1.0000
$N = 64$	0.4223	0.1499	0.4003	0.4234	0.1505	0.5054	1.0000	1.0000
$N = 128$	0.4111	0.1031	0.3965	0.4095	0.1027	−1.0603	1.0000	1.0000
$N = 256$	0.4055	0.0719	0.4012	0.4060	0.0719	0.4926	1.0000	1.0000
$p = 256$, $q = 1$, $V(\mathbf{\Sigma}) = 0.6$								
$N = 4$	1.1344	1.8792	0.4711	1.0961	1.7882	−1.5150	0.5510	0.5306
$N = 8$	0.8290	0.8960	0.5433	0.8354	0.8985	0.5049	0.8694	0.8588
$N = 16$	0.7069	0.5200	0.5747	0.7078	0.5192	0.1261	0.9946	0.9936
$N = 32$	0.6517	0.3326	0.5949	0.6581	0.3348	1.3577	1.0000	1.0000
$N = 64$	0.6254	0.2235	0.5884	0.6207	0.2239	−1.4937	1.0000	1.0000
$N = 128$	0.6126	0.1541	0.5974	0.6123	0.1544	−0.1619	1.0000	1.0000
$N = 256$	0.6063	0.1076	0.5994	0.6061	0.1066	−0.1095	1.0000	1.0000
$p = 256$, $q = 1$, $V(\mathbf{\Sigma}) = 0.8$								
$N = 4$	1.4005	2.4338	0.5288	1.4172	2.5212	0.4676	0.5650	0.5524
$N = 8$	1.0574	1.1735	0.6982	1.0818	1.1935	1.4492	0.8902	0.8828
$N = 16$	0.9201	0.6862	0.7373	0.9122	0.6746	−0.8321	0.9964	0.9964
$N = 32$	0.8581	0.4409	0.7749	0.8663	0.4540	1.2689	1.0000	1.0000
$N = 64$	0.8286	0.2971	0.7824	0.8219	0.2873	−1.6582	1.0000	1.0000
$N = 128$	0.8142	0.2050	0.7977	0.8154	0.2033	0.4365	1.0000	1.0000
$N = 256$	0.8071	0.1432	0.7974	0.8086	0.1460	0.7277	1.0000	1.0000

(*continued*)

Table S1. (*continued*)

	E[$V(\mathbf{S})$]	SD[$V(\mathbf{S})$]	Median	Mean	ESD	T	Pow. 5%	Pow. 1%
$p = 256$, $q = 2$, $V(\mathbf{\Sigma}) = 0.1$								
$N = 4$	0.4690	0.3474	0.3654	0.4634	0.3480	−1.1409	0.4556	0.4024
$N = 8$	0.2581	0.1423	0.2253	0.2595	0.1427	0.6890	0.7438	0.7116
$N = 16$	0.1738	0.0735	0.1578	0.1718	0.0736	−1.9007	0.9722	0.9690
$N = 32$	0.1357	0.0435	0.1283	0.1348	0.0426	−1.5449	1.0000	1.0000
$N = 64$	0.1176	0.0280	0.1144	0.1177	0.0281	0.2848	1.0000	1.0000
$N = 128$	0.1087	0.0188	0.1069	0.1084	0.0189	−1.0010	1.0000	1.0000
$N = 256$	0.1043	0.0130	0.1040	0.1046	0.0131	1.4744	1.0000	1.0000
$p = 256$, $q = 2$, $V(\mathbf{\Sigma}) = 0.2$								
$N = 4$	0.6021	0.5930	0.4144	0.5971	0.6015	−0.5910	0.5248	0.4916
$N = 8$	0.3723	0.2553	0.3056	0.3701	0.2520	−0.6132	0.8336	0.8142
$N = 16$	0.2804	0.1372	0.2539	0.2790	0.1348	−0.7403	0.9926	0.9912
$N = 32$	0.2389	0.0836	0.2263	0.2379	0.0827	−0.8512	1.0000	1.0000
$N = 64$	0.2191	0.0546	0.2131	0.2187	0.0547	−0.6298	1.0000	1.0000
$N = 128$	0.2095	0.0370	0.2066	0.2100	0.0367	1.0076	1.0000	1.0000
$N = 256$	0.2047	0.0256	0.2033	0.2046	0.0255	−0.4003	1.0000	1.0000
$p = 256$, $q = 2$, $V(\mathbf{\Sigma}) = 0.4$								
$N = 4$	0.8682	1.0468	0.5365	0.8927	1.0995	1.5729	0.6016	0.5770
$N = 8$	0.6007	0.4701	0.4639	0.5909	0.4642	−1.4846	0.9042	0.8960
$N = 16$	0.4936	0.2609	0.4474	0.5025	0.2686	2.3407	0.9996	0.9996
$N = 32$	0.4453	0.1622	0.4253	0.4481	0.1594	1.2589	1.0000	1.0000
$N = 64$	0.4223	0.1073	0.4107	0.4221	0.1070	−0.1076	1.0000	1.0000
$N = 128$	0.4111	0.0733	0.4038	0.4095	0.0729	−1.5460	1.0000	1.0000
$N = 256$	0.4055	0.0509	0.4043	0.4063	0.0516	1.1106	1.0000	1.0000
$p = 256$, $q = 4$, $V(\mathbf{\Sigma}) = 0.1$								
$N = 4$	0.4690	0.3008	0.3970	0.4698	0.2910	0.1839	0.5062	0.4560
$N = 8$	0.2581	0.1168	0.2346	0.2563	0.1142	−1.1614	0.8074	0.7734
$N = 16$	0.1738	0.0574	0.1645	0.1723	0.0557	−1.9201	0.9940	0.9924
$N = 32$	0.1357	0.0327	0.1315	0.1352	0.0326	−1.1484	1.0000	1.0000
$N = 64$	0.1176	0.0204	0.1162	0.1178	0.0206	0.8992	1.0000	1.0000
$N = 128$	0.1087	0.0135	0.1082	0.1087	0.0134	−0.1494	1.0000	1.0000
$N = 256$	0.1043	0.0092	0.1041	0.1045	0.0092	1.2177	1.0000	1.0000
$p = 256$, $q = 4$, $V(\mathbf{\Sigma}) = 0.2$								
$N = 4$	0.6021	0.4998	0.4605	0.5996	0.4947	−0.3569	0.5792	0.5418
$N = 8$	0.3723	0.2044	0.3280	0.3694	0.2072	−0.9800	0.8912	0.8774
$N = 16$	0.2804	0.1050	0.2652	0.2818	0.1068	0.9360	0.9994	0.9994
$N = 32$	0.2389	0.0618	0.2323	0.2377	0.0614	−1.4261	1.0000	1.0000
$N = 64$	0.2191	0.0395	0.2166	0.2189	0.0395	−0.4363	1.0000	1.0000
$N = 128$	0.2095	0.0265	0.2082	0.2099	0.0270	1.1301	1.0000	1.0000
$N = 256$	0.2047	0.0182	0.2040	0.2048	0.0180	0.1575	1.0000	1.0000

(*continued*)

Table S1. (*continued*)

	E[$V(\mathbf{S})$]	SD[$V(\mathbf{S})$]	Median	Mean	ESD	T	Pow. 5%	Pow. 1%
$p = 1024$, $q = 1$, $V(\mathbf{\Sigma}) = 0.1$								
$N = 4$	0.4673	0.4098	0.3340	0.4614	0.3938	−1.0472	0.4516	0.4324
$N = 8$	0.2574	0.1770	0.2071	0.2598	0.1802	0.9277	0.7062	0.6892
$N = 16$	0.1735	0.0957	0.1506	0.1731	0.0955	−0.2362	0.9464	0.9400
$N = 32$	0.1355	0.0585	0.1229	0.1345	0.0579	−1.2252	1.0000	1.0000
$N = 64$	0.1175	0.0383	0.1119	0.1176	0.0385	0.1237	1.0000	1.0000
$N = 128$	0.1087	0.0261	0.1056	0.1081	0.0258	−1.5172	1.0000	1.0000
$N = 256$	0.1043	0.0181	0.1028	0.1041	0.0181	−1.0113	1.0000	1.0000
$p = 1024$, $q = 1$, $V(\mathbf{\Sigma}) = 0.2$								
$N = 4$	0.6005	0.7225	0.3486	0.6004	0.7467	−0.0149	0.4836	0.4722
$N = 8$	0.3717	0.3263	0.2718	0.3697	0.3275	−0.4127	0.7766	0.7646
$N = 16$	0.2801	0.1823	0.2393	0.2820	0.1793	0.7472	0.9752	0.9740
$N = 32$	0.2388	0.1139	0.2163	0.2375	0.1138	−0.7599	1.0000	1.0000
$N = 64$	0.2191	0.0756	0.2098	0.2201	0.0761	0.9238	1.0000	1.0000
$N = 128$	0.2095	0.0517	0.2029	0.2079	0.0514	−2.1703	1.0000	1.0000
$N = 256$	0.2047	0.0360	0.2010	0.2036	0.0356	−2.2748	1.0000	1.0000
$p = 1024$, $q = 1$, $V(\mathbf{\Sigma}) = 0.4$								
$N = 4$	0.8671	1.3102	0.4015	0.8405	1.3164	−1.4242	0.5364	0.5234
$N = 8$	0.6002	0.6138	0.3961	0.5940	0.6361	−0.6814	0.8298	0.8208
$N = 16$	0.4934	0.3519	0.4015	0.4977	0.3638	0.8432	0.9866	0.9860
$N = 32$	0.4452	0.2235	0.4037	0.4489	0.2304	1.1498	1.0000	1.0000
$N = 64$	0.4222	0.1496	0.4020	0.4240	0.1526	0.8140	1.0000	1.0000
$N = 128$	0.4110	0.1029	0.3979	0.4104	0.1038	−0.4592	1.0000	1.0000
$N = 256$	0.4055	0.0717	0.4020	0.4063	0.0728	0.7559	1.0000	1.0000
$p = 1024$, $q = 1$, $V(\mathbf{\Sigma}) = 0.6$								
$N = 4$	1.1336	1.8768	0.4611	1.1261	1.9068	−0.2763	0.5542	0.5472
$N = 8$	0.8287	0.8950	0.5476	0.8168	0.8639	−0.9740	0.8732	0.8690
$N = 16$	0.7067	0.5194	0.5792	0.7003	0.4944	−0.9163	0.9940	0.9938
$N = 32$	0.6516	0.3323	0.5888	0.6511	0.3351	−0.1071	1.0000	1.0000
$N = 64$	0.6254	0.2233	0.5952	0.6228	0.2197	−0.8267	1.0000	1.0000
$N = 128$	0.6126	0.1539	0.5969	0.6127	0.1505	0.0278	1.0000	1.0000
$N = 256$	0.6063	0.1075	0.5971	0.6056	0.1075	−0.4205	1.0000	1.0000
$p = 1024$, $q = 1$, $V(\mathbf{\Sigma}) = 0.8$								
$N = 4$	1.4001	2.4326	0.5395	1.3638	2.3850	−1.0764	0.5938	0.5872
$N = 8$	1.0572	1.1729	0.6881	1.0573	1.1723	0.0072	0.8892	0.8864
$N = 16$	0.9200	0.6859	0.7655	0.9344	0.6943	1.4624	0.9964	0.9962
$N = 32$	0.8581	0.4407	0.7709	0.8531	0.4414	−0.7945	1.0000	1.0000
$N = 64$	0.8286	0.2969	0.7840	0.8292	0.2987	0.1364	1.0000	1.0000
$N = 128$	0.8142	0.2049	0.7958	0.8135	0.2091	−0.2323	1.0000	1.0000
$N = 256$	0.8071	0.1432	0.7897	0.8021	0.1457	−2.4090	1.0000	1.0000

(*continued*)

Table S1. (*continued*)

	E[$V(\mathbf{S})$]	SD[$V(\mathbf{S})$]	Median	Mean	ESD	T	Pow. 5%	Pow. 1%
$p = 1024$, $q = 2$, $V(\mathbf{\Sigma}) = 0.1$								
$N = 4$	0.4673	0.3431	0.3680	0.4677	0.3375	0.0847	0.5096	0.4900
$N = 8$	0.2574	0.1407	0.2234	0.2551	0.1380	−1.1672	0.7816	0.7650
$N = 16$	0.1735	0.0728	0.1589	0.1725	0.0728	−0.8882	0.9808	0.9794
$N = 32$	0.1355	0.0432	0.1290	0.1351	0.0430	−0.7093	1.0000	1.0000
$N = 64$	0.1175	0.0277	0.1154	0.1181	0.0280	1.5804	1.0000	1.0000
$N = 128$	0.1087	0.0187	0.1075	0.1088	0.0185	0.4350	1.0000	1.0000
$N = 256$	0.1043	0.0129	0.1037	0.1043	0.0129	0.1578	1.0000	1.0000
$p = 1024$, $q = 2$, $V(\mathbf{\Sigma}) = 0.2$								
$N = 4$	0.6005	0.5891	0.4114	0.5972	0.6001	−0.3908	0.5562	0.5428
$N = 8$	0.3717	0.2538	0.3100	0.3740	0.2543	0.6557	0.8622	0.8536
$N = 16$	0.2801	0.1366	0.2497	0.2786	0.1375	−0.7571	0.9954	0.9954
$N = 32$	0.2388	0.0832	0.2278	0.2396	0.0843	0.7147	1.0000	1.0000
$N = 64$	0.2191	0.0544	0.2124	0.2181	0.0540	−1.2282	1.0000	1.0000
$N = 128$	0.2095	0.0369	0.2071	0.2092	0.0363	−0.4385	1.0000	1.0000
$N = 256$	0.2047	0.0256	0.2042	0.2050	0.0255	0.7656	1.0000	1.0000
$p = 1024$, $q = 2$, $V(\mathbf{\Sigma}) = 0.4$								
$N = 4$	0.8671	1.0439	0.5247	0.8745	1.0769	0.4858	0.6186	0.6108
$N = 8$	0.6002	0.4691	0.4631	0.5869	0.4547	−2.0640	0.9268	0.9202
$N = 16$	0.4934	0.2605	0.4428	0.4976	0.2683	1.0984	0.9992	0.9990
$N = 32$	0.4452	0.1620	0.4194	0.4427	0.1615	−1.0754	1.0000	1.0000
$N = 64$	0.4222	0.1072	0.4127	0.4236	0.1082	0.8702	1.0000	1.0000
$N = 128$	0.4110	0.0732	0.4088	0.4135	0.0733	2.4063	1.0000	1.0000
$N = 256$	0.4055	0.0509	0.4024	0.4058	0.0506	0.3761	1.0000	1.0000
$p = 1024$, $q = 4$, $V(\mathbf{\Sigma}) = 0.1$								
$N = 4$	0.4673	0.2966	0.3913	0.4672	0.2960	−0.0035	0.5506	0.5286
$N = 8$	0.2574	0.1153	0.2361	0.2596	0.1170	1.3608	0.8494	0.8328
$N = 16$	0.1735	0.0567	0.1645	0.1741	0.0584	0.8447	0.9966	0.9960
$N = 32$	0.1355	0.0324	0.1313	0.1349	0.0329	−1.2922	1.0000	1.0000
$N = 64$	0.1175	0.0203	0.1157	0.1168	0.0200	−2.4767	1.0000	1.0000
$N = 128$	0.1087	0.0134	0.1082	0.1088	0.0136	0.8393	1.0000	1.0000
$N = 256$	0.1043	0.0092	0.1040	0.1043	0.0090	0.1824	1.0000	1.0000
$p = 1024$, $q = 4$, $V(\mathbf{\Sigma}) = 0.2$								
$N = 4$	0.6005	0.4964	0.4682	0.5980	0.4856	−0.3698	0.6212	0.6076
$N = 8$	0.3717	0.2033	0.3306	0.3706	0.2005	−0.3631	0.9174	0.9120
$N = 16$	0.2801	0.1046	0.2681	0.2846	0.1044	3.0183	1.0000	1.0000
$N = 32$	0.2388	0.0616	0.2315	0.2376	0.0602	−1.3527	1.0000	1.0000
$N = 64$	0.2191	0.0394	0.2156	0.2182	0.0389	−1.6629	1.0000	1.0000
$N = 128$	0.2095	0.0264	0.2076	0.2089	0.0261	−1.5712	1.0000	1.0000
$N = 256$	0.2047	0.0182	0.2038	0.2045	0.0181	−0.9541	1.0000	1.0000

(*continued*)

Table S1. (*continued*)

	E[$V(\mathbf{S})$]	SD[$V(\mathbf{S})$]	Median	Mean	ESD	T	Pow. 5%	Pow. 1%
$p = 2$, linearly decreasing λ ($V(\mathbf{\Sigma}) = 0.1111$)								
$N = 4$	0.7778	1.3168	0.3244	0.7933	1.3342	0.8238	0.0708	0.0190
$N = 8$	0.3968	0.5318	0.2164	0.3997	0.5313	0.3812	0.1042	0.0328
$N = 16$	0.2444	0.2693	0.1575	0.2433	0.2687	−0.2967	0.1820	0.0676
$N = 32$	0.1756	0.1565	0.1352	0.1795	0.1599	1.7054	0.3436	0.1446
$N = 64$	0.1429	0.0992	0.1232	0.1434	0.1000	0.4129	0.6262	0.4204
$N = 128$	0.1269	0.0661	0.1169	0.1281	0.0676	1.3481	0.9248	0.8128
$N = 256$	0.1190	0.0453	0.1140	0.1192	0.0455	0.4317	0.9980	0.9892
$p = 4$, linearly decreasing λ ($V(\mathbf{\Sigma}) = 0.0667$)								
$N = 4$	0.5778	0.6569	0.3679	0.5751	0.6531	−0.2908	0.0824	0.0210
$N = 8$	0.2857	0.2434	0.2159	0.2877	0.2528	0.5523	0.1362	0.0496
$N = 16$	0.1689	0.1133	0.1381	0.1670	0.1128	−1.1736	0.2488	0.0998
$N = 32$	0.1161	0.0613	0.1008	0.1140	0.0603	−2.5412	0.5314	0.2710
$N = 64$	0.0910	0.0369	0.0855	0.0917	0.0374	1.2880	0.9250	0.8034
$N = 128$	0.0787	0.0238	0.0754	0.0786	0.0239	−0.5522	1.0000	0.9984
$N = 256$	0.0727	0.0160	0.0717	0.0729	0.0160	0.7927	1.0000	1.0000
$p = 8$, linearly decreasing λ ($V(\mathbf{\Sigma}) = 0.0370$)								
$N = 4$	0.4630	0.3521	0.3683	0.4628	0.3535	−0.0264	0.0898	0.0322
$N = 8$	0.2196	0.1211	0.1903	0.2180	0.1228	−0.8922	0.1508	0.0504
$N = 16$	0.1222	0.0520	0.1125	0.1220	0.0520	−0.2921	0.3076	0.1458
$N = 32$	0.0783	0.0261	0.0748	0.0785	0.0264	0.6822	0.6982	0.4684
$N = 64$	0.0573	0.0148	0.0558	0.0574	0.0148	0.4841	0.9930	0.9622
$N = 128$	0.0471	0.0091	0.0461	0.0469	0.0090	−1.5428	1.0000	1.0000
$N = 256$	0.0420	0.0060	0.0416	0.0421	0.0060	1.1109	1.0000	1.0000
$p = 16$, linearly decreasing λ ($V(\mathbf{\Sigma}) = 0.0196$)								
$N = 4$	0.4003	0.2049	0.3565	0.4022	0.2110	0.6379	0.0916	0.0268
$N = 8$	0.1828	0.0658	0.1722	0.1821	0.0656	−0.6784	0.1430	0.0518
$N = 16$	0.0958	0.0260	0.0936	0.0964	0.0263	1.8197	0.3258	0.1462
$N = 32$	0.0565	0.0120	0.0552	0.0564	0.0121	−0.0814	0.7550	0.5230
$N = 64$	0.0377	0.0063	0.0373	0.0378	0.0064	0.4353	0.9976	0.9880
$N = 128$	0.0286	0.0036	0.0284	0.0286	0.0037	−0.5174	1.0000	1.0000
$N = 256$	0.0241	0.0023	0.0240	0.0241	0.0022	0.9463	1.0000	1.0000
$p = 32$, linearly decreasing λ ($V(\mathbf{\Sigma}) = 0.0101$)								
$N = 4$	0.3674	0.1284	0.3498	0.3676	0.1275	0.0762	0.0890	0.0322
$N = 8$	0.1632	0.0391	0.1574	0.1611	0.0386	−3.8961	0.1182	0.0470
$N = 16$	0.0816	0.0143	0.0803	0.0814	0.0141	−0.7872	0.2772	0.1328
$N = 32$	0.0447	0.0060	0.0443	0.0447	0.0061	0.2237	0.7446	0.5416
$N = 64$	0.0271	0.0029	0.0270	0.0271	0.0029	0.3384	0.9986	0.9954
$N = 128$	0.0185	0.0015	0.0185	0.0185	0.0015	0.2761	1.0000	1.0000
$N = 256$	0.0143	0.0009	0.0143	0.0143	0.0009	0.0449	1.0000	1.0000

(*continued*)

Table S1. (*continued*)

	E[$V(\mathbf{S})$]	SD[$V(\mathbf{S})$]	Median	Mean	ESD	T	Pow. 5%	Pow. 1%
$p = 64$, linearly decreasing λ ($V(\mathbf{\Sigma}) = 0.0051$)								
$N = 4$	0.3505	0.08474	0.3397	0.3483	0.08321	−1.8765	0.0926	0.0218
$N = 8$	0.1532	0.02489	0.1512	0.1531	0.02482	−0.1999	0.1152	0.0330
$N = 16$	0.0742	0.00863	0.0738	0.0743	0.00855	0.5331	0.2424	0.0954
$N = 32$	0.0386	0.00335	0.0384	0.0386	0.00337	0.1913	0.6256	0.4168
$N = 64$	0.0216	0.00145	0.0215	0.0216	0.00144	0.5035	0.9970	0.9890
$N = 128$	0.0133	0.00070	0.0133	0.0133	0.00071	−0.1560	1.0000	1.0000
$N = 256$	0.0092	0.00038	0.0092	0.0092	0.00037	−2.0535	1.0000	1.0000
$p = 128$, linearly decreasing λ ($V(\mathbf{\Sigma}) = 0.0026$)								
$N = 4$	0.3420	0.05775	0.3379	0.3416	0.05769	−0.4209	0.0894	0.0274
$N = 8$	0.1480	0.01660	0.1471	0.1478	0.01665	−0.8164	0.1096	0.0346
$N = 16$	0.0705	0.00554	0.0704	0.0705	0.00558	−0.0138	0.1858	0.0718
$N = 32$	0.0354	0.00203	0.0354	0.0354	0.00203	0.4273	0.4964	0.2800
$N = 64$	0.0187	0.00081	0.0187	0.0188	0.00081	0.6380	0.9844	0.9502
$N = 128$	0.0106	0.00036	0.0106	0.0106	0.00035	0.2818	1.0000	1.0000
$N = 256$	0.0066	0.00017	0.0066	0.0066	0.00017	1.8720	1.0000	1.0000
$p = 256$, linearly decreasing λ ($V(\mathbf{\Sigma}) = 0.0013$)								
$N = 4$	0.3377	0.04006	0.3359	0.3382	0.04042	0.8696	0.0924	0.0236
$N = 8$	0.1455	0.01138	0.1452	0.1455	0.01124	0.4174	0.0908	0.0208
$N = 16$	0.0686	0.00372	0.0685	0.0686	0.00372	0.2241	0.1694	0.0666
$N = 32$	0.0338	0.00131	0.0338	0.0338	0.00131	−0.6163	0.3578	0.1798
$N = 64$	0.0173	0.00049	0.0173	0.0173	0.00050	1.3107	0.9134	0.7978
$N = 128$	0.0092	0.00020	0.0092	0.0092	0.00020	−0.1534	1.0000	1.0000
$N = 256$	0.0053	0.00009	0.0053	0.0053	0.00009	−0.1959	1.0000	1.0000
$p = 1024$, linearly decreasing λ ($V(\mathbf{\Sigma}) = 0.0003$)								
$N = 4$	0.3344	0.01974	0.3339	0.3345	0.01985	0.2764	0.0848	0.0270
$N = 8$	0.1435	0.00556	0.1434	0.1435	0.00552	−0.5480	0.0880	0.0190
$N = 16$	0.0671	0.00178	0.0671	0.0671	0.00178	−0.0478	0.1052	0.0338
$N = 32$	0.0327	0.00061	0.0327	0.0327	0.00062	0.5148	0.2036	0.0790
$N = 64$	0.0162	0.00021	0.0162	0.0162	0.00021	0.3321	0.5512	0.3070
$N = 128$	0.0082	0.00008	0.0082	0.0082	0.00008	1.8861	0.9988	0.9906
$N = 256$	0.0043	0.00003	0.0043	0.0043	0.00003	0.8650	1.0000	1.0000

(*continued*)

Table S1. (*continued*)

	E[$V(\mathbf{S})$]	SD[$V(\mathbf{S})$]	Median	Mean	ESD	T	Pow. 5%	Pow. 1%
$p = 2$, quadratically decreasing λ ($V(\mathbf{\Sigma}) = 0.3600$)								
$N = 4$	1.0267	1.8585	0.3865	0.9886	1.7577	−1.5298	0.1000	0.0320
$N = 8$	0.6457	0.8290	0.3649	0.6528	0.8393	0.5941	0.2108	0.0958
$N = 16$	0.4933	0.4583	0.3551	0.4902	0.4570	−0.4788	0.4410	0.2418
$N = 32$	0.4245	0.2842	0.3563	0.4239	0.2886	−0.1479	0.7944	0.5390
$N = 64$	0.3917	0.1877	0.3601	0.3932	0.1889	0.5256	0.9884	0.9542
$N = 128$	0.3757	0.1282	0.3611	0.3769	0.1279	0.6613	1.0000	0.9998
$N = 256$	0.3678	0.0890	0.3567	0.3669	0.0896	−0.7454	1.0000	1.0000
$p = 4$, quadratically decreasing λ ($V(\mathbf{\Sigma}) = 0.1911$)								
$N = 4$	0.7230	0.9730	0.4085	0.7294	0.9809	0.4633	0.1306	0.0548
$N = 8$	0.4190	0.4031	0.3059	0.4178	0.3900	−0.2228	0.2756	0.1264
$N = 16$	0.2975	0.2094	0.2416	0.2960	0.2056	−0.5254	0.5702	0.3578
$N = 32$	0.2426	0.1242	0.2203	0.2436	0.1233	0.5682	0.9398	0.8156
$N = 64$	0.2164	0.0798	0.2046	0.2155	0.0785	−0.8868	1.0000	0.9996
$N = 128$	0.2037	0.0537	0.1980	0.2042	0.0534	0.6874	1.0000	1.0000
$N = 256$	0.1974	0.0370	0.1945	0.1974	0.0368	0.1120	1.0000	1.0000
$p = 8$, quadratically decreasing λ ($V(\mathbf{\Sigma}) = 0.0980$)								
$N = 4$	0.5392	0.4970	0.3844	0.5303	0.4841	−1.3072	0.1458	0.0692
$N = 8$	0.2871	0.1893	0.2402	0.2887	0.1957	0.5796	0.3016	0.1590
$N = 16$	0.1863	0.0910	0.1663	0.1856	0.0920	−0.5266	0.6552	0.4694
$N = 32$	0.1407	0.0508	0.1312	0.1399	0.0506	−1.1144	0.9838	0.9450
$N = 64$	0.1190	0.0313	0.1150	0.1190	0.0317	−0.1024	1.0000	1.0000
$N = 128$	0.1085	0.0205	0.1064	0.1085	0.0206	−0.0111	1.0000	1.0000
$N = 256$	0.1032	0.0139	0.1020	0.1030	0.0140	−0.9112	1.0000	1.0000
$p = 16$, quadratically decreasing λ ($V(\mathbf{\Sigma}) = 0.0496$)								
$N = 4$	0.4390	0.2711	0.3719	0.4354	0.2697	−0.9575	0.1392	0.0572
$N = 8$	0.2165	0.0946	0.1975	0.2151	0.0922	−1.0611	0.2892	0.1544
$N = 16$	0.1274	0.0415	0.1209	0.1270	0.0412	−0.8072	0.6622	0.4782
$N = 32$	0.0872	0.0213	0.0847	0.0874	0.0217	0.5232	0.9916	0.9652
$N = 64$	0.0681	0.0123	0.0670	0.0682	0.0124	0.6871	1.0000	1.0000
$N = 128$	0.0588	0.0078	0.0580	0.0586	0.0077	−1.3435	1.0000	1.0000
$N = 256$	0.0541	0.0052	0.0540	0.0542	0.0052	1.1584	1.0000	1.0000
$p = 32$, quadratically decreasing λ ($V(\mathbf{\Sigma}) = 0.0249$)								
$N = 4$	0.3868	0.1611	0.3537	0.3840	0.1566	−1.2819	0.1400	0.0626
$N = 8$	0.1800	0.0520	0.1740	0.1803	0.0518	0.3846	0.2702	0.1556
$N = 16$	0.0973	0.0207	0.0950	0.0971	0.0207	−0.7694	0.6166	0.4606
$N = 32$	0.0599	0.0097	0.0594	0.0601	0.0099	0.9872	0.9894	0.9688
$N = 64$	0.0421	0.0051	0.0418	0.0421	0.0051	0.0932	1.0000	1.0000
$N = 128$	0.0334	0.0030	0.0333	0.0334	0.0031	−0.4273	1.0000	1.0000
$N = 256$	0.0292	0.0019	0.0291	0.0292	0.0019	1.2425	1.0000	1.0000

(*continued*)

Table S1. (*continued*)

	E[$V(\mathbf{S})$]	SD[$V(\mathbf{S})$]	Median	Mean	ESD	T	Pow. 5%	Pow. 1%
$p = 64$, quadratically decreasing λ ($V(\mathbf{\Sigma}) = 0.0125$)								
$N = 4$	0.3603	0.10274	0.3469	0.3599	0.10569	−0.2366	0.1464	0.0638
$N = 8$	0.1615	0.03129	0.1581	0.1616	0.03125	0.2612	0.2324	0.1032
$N = 16$	0.0820	0.01150	0.0815	0.0826	0.01166	3.4198	0.5504	0.3684
$N = 32$	0.0461	0.00486	0.0458	0.0460	0.00484	−1.3132	0.9774	0.9342
$N = 64$	0.0290	0.00233	0.0290	0.0291	0.00236	1.9871	1.0000	1.0000
$N = 128$	0.0207	0.00126	0.0206	0.0207	0.00126	−2.1347	1.0000	1.0000
$N = 256$	0.0166	0.00075	0.0165	0.0166	0.00075	0.4776	1.0000	1.0000
$p = 128$, quadratically decreasing λ ($V(\mathbf{\Sigma}) = 0.0062$)								
$N = 4$	0.3468	0.06862	0.3414	0.3476	0.06800	0.8011	0.1350	0.0620
$N = 8$	0.1522	0.02014	0.1508	0.1520	0.02010	−0.6510	0.2016	0.0944
$N = 16$	0.0744	0.00697	0.0738	0.0742	0.00692	−1.6078	0.4236	0.2468
$N = 32$	0.0392	0.00271	0.0392	0.0392	0.00272	0.1739	0.9186	0.8312
$N = 64$	0.0225	0.00118	0.0224	0.0224	0.00118	−1.0233	1.0000	1.0000
$N = 128$	0.0143	0.00057	0.0143	0.0143	0.00058	0.4957	1.0000	1.0000
$N = 256$	0.0103	0.00031	0.0102	0.0102	0.00032	−0.7049	1.0000	1.0000
$p = 256$, quadratically decreasing λ ($V(\mathbf{\Sigma}) = 0.0031$)								
$N = 4$	0.3401	0.04709	0.3378	0.3400	0.04713	−0.1581	0.1338	0.0460
$N = 8$	0.1475	0.01353	0.1469	0.1474	0.01375	−0.7367	0.1654	0.0648
$N = 16$	0.0705	0.00451	0.0703	0.0705	0.00454	−0.5367	0.3418	0.1896
$N = 32$	0.0357	0.00165	0.0357	0.0357	0.00164	−0.2453	0.8128	0.6602
$N = 64$	0.0192	0.00066	0.0191	0.0191	0.00066	−2.5120	1.0000	1.0000
$N = 128$	0.0111	0.00029	0.0111	0.0111	0.00029	−3.0020	1.0000	1.0000
$N = 256$	0.0071	0.00014	0.0071	0.0071	0.00014	−1.4241	1.0000	1.0000
$p = 1024$, quadratically decreasing λ ($V(\mathbf{\Sigma}) = 0.0008$)								
$N = 4$	0.3350	0.02300	0.3346	0.3352	0.02282	0.4279	0.1146	0.0486
$N = 8$	0.1440	0.00649	0.1439	0.1440	0.00650	−0.0425	0.1416	0.0490
$N = 16$	0.0676	0.00210	0.0676	0.0677	0.00210	0.8367	0.2058	0.0988
$N = 32$	0.0331	0.00072	0.0331	0.0331	0.00071	0.7721	0.4686	0.2736
$N = 64$	0.0167	0.00026	0.0167	0.0167	0.00027	−1.3843	0.9656	0.9110
$N = 128$	0.0087	0.00010	0.0087	0.0087	0.00010	−1.8267	1.0000	1.0000
$N = 256$	0.0047	0.00004	0.0047	0.0047	0.00004	0.4628	1.0000	1.0000

Table S2. Summary statistics of simulation results for $V_{rel}(\mathbf{S})$. Theoretical expectation ($E[V_{rel}(\mathbf{S})]$) and standard deviation ($SD[V_{rel}(\mathbf{S})]$; approximate results are shown for these in non-null conditions), as well as empirical median, mean, standard deviation (ESD), bias in standard error unit (T), and critical points or power (for null and non-null conditions, respectively) at $\alpha = 0.05$ and 0.01 (CP/Pow. 5% and 1%) from 5000 simulation runs are shown. See Table S1 for further information.

	$E[V_{rel}(\mathbf{S})]$	$SD[V_{rel}(\mathbf{S})]$	Median	Mean	ESD	T	CP 5%	CP 1%
$p = 2$, $V_{rel}(\mathbf{\Sigma}) = 0$								
$N = 4$	0.5000	0.2887	0.5073	0.5039	0.2885	0.9603	0.9500	0.9897
$N = 8$	0.2500	0.1936	0.2079	0.2514	0.1924	0.4961	0.6335	0.7686
$N = 16$	0.1250	0.1102	0.0953	0.1259	0.1098	0.6000	0.3454	0.4862
$N = 32$	0.0625	0.0587	0.0448	0.0628	0.0597	0.3234	0.1830	0.2744
$N = 64$	0.0313	0.0303	0.0224	0.0309	0.0289	−0.8301	0.0893	0.1266
$N = 128$	0.0156	0.0154	0.0109	0.0154	0.0149	−1.1474	0.0455	0.0646
$N = 256$	0.0078	0.0078	0.0055	0.0079	0.0078	0.5516	0.0232	0.0351
$p = 4$, $V_{rel}(\mathbf{\Sigma}) = 0$								
$N = 4$	0.4286	0.1506	0.4028	0.4293	0.1509	0.3344	0.7168	0.8275
$N = 8$	0.2000	0.0840	0.1856	0.2002	0.0858	0.1644	0.3641	0.4610
$N = 16$	0.0968	0.0433	0.0907	0.0968	0.0434	0.0620	0.1774	0.2307
$N = 32$	0.0476	0.0219	0.0438	0.0474	0.0221	−0.6146	0.0885	0.1159
$N = 64$	0.0236	0.0110	0.0218	0.0237	0.0110	0.6544	0.0442	0.0558
$N = 128$	0.0118	0.0055	0.0109	0.0118	0.0056	0.1782	0.0225	0.0287
$N = 256$	0.0059	0.0028	0.0054	0.0058	0.0027	−1.1927	0.0107	0.0138
$p = 8$, $V_{rel}(\mathbf{\Sigma}) = 0$								
$N = 4$	0.3846	0.0803	0.3732	0.3863	0.0811	1.5112	0.5406	0.6279
$N = 8$	0.1724	0.0397	0.1685	0.1725	0.0390	0.2005	0.2434	0.2820
$N = 16$	0.0820	0.0193	0.0802	0.0821	0.0190	0.5489	0.1163	0.1340
$N = 32$	0.0400	0.0095	0.0390	0.0401	0.0096	0.7661	0.0574	0.0668
$N = 64$	0.0198	0.0047	0.0193	0.0198	0.0047	0.2662	0.0281	0.0324
$N = 128$	0.0098	0.0023	0.0096	0.0098	0.0024	−0.4846	0.0140	0.0163
$N = 256$	0.0049	0.0012	0.0048	0.0049	0.0012	1.1240	0.0070	0.0082
$p = 16$, $V_{rel}(\mathbf{\Sigma}) = 0$								
$N = 4$	0.3600	0.0418	0.3532	0.3601	0.0412	0.2428	0.4385	0.4926
$N = 8$	0.1579	0.0193	0.1562	0.1580	0.0197	0.3764	0.1934	0.2135
$N = 16$	0.0744	0.0091	0.0738	0.0746	0.0094	1.4158	0.0911	0.0991
$N = 32$	0.0361	0.0044	0.0357	0.0361	0.0044	−1.2604	0.0439	0.0477
$N = 64$	0.0178	0.0022	0.0177	0.0178	0.0022	0.4338	0.0215	0.0234
$N = 128$	0.0088	0.0011	0.0088	0.0088	0.0011	−1.2039	0.0107	0.0116
$N = 256$	0.0044	0.0005	0.0044	0.0044	0.0005	1.8858	0.0053	0.0058
$p = 32$, $V_{rel}(\mathbf{\Sigma}) = 0$								
$N = 4$	0.3469	0.0214	0.3429	0.3468	0.0212	−0.4007	0.3872	0.4132
$N = 8$	0.1504	0.0095	0.1492	0.1503	0.0096	−0.8935	0.1680	0.1777
$N = 16$	0.0705	0.0044	0.0701	0.0704	0.0044	−1.6332	0.0780	0.0823
$N = 32$	0.0342	0.0021	0.0341	0.0342	0.0021	−0.7810	0.0378	0.0397
$N = 64$	0.0168	0.0010	0.0168	0.0168	0.0010	−0.7681	0.0186	0.0195
$N = 128$	0.0084	0.0005	0.0083	0.0084	0.0005	0.0999	0.0093	0.0096
$N = 256$	0.0042	0.0003	0.0042	0.0042	0.0003	0.1845	0.0046	0.0048

(*continued*)

Table S2. (*continued*)

	E[V_{rel}(**S**)]	SD[V_{rel}(**S**)]	Median	Mean	ESD	*T*	CP 5%	CP 1%
$p = 64$, $V_{rel}(\mathbf{\Sigma}) = 0$								
$N = 4$	0.3402	0.01084	0.3381	0.3403	0.01099	0.3923	0.3616	0.3763
$N = 8$	0.1467	0.00472	0.1462	0.1466	0.00464	−0.6909	0.1549	0.1594
$N = 16$	0.0686	0.00218	0.0685	0.0686	0.00216	0.5618	0.0723	0.0741
$N = 32$	0.0332	0.00104	0.0332	0.0332	0.00106	0.0446	0.0350	0.0359
$N = 64$	0.0164	0.00051	0.0163	0.0164	0.00050	−0.5869	0.0172	0.0176
$N = 128$	0.0081	0.00025	0.0081	0.0081	0.00025	0.6710	0.0085	0.0087
$N = 256$	0.0040	0.00013	0.0040	0.0040	0.00013	1.8656	0.0043	0.0044
$p = 128$, $V_{rel}(\mathbf{\Sigma}) = 0$								
$N = 4$	0.3368	0.00545	0.3358	0.3368	0.00545	0.1266	0.3471	0.3539
$N = 8$	0.1448	0.00235	0.1446	0.1447	0.00230	−0.0173	0.1488	0.1509
$N = 16$	0.0676	0.00108	0.0676	0.0677	0.00107	1.4545	0.0695	0.0704
$N = 32$	0.0327	0.00052	0.0327	0.0327	0.00052	−0.7481	0.0336	0.0340
$N = 64$	0.0161	0.00025	0.0161	0.0161	0.00025	0.3608	0.0165	0.0167
$N = 128$	0.0080	0.00012	0.0080	0.0080	0.00012	0.8117	0.0082	0.0083
$N = 256$	0.0040	0.00006	0.0040	0.0040	0.00006	0.5283	0.0041	0.0041
$p = 256$, $V_{rel}(\mathbf{\Sigma}) = 0$								
$N = 4$	0.3351	0.00274	0.3345	0.3351	0.00275	0.9603	0.3403	0.3437
$N = 8$	0.1438	0.00117	0.1437	0.1438	0.00118	0.4961	0.1459	0.1472
$N = 16$	0.0672	0.00054	0.0671	0.0672	0.00053	0.6000	0.0681	0.0685
$N = 32$	0.0325	0.00026	0.0325	0.0325	0.00025	0.3234	0.0329	0.0331
$N = 64$	0.0160	0.00013	0.0160	0.0160	0.00013	−0.8301	0.0162	0.0163
$N = 128$	0.0079	0.00006	0.0079	0.0079	0.00006	−1.1474	0.0080	0.0081
$N = 256$	0.0040	0.00003	0.0040	0.0040	0.00003	0.5516	0.0040	0.0040
$p = 1024$, $V_{rel}(\mathbf{\Sigma}) = 0$								
$N = 4$	0.3338	0.00069	0.3336	0.3338	0.00070	1.2938	0.3351	0.3360
$N = 8$	0.1431	0.00029	0.1431	0.1431	0.00029	−0.5105	0.1436	0.1439
$N = 16$	0.0668	0.00013	0.0668	0.0668	0.00013	0.0231	0.0670	0.0671
$N = 32$	0.0323	0.00006	0.0323	0.0323	0.00006	−1.3055	0.0324	0.0325
$N = 64$	0.0159	0.00003	0.0159	0.0159	0.00003	−0.0022	0.0160	0.0160
$N = 128$	0.0079	0.00002	0.0079	0.0079	0.00002	0.3824	0.0079	0.0079
$N = 256$	0.0039	0.00001	0.0039	0.0039	0.00001	−0.3392	0.0039	0.0039

(*continued*)

Table S2. (*continued*)

	$\approx \mathrm{E}[V_{\mathrm{rel}}(\mathbf{S})]$	$\approx \mathrm{SD}[V_{\mathrm{rel}}(\mathbf{S})]$	Median	Mean	ESD	T	Pow. 5%	Pow. 1%
$p = 2, q = 1, V_{\mathrm{rel}}(\mathbf{\Sigma}) = 0.1$								
$N = 4$	0.4469	0.4633	0.5363	0.5248	0.2904	18.9688	0.0586	0.0122
$N = 8$	0.2782	0.2935	0.2711	0.3061	0.2126	9.2675	0.0882	0.0254
$N = 16$	0.1920	0.1811	0.1640	0.1932	0.1428	0.5873	0.1592	0.0406
$N = 32$	0.1469	0.1157	0.1328	0.1505	0.1028	2.4955	0.3320	0.1290
$N = 64$	0.1237	0.0768	0.1132	0.1238	0.0710	0.0973	0.6406	0.4366
$N = 128$	0.1119	0.0523	0.1063	0.1112	0.0507	−1.0195	0.9184	0.8118
$N = 256$	0.1060	0.0363	0.1051	0.1070	0.0355	2.1216	0.9982	0.9914
$p = 2, q = 1, V_{\mathrm{rel}}(\mathbf{\Sigma}) = 0.2$								
$N = 4$	0.4290	0.4462	0.5869	0.5583	0.2857	31.9985	0.0660	0.0140
$N = 8$	0.3197	0.3082	0.3399	0.3586	0.2254	12.1908	0.1356	0.0464
$N = 16$	0.2642	0.2030	0.2591	0.2743	0.1661	4.3048	0.3274	0.1210
$N = 32$	0.2335	0.1359	0.2264	0.2368	0.1214	1.9558	0.6386	0.3574
$N = 64$	0.2171	0.0930	0.2153	0.2182	0.0883	0.9017	0.9382	0.8402
$N = 128$	0.2087	0.0645	0.2060	0.2088	0.0622	0.2154	0.9994	0.9958
$N = 256$	0.2044	0.0452	0.2041	0.2051	0.0442	1.1662	1.0000	1.0000
$p = 2, q = 1, V_{\mathrm{rel}}(\mathbf{\Sigma}) = 0.4$								
$N = 4$	0.4756	0.3691	0.6779	0.6252	0.2745	38.5387	0.0958	0.0184
$N = 8$	0.4377	0.2825	0.4939	0.4804	0.2334	12.9356	0.2916	0.1148
$N = 16$	0.4232	0.1982	0.4457	0.4384	0.1764	6.0670	0.6988	0.4114
$N = 32$	0.4132	0.1378	0.4169	0.4152	0.1297	1.1224	0.9592	0.8522
$N = 64$	0.4070	0.0963	0.4108	0.4083	0.0945	0.9214	1.0000	0.9990
$N = 128$	0.4036	0.0676	0.4051	0.4042	0.0661	0.6227	1.0000	1.0000
$N = 256$	0.4018	0.0476	0.4019	0.4014	0.0479	−0.6817	1.0000	1.0000
$p = 2, q = 1, V_{\mathrm{rel}}(\mathbf{\Sigma}) = 0.6$								
$N = 4$	0.6025	0.2596	0.7743	0.7012	0.2530	27.5684	0.1468	0.0342
$N = 8$	0.5952	0.2126	0.6625	0.6262	0.2094	10.4774	0.5502	0.2920
$N = 16$	0.6000	0.1549	0.6271	0.6099	0.1560	4.4717	0.9312	0.8046
$N = 32$	0.6011	0.1100	0.6136	0.6029	0.1090	1.1799	0.9996	0.9940
$N = 64$	0.6009	0.0777	0.6038	0.6004	0.0780	−0.4144	1.0000	1.0000
$N = 128$	0.6005	0.0549	0.6020	0.6004	0.0553	−0.2033	1.0000	1.0000
$N = 256$	0.6003	0.0388	0.6015	0.6002	0.0384	−0.1776	1.0000	1.0000
$p = 2, q = 1, V_{\mathrm{rel}}(\mathbf{\Sigma}) = 0.8$								
$N = 4$	0.7836	0.1336	0.8863	0.8078	0.2061	8.3207	0.2682	0.0708
$N = 8$	0.7847	0.1153	0.8314	0.7947	0.1473	4.8016	0.8766	0.6756
$N = 16$	0.7929	0.0866	0.8164	0.7963	0.1004	2.4327	0.9976	0.9890
$N = 32$	0.7969	0.0625	0.8090	0.7990	0.0672	2.2207	1.0000	1.0000
$N = 64$	0.7986	0.0445	0.8030	0.7983	0.0470	−0.3966	1.0000	1.0000
$N = 128$	0.7993	0.0315	0.8008	0.7989	0.0318	−0.9023	1.0000	1.0000
$N = 256$	0.7997	0.0223	0.8009	0.8003	0.0223	1.8873	1.0000	1.0000

(*continued*)

Table S2. (*continued*)

	$\approx \mathrm{E}[V_{\mathrm{rel}}(\mathbf{S})]$	$\approx \mathrm{SD}[V_{\mathrm{rel}}(\mathbf{S})]$	Median	Mean	ESD	T	Pow. 5%	Pow. 1%
$p = 4, q = 1, V_{\mathrm{rel}}(\mathbf{\Sigma}) = 0.1$								
$N = 4$	0.4100	0.2621	0.4457	0.4695	0.1653	25.4117	0.0964	0.0254
$N = 8$	0.2514	0.1644	0.2472	0.2694	0.1191	10.6867	0.1984	0.0760
$N = 16$	0.1758	0.1029	0.1661	0.1809	0.0855	4.2193	0.4512	0.2578
$N = 32$	0.1380	0.0671	0.1316	0.1392	0.0602	1.3758	0.7884	0.6014
$N = 64$	0.1190	0.0453	0.1150	0.1195	0.0433	0.7437	0.9820	0.9506
$N = 128$	0.1095	0.0312	0.1084	0.1104	0.0305	2.1101	0.9998	0.9994
$N = 256$	0.1048	0.0218	0.1034	0.1045	0.0214	−0.9490	1.0000	1.0000
$p = 4, q = 1, V_{\mathrm{rel}}(\mathbf{\Sigma}) = 0.2$								
$N = 4$	0.4037	0.2878	0.4878	0.5064	0.1746	41.5546	0.1402	0.0424
$N = 8$	0.3041	0.1990	0.3186	0.3363	0.1442	15.8368	0.3792	0.2024
$N = 16$	0.2545	0.1316	0.2556	0.2624	0.1086	5.0868	0.7618	0.5808
$N = 32$	0.2280	0.0887	0.2250	0.2292	0.0792	1.0147	0.9722	0.9310
$N = 64$	0.2142	0.0610	0.2112	0.2144	0.0581	0.2411	1.0000	0.9998
$N = 128$	0.2072	0.0425	0.2049	0.2064	0.0411	−1.3741	1.0000	1.0000
$N = 256$	0.2036	0.0298	0.2033	0.2040	0.0296	0.8971	1.0000	1.0000
$p = 4, q = 1, V_{\mathrm{rel}}(\mathbf{\Sigma}) = 0.4$								
$N = 4$	0.4602	0.2677	0.5962	0.5896	0.1887	48.4850	0.2948	0.1162
$N = 8$	0.4319	0.2065	0.4730	0.4675	0.1658	15.1734	0.7126	0.5234
$N = 16$	0.4200	0.1444	0.4316	0.4288	0.1272	4.8902	0.9750	0.9318
$N = 32$	0.4113	0.1001	0.4147	0.4125	0.0944	0.9058	1.0000	0.9994
$N = 64$	0.4060	0.0699	0.4073	0.4067	0.0682	0.7503	1.0000	1.0000
$N = 128$	0.4031	0.0490	0.4038	0.4026	0.0480	−0.7644	1.0000	1.0000
$N = 256$	0.4016	0.0345	0.4012	0.4008	0.0335	−1.7085	1.0000	1.0000
$p = 4, q = 1, V_{\mathrm{rel}}(\mathbf{\Sigma}) = 0.6$								
$N = 4$	0.5944	0.1973	0.7186	0.6836	0.1866	33.8195	0.5030	0.2728
$N = 8$	0.5930	0.1644	0.6442	0.6214	0.1590	12.5992	0.9218	0.8380
$N = 16$	0.5992	0.1195	0.6198	0.6055	0.1174	3.8086	0.9988	0.9962
$N = 32$	0.6006	0.0846	0.6086	0.6022	0.0830	1.3653	1.0000	1.0000
$N = 64$	0.6006	0.0596	0.6043	0.6007	0.0601	0.1178	1.0000	1.0000
$N = 128$	0.6004	0.0420	0.6017	0.5991	0.0421	−2.1326	1.0000	1.0000
$N = 256$	0.6002	0.0297	0.6011	0.6001	0.0303	−0.2881	1.0000	1.0000
$p = 4, q = 1, V_{\mathrm{rel}}(\mathbf{\Sigma}) = 0.8$								
$N = 4$	0.7812	0.1037	0.8548	0.8020	0.1610	9.1171	0.7666	0.5686
$N = 8$	0.7841	0.0920	0.8207	0.7927	0.1170	5.1526	0.9928	0.9804
$N = 16$	0.7927	0.0692	0.8086	0.7945	0.0793	1.6175	0.9998	0.9998
$N = 32$	0.7968	0.0498	0.8039	0.7967	0.0537	−0.1966	1.0000	1.0000
$N = 64$	0.7985	0.0354	0.8026	0.7993	0.0368	1.5352	1.0000	1.0000
$N = 128$	0.7993	0.0251	0.8012	0.7994	0.0255	0.2206	1.0000	1.0000
$N = 256$	0.7997	0.0177	0.8003	0.7997	0.0176	0.0875	1.0000	1.0000

(*continued*)

Table S2. (*continued*)

	$\approx \mathrm{E}[V_{\mathrm{rel}}(\mathbf{S})]$	$\approx \mathrm{SD}[V_{\mathrm{rel}}(\mathbf{S})]$	Median	Mean	ESD	T	Pow. 5%	Pow. 1%
$p = 4, q = 2, V_{\mathrm{rel}}(\mathbf{\Sigma}) = 0.1$								
$N = 4$	0.4605	0.2422	0.4572	0.4810	0.1640	8.8203	0.0980	0.0270
$N = 8$	0.2728	0.1327	0.2646	0.2784	0.1053	3.7235	0.1932	0.0616
$N = 16$	0.1851	0.0733	0.1780	0.1855	0.0664	0.3458	0.5050	0.2212
$N = 32$	0.1423	0.0429	0.1409	0.1433	0.0408	1.7920	0.9230	0.7422
$N = 64$	0.1211	0.0267	0.1204	0.1215	0.0263	1.0538	0.9998	0.9976
$N = 128$	0.1105	0.0175	0.1102	0.1107	0.0173	0.6470	1.0000	1.0000
$N = 256$	0.1053	0.0118	0.1048	0.1049	0.0118	−2.0594	1.0000	1.0000
$p = 4, q = 2, V_{\mathrm{rel}}(\mathbf{\Sigma}) = 0.2$								
$N = 4$	0.5313	0.2669	0.5324	0.5467	0.1745	6.2103	0.1934	0.0684
$N = 8$	0.3615	0.1449	0.3441	0.3667	0.1203	3.1014	0.4370	0.2064
$N = 16$	0.2803	0.0771	0.2710	0.2804	0.0687	0.1260	0.9646	0.7720
$N = 32$	0.2401	0.0426	0.2379	0.2413	0.0412	2.1470	1.0000	0.9994
$N = 64$	0.2200	0.0249	0.2186	0.2199	0.0246	−0.4333	1.0000	1.0000
$N = 128$	0.2100	0.0154	0.2097	0.2099	0.0158	−0.5985	1.0000	1.0000
$N = 256$	0.2050	0.0101	0.2049	0.2051	0.0100	0.3652	1.0000	1.0000
$p = 4, q = 2, V_{\mathrm{rel}}(\mathbf{\Sigma}) = 0.4$ (This comformation is impossible)								

(*continued*)

Table S2. (*continued*)

	$\approx \mathrm{E}[V_{\mathrm{rel}}(\mathbf{S})]$	$\approx \mathrm{SD}[V_{\mathrm{rel}}(\mathbf{S})]$	Median	Mean	ESD	T	Pow. 5%	Pow. 1%
$p = 8, q = 1, V_{\mathrm{rel}}(\mathbf{\Sigma}) = 0.1$								
$N = 4$	0.3892	0.1871	0.4158	0.4355	0.1090	30.0381	0.1688	0.0620
$N = 8$	0.2368	0.1191	0.2305	0.2475	0.0838	9.0124	0.4426	0.2874
$N = 16$	0.1673	0.0758	0.1604	0.1698	0.0621	2.8253	0.7950	0.6780
$N = 32$	0.1334	0.0502	0.1299	0.1343	0.0452	1.4051	0.9828	0.9576
$N = 64$	0.1167	0.0342	0.1140	0.1171	0.0326	0.8569	0.9998	0.9994
$N = 128$	0.1083	0.0237	0.1069	0.1080	0.0230	−1.0270	1.0000	1.0000
$N = 256$	0.1042	0.0166	0.1034	0.1043	0.0166	0.7600	1.0000	1.0000
$p = 8, q = 1, V_{\mathrm{rel}}(\mathbf{\Sigma}) = 0.2$								
$N = 4$	0.3906	0.2315	0.4683	0.4859	0.1313	51.3142	0.3222	0.1598
$N = 8$	0.2957	0.1608	0.3077	0.3226	0.1115	17.0187	0.7298	0.5902
$N = 16$	0.2495	0.1066	0.2474	0.2544	0.0874	3.9350	0.9640	0.9300
$N = 32$	0.2252	0.0721	0.2229	0.2269	0.0661	1.7453	1.0000	0.9996
$N = 64$	0.2127	0.0496	0.2102	0.2125	0.0480	−0.2832	1.0000	1.0000
$N = 128$	0.2064	0.0346	0.2067	0.2073	0.0333	1.8083	1.0000	1.0000
$N = 256$	0.2032	0.0243	0.2029	0.2030	0.0241	−0.6017	1.0000	1.0000
$p = 8, q = 1, V_{\mathrm{rel}}(\mathbf{\Sigma}) = 0.4$								
$N = 4$	0.4525	0.2334	0.5701	0.5731	0.1549	55.1063	0.5656	0.3908
$N = 8$	0.4290	0.1803	0.4659	0.4613	0.1429	15.9923	0.9252	0.8754
$N = 16$	0.4183	0.1256	0.4316	0.4290	0.1092	6.9108	0.9986	0.9980
$N = 32$	0.4103	0.0870	0.4153	0.4128	0.0823	2.1081	1.0000	1.0000
$N = 64$	0.4055	0.0606	0.4078	0.4063	0.0585	0.9585	1.0000	1.0000
$N = 128$	0.4028	0.0425	0.4038	0.4034	0.0417	1.0354	1.0000	1.0000
$N = 256$	0.4014	0.0299	0.4013	0.4011	0.0292	−0.8338	1.0000	1.0000
$p = 8, q = 1, V_{\mathrm{rel}}(\mathbf{\Sigma}) = 0.6$								
$N = 4$	0.5903	0.1765	0.6998	0.6731	0.1648	35.5306	0.7656	0.6362
$N = 8$	0.5920	0.1482	0.6382	0.6170	0.1435	12.3162	0.9902	0.9768
$N = 16$	0.5987	0.1074	0.6205	0.6077	0.1052	6.0548	0.9998	0.9998
$N = 32$	0.6004	0.0758	0.6060	0.5997	0.0766	−0.6096	1.0000	1.0000
$N = 64$	0.6005	0.0534	0.6031	0.6005	0.0536	0.0160	1.0000	1.0000
$N = 128$	0.6003	0.0376	0.6023	0.6003	0.0370	−0.1299	1.0000	1.0000
$N = 256$	0.6002	0.0265	0.6012	0.6001	0.0266	−0.3410	1.0000	1.0000
$p = 8, q = 1, V_{\mathrm{rel}}(\mathbf{\Sigma}) = 0.8$								
$N = 4$	0.7800	0.0936	0.8464	0.8015	0.1448	10.4973	0.9262	0.8738
$N = 8$	0.7839	0.0843	0.8159	0.7910	0.1083	4.6211	0.9996	0.9990
$N = 16$	0.7926	0.0634	0.8056	0.7930	0.0728	0.3423	1.0000	1.0000
$N = 32$	0.7968	0.0455	0.8030	0.7978	0.0473	1.5850	1.0000	1.0000
$N = 64$	0.7985	0.0323	0.8008	0.7982	0.0331	−0.7649	1.0000	1.0000
$N = 128$	0.7993	0.0229	0.8011	0.7997	0.0231	1.0882	1.0000	1.0000
$N = 256$	0.7997	0.0162	0.8001	0.7994	0.0162	−1.1600	1.0000	1.0000

(*continued*)

Table S2. (*continued*)

	$\approx \mathrm{E}[V_{\mathrm{rel}}(\mathbf{S})]$	$\approx \mathrm{SD}[V_{\mathrm{rel}}(\mathbf{S})]$	Median	Mean	ESD	T	Pow. 5%	Pow. 1%
$p = 8, q = 2, V_{\mathrm{rel}}(\mathbf{\Sigma}) = 0.1$								
$N = 4$	0.4290	0.1604	0.4268	0.4460	0.1079	11.1170	0.1910	0.0696
$N = 8$	0.2529	0.0895	0.2481	0.2581	0.0725	5.1536	0.5284	0.3212
$N = 16$	0.1742	0.0517	0.1705	0.1746	0.0460	0.5660	0.9114	0.8146
$N = 32$	0.1366	0.0319	0.1351	0.1370	0.0302	0.8562	0.9996	0.9974
$N = 64$	0.1182	0.0208	0.1167	0.1176	0.0202	−2.1649	1.0000	1.0000
$N = 128$	0.1091	0.0141	0.1090	0.1091	0.0139	0.4297	1.0000	1.0000
$N = 256$	0.1045	0.0097	0.1045	0.1045	0.0096	−0.2327	1.0000	1.0000
$p = 8, q = 2, V_{\mathrm{rel}}(\mathbf{\Sigma}) = 0.2$								
$N = 4$	0.4926	0.1956	0.4995	0.5161	0.1295	12.8805	0.3960	0.2078
$N = 8$	0.3393	0.1091	0.3322	0.3433	0.0889	3.1755	0.8854	0.7434
$N = 16$	0.2687	0.0615	0.2643	0.2696	0.0573	1.1307	0.9990	0.9956
$N = 32$	0.2341	0.0368	0.2330	0.2346	0.0361	0.9088	1.0000	1.0000
$N = 64$	0.2170	0.0234	0.2166	0.2168	0.0231	−0.5343	1.0000	1.0000
$N = 128$	0.2085	0.0155	0.2083	0.2083	0.0153	−0.7404	1.0000	1.0000
$N = 256$	0.2042	0.0106	0.2043	0.2042	0.0103	−0.0092	1.0000	1.0000
$p = 8, q = 2, V_{\mathrm{rel}}(\mathbf{\Sigma}) = 0.4$								
$N = 4$	0.6820	0.2513	0.6817	0.6803	0.1556	−0.7726	0.7586	0.5986
$N = 8$	0.5399	0.1346	0.5145	0.5385	0.1050	−0.9238	1.0000	1.0000
$N = 16$	0.4698	0.0683	0.4529	0.4693	0.0602	−0.6598	1.0000	1.0000
$N = 32$	0.4349	0.0344	0.4258	0.4348	0.0316	−0.3472	1.0000	1.0000
$N = 64$	0.4175	0.0174	0.4131	0.4176	0.0169	0.4181	1.0000	1.0000
$N = 128$	0.4087	0.0089	0.4066	0.4088	0.0088	0.2251	1.0000	1.0000
$N = 256$	0.4044	0.0047	0.4034	0.4044	0.0048	0.2576	1.0000	1.0000
$p = 8, q = 4, V_{\mathrm{rel}}(\mathbf{\Sigma}) = 0.1$								
$N = 4$	0.4646	0.1481	0.4458	0.4666	0.1129	1.2361	0.2366	0.0988
$N = 8$	0.2682	0.0717	0.2611	0.2699	0.0636	1.8384	0.6264	0.3590
$N = 16$	0.1811	0.0351	0.1770	0.1817	0.0335	1.3536	0.9980	0.9606
$N = 32$	0.1398	0.0177	0.1379	0.1397	0.0170	−0.3943	1.0000	1.0000
$N = 64$	0.1197	0.0093	0.1189	0.1198	0.0092	0.7866	1.0000	1.0000
$N = 128$	0.1098	0.0052	0.1095	0.1098	0.0051	0.1577	1.0000	1.0000
$N = 256$	0.1049	0.0030	0.1048	0.1049	0.0030	−0.9935	1.0000	1.0000
$p = 8, q = 4, V_{\mathrm{rel}}(\mathbf{\Sigma}) = 0.2$ (This comformation is impossible)								

(*continued*)

Table S2. (*continued*)

	$\approx \mathrm{E}[V_{\mathrm{rel}}(\mathbf{S})]$	$\approx \mathrm{SD}[V_{\mathrm{rel}}(\mathbf{S})]$	Median	Mean	ESD	T	Pow. 5%	Pow. 1%
$p = 16, q = 1, V_{\mathrm{rel}}(\mathbf{\Sigma}) = 0.1$								
$N = 4$	0.3781	0.1547	0.3993	0.4200	0.0844	35.1233	0.3406	0.1980
$N = 8$	0.2291	0.1000	0.2267	0.2407	0.0704	11.6244	0.7040	0.5780
$N = 16$	0.1629	0.0643	0.1566	0.1645	0.0534	2.1175	0.9522	0.9166
$N = 32$	0.1311	0.0429	0.1278	0.1315	0.0392	0.7208	0.9994	0.9984
$N = 64$	0.1155	0.0293	0.1132	0.1157	0.0283	0.6514	1.0000	1.0000
$N = 128$	0.1077	0.0204	0.1069	0.1079	0.0201	0.5728	1.0000	1.0000
$N = 256$	0.1039	0.0143	0.1033	0.1039	0.0142	0.0771	1.0000	1.0000
$p = 16, q = 1, V_{\mathrm{rel}}(\mathbf{\Sigma}) = 0.2$								
$N = 4$	0.3839	0.2075	0.4479	0.4692	0.1109	54.4282	0.5346	0.3688
$N = 8$	0.2914	0.1443	0.3019	0.3139	0.1010	15.7447	0.8904	0.8238
$N = 16$	0.2469	0.0958	0.2456	0.2524	0.0791	4.9064	0.9968	0.9936
$N = 32$	0.2238	0.0648	0.2218	0.2241	0.0585	0.3753	1.0000	1.0000
$N = 64$	0.2120	0.0447	0.2112	0.2122	0.0426	0.3554	1.0000	1.0000
$N = 128$	0.2060	0.0312	0.2048	0.2055	0.0303	−1.2781	1.0000	1.0000
$N = 256$	0.2030	0.0219	0.2026	0.2030	0.0216	−0.1191	1.0000	1.0000
$p = 16, q = 1, V_{\mathrm{rel}}(\mathbf{\Sigma}) = 0.4$								
$N = 4$	0.4486	0.2189	0.5668	0.5678	0.1418	59.4299	0.7750	0.6596
$N = 8$	0.4275	0.1691	0.4657	0.4626	0.1346	18.4219	0.9828	0.9698
$N = 16$	0.4174	0.1175	0.4302	0.4270	0.1049	6.4710	1.0000	1.0000
$N = 32$	0.4098	0.0813	0.4161	0.4129	0.0762	2.8682	1.0000	1.0000
$N = 64$	0.4052	0.0566	0.4070	0.4058	0.0548	0.7118	1.0000	1.0000
$N = 128$	0.4027	0.0397	0.4042	0.4038	0.0394	1.9337	1.0000	1.0000
$N = 256$	0.4014	0.0279	0.4013	0.4012	0.0280	−0.3594	1.0000	1.0000
$p = 16, q = 1, V_{\mathrm{rel}}(\mathbf{\Sigma}) = 0.6$								
$N = 4$	0.5882	0.1678	0.6919	0.6700	0.1577	36.6795	0.8948	0.8326
$N = 8$	0.5915	0.1412	0.6344	0.6165	0.1383	12.8135	0.9982	0.9954
$N = 16$	0.5985	0.1023	0.6172	0.6057	0.1014	5.0298	1.0000	1.0000
$N = 32$	0.6003	0.0721	0.6085	0.6022	0.0714	1.9527	1.0000	1.0000
$N = 64$	0.6004	0.0507	0.6032	0.6007	0.0506	0.4295	1.0000	1.0000
$N = 128$	0.6003	0.0357	0.6020	0.6007	0.0361	0.8161	1.0000	1.0000
$N = 256$	0.6002	0.0252	0.6006	0.5999	0.0253	−0.8000	1.0000	1.0000
$p = 16, q = 1, V_{\mathrm{rel}}(\mathbf{\Sigma}) = 0.8$								
$N = 4$	0.7795	0.0893	0.8397	0.7967	0.1413	8.6401	0.9688	0.9514
$N = 8$	0.7838	0.0810	0.8153	0.7913	0.1049	5.0688	0.9998	0.9998
$N = 16$	0.7926	0.0609	0.8067	0.7943	0.0696	1.7415	1.0000	1.0000
$N = 32$	0.7968	0.0437	0.8044	0.7989	0.0452	3.3474	1.0000	1.0000
$N = 64$	0.7985	0.0310	0.8019	0.7990	0.0323	1.0675	1.0000	1.0000
$N = 128$	0.7993	0.0220	0.8000	0.7988	0.0223	−1.7432	1.0000	1.0000
$N = 256$	0.7997	0.0155	0.8000	0.7996	0.0157	−0.2993	1.0000	1.0000

(*continued*)

Table S2. (*continued*)

	$\approx \mathrm{E}[V_{\mathrm{rel}}(\mathbf{S})]$	$\approx \mathrm{SD}[V_{\mathrm{rel}}(\mathbf{S})]$	Median	Mean	ESD	T	Pow. 5%	Pow. 1%
$p = 16, q = 2, V_{\mathrm{rel}}(\mathbf{\Sigma}) = 0.1$								
$N = 4$	0.4143	0.1238	0.4134	0.4286	0.0815	12.3917	0.3806	0.1976
$N = 8$	0.2434	0.0706	0.2383	0.2455	0.0557	2.5532	0.8294	0.6884
$N = 16$	0.1691	0.0419	0.1666	0.1696	0.0369	1.0663	0.9958	0.9908
$N = 32$	0.1339	0.0266	0.1333	0.1345	0.0255	1.5713	1.0000	1.0000
$N = 64$	0.1168	0.0176	0.1164	0.1170	0.0173	0.8504	1.0000	1.0000
$N = 128$	0.1084	0.0120	0.1079	0.1082	0.0119	−1.0759	1.0000	1.0000
$N = 256$	0.1042	0.0084	0.1037	0.1040	0.0084	−1.3172	1.0000	1.0000
$p = 16, q = 2, V_{\mathrm{rel}}(\mathbf{\Sigma}) = 0.2$								
$N = 4$	0.4775	0.1649	0.4801	0.4984	0.1080	13.7304	0.6566	0.4588
$N = 8$	0.3305	0.0936	0.3271	0.3362	0.0744	5.3878	0.9894	0.9730
$N = 16$	0.2640	0.0543	0.2616	0.2646	0.0499	0.8966	1.0000	1.0000
$N = 32$	0.2317	0.0334	0.2306	0.2316	0.0320	−0.2412	1.0000	1.0000
$N = 64$	0.2158	0.0217	0.2152	0.2151	0.0213	−2.2294	1.0000	1.0000
$N = 128$	0.2079	0.0147	0.2077	0.2077	0.0146	−0.9653	1.0000	1.0000
$N = 256$	0.2039	0.0101	0.2043	0.2042	0.0098	1.6488	1.0000	1.0000
$p = 16, q = 2, V_{\mathrm{rel}}(\mathbf{\Sigma}) = 0.4$								
$N = 4$	0.6595	0.2219	0.6539	0.6600	0.1378	0.2882	0.9756	0.8632
$N = 8$	0.5273	0.1187	0.5057	0.5269	0.0936	−0.3636	1.0000	1.0000
$N = 16$	0.4634	0.0608	0.4512	0.4639	0.0540	0.5775	1.0000	1.0000
$N = 32$	0.4317	0.0314	0.4254	0.4310	0.0285	−1.7871	1.0000	1.0000
$N = 64$	0.4158	0.0167	0.4131	0.4155	0.0159	−1.6153	1.0000	1.0000
$N = 128$	0.4079	0.0093	0.4068	0.4079	0.0093	−0.0692	1.0000	1.0000
$N = 256$	0.4040	0.0054	0.4035	0.4039	0.0055	−1.0354	1.0000	1.0000
$p = 16, q = 4, V_{\mathrm{rel}}(\mathbf{\Sigma}) = 0.1$								
$N = 4$	0.4407	0.1087	0.4285	0.4431	0.0808	2.0856	0.4498	0.2388
$N = 8$	0.2545	0.0534	0.2481	0.2548	0.0460	0.4484	0.9444	0.8240
$N = 16$	0.1740	0.0273	0.1716	0.1746	0.0259	1.7728	1.0000	1.0000
$N = 32$	0.1362	0.0149	0.1349	0.1358	0.0144	−2.2596	1.0000	1.0000
$N = 64$	0.1179	0.0087	0.1176	0.1178	0.0085	−1.1815	1.0000	1.0000
$N = 128$	0.1089	0.0055	0.1089	0.1091	0.0054	2.0563	1.0000	1.0000
$N = 256$	0.1044	0.0036	0.1044	0.1044	0.0036	−0.7657	1.0000	1.0000
$p = 16, q = 4, V_{\mathrm{rel}}(\mathbf{\Sigma}) = 0.2$								
$N = 4$	0.5429	0.1577	0.5188	0.5399	0.1191	−1.7637	0.8000	0.5890
$N = 8$	0.3600	0.0765	0.3492	0.3588	0.0665	−1.2879	1.0000	1.0000
$N = 16$	0.2774	0.0369	0.2721	0.2773	0.0347	−0.1483	1.0000	1.0000
$N = 32$	0.2381	0.0181	0.2359	0.2382	0.0176	0.5801	1.0000	1.0000
$N = 64$	0.2189	0.0089	0.2174	0.2188	0.0088	−0.4406	1.0000	1.0000
$N = 128$	0.2094	0.0044	0.2087	0.2095	0.0045	1.3265	1.0000	1.0000
$N = 256$	0.2047	0.0022	0.2043	0.2047	0.0022	−1.4616	1.0000	1.0000

(*continued*)

Table S2. (*continued*)

	$\approx \mathrm{E}[V_{\mathrm{rel}}(\mathbf{S})]$	$\approx \mathrm{SD}[V_{\mathrm{rel}}(\mathbf{S})]$	Median	Mean	ESD	T	Pow. 5%	Pow. 1%
$p = 32, q = 1, V_{\mathrm{rel}}(\mathbf{\Sigma}) = 0.1$								
$N = 4$	0.3722	0.1401	0.3890	0.4085	0.0722	35.5187	0.5116	0.3740
$N = 8$	0.2252	0.0913	0.2179	0.2316	0.0629	7.1557	0.8658	0.7946
$N = 16$	0.1607	0.0590	0.1578	0.1642	0.0492	4.9649	0.9948	0.9884
$N = 32$	0.1300	0.0395	0.1274	0.1307	0.0355	1.5884	1.0000	1.0000
$N = 64$	0.1149	0.0271	0.1135	0.1151	0.0258	0.5694	1.0000	1.0000
$N = 128$	0.1074	0.0188	0.1063	0.1069	0.0185	−2.1220	1.0000	1.0000
$N = 256$	0.1037	0.0132	0.1028	0.1033	0.0129	−2.0896	1.0000	1.0000
$p = 32, q = 1, V_{\mathrm{rel}}(\mathbf{\Sigma}) = 0.2$								
$N = 4$	0.3805	0.1965	0.4370	0.4585	0.1007	54.7782	0.6940	0.5928
$N = 8$	0.2893	0.1367	0.2993	0.3106	0.0957	15.8065	0.9646	0.9436
$N = 16$	0.2456	0.0907	0.2423	0.2484	0.0741	2.6792	1.0000	0.9996
$N = 32$	0.2231	0.0614	0.2216	0.2249	0.0564	2.2321	1.0000	1.0000
$N = 64$	0.2116	0.0424	0.2110	0.2126	0.0401	1.6316	1.0000	1.0000
$N = 128$	0.2058	0.0296	0.2061	0.2065	0.0284	1.6193	1.0000	1.0000
$N = 256$	0.2029	0.0208	0.2028	0.2031	0.0202	0.5471	1.0000	1.0000
$p = 32, q = 1, V_{\mathrm{rel}}(\mathbf{\Sigma}) = 0.4$								
$N = 4$	0.4467	0.2122	0.5598	0.5635	0.1376	60.0007	0.8810	0.8234
$N = 8$	0.4268	0.1638	0.4631	0.4583	0.1291	17.2526	0.9966	0.9944
$N = 16$	0.4170	0.1137	0.4271	0.4250	0.0995	5.6662	1.0000	1.0000
$N = 32$	0.4096	0.0786	0.4154	0.4128	0.0756	2.9659	1.0000	1.0000
$N = 64$	0.4051	0.0547	0.4072	0.4057	0.0529	0.7484	1.0000	1.0000
$N = 128$	0.4026	0.0384	0.4038	0.4036	0.0382	1.8820	1.0000	1.0000
$N = 256$	0.4013	0.0270	0.4010	0.4011	0.0265	−0.5358	1.0000	1.0000
$p = 32, q = 1, V_{\mathrm{rel}}(\mathbf{\Sigma}) = 0.6$								
$N = 4$	0.5872	0.1637	0.6947	0.6706	0.1518	38.8361	0.9460	0.9222
$N = 8$	0.5912	0.1380	0.6345	0.6170	0.1313	13.8710	1.0000	0.9998
$N = 16$	0.5984	0.0998	0.6160	0.6041	0.0995	4.0499	1.0000	1.0000
$N = 32$	0.6002	0.0703	0.6081	0.6018	0.0706	1.6224	1.0000	1.0000
$N = 64$	0.6004	0.0494	0.6041	0.6014	0.0492	1.4951	1.0000	1.0000
$N = 128$	0.6003	0.0348	0.6004	0.5996	0.0348	−1.3790	1.0000	1.0000
$N = 256$	0.6002	0.0246	0.6011	0.6002	0.0245	0.0139	1.0000	1.0000
$p = 32, q = 1, V_{\mathrm{rel}}(\mathbf{\Sigma}) = 0.8$								
$N = 4$	0.7792	0.0873	0.8365	0.7949	0.1393	7.9763	0.9844	0.9772
$N = 8$	0.7837	0.0794	0.8157	0.7922	0.1009	5.9763	1.0000	1.0000
$N = 16$	0.7926	0.0597	0.8050	0.7935	0.0684	0.9693	1.0000	1.0000
$N = 32$	0.7967	0.0429	0.8033	0.7977	0.0452	1.5534	1.0000	1.0000
$N = 64$	0.7985	0.0304	0.8008	0.7983	0.0308	−0.6108	1.0000	1.0000
$N = 128$	0.7993	0.0215	0.8011	0.7998	0.0215	1.6288	1.0000	1.0000
$N = 256$	0.7997	0.0152	0.8001	0.7994	0.0154	−1.2286	1.0000	1.0000

(*continued*)

Table S2. (*continued*)

	$\approx \mathrm{E}[V_{\mathrm{rel}}(\mathbf{S})]$	$\approx \mathrm{SD}[V_{\mathrm{rel}}(\mathbf{S})]$	Median	Mean	ESD	T	Pow. 5%	Pow. 1%
$p = 32$, $q = 2$, $V_{\mathrm{rel}}(\mathbf{\Sigma}) = 0.1$								
$N = 4$	0.4069	0.1066	0.4070	0.4201	0.0673	13.8253	0.6254	0.4612
$N = 8$	0.2388	0.0619	0.2344	0.2412	0.0491	3.4320	0.9654	0.9284
$N = 16$	0.1665	0.0374	0.1634	0.1660	0.0336	−1.0262	0.9998	0.9996
$N = 32$	0.1326	0.0240	0.1319	0.1326	0.0229	−0.0886	1.0000	1.0000
$N = 64$	0.1162	0.0161	0.1160	0.1163	0.0156	0.7616	1.0000	1.0000
$N = 128$	0.1080	0.0110	0.1077	0.1080	0.0108	−0.3648	1.0000	1.0000
$N = 256$	0.1040	0.0077	0.1041	0.1041	0.0076	1.0367	1.0000	1.0000
$p = 32$, $q = 2$, $V_{\mathrm{rel}}(\mathbf{\Sigma}) = 0.2$								
$N = 4$	0.4706	0.1506	0.4771	0.4921	0.0964	15.8001	0.8662	0.7700
$N = 8$	0.3264	0.0864	0.3271	0.3329	0.0703	6.4974	0.9990	0.9980
$N = 16$	0.2618	0.0508	0.2609	0.2630	0.0454	1.8913	1.0000	1.0000
$N = 32$	0.2306	0.0317	0.2300	0.2310	0.0305	0.8537	1.0000	1.0000
$N = 64$	0.2152	0.0208	0.2153	0.2158	0.0207	1.9430	1.0000	1.0000
$N = 128$	0.2076	0.0141	0.2075	0.2076	0.0141	−0.0879	1.0000	1.0000
$N = 256$	0.2038	0.0098	0.2038	0.2038	0.0096	−0.1538	1.0000	1.0000
$p = 32$, $q = 2$, $V_{\mathrm{rel}}(\mathbf{\Sigma}) = 0.4$								
$N = 4$	0.6497	0.2088	0.6458	0.6505	0.1291	0.4379	0.9976	0.9916
$N = 8$	0.5219	0.1118	0.5050	0.5229	0.0885	0.7836	1.0000	1.0000
$N = 16$	0.4607	0.0578	0.4507	0.4615	0.0518	1.0509	1.0000	1.0000
$N = 32$	0.4303	0.0303	0.4253	0.4303	0.0291	−0.0698	1.0000	1.0000
$N = 64$	0.4152	0.0166	0.4135	0.4153	0.0162	0.5373	1.0000	1.0000
$N = 128$	0.4076	0.0095	0.4071	0.4076	0.0095	0.2889	1.0000	1.0000
$N = 256$	0.4038	0.0058	0.4037	0.4039	0.0058	1.8489	1.0000	1.0000
$p = 32$, $q = 4$, $V_{\mathrm{rel}}(\mathbf{\Sigma}) = 0.1$								
$N = 4$	0.4304	0.0901	0.4220	0.4353	0.0680	5.1163	0.7372	0.5570
$N = 8$	0.2485	0.0448	0.2434	0.2492	0.0396	1.2297	0.9980	0.9914
$N = 16$	0.1708	0.0236	0.1696	0.1716	0.0223	2.5933	1.0000	1.0000
$N = 32$	0.1346	0.0134	0.1341	0.1346	0.0132	0.2360	1.0000	1.0000
$N = 64$	0.1171	0.0082	0.1171	0.1173	0.0081	1.2790	1.0000	1.0000
$N = 128$	0.1085	0.0053	0.1085	0.1085	0.0053	−0.2026	1.0000	1.0000
$N = 256$	0.1042	0.0036	0.1042	0.1042	0.0035	−0.3077	1.0000	1.0000
$p = 32$, $q = 4$, $V_{\mathrm{rel}}(\mathbf{\Sigma}) = 0.2$								
$N = 4$	0.5291	0.1397	0.5095	0.5278	0.1049	−0.8747	0.9464	0.8860
$N = 8$	0.3524	0.0674	0.3431	0.3521	0.0579	−0.3826	1.0000	1.0000
$N = 16$	0.2735	0.0326	0.2679	0.2727	0.0304	−1.9324	1.0000	1.0000
$N = 32$	0.2362	0.0161	0.2335	0.2357	0.0156	−1.9882	1.0000	1.0000
$N = 64$	0.2179	0.0081	0.2169	0.2179	0.0079	−0.6360	1.0000	1.0000
$N = 128$	0.2089	0.0042	0.2084	0.2090	0.0042	0.5130	1.0000	1.0000
$N = 256$	0.2045	0.0022	0.2043	0.2045	0.0022	0.5881	1.0000	1.0000

(*continued*)

Table S2. (*continued*)

	$\approx \mathrm{E}[V_{\mathrm{rel}}(\mathbf{S})]$	$\approx \mathrm{SD}[V_{\mathrm{rel}}(\mathbf{S})]$	Median	Mean	ESD	T	Pow. 5%	Pow. 1%
$p = 64$, $q = 1$, $V_{\mathrm{rel}}(\mathbf{\Sigma}) = 0.1$								
$N = 4$	0.3693	0.1331	0.3833	0.4049	0.0688	36.6235	0.6648	0.5412
$N = 8$	0.2232	0.0871	0.2177	0.2312	0.0609	9.2822	0.9624	0.9330
$N = 16$	0.1596	0.0565	0.1555	0.1614	0.0468	2.6219	1.0000	0.9996
$N = 32$	0.1294	0.0378	0.1264	0.1301	0.0344	1.4771	1.0000	1.0000
$N = 64$	0.1146	0.0260	0.1130	0.1146	0.0253	−0.0493	1.0000	1.0000
$N = 128$	0.1073	0.0181	0.1065	0.1073	0.0175	−0.0405	1.0000	1.0000
$N = 256$	0.1036	0.0127	0.1032	0.1037	0.0126	0.6022	1.0000	1.0000
$p = 64$, $q = 1$, $V_{\mathrm{rel}}(\mathbf{\Sigma}) = 0.2$								
$N = 4$	0.3788	0.1912	0.4356	0.4583	0.1014	55.4640	0.8090	0.7328
$N = 8$	0.2881	0.1330	0.2971	0.3077	0.0917	15.0979	0.9922	0.9844
$N = 16$	0.2450	0.0883	0.2472	0.2512	0.0732	6.0300	0.9998	0.9998
$N = 32$	0.2227	0.0598	0.2228	0.2247	0.0546	2.5121	1.0000	1.0000
$N = 64$	0.2114	0.0412	0.2098	0.2112	0.0392	−0.3645	1.0000	1.0000
$N = 128$	0.2057	0.0288	0.2046	0.2053	0.0285	−1.0540	1.0000	1.0000
$N = 256$	0.2029	0.0202	0.2025	0.2030	0.0200	0.2987	1.0000	1.0000
$p = 64$, $q = 1$, $V_{\mathrm{rel}}(\mathbf{\Sigma}) = 0.4$								
$N = 4$	0.4458	0.2090	0.5557	0.5594	0.1376	58.3687	0.9216	0.8926
$N = 8$	0.4264	0.1613	0.4670	0.4599	0.1273	18.6017	0.9980	0.9974
$N = 16$	0.4168	0.1119	0.4286	0.4266	0.0996	6.9651	1.0000	1.0000
$N = 32$	0.4095	0.0773	0.4125	0.4109	0.0726	1.3497	1.0000	1.0000
$N = 64$	0.4050	0.0538	0.4063	0.4056	0.0532	0.7287	1.0000	1.0000
$N = 128$	0.4026	0.0377	0.4041	0.4032	0.0371	1.1293	1.0000	1.0000
$N = 256$	0.4013	0.0266	0.4018	0.4015	0.0261	0.4964	1.0000	1.0000
$p = 64$, $q = 1$, $V_{\mathrm{rel}}(\mathbf{\Sigma}) = 0.6$								
$N = 4$	0.5867	0.1617	0.6883	0.6668	0.1510	37.5484	0.9718	0.9596
$N = 8$	0.5911	0.1364	0.6354	0.6177	0.1314	14.3427	0.9998	0.9998
$N = 16$	0.5983	0.0987	0.6151	0.6052	0.0974	5.0151	1.0000	1.0000
$N = 32$	0.6002	0.0695	0.6085	0.6022	0.0693	2.0323	1.0000	1.0000
$N = 64$	0.6004	0.0488	0.6039	0.6012	0.0484	1.1728	1.0000	1.0000
$N = 128$	0.6003	0.0344	0.6015	0.6002	0.0342	−0.0756	1.0000	1.0000
$N = 256$	0.6001	0.0243	0.6009	0.6002	0.0241	0.2174	1.0000	1.0000
$p = 64$, $q = 1$, $V_{\mathrm{rel}}(\mathbf{\Sigma}) = 0.8$								
$N = 4$	0.7790	0.0864	0.8377	0.7928	0.1416	6.9078	0.9904	0.9854
$N = 8$	0.7837	0.0787	0.8157	0.7915	0.1022	5.4258	1.0000	1.0000
$N = 16$	0.7926	0.0592	0.8072	0.7956	0.0669	3.2349	1.0000	1.0000
$N = 32$	0.7967	0.0425	0.8021	0.7967	0.0447	−0.0106	1.0000	1.0000
$N = 64$	0.7985	0.0301	0.8018	0.7989	0.0308	0.8231	1.0000	1.0000
$N = 128$	0.7993	0.0213	0.8012	0.7999	0.0216	1.8961	1.0000	1.0000
$N = 256$	0.7997	0.0151	0.8006	0.7996	0.0152	−0.2806	1.0000	1.0000

(*continued*)

Table S2. (*continued*)

	$\approx \mathrm{E}[V_{\mathrm{rel}}(\mathbf{S})]$	$\approx \mathrm{SD}[V_{\mathrm{rel}}(\mathbf{S})]$	Median	Mean	ESD	T	Pow. 5%	Pow. 1%
$p = 64$, $q = 2$, $V_{\mathrm{rel}}(\mathbf{\Sigma}) = 0.1$								
$N = 4$	0.4033	0.0983	0.4018	0.4170	0.0625	15.5134	0.8144	0.7052
$N = 8$	0.2365	0.0577	0.2331	0.2394	0.0473	4.4814	0.9960	0.9914
$N = 16$	0.1653	0.0352	0.1636	0.1662	0.0321	2.1126	1.0000	1.0000
$N = 32$	0.1320	0.0227	0.1311	0.1319	0.0219	−0.0435	1.0000	1.0000
$N = 64$	0.1158	0.0153	0.1156	0.1159	0.0148	0.1625	1.0000	1.0000
$N = 128$	0.1079	0.0105	0.1079	0.1080	0.0103	0.9248	1.0000	1.0000
$N = 256$	0.1039	0.0073	0.1039	0.1040	0.0073	0.3798	1.0000	1.0000
$p = 64$, $q = 2$, $V_{\mathrm{rel}}(\mathbf{\Sigma}) = 0.2$								
$N = 4$	0.4672	0.1436	0.4719	0.4877	0.0920	15.6853	0.9534	0.9086
$N = 8$	0.3244	0.0829	0.3238	0.3306	0.0666	6.5016	1.0000	1.0000
$N = 16$	0.2607	0.0490	0.2589	0.2610	0.0449	0.4644	1.0000	1.0000
$N = 32$	0.2300	0.0308	0.2295	0.2304	0.0297	0.7439	1.0000	1.0000
$N = 64$	0.2149	0.0203	0.2148	0.2146	0.0197	−1.1127	1.0000	1.0000
$N = 128$	0.2075	0.0138	0.2075	0.2076	0.0138	0.9941	1.0000	1.0000
$N = 256$	0.2037	0.0096	0.2038	0.2037	0.0095	−0.4661	1.0000	1.0000
$p = 64$, $q = 2$, $V_{\mathrm{rel}}(\mathbf{\Sigma}) = 0.4$								
$N = 4$	0.6451	0.2025	0.6453	0.6520	0.1274	3.8135	0.9992	0.9986
$N = 8$	0.5194	0.1086	0.4985	0.5178	0.0858	−1.2882	1.0000	1.0000
$N = 16$	0.4594	0.0563	0.4507	0.4604	0.0496	1.3591	1.0000	1.0000
$N = 32$	0.4297	0.0299	0.4253	0.4303	0.0290	1.4675	1.0000	1.0000
$N = 64$	0.4148	0.0165	0.4132	0.4149	0.0164	0.2356	1.0000	1.0000
$N = 128$	0.4074	0.0097	0.4067	0.4072	0.0094	−1.3898	1.0000	1.0000
$N = 256$	0.4037	0.0060	0.4033	0.4036	0.0061	−0.7394	1.0000	1.0000
$p = 64$, $q = 4$, $V_{\mathrm{rel}}(\mathbf{\Sigma}) = 0.1$								
$N = 4$	0.4254	0.0810	0.4164	0.4276	0.0588	2.6768	0.9004	0.8048
$N = 8$	0.2456	0.0407	0.2411	0.2458	0.0350	0.4676	1.0000	1.0000
$N = 16$	0.1693	0.0218	0.1676	0.1694	0.0203	0.4186	1.0000	1.0000
$N = 32$	0.1338	0.0126	0.1333	0.1339	0.0123	0.2041	1.0000	1.0000
$N = 64$	0.1167	0.0078	0.1167	0.1168	0.0079	0.6494	1.0000	1.0000
$N = 128$	0.1083	0.0051	0.1083	0.1082	0.0051	−1.1718	1.0000	1.0000
$N = 256$	0.1041	0.0035	0.1042	0.1042	0.0035	0.2485	1.0000	1.0000
$p = 64$, $q = 4$, $V_{\mathrm{rel}}(\mathbf{\Sigma}) = 0.2$								
$N = 4$	0.5229	0.1312	0.5065	0.5241	0.0977	0.8973	0.9866	0.9726
$N = 8$	0.3489	0.0633	0.3406	0.3487	0.0551	−0.2548	1.0000	1.0000
$N = 16$	0.2718	0.0307	0.2678	0.2719	0.0292	0.1980	1.0000	1.0000
$N = 32$	0.2353	0.0153	0.2336	0.2353	0.0148	0.4010	1.0000	1.0000
$N = 64$	0.2175	0.0079	0.2164	0.2175	0.0079	0.5288	1.0000	1.0000
$N = 128$	0.2087	0.0042	0.2084	0.2088	0.0042	1.3044	1.0000	1.0000
$N = 256$	0.2043	0.0024	0.2042	0.2043	0.0023	0.0456	1.0000	1.0000

(*continued*)

Table S2. (*continued*)

	$\approx \mathrm{E}[V_{\mathrm{rel}}(\mathbf{S})]$	$\approx \mathrm{SD}[V_{\mathrm{rel}}(\mathbf{S})]$	Median	Mean	ESD	T	Pow. 5%	Pow. 1%
$p = 128, q = 1, V_{\mathrm{rel}}(\mathbf{\Sigma}) = 0.1$								
$N = 4$	0.3678	0.1298	0.3805	0.4016	0.0662	36.1631	0.7914	0.7176
$N = 8$	0.2222	0.0851	0.2202	0.2319	0.0608	11.2526	0.9884	0.9816
$N = 16$	0.1591	0.0552	0.1554	0.1613	0.0462	3.3949	1.0000	1.0000
$N = 32$	0.1291	0.0370	0.1275	0.1301	0.0336	2.0940	1.0000	1.0000
$N = 64$	0.1144	0.0254	0.1125	0.1141	0.0244	−0.8564	1.0000	1.0000
$N = 128$	0.1072	0.0177	0.1061	0.1070	0.0174	−0.9694	1.0000	1.0000
$N = 256$	0.1036	0.0124	0.1035	0.1036	0.0122	−0.0474	1.0000	1.0000
$p = 128, q = 1, V_{\mathrm{rel}}(\mathbf{\Sigma}) = 0.2$								
$N = 4$	0.3779	0.1886	0.4357	0.4560	0.0968	56.9972	0.8926	0.8560
$N = 8$	0.2876	0.1312	0.2974	0.3095	0.0922	16.8239	0.9976	0.9956
$N = 16$	0.2446	0.0871	0.2447	0.2497	0.0738	4.8935	1.0000	1.0000
$N = 32$	0.2226	0.0590	0.2220	0.2240	0.0534	1.8409	1.0000	1.0000
$N = 64$	0.2114	0.0407	0.2111	0.2119	0.0385	1.0824	1.0000	1.0000
$N = 128$	0.2057	0.0284	0.2055	0.2065	0.0279	1.9585	1.0000	1.0000
$N = 256$	0.2028	0.0199	0.2022	0.2027	0.0197	−0.3729	1.0000	1.0000
$p = 128, q = 1, V_{\mathrm{rel}}(\mathbf{\Sigma}) = 0.4$								
$N = 4$	0.4453	0.2074	0.5559	0.5594	0.1346	59.9265	0.9670	0.9496
$N = 8$	0.4262	0.1601	0.4626	0.4578	0.1262	17.7102	0.9998	0.9996
$N = 16$	0.4167	0.1110	0.4252	0.4220	0.0981	3.8079	1.0000	1.0000
$N = 32$	0.4094	0.0766	0.4134	0.4124	0.0715	2.9484	1.0000	1.0000
$N = 64$	0.4050	0.0534	0.4051	0.4053	0.0515	0.4527	1.0000	1.0000
$N = 128$	0.4026	0.0374	0.4035	0.4024	0.0372	−0.3393	1.0000	1.0000
$N = 256$	0.4013	0.0263	0.4022	0.4021	0.0258	2.1191	1.0000	1.0000
$p = 128, q = 1, V_{\mathrm{rel}}(\mathbf{\Sigma}) = 0.6$								
$N = 4$	0.5864	0.1608	0.6876	0.6652	0.1523	36.6050	0.9842	0.9788
$N = 8$	0.5910	0.1357	0.6346	0.6155	0.1327	13.0148	1.0000	1.0000
$N = 16$	0.5983	0.0981	0.6162	0.6051	0.0963	5.0064	1.0000	1.0000
$N = 32$	0.6001	0.0691	0.6069	0.6016	0.0696	1.4855	1.0000	1.0000
$N = 64$	0.6004	0.0485	0.6044	0.6011	0.0485	1.0441	1.0000	1.0000
$N = 128$	0.6003	0.0342	0.6023	0.6007	0.0339	0.8364	1.0000	1.0000
$N = 256$	0.6001	0.0241	0.6010	0.6001	0.0241	−0.1653	1.0000	1.0000
$p = 128, q = 1, V_{\mathrm{rel}}(\mathbf{\Sigma}) = 0.8$								
$N = 4$	0.7789	0.0859	0.8372	0.7960	0.1372	8.7820	0.9956	0.9936
$N = 8$	0.7836	0.0783	0.8095	0.7880	0.1014	3.0677	1.0000	1.0000
$N = 16$	0.7926	0.0589	0.8052	0.7934	0.0665	0.8762	1.0000	1.0000
$N = 32$	0.7967	0.0423	0.8021	0.7970	0.0447	0.3646	1.0000	1.0000
$N = 64$	0.7985	0.0300	0.8018	0.7991	0.0311	1.3807	1.0000	1.0000
$N = 128$	0.7993	0.0212	0.8009	0.7996	0.0214	1.1186	1.0000	1.0000
$N = 256$	0.7997	0.0150	0.8000	0.7993	0.0151	−1.7751	1.0000	1.0000

(*continued*)

Table S2. (*continued*)

	$\approx \mathrm{E}[V_{\mathrm{rel}}(\mathbf{S})]$	$\approx \mathrm{SD}[V_{\mathrm{rel}}(\mathbf{S})]$	Median	Mean	ESD	T	Pow. 5%	Pow. 1%
$p = 128$, $q = 2$, $V_{\mathrm{rel}}(\mathbf{\Sigma}) = 0.1$								
$N = 4$	0.4014	0.0943	0.3998	0.4133	0.0587	14.3539	0.9222	0.8732
$N = 8$	0.2353	0.0557	0.2325	0.2385	0.0452	4.9532	0.9994	0.9988
$N = 16$	0.1646	0.0341	0.1624	0.1650	0.0306	0.8469	1.0000	1.0000
$N = 32$	0.1316	0.0221	0.1302	0.1313	0.0207	−1.2201	1.0000	1.0000
$N = 64$	0.1157	0.0149	0.1156	0.1160	0.0145	1.5574	1.0000	1.0000
$N = 128$	0.1078	0.0103	0.1076	0.1079	0.0102	0.9428	1.0000	1.0000
$N = 256$	0.1039	0.0072	0.1038	0.1039	0.0071	0.1376	1.0000	1.0000
$p = 128$, $q = 2$, $V_{\mathrm{rel}}(\mathbf{\Sigma}) = 0.2$								
$N = 4$	0.4656	0.1402	0.4709	0.4855	0.0889	15.7910	0.9894	0.9774
$N = 8$	0.3235	0.0812	0.3232	0.3291	0.0663	5.9794	1.0000	1.0000
$N = 16$	0.2602	0.0482	0.2586	0.2608	0.0442	1.0265	1.0000	1.0000
$N = 32$	0.2298	0.0303	0.2290	0.2301	0.0288	0.8073	1.0000	1.0000
$N = 64$	0.2148	0.0200	0.2149	0.2147	0.0199	−0.2697	1.0000	1.0000
$N = 128$	0.2074	0.0137	0.2074	0.2074	0.0137	0.2450	1.0000	1.0000
$N = 256$	0.2037	0.0095	0.2039	0.2037	0.0095	−0.0761	1.0000	1.0000
$p = 128$, $q = 2$, $V_{\mathrm{rel}}(\mathbf{\Sigma}) = 0.4$								
$N = 4$	0.6429	0.1994	0.6451	0.6482	0.1253	2.9897	0.9998	0.9990
$N = 8$	0.5182	0.1070	0.5029	0.5197	0.0852	1.2226	1.0000	1.0000
$N = 16$	0.4588	0.0557	0.4479	0.4586	0.0500	−0.2879	1.0000	1.0000
$N = 32$	0.4294	0.0296	0.4251	0.4294	0.0286	0.0105	1.0000	1.0000
$N = 64$	0.4147	0.0165	0.4133	0.4148	0.0161	0.5386	1.0000	1.0000
$N = 128$	0.4073	0.0097	0.4069	0.4073	0.0098	−0.1664	1.0000	1.0000
$N = 256$	0.4037	0.0061	0.4036	0.4037	0.0061	0.9004	1.0000	1.0000
$p = 128$, $q = 4$, $V_{\mathrm{rel}}(\mathbf{\Sigma}) = 0.1$								
$N = 4$	0.4230	0.0766	0.4169	0.4273	0.0555	5.4744	0.9766	0.9560
$N = 8$	0.2441	0.0387	0.2396	0.2444	0.0342	0.5399	1.0000	1.0000
$N = 16$	0.1685	0.0209	0.1674	0.1690	0.0196	1.6338	1.0000	1.0000
$N = 32$	0.1334	0.0122	0.1328	0.1334	0.0119	−0.2881	1.0000	1.0000
$N = 64$	0.1165	0.0076	0.1164	0.1165	0.0076	−0.6600	1.0000	1.0000
$N = 128$	0.1082	0.0050	0.1081	0.1082	0.0050	−0.6723	1.0000	1.0000
$N = 256$	0.1041	0.0034	0.1040	0.1040	0.0034	−1.7921	1.0000	1.0000
$p = 128$, $q = 4$, $V_{\mathrm{rel}}(\mathbf{\Sigma}) = 0.2$								
$N = 4$	0.5199	0.1270	0.5004	0.5186	0.0928	−0.9804	0.9976	0.9954
$N = 8$	0.3473	0.0613	0.3401	0.3480	0.0527	0.9132	1.0000	1.0000
$N = 16$	0.2709	0.0298	0.2678	0.2714	0.0275	1.0597	1.0000	1.0000
$N = 32$	0.2348	0.0150	0.2329	0.2348	0.0145	−0.2822	1.0000	1.0000
$N = 64$	0.2173	0.0078	0.2164	0.2172	0.0076	−0.5165	1.0000	1.0000
$N = 128$	0.2086	0.0042	0.2084	0.2087	0.0042	0.9662	1.0000	1.0000
$N = 256$	0.2043	0.0024	0.2042	0.2043	0.0024	−0.3874	1.0000	1.0000

(*continued*)

Table S2. (*continued*)

	$\approx \mathrm{E}[V_{\mathrm{rel}}(\mathbf{S})]$	$\approx \mathrm{SD}[V_{\mathrm{rel}}(\mathbf{S})]$	Median	Mean	ESD	T	Pow. 5%	Pow. 1%
$p = 256$, $q = 1$, $V_{\mathrm{rel}}(\mathbf{\Sigma}) = 0.1$								
$N = 4$	0.3670	0.1282	0.3802	0.4010	0.0649	36.9664	0.8680	0.8214
$N = 8$	0.2217	0.0841	0.2161	0.2282	0.0586	7.8635	0.9948	0.9910
$N = 16$	0.1588	0.0546	0.1547	0.1603	0.0443	2.3327	1.0000	1.0000
$N = 32$	0.1289	0.0366	0.1252	0.1283	0.0328	−1.3113	1.0000	1.0000
$N = 64$	0.1144	0.0252	0.1131	0.1145	0.0238	0.5640	1.0000	1.0000
$N = 128$	0.1072	0.0175	0.1067	0.1072	0.0171	0.0656	1.0000	1.0000
$N = 256$	0.1036	0.0123	0.1029	0.1035	0.0123	−0.2719	1.0000	1.0000
$p = 256$, $q = 1$, $V_{\mathrm{rel}}(\mathbf{\Sigma}) = 0.2$								
$N = 4$	0.3775	0.1873	0.4345	0.4545	0.0960	56.7566	0.9408	0.9150
$N = 8$	0.2873	0.1303	0.2947	0.3059	0.0906	14.5168	0.9998	0.9996
$N = 16$	0.2445	0.0865	0.2439	0.2494	0.0717	4.8522	1.0000	1.0000
$N = 32$	0.2225	0.0586	0.2207	0.2230	0.0532	0.7110	1.0000	1.0000
$N = 64$	0.2113	0.0404	0.2113	0.2117	0.0393	0.7681	1.0000	1.0000
$N = 128$	0.2057	0.0282	0.2060	0.2063	0.0273	1.6400	1.0000	1.0000
$N = 256$	0.2028	0.0198	0.2025	0.2030	0.0195	0.6016	1.0000	1.0000
$p = 256$, $q = 1$, $V_{\mathrm{rel}}(\mathbf{\Sigma}) = 0.4$								
$N = 4$	0.4451	0.2066	0.5553	0.5569	0.1336	59.1992	0.9778	0.9692
$N = 8$	0.4261	0.1594	0.4637	0.4606	0.1249	19.5222	1.0000	1.0000
$N = 16$	0.4166	0.1105	0.4262	0.4228	0.0977	4.4222	1.0000	1.0000
$N = 32$	0.4094	0.0763	0.4148	0.4120	0.0718	2.5791	1.0000	1.0000
$N = 64$	0.4050	0.0531	0.4066	0.4058	0.0520	1.1405	1.0000	1.0000
$N = 128$	0.4026	0.0373	0.4017	0.4021	0.0365	−0.8094	1.0000	1.0000
$N = 256$	0.4013	0.0262	0.4020	0.4016	0.0260	0.7194	1.0000	1.0000
$p = 256$, $q = 1$, $V_{\mathrm{rel}}(\mathbf{\Sigma}) = 0.6$								
$N = 4$	0.5863	0.1603	0.6891	0.6644	0.1489	37.1120	0.9924	0.9878
$N = 8$	0.5910	0.1353	0.6340	0.6178	0.1277	14.8192	0.9998	0.9998
$N = 16$	0.5983	0.0978	0.6147	0.6052	0.0952	5.1681	1.0000	1.0000
$N = 32$	0.6001	0.0689	0.6085	0.6029	0.0685	2.8470	1.0000	1.0000
$N = 64$	0.6004	0.0484	0.6027	0.5997	0.0483	−0.9421	1.0000	1.0000
$N = 128$	0.6003	0.0341	0.6019	0.6002	0.0342	−0.0204	1.0000	1.0000
$N = 256$	0.6001	0.0240	0.6008	0.6002	0.0240	0.0870	1.0000	1.0000
$p = 256$, $q = 1$, $V_{\mathrm{rel}}(\mathbf{\Sigma}) = 0.8$								
$N = 4$	0.7789	0.0857	0.8347	0.7932	0.1395	7.2244	0.9968	0.9958
$N = 8$	0.7836	0.0781	0.8150	0.7930	0.0994	6.6508	1.0000	1.0000
$N = 16$	0.7926	0.0588	0.8058	0.7944	0.0663	1.9392	1.0000	1.0000
$N = 32$	0.7967	0.0422	0.8033	0.7976	0.0455	1.3138	1.0000	1.0000
$N = 64$	0.7985	0.0299	0.8010	0.7983	0.0303	−0.5863	1.0000	1.0000
$N = 128$	0.7993	0.0212	0.8010	0.7995	0.0212	0.7960	1.0000	1.0000
$N = 256$	0.7997	0.0150	0.8004	0.7998	0.0153	0.5080	1.0000	1.0000

(*continued*)

Table S2. (*continued*)

	$\approx \mathrm{E}[V_{\mathrm{rel}}(\mathbf{S})]$	$\approx \mathrm{SD}[V_{\mathrm{rel}}(\mathbf{S})]$	Median	Mean	ESD	T	Pow. 5%	Pow. 1%
$p = 256$, $q = 2$, $V_{\mathrm{rel}}(\mathbf{\Sigma}) = 0.1$								
$N = 4$	0.4005	0.0923	0.3999	0.4120	0.0570	14.2491	0.9688	0.9502
$N = 8$	0.2347	0.0547	0.2321	0.2380	0.0440	5.3249	1.0000	1.0000
$N = 16$	0.1643	0.0336	0.1618	0.1640	0.0302	−0.6560	1.0000	1.0000
$N = 32$	0.1315	0.0218	0.1301	0.1312	0.0204	−0.8040	1.0000	1.0000
$N = 64$	0.1156	0.0147	0.1149	0.1157	0.0144	0.4099	1.0000	1.0000
$N = 128$	0.1077	0.0101	0.1074	0.1076	0.0101	−0.9266	1.0000	1.0000
$N = 256$	0.1039	0.0071	0.1039	0.1040	0.0071	1.4076	1.0000	1.0000
$p = 256$, $q = 2$, $V_{\mathrm{rel}}(\mathbf{\Sigma}) = 0.2$								
$N = 4$	0.4648	0.1385	0.4678	0.4835	0.0865	15.2564	0.9948	0.9912
$N = 8$	0.3230	0.0803	0.3213	0.3272	0.0645	4.5921	1.0000	1.0000
$N = 16$	0.2599	0.0478	0.2587	0.2606	0.0430	1.0712	1.0000	1.0000
$N = 32$	0.2296	0.0301	0.2296	0.2295	0.0289	−0.2494	1.0000	1.0000
$N = 64$	0.2147	0.0199	0.2145	0.2146	0.0197	−0.4946	1.0000	1.0000
$N = 128$	0.2074	0.0136	0.2074	0.2076	0.0133	1.2036	1.0000	1.0000
$N = 256$	0.2037	0.0094	0.2037	0.2036	0.0094	−0.3174	1.0000	1.0000
$p = 256$, $q = 2$, $V_{\mathrm{rel}}(\mathbf{\Sigma}) = 0.4$								
$N = 4$	0.6418	0.1979	0.6414	0.6484	0.1237	3.7632	0.9998	0.9996
$N = 8$	0.5176	0.1062	0.4989	0.5166	0.0846	−0.8435	1.0000	1.0000
$N = 16$	0.4585	0.0553	0.4502	0.4599	0.0496	2.0152	1.0000	1.0000
$N = 32$	0.4292	0.0295	0.4255	0.4294	0.0276	0.4661	1.0000	1.0000
$N = 64$	0.4146	0.0165	0.4129	0.4145	0.0159	−0.5531	1.0000	1.0000
$N = 128$	0.4073	0.0097	0.4068	0.4072	0.0096	−0.8852	1.0000	1.0000
$N = 256$	0.4036	0.0061	0.4037	0.4037	0.0062	1.0291	1.0000	1.0000
$p = 256$, $q = 4$, $V_{\mathrm{rel}}(\mathbf{\Sigma}) = 0.1$								
$N = 4$	0.4218	0.0744	0.4150	0.4253	0.0544	4.6252	0.9958	0.9918
$N = 8$	0.2434	0.0377	0.2390	0.2431	0.0321	−0.6534	1.0000	1.0000
$N = 16$	0.1682	0.0204	0.1663	0.1679	0.0187	−1.0115	1.0000	1.0000
$N = 32$	0.1333	0.0120	0.1324	0.1331	0.0116	−1.1964	1.0000	1.0000
$N = 64$	0.1164	0.0075	0.1164	0.1165	0.0075	1.0008	1.0000	1.0000
$N = 128$	0.1082	0.0050	0.1082	0.1081	0.0049	−0.3841	1.0000	1.0000
$N = 256$	0.1041	0.0034	0.1041	0.1041	0.0034	1.4474	1.0000	1.0000
$p = 256$, $q = 4$, $V_{\mathrm{rel}}(\mathbf{\Sigma}) = 0.2$								
$N = 4$	0.5184	0.1250	0.5027	0.5188	0.0921	0.2504	0.9990	0.9986
$N = 8$	0.3465	0.0603	0.3376	0.3459	0.0517	−0.8305	1.0000	1.0000
$N = 16$	0.2705	0.0294	0.2673	0.2711	0.0278	1.3770	1.0000	1.0000
$N = 32$	0.2346	0.0148	0.2332	0.2350	0.0146	2.0066	1.0000	1.0000
$N = 64$	0.2172	0.0078	0.2164	0.2171	0.0076	−0.2420	1.0000	1.0000
$N = 128$	0.2085	0.0043	0.2082	0.2086	0.0043	0.4033	1.0000	1.0000
$N = 256$	0.2043	0.0025	0.2042	0.2043	0.0025	0.7756	1.0000	1.0000

(*continued*)

Table S2. (*continued*)

	$\approx \mathrm{E}[V_{\mathrm{rel}}(\mathbf{S})]$	$\approx \mathrm{SD}[V_{\mathrm{rel}}(\mathbf{S})]$	Median	Mean	ESD	T	Pow. 5%	Pow. 1%
$p = 1024$, $q = 1$, $V_{\mathrm{rel}}(\mathbf{\Sigma}) = 0.1$								
$N = 4$	0.3664	0.1269	0.3824	0.4005	0.0628	38.3853	0.9530	0.9368
$N = 8$	0.2214	0.0834	0.2187	0.2300	0.0594	10.3495	0.9996	0.9992
$N = 16$	0.1586	0.0541	0.1546	0.1604	0.0450	2.7974	1.0000	1.0000
$N = 32$	0.1288	0.0363	0.1252	0.1288	0.0327	−0.1243	1.0000	1.0000
$N = 64$	0.1143	0.0250	0.1129	0.1144	0.0239	0.3962	1.0000	1.0000
$N = 128$	0.1071	0.0174	0.1061	0.1068	0.0168	−1.3612	1.0000	1.0000
$N = 256$	0.1036	0.0122	0.1030	0.1034	0.0121	−0.9759	1.0000	1.0000
$p = 1024$, $q = 1$, $V_{\mathrm{rel}}(\mathbf{\Sigma}) = 0.2$								
$N = 4$	0.3772	0.1863	0.4316	0.4538	0.0966	56.1171	0.9792	0.9712
$N = 8$	0.2871	0.1296	0.2968	0.3061	0.0902	14.9086	1.0000	1.0000
$N = 16$	0.2443	0.0860	0.2460	0.2502	0.0711	5.8614	1.0000	1.0000
$N = 32$	0.2224	0.0583	0.2206	0.2229	0.0530	0.6929	1.0000	1.0000
$N = 64$	0.2113	0.0402	0.2110	0.2121	0.0385	1.4655	1.0000	1.0000
$N = 128$	0.2057	0.0281	0.2044	0.2049	0.0273	−2.0171	1.0000	1.0000
$N = 256$	0.2028	0.0197	0.2019	0.2022	0.0194	−2.1194	1.0000	1.0000
$p = 1024$, $q = 1$, $V_{\mathrm{rel}}(\mathbf{\Sigma}) = 0.4$								
$N = 4$	0.4449	0.2060	0.5508	0.5536	0.1326	57.9415	0.9934	0.9894
$N = 8$	0.4261	0.1590	0.4566	0.4548	0.1261	16.1041	1.0000	1.0000
$N = 16$	0.4166	0.1102	0.4272	0.4246	0.0990	5.7314	1.0000	1.0000
$N = 32$	0.4094	0.0761	0.4140	0.4123	0.0718	2.8690	1.0000	1.0000
$N = 64$	0.4050	0.0530	0.4068	0.4058	0.0521	1.1494	1.0000	1.0000
$N = 128$	0.4026	0.0371	0.4024	0.4024	0.0366	−0.2967	1.0000	1.0000
$N = 256$	0.4013	0.0261	0.4024	0.4016	0.0263	0.7143	1.0000	1.0000
$p = 1024$, $q = 1$, $V_{\mathrm{rel}}(\mathbf{\Sigma}) = 0.6$								
$N = 4$	0.5862	0.1600	0.6832	0.6637	0.1492	36.7630	0.9966	0.9950
$N = 8$	0.5910	0.1350	0.6344	0.6160	0.1281	13.8435	1.0000	1.0000
$N = 16$	0.5983	0.0976	0.6170	0.6051	0.0949	5.0647	1.0000	1.0000
$N = 32$	0.6001	0.0687	0.6076	0.6012	0.0692	1.0874	1.0000	1.0000
$N = 64$	0.6004	0.0483	0.6040	0.6005	0.0476	0.1575	1.0000	1.0000
$N = 128$	0.6003	0.0340	0.6016	0.6005	0.0334	0.5738	1.0000	1.0000
$N = 256$	0.6001	0.0240	0.6006	0.6000	0.0240	−0.4044	1.0000	1.0000
$p = 1024$, $q = 1$, $V_{\mathrm{rel}}(\mathbf{\Sigma}) = 0.8$								
$N = 4$	0.7789	0.0855	0.8366	0.7933	0.1392	7.3423	0.9990	0.9986
$N = 8$	0.7836	0.0780	0.8140	0.7904	0.1011	4.7652	1.0000	1.0000
$N = 16$	0.7926	0.0587	0.8081	0.7959	0.0665	3.5530	1.0000	1.0000
$N = 32$	0.7967	0.0421	0.8026	0.7967	0.0448	−0.0218	1.0000	1.0000
$N = 64$	0.7985	0.0299	0.8012	0.7987	0.0307	0.4338	1.0000	1.0000
$N = 128$	0.7993	0.0211	0.8009	0.7991	0.0220	−0.6352	1.0000	1.0000
$N = 256$	0.7997	0.0149	0.7996	0.7991	0.0154	−2.7295	1.0000	1.0000

(*continued*)

Table S2. (*continued*)

	$\approx \mathrm{E}[V_{\mathrm{rel}}(\mathbf{S})]$	$\approx \mathrm{SD}[V_{\mathrm{rel}}(\mathbf{S})]$	Median	Mean	ESD	T	Pow. 5%	Pow. 1%
$p = 1024$, $q = 2$, $V_{\mathrm{rel}}(\mathbf{\Sigma}) = 0.1$								
$N = 4$	0.3998	0.0908	0.4004	0.4135	0.0570	16.9530	0.9966	0.9932
$N = 8$	0.2343	0.0540	0.2310	0.2367	0.0428	3.9784	1.0000	1.0000
$N = 16$	0.1641	0.0332	0.1618	0.1645	0.0300	0.8667	1.0000	1.0000
$N = 32$	0.1314	0.0216	0.1304	0.1312	0.0205	−0.3665	1.0000	1.0000
$N = 64$	0.1155	0.0146	0.1157	0.1158	0.0143	1.6711	1.0000	1.0000
$N = 128$	0.1077	0.0101	0.1076	0.1078	0.0098	0.6646	1.0000	1.0000
$N = 256$	0.1038	0.0070	0.1038	0.1039	0.0070	0.2842	1.0000	1.0000
$p = 1024$, $q = 2$, $V_{\mathrm{rel}}(\mathbf{\Sigma}) = 0.2$								
$N = 4$	0.4642	0.1372	0.4699	0.4843	0.0868	16.3768	0.9992	0.9988
$N = 8$	0.3226	0.0797	0.3230	0.3279	0.0648	5.7031	1.0000	1.0000
$N = 16$	0.2597	0.0474	0.2583	0.2605	0.0433	1.1566	1.0000	1.0000
$N = 32$	0.2295	0.0300	0.2301	0.2302	0.0291	1.5109	1.0000	1.0000
$N = 64$	0.2147	0.0198	0.2143	0.2143	0.0195	−1.2399	1.0000	1.0000
$N = 128$	0.2073	0.0135	0.2074	0.2073	0.0132	−0.3207	1.0000	1.0000
$N = 256$	0.2037	0.0094	0.2039	0.2038	0.0093	0.8660	1.0000	1.0000
$p = 1024$, $q = 2$, $V_{\mathrm{rel}}(\mathbf{\Sigma}) = 0.4$								
$N = 4$	0.6410	0.1968	0.6318	0.6431	0.1222	1.2092	1.0000	1.0000
$N = 8$	0.5171	0.1057	0.5005	0.5176	0.0835	0.3728	1.0000	1.0000
$N = 16$	0.4583	0.0551	0.4494	0.4586	0.0495	0.5014	1.0000	1.0000
$N = 32$	0.4291	0.0294	0.4251	0.4290	0.0284	−0.1381	1.0000	1.0000
$N = 64$	0.4145	0.0165	0.4133	0.4146	0.0159	0.1152	1.0000	1.0000
$N = 128$	0.4073	0.0098	0.4072	0.4075	0.0096	1.4718	1.0000	1.0000
$N = 256$	0.4036	0.0061	0.4035	0.4037	0.0061	0.6990	1.0000	1.0000
$p = 1024$, $q = 4$, $V_{\mathrm{rel}}(\mathbf{\Sigma}) = 0.1$								
$N = 4$	0.4209	0.0727	0.4147	0.4244	0.0526	4.6637	0.9998	0.9998
$N = 8$	0.2429	0.0370	0.2400	0.2444	0.0329	3.3100	1.0000	1.0000
$N = 16$	0.1679	0.0201	0.1664	0.1681	0.0194	1.0058	1.0000	1.0000
$N = 32$	0.1331	0.0118	0.1324	0.1329	0.0117	−1.3092	1.0000	1.0000
$N = 64$	0.1164	0.0075	0.1161	0.1162	0.0074	−1.8472	1.0000	1.0000
$N = 128$	0.1081	0.0049	0.1082	0.1082	0.0050	0.8669	1.0000	1.0000
$N = 256$	0.1041	0.0034	0.1041	0.1041	0.0033	0.3270	1.0000	1.0000
$p = 1024$, $q = 4$, $V_{\mathrm{rel}}(\mathbf{\Sigma}) = 0.2$								
$N = 4$	0.5174	0.1234	0.5036	0.5197	0.0916	1.7658	1.0000	1.0000
$N = 8$	0.3459	0.0596	0.3379	0.3465	0.0516	0.8457	1.0000	1.0000
$N = 16$	0.2702	0.0291	0.2672	0.2711	0.0272	2.2078	1.0000	1.0000
$N = 32$	0.2345	0.0147	0.2329	0.2345	0.0142	−0.0558	1.0000	1.0000
$N = 64$	0.2171	0.0077	0.2164	0.2171	0.0076	−0.3159	1.0000	1.0000
$N = 128$	0.2085	0.0043	0.2082	0.2085	0.0042	−0.4645	1.0000	1.0000
$N = 256$	0.2042	0.0025	0.2041	0.2042	0.0025	−0.3507	1.0000	1.0000

(*continued*)

Table S2. (*continued*)

	$\approx \mathrm{E}[V_{\mathrm{rel}}(\mathbf{S})]$	$\approx \mathrm{SD}[V_{\mathrm{rel}}(\mathbf{S})]$	Median	Mean	ESD	*T*	Pow. 5%	Pow. 1%
$p = 2$, linearly decreasing λ ($V_{\mathrm{rel}}(\mathbf{\Sigma}) = 0.1111$)								
$N = 4$	0.4433	0.4624	0.5454	0.5308	0.2864	21.5974	0.0550	0.0116
$N = 8$	0.2822	0.2964	0.2773	0.3101	0.2141	9.2064	0.0964	0.0266
$N = 16$	0.1998	0.1848	0.1783	0.2080	0.1505	3.8473	0.1900	0.0548
$N = 32$	0.1564	0.1190	0.1422	0.1606	0.1065	2.8070	0.3726	0.1508
$N = 64$	0.1340	0.0794	0.1260	0.1346	0.0747	0.6060	0.6880	0.4968
$N = 128$	0.1226	0.0543	0.1191	0.1235	0.0534	1.1103	0.9492	0.8676
$N = 256$	0.1169	0.0377	0.1145	0.1167	0.0369	−0.3463	0.9990	0.9940
$p = 4$, linearly decreasing λ ($V_{\mathrm{rel}}(\mathbf{\Sigma}) = 0.0667$)								
$N = 4$	0.4440	0.2334	0.4352	0.4602	0.1600	7.1593	0.0810	0.0180
$N = 8$	0.2464	0.1278	0.2350	0.2515	0.1022	3.5335	0.1358	0.0408
$N = 16$	0.1549	0.0713	0.1466	0.1551	0.0626	0.3162	0.3068	0.1148
$N = 32$	0.1104	0.0423	0.1044	0.1098	0.0396	−1.0912	0.6722	0.3788
$N = 64$	0.0884	0.0267	0.0863	0.0890	0.0258	1.4457	0.9832	0.9172
$N = 128$	0.0775	0.0176	0.0760	0.0775	0.0174	−0.2476	1.0000	1.0000
$N = 256$	0.0721	0.0120	0.0718	0.0724	0.0117	1.6817	1.0000	1.0000
$p = 8$, linearly decreasing λ ($V_{\mathrm{rel}}(\mathbf{\Sigma}) = 0.0370$)								
$N = 4$	0.4089	0.1184	0.3958	0.4129	0.0932	2.9996	0.1068	0.0292
$N = 8$	0.2058	0.0584	0.1989	0.2060	0.0510	0.2640	0.1982	0.0808
$N = 16$	0.1178	0.0302	0.1139	0.1176	0.0282	−0.4178	0.4668	0.2476
$N = 32$	0.0766	0.0168	0.0754	0.0771	0.0165	2.2504	0.9060	0.7168
$N = 64$	0.0566	0.0100	0.0559	0.0567	0.0098	0.6109	1.0000	1.0000
$N = 128$	0.0468	0.0063	0.0463	0.0467	0.0062	−1.1788	1.0000	1.0000
$N = 256$	0.0419	0.0042	0.0416	0.0420	0.0042	1.1985	1.0000	1.0000
$p = 16$, linearly decreasing λ ($V_{\mathrm{rel}}(\mathbf{\Sigma}) = 0.0196$)								
$N = 4$	0.3773	0.0593	0.3693	0.3780	0.0526	1.0046	0.1246	0.0366
$N = 8$	0.1776	0.0274	0.1747	0.1776	0.0251	0.0584	0.2290	0.0860
$N = 16$	0.0942	0.0134	0.0932	0.0945	0.0132	1.1528	0.5654	0.3212
$N = 32$	0.0559	0.0071	0.0555	0.0560	0.0071	0.9064	0.9740	0.8924
$N = 64$	0.0375	0.0040	0.0372	0.0375	0.0040	0.0096	1.0000	1.0000
$N = 128$	0.0285	0.0024	0.0284	0.0285	0.0024	−0.6234	1.0000	1.0000
$N = 256$	0.0240	0.0015	0.0240	0.0240	0.0015	0.0265	1.0000	1.0000
$p = 32$, linearly decreasing λ ($V_{\mathrm{rel}}(\mathbf{\Sigma}) = 0.0101$)								
$N = 4$	0.3570	0.0295	0.3524	0.3575	0.0271	1.2012	0.1346	0.0410
$N = 8$	0.1611	0.0131	0.1595	0.1608	0.0125	−1.6115	0.2570	0.0966
$N = 16$	0.0810	0.0063	0.0804	0.0809	0.0061	−1.1890	0.6594	0.3810
$N = 32$	0.0445	0.0032	0.0443	0.0445	0.0031	−0.6711	0.9894	0.9498
$N = 64$	0.0271	0.0017	0.0270	0.0271	0.0017	0.5277	1.0000	1.0000
$N = 128$	0.0185	0.0010	0.0185	0.0185	0.0010	0.8847	1.0000	1.0000
$N = 256$	0.0143	0.0006	0.0143	0.0143	0.0006	−0.1711	1.0000	1.0000

(*continued*)

Table S2. (*continued*)

	$\approx \mathrm{E}[V_{\mathrm{rel}}(\mathbf{S})]$	$\approx \mathrm{SD}[V_{\mathrm{rel}}(\mathbf{S})]$	Median	Mean	ESD	T	Pow. 5%	Pow. 1%
$p = 64$, linearly decreasing λ ($V_{\mathrm{rel}}(\mathbf{\Sigma}) = 0.0051$)								
$N = 4$	0.3456	0.01471	0.3427	0.3456	0.01414	0.1623	0.1296	0.0366
$N = 8$	0.1522	0.00642	0.1514	0.1522	0.00633	0.0749	0.2962	0.1338
$N = 16$	0.0740	0.00300	0.0737	0.0739	0.00296	−1.7247	0.6844	0.4484
$N = 32$	0.0385	0.00148	0.0384	0.0385	0.00148	0.6798	0.9936	0.9696
$N = 64$	0.0216	0.00076	0.0215	0.0216	0.00076	0.7268	1.0000	1.0000
$N = 128$	0.0133	0.00041	0.0133	0.0133	0.00042	−0.5858	1.0000	1.0000
$N = 256$	0.0092	0.00024	0.0092	0.0092	0.00023	−2.1676	1.0000	1.0000
$p = 128$, linearly decreasing λ ($V_{\mathrm{rel}}(\mathbf{\Sigma}) = 0.0026$)								
$N = 4$	0.3396	0.00734	0.3381	0.3395	0.00715	−1.1276	0.1388	0.0446
$N = 8$	0.1476	0.00317	0.1473	0.1476	0.00319	1.3934	0.3240	0.1514
$N = 16$	0.0704	0.00146	0.0702	0.0703	0.00146	−1.6467	0.7072	0.4642
$N = 32$	0.0354	0.00071	0.0354	0.0354	0.00071	−0.1477	0.9956	0.9772
$N = 64$	0.0187	0.00036	0.0187	0.0187	0.00036	−0.4842	1.0000	1.0000
$N = 128$	0.0106	0.00019	0.0106	0.0106	0.00019	0.7478	1.0000	1.0000
$N = 256$	0.0066	0.00010	0.0066	0.0066	0.00010	1.7065	1.0000	1.0000
$p = 256$, linearly decreasing λ ($V_{\mathrm{rel}}(\mathbf{\Sigma}) = 0.0013$)								
$N = 4$	0.3365	0.00366	0.3357	0.3365	0.00365	0.5477	0.1388	0.0488
$N = 8$	0.1452	0.00157	0.1451	0.1453	0.00155	0.9592	0.3200	0.1046
$N = 16$	0.0685	0.00072	0.0685	0.0685	0.00071	2.6723	0.7506	0.4980
$N = 32$	0.0338	0.00035	0.0338	0.0338	0.00035	−0.3700	0.9968	0.9796
$N = 64$	0.0173	0.00017	0.0173	0.0173	0.00017	0.7181	1.0000	1.0000
$N = 128$	0.0092	0.00009	0.0092	0.0092	0.00009	−0.0474	1.0000	1.0000
$N = 256$	0.0053	0.00005	0.0053	0.0053	0.00005	−0.2356	1.0000	1.0000
$p = 1024$, linearly decreasing λ ($V_{\mathrm{rel}}(\mathbf{\Sigma}) = 0.0003$)								
$N = 4$	0.3341	0.00092	0.3340	0.3341	0.00093	0.5238	0.1328	0.0428
$N = 8$	0.1435	0.00039	0.1434	0.1435	0.00039	−0.0304	0.3188	0.1342
$N = 16$	0.0671	0.00018	0.0671	0.0671	0.00018	0.0071	0.7104	0.5334
$N = 32$	0.0327	0.00009	0.0327	0.0327	0.00009	1.9692	0.9984	0.9884
$N = 64$	0.0162	0.00004	0.0162	0.0162	0.00004	−1.4251	1.0000	1.0000
$N = 128$	0.0082	0.00002	0.0082	0.0082	0.00002	−0.7182	1.0000	1.0000
$N = 256$	0.0043	0.00001	0.0043	0.0043	0.00001	0.4714	1.0000	1.0000

(*continued*)

Table S2. (*continued*)

	$\approx \mathrm{E}[V_{\mathrm{rel}}(\mathbf{S})]$	$\approx \mathrm{SD}[V_{\mathrm{rel}}(\mathbf{S})]$	Median	Mean	ESD	T	Pow. 5%	Pow. 1%
$p = 2$, quadratically decreasing λ ($V_{\mathrm{rel}}(\mathbf{\Sigma}) = 0.3600$)								
$N = 4$	0.4588	0.3879	0.6400	0.6006	0.2781	36.0479	0.0902	0.0184
$N = 8$	0.4107	0.2919	0.4696	0.4570	0.2354	13.8894	0.2646	0.0982
$N = 16$	0.3899	0.2029	0.4064	0.4019	0.1785	4.7316	0.6200	0.3362
$N = 32$	0.3766	0.1403	0.3794	0.3790	0.1297	1.3433	0.9294	0.7882
$N = 64$	0.3687	0.0977	0.3710	0.3700	0.0946	0.9496	0.9992	0.9960
$N = 128$	0.3645	0.0685	0.3644	0.3653	0.0671	0.8978	1.0000	1.0000
$N = 256$	0.3623	0.0482	0.3629	0.3620	0.0480	−0.4354	1.0000	1.0000
$p = 4$, quadratically decreasing λ ($V_{\mathrm{rel}}(\mathbf{\Sigma}) = 0.1911$)								
$N = 4$	0.4786	0.2770	0.5126	0.5300	0.1744	20.8377	0.1746	0.0572
$N = 8$	0.3332	0.1705	0.3275	0.3461	0.1250	7.3018	0.3820	0.1802
$N = 16$	0.2628	0.1044	0.2523	0.2658	0.0869	2.4188	0.8598	0.6038
$N = 32$	0.2272	0.0667	0.2212	0.2286	0.0606	1.6646	0.9998	0.9914
$N = 64$	0.2092	0.0444	0.2043	0.2090	0.0418	−0.3674	1.0000	1.0000
$N = 128$	0.2002	0.0303	0.1977	0.2004	0.0293	0.5275	1.0000	1.0000
$N = 256$	0.1957	0.0211	0.1948	0.1956	0.0205	−0.2530	1.0000	1.0000
$p = 8$, quadratically decreasing λ ($V_{\mathrm{rel}}(\mathbf{\Sigma}) = 0.0980$)								
$N = 4$	0.4455	0.1557	0.4359	0.4568	0.1104	7.2433	0.2120	0.0808
$N = 8$	0.2589	0.0830	0.2499	0.2608	0.0683	1.8730	0.5416	0.3214
$N = 16$	0.1759	0.0461	0.1704	0.1762	0.0410	0.6287	0.9666	0.8714
$N = 32$	0.1363	0.0274	0.1333	0.1365	0.0257	0.3997	1.0000	1.0000
$N = 64$	0.1170	0.0174	0.1152	0.1169	0.0170	−0.7032	1.0000	1.0000
$N = 128$	0.1075	0.0116	0.1067	0.1075	0.0114	0.0192	1.0000	1.0000
$N = 256$	0.1028	0.0079	0.1023	0.1028	0.0078	0.2060	1.0000	1.0000
$p = 16$, quadratically decreasing λ ($V_{\mathrm{rel}}(\mathbf{\Sigma}) = 0.0496$)								
$N = 4$	0.4022	0.0801	0.3929	0.4044	0.0655	2.4555	0.2552	0.1008
$N = 8$	0.2069	0.0388	0.2025	0.2075	0.0346	1.1343	0.6284	0.3734
$N = 16$	0.1243	0.0201	0.1219	0.1242	0.0189	−0.2887	0.9884	0.9362
$N = 32$	0.0860	0.0112	0.0851	0.0861	0.0108	0.3780	1.0000	1.0000
$N = 64$	0.0676	0.0068	0.0670	0.0676	0.0066	0.5759	1.0000	1.0000
$N = 128$	0.0585	0.0043	0.0582	0.0584	0.0042	−1.0260	1.0000	1.0000
$N = 256$	0.0540	0.0029	0.0540	0.0541	0.0029	2.0991	1.0000	1.0000
$p = 32$, quadratically decreasing λ ($V_{\mathrm{rel}}(\mathbf{\Sigma}) = 0.0249$)								
$N = 4$	0.3713	0.0401	0.3642	0.3715	0.0363	0.3888	0.2768	0.1296
$N = 8$	0.1765	0.0183	0.1741	0.1765	0.0177	0.2092	0.6570	0.4126
$N = 16$	0.0962	0.0090	0.0953	0.0960	0.0087	−1.6594	0.9944	0.9622
$N = 32$	0.0595	0.0048	0.0593	0.0596	0.0047	0.8578	1.0000	1.0000
$N = 64$	0.0420	0.0027	0.0418	0.0420	0.0027	−0.3644	1.0000	1.0000
$N = 128$	0.0334	0.0017	0.0333	0.0334	0.0017	0.6213	1.0000	1.0000
$N = 256$	0.0291	0.0011	0.0291	0.0291	0.0011	0.8151	1.0000	1.0000

(*continued*)

Table S2. (*continued*)

	$\approx \mathrm{E}[V_{\mathrm{rel}}(\mathbf{S})]$	$\approx \mathrm{SD}[V_{\mathrm{rel}}(\mathbf{S})]$	Median	Mean	ESD	T	Pow. 5%	Pow. 1%
$p = 64$, quadratically decreasing λ ($V_{\mathrm{rel}}(\mathbf{\Sigma}) = 0.0125$)								
$N = 4$	0.3532	0.01994	0.3501	0.3537	0.01885	1.7900	0.2828	0.1174
$N = 8$	0.1601	0.00883	0.1590	0.1600	0.00873	−0.6981	0.6952	0.4790
$N = 16$	0.0816	0.00420	0.0814	0.0818	0.00424	2.1275	0.9958	0.9770
$N = 32$	0.0460	0.00213	0.0459	0.0460	0.00209	0.5724	1.0000	1.0000
$N = 64$	0.0290	0.00115	0.0290	0.0290	0.00114	2.1029	1.0000	1.0000
$N = 128$	0.0207	0.00066	0.0206	0.0207	0.00066	−1.9228	1.0000	1.0000
$N = 256$	0.0166	0.00041	0.0166	0.0166	0.00041	0.8326	1.0000	1.0000
$p = 128$, quadratically decreasing λ ($V_{\mathrm{rel}}(\mathbf{\Sigma}) = 0.0062$)								
$N = 4$	0.3435	0.00993	0.3416	0.3436	0.00964	0.2942	0.2888	0.1320
$N = 8$	0.1516	0.00432	0.1511	0.1515	0.00424	−0.6585	0.7264	0.5188
$N = 16$	0.0742	0.00202	0.0741	0.0742	0.00200	−0.8615	0.9962	0.9824
$N = 32$	0.0392	0.00100	0.0391	0.0391	0.00100	−1.0978	1.0000	1.0000
$N = 64$	0.0224	0.00052	0.0224	0.0224	0.00051	−1.0415	1.0000	1.0000
$N = 128$	0.0143	0.00028	0.0143	0.0143	0.00028	−0.0377	1.0000	1.0000
$N = 256$	0.0102	0.00016	0.0102	0.0102	0.00016	−0.4172	1.0000	1.0000
$p = 256$, quadratically decreasing λ ($V_{\mathrm{rel}}(\mathbf{\Sigma}) = 0.0031$)								
$N = 4$	0.3385	0.00495	0.3375	0.3385	0.00483	−0.3735	0.2886	0.1312
$N = 8$	0.1472	0.00214	0.1470	0.1472	0.00212	0.1107	0.7280	0.4636
$N = 16$	0.0704	0.00099	0.0704	0.0704	0.00098	−1.6367	0.9976	0.9846
$N = 32$	0.0357	0.00048	0.0357	0.0357	0.00048	0.6626	1.0000	1.0000
$N = 64$	0.0192	0.00024	0.0192	0.0192	0.00024	−1.5591	1.0000	1.0000
$N = 128$	0.0111	0.00013	0.0111	0.0111	0.00013	−2.4955	1.0000	1.0000
$N = 256$	0.0071	0.00007	0.0071	0.0071	0.00007	0.0791	1.0000	1.0000
$p = 1024$, quadratically decreasing λ ($V_{\mathrm{rel}}(\mathbf{\Sigma}) = 0.0008$)								
$N = 4$	0.3346	0.00124	0.3344	0.3346	0.00121	0.6326	0.2838	0.1306
$N = 8$	0.1440	0.00053	0.1439	0.1440	0.00054	1.2686	0.7300	0.5134
$N = 16$	0.0676	0.00024	0.0676	0.0676	0.00024	−1.5337	0.9968	0.9880
$N = 32$	0.0331	0.00012	0.0331	0.0331	0.00011	0.5647	1.0000	1.0000
$N = 64$	0.0167	0.00006	0.0167	0.0167	0.00006	−0.7195	1.0000	1.0000
$N = 128$	0.0087	0.00003	0.0087	0.0087	0.00003	−1.0076	1.0000	1.0000
$N = 256$	0.0047	0.00001	0.0047	0.0047	0.00002	−0.1773	1.0000	1.0000

Table S3. Summary statistics of simulation results for $V_{rel}(\mathbf{R})$. Theoretical expectation (E[$V_{rel}(\mathbf{R})$]) and standard deviation (SD[$V_{rel}(\mathbf{R})$]; asymptotic results are shown for the latter in non-null conditions with $p > 2$), and empirical median, mean, standard deviation (ESD), bias in standard error unit (T), and critical points or power (for null and non-null conditions, respectively) at $\alpha = 0.05$ and 0.01 (CP/Pow. 5% and 1%) from 5000 simulation runs are shown. See Table S1 for further information.

	E[$V_{rel}(\mathbf{R})$]	SD[$V_{rel}(\mathbf{R})$]	Median	Mean	ESD	T	CP 5%	CP 1%
$p = 2$, $V_{rel}(\mathbf{P}) = 0$								
$N = 4$	0.3333	0.2981	0.2517	0.3325	0.2989	−0.1990	0.9021	0.9807
$N = 8$	0.1429	0.1650	0.0792	0.1429	0.1635	0.0363	0.4979	0.6857
$N = 16$	0.0667	0.0856	0.0336	0.0679	0.0862	1.0235	0.2456	0.3876
$N = 32$	0.0323	0.0435	0.0163	0.0326	0.0427	0.6113	0.1194	0.1934
$N = 64$	0.0159	0.0219	0.0075	0.0156	0.0205	−1.0380	0.0583	0.0938
$N = 128$	0.0079	0.0110	0.0035	0.0076	0.0104	−1.5798	0.0295	0.0467
$N = 256$	0.0039	0.0055	0.0018	0.0039	0.0054	−0.3981	0.0148	0.0252
$p = 4$, $V_{rel}(\mathbf{P}) = 0$								
$N = 4$	0.3333	0.1217	0.3152	0.3327	0.1214	−0.3906	0.5646	0.7079
$N = 8$	0.1429	0.0673	0.1332	0.1432	0.0673	0.3148	0.2728	0.3435
$N = 16$	0.0667	0.0349	0.0608	0.0661	0.0344	−1.0696	0.1289	0.1728
$N = 32$	0.0323	0.0178	0.0292	0.0321	0.0175	−0.6906	0.0642	0.0866
$N = 64$	0.0159	0.0090	0.0142	0.0157	0.0087	−1.0749	0.0323	0.0426
$N = 128$	0.0079	0.0045	0.0070	0.0079	0.0045	0.0033	0.0165	0.0215
$N = 256$	0.0039	0.0023	0.0035	0.0039	0.0022	−0.9161	0.0081	0.0107
$p = 8$, $V_{rel}(\mathbf{P}) = 0$								
$N = 4$	0.3333	0.0563	0.3228	0.3336	0.0569	0.3780	0.4418	0.5149
$N = 8$	0.1429	0.0312	0.1402	0.1428	0.0312	−0.1003	0.1975	0.2302
$N = 16$	0.0667	0.0162	0.0654	0.0668	0.0159	0.4573	0.0948	0.1102
$N = 32$	0.0323	0.0082	0.0315	0.0322	0.0082	−0.1190	0.0465	0.0544
$N = 64$	0.0159	0.0041	0.0156	0.0159	0.0041	0.2305	0.0232	0.0270
$N = 128$	0.0079	0.0021	0.0077	0.0079	0.0021	0.0628	0.0117	0.0136
$N = 256$	0.0039	0.0010	0.0039	0.0039	0.0010	1.2483	0.0058	0.0067
$p = 16$, $V_{rel}(\mathbf{P}) = 0$								
$N = 4$	0.3333	0.0272	0.3281	0.3332	0.0265	−0.4751	0.3850	0.4135
$N = 8$	0.1429	0.0151	0.1411	0.1428	0.0151	−0.0917	0.1698	0.1840
$N = 16$	0.0667	0.0078	0.0663	0.0669	0.0080	1.7743	0.0810	0.0879
$N = 32$	0.0323	0.0040	0.0319	0.0322	0.0039	−1.7517	0.0389	0.0428
$N = 64$	0.0159	0.0020	0.0158	0.0159	0.0020	0.7127	0.0192	0.0209
$N = 128$	0.0079	0.0010	0.0078	0.0079	0.0010	−0.7405	0.0096	0.0104
$N = 256$	0.0039	0.0005	0.0039	0.0039	0.0005	1.3884	0.0048	0.0052
$p = 32$, $V_{rel}(\mathbf{P}) = 0$								
$N = 4$	0.3333	0.0134	0.3306	0.3332	0.0133	−0.7714	0.3586	0.3770
$N = 8$	0.1429	0.0074	0.1418	0.1426	0.0074	−2.0764	0.1562	0.1627
$N = 16$	0.0667	0.0038	0.0665	0.0666	0.0038	−1.7329	0.0732	0.0766
$N = 32$	0.0323	0.0020	0.0322	0.0322	0.0019	−1.3105	0.0355	0.0370
$N = 64$	0.0159	0.0010	0.0158	0.0159	0.0010	−0.5099	0.0175	0.0183
$N = 128$	0.0079	0.0005	0.0079	0.0079	0.0005	−0.0426	0.0087	0.0091
$N = 256$	0.0039	0.0002	0.0039	0.0039	0.0002	−0.0743	0.0043	0.0045

(*continued*)

Table S3. (*continued*)

	E[V_{rel}(**R**)]	SD[V_{rel}(**R**)]	Median	Mean	ESD	*T*	CP 5%	CP 1%
$p = 64$, $V_{rel}(\mathbf{P}) = 0$								
$N = 4$	0.3333	0.00664	0.3320	0.3333	0.00677	−0.0624	0.3463	0.3543
$N = 8$	0.1429	0.00367	0.1425	0.1428	0.00363	−0.4617	0.1492	0.1530
$N = 16$	0.0667	0.00191	0.0666	0.0667	0.00188	0.4407	0.0699	0.0716
$N = 32$	0.0323	0.00097	0.0322	0.0323	0.00099	−0.0725	0.0339	0.0347
$N = 64$	0.0159	0.00049	0.0159	0.0159	0.00048	−0.6525	0.0167	0.0170
$N = 128$	0.0079	0.00025	0.0079	0.0079	0.00025	0.8165	0.0083	0.0085
$N = 256$	0.0039	0.00012	0.0039	0.0039	0.00012	1.7441	0.0041	0.0042
$p = 128$, $V_{rel}(\mathbf{P}) = 0$								
$N = 4$	0.3333	0.00331	0.3327	0.3333	0.00327	0.1648	0.3397	0.3433
$N = 8$	0.1429	0.00183	0.1427	0.1428	0.00180	−1.3211	0.1460	0.1478
$N = 16$	0.0667	0.00095	0.0666	0.0667	0.00094	0.7843	0.0683	0.0692
$N = 32$	0.0323	0.00048	0.0322	0.0323	0.00049	0.3062	0.0331	0.0334
$N = 64$	0.0159	0.00024	0.0159	0.0159	0.00024	−0.7890	0.0163	0.0165
$N = 128$	0.0079	0.00012	0.0079	0.0079	0.00012	−0.8957	0.0081	0.0082
$N = 256$	0.0039	0.00006	0.0039	0.0039	0.00006	0.3419	0.0040	0.0041
$p = 256$, $V_{rel}(\mathbf{P}) = 0$								
$N = 4$	0.3333	0.00165	0.3330	0.3334	0.00170	1.8964	0.3366	0.3388
$N = 8$	0.1429	0.00091	0.1428	0.1429	0.00091	0.0105	0.1445	0.1453
$N = 16$	0.0667	0.00047	0.0667	0.0667	0.00047	1.8676	0.0675	0.0679
$N = 32$	0.0323	0.00024	0.0323	0.0323	0.00024	−0.9701	0.0327	0.0328
$N = 64$	0.0159	0.00012	0.0159	0.0159	0.00012	0.3244	0.0161	0.0162
$N = 128$	0.0079	0.00006	0.0079	0.0079	0.00006	0.8789	0.0080	0.0080
$N = 256$	0.0039	0.00003	0.0039	0.0039	0.00003	0.5874	0.0040	0.0040
$p = 1024$, $V_{rel}(\mathbf{P}) = 0$								
$N = 4$	0.3333	0.00041	0.3333	0.3333	0.00041	1.4469	0.3342	0.3346
$N = 8$	0.1429	0.00023	0.1428	0.1429	0.00023	−0.9639	0.1433	0.1435
$N = 16$	0.0667	0.00012	0.0667	0.0667	0.00012	0.5220	0.0669	0.0670
$N = 32$	0.0323	0.00006	0.0323	0.0323	0.00006	−1.8393	0.0324	0.0324
$N = 64$	0.0159	0.00003	0.0159	0.0159	0.00003	−0.0357	0.0159	0.0159
$N = 128$	0.0079	0.00002	0.0079	0.0079	0.00002	0.1288	0.0079	0.0079
$N = 256$	0.0039	0.00001	0.0039	0.0039	0.00001	−0.3305	0.0039	0.0039

(*continued*)

Table S3. (*continued*)

	E[V_{rel}(**R**)]	SD[V_{rel}(**R**)]	Median	Mean	ESD	T	Pow. 5%	Pow. 1%
$p = 2, q = 1, V_{rel}(\mathbf{P}) = 0.1$								
$N = 4$	0.3745	0.3092	0.3229	0.3769	0.3071	0.5423	0.0606	0.0126
$N = 8$	0.2108	0.2061	0.1513	0.2161	0.2092	1.7989	0.1222	0.0372
$N = 16$	0.1499	0.1420	0.1031	0.1437	0.1389	−3.1691	0.2126	0.0712
$N = 32$	0.1237	0.1001	0.1050	0.1259	0.1012	1.5152	0.4484	0.2328
$N = 64$	0.1115	0.0709	0.1011	0.1117	0.0702	0.2070	0.7482	0.5448
$N = 128$	0.1057	0.0502	0.0996	0.1047	0.0503	−1.4136	0.9612	0.8832
$N = 256$	0.1028	0.0355	0.1018	0.1038	0.0355	1.9926	0.9998	0.9968
$p = 2, q = 1, V_{rel}(\mathbf{P}) = 0.2$								
$N = 4$	0.4184	0.3169	0.3856	0.4190	0.3181	0.1492	0.0826	0.0178
$N = 8$	0.2814	0.2314	0.2368	0.2799	0.2312	−0.4442	0.1958	0.0660
$N = 16$	0.2350	0.1696	0.2114	0.2330	0.1682	−0.8121	0.4312	0.1894
$N = 32$	0.2162	0.1229	0.2045	0.2162	0.1232	0.0219	0.7550	0.5344
$N = 64$	0.2078	0.0881	0.2054	0.2083	0.0890	0.3926	0.9686	0.9028
$N = 128$	0.2038	0.0628	0.2018	0.2040	0.0623	0.1506	1.0000	0.9990
$N = 256$	0.2019	0.0446	0.2014	0.2025	0.0442	1.0388	1.0000	1.0000
$p = 2, q = 1, V_{rel}(\mathbf{P}) = 0.4$								
$N = 4$	0.5158	0.3203	0.5639	0.5254	0.3179	2.1361	0.1410	0.0274
$N = 8$	0.4318	0.2495	0.4362	0.4294	0.2516	−0.6571	0.4256	0.1854
$N = 16$	0.4111	0.1844	0.4230	0.4147	0.1832	1.3640	0.8050	0.5666
$N = 32$	0.4046	0.1326	0.4056	0.4041	0.1322	−0.2806	0.9858	0.9388
$N = 64$	0.4021	0.0944	0.4058	0.4025	0.0954	0.3294	1.0000	1.0000
$N = 128$	0.4010	0.0669	0.4020	0.4013	0.0665	0.3770	1.0000	1.0000
$N = 256$	0.4005	0.0474	0.4006	0.4000	0.0480	−0.7435	1.0000	1.0000
$p = 2, q = 1, V_{rel}(\mathbf{P}) = 0.6$								
$N = 4$	0.6313	0.3022	0.7219	0.6328	0.3010	0.3570	0.2224	0.0522
$N = 8$	0.5973	0.2285	0.6376	0.5970	0.2281	−0.0946	0.7126	0.4182
$N = 16$	0.5963	0.1608	0.6175	0.5980	0.1623	0.7784	0.9678	0.8914
$N = 32$	0.5978	0.1120	0.6072	0.5973	0.1108	−0.3007	0.9998	0.9990
$N = 64$	0.5988	0.0784	0.6017	0.5978	0.0787	−0.8984	1.0000	1.0000
$N = 128$	0.5994	0.0551	0.6010	0.5991	0.0556	−0.3529	1.0000	1.0000
$N = 256$	0.5997	0.0389	0.6008	0.5996	0.0385	−0.2220	1.0000	1.0000
$p = 2, q = 1, V_{rel}(\mathbf{P}) = 0.8$								
$N = 4$	0.7768	0.2440	0.8733	0.7748	0.2470	−0.5570	0.4220	0.1180
$N = 8$	0.7831	0.1596	0.8250	0.7853	0.1571	0.9790	0.9352	0.8012
$N = 16$	0.7918	0.1015	0.8141	0.7928	0.1033	0.6253	0.9996	0.9956
$N = 32$	0.7961	0.0674	0.8076	0.7976	0.0680	1.5536	1.0000	1.0000
$N = 64$	0.7981	0.0462	0.8024	0.7976	0.0473	−0.6617	1.0000	1.0000
$N = 128$	0.7991	0.0321	0.8006	0.7986	0.0319	−1.0007	1.0000	1.0000
$N = 256$	0.7995	0.0225	0.8008	0.8001	0.0223	1.8536	1.0000	1.0000

(*continued*)

Table S3. (*continued*)

	$E[V_{rel}(\mathbf{R})]$	$\approx SD[V_{rel}(\mathbf{R})]$	Median	Mean	ESD	T	Pow. 5%	Pow. 1%
$p = 4, q = 1, V_{rel}(\mathbf{P}) = 0.1$								
$N = 4$	0.3745	0.1986	0.3467	0.3755	0.1470	0.4579	0.1144	0.0368
$N = 8$	0.2108	0.1300	0.1917	0.2134	0.1115	1.6596	0.2484	0.1262
$N = 16$	0.1499	0.0888	0.1373	0.1511	0.0815	1.0182	0.5380	0.3360
$N = 32$	0.1237	0.0618	0.1155	0.1240	0.0594	0.3959	0.8520	0.7024
$N = 64$	0.1115	0.0433	0.1070	0.1116	0.0429	0.0896	0.9884	0.9720
$N = 128$	0.1057	0.0305	0.1045	0.1065	0.0303	1.9867	1.0000	0.9998
$N = 256$	0.1028	0.0215	0.1016	0.1025	0.0213	−1.0710	1.0000	1.0000
$p = 4, q = 1, V_{rel}(\mathbf{P}) = 0.2$								
$N = 4$	0.4184	0.2729	0.3831	0.4167	0.1663	−0.7193	0.1916	0.0690
$N = 8$	0.2814	0.1786	0.2562	0.2822	0.1433	0.4227	0.4578	0.2962
$N = 16$	0.2350	0.1220	0.2242	0.2352	0.1090	0.1625	0.8206	0.6788
$N = 32$	0.2162	0.0849	0.2107	0.2156	0.0792	−0.5585	0.9862	0.9592
$N = 64$	0.2078	0.0595	0.2040	0.2076	0.0584	−0.1842	1.0000	1.0000
$N = 128$	0.2038	0.0419	0.2011	0.2028	0.0411	−1.6816	1.0000	1.0000
$N = 256$	0.2019	0.0296	0.2016	0.2023	0.0297	0.8644	1.0000	1.0000
$p = 4, q = 1, V_{rel}(\mathbf{P}) = 0.4$								
$N = 4$	0.5158	0.3175	0.4927	0.5144	0.2023	−0.4921	0.3980	0.2132
$N = 8$	0.4318	0.2078	0.4314	0.4287	0.1750	−1.2271	0.7814	0.6600
$N = 16$	0.4111	0.1420	0.4141	0.4093	0.1317	−0.9769	0.9866	0.9596
$N = 32$	0.4046	0.0988	0.4054	0.4034	0.0960	−0.8743	1.0000	1.0000
$N = 64$	0.4021	0.0693	0.4033	0.4022	0.0687	0.1270	1.0000	1.0000
$N = 128$	0.4010	0.0488	0.4016	0.4003	0.0484	−0.9561	1.0000	1.0000
$N = 256$	0.4005	0.0344	0.3998	0.3997	0.0336	−1.7358	1.0000	1.0000
$p = 4, q = 1, V_{rel}(\mathbf{P}) = 0.6$								
$N = 4$	0.6313	0.2736	0.6644	0.6329	0.2101	0.5400	0.6206	0.4366
$N = 8$	0.5973	0.1791	0.6219	0.5978	0.1714	0.2242	0.9456	0.9046
$N = 16$	0.5963	0.1223	0.6106	0.5949	0.1216	−0.7641	0.9994	0.9986
$N = 32$	0.5978	0.0851	0.6047	0.5975	0.0846	−0.1828	1.0000	1.0000
$N = 64$	0.5988	0.0597	0.6019	0.5985	0.0606	−0.3532	1.0000	1.0000
$N = 128$	0.5994	0.0420	0.6005	0.5980	0.0422	−2.2753	1.0000	1.0000
$N = 256$	0.5997	0.0297	0.6006	0.5996	0.0304	−0.3144	1.0000	1.0000
$p = 4, q = 1, V_{rel}(\mathbf{P}) = 0.8$								
$N = 4$	0.7768	0.1640	0.8388	0.7754	0.1873	−0.5322	0.8496	0.7278
$N = 8$	0.7831	0.1073	0.8149	0.7840	0.1249	0.4605	0.9970	0.9896
$N = 16$	0.7918	0.0733	0.8059	0.7913	0.0815	−0.4682	1.0000	0.9998
$N = 32$	0.7961	0.0510	0.8027	0.7953	0.0543	−1.0173	1.0000	1.0000
$N = 64$	0.7981	0.0358	0.8019	0.7987	0.0370	1.2077	1.0000	1.0000
$N = 128$	0.7991	0.0252	0.8008	0.7991	0.0255	0.1156	1.0000	1.0000
$N = 256$	0.7995	0.0178	0.8003	0.7995	0.0176	0.0407	1.0000	1.0000

(*continued*)

Table S3. (*continued*)

	$E[V_{rel}(\mathbf{R})]$	$\approx SD[V_{rel}(\mathbf{R})]$	Median	Mean	ESD	T	Pow. 5%	Pow. 1%
$p = 4, q = 2, V_{rel}(\mathbf{P}) = 0.1$								
$N = 4$	0.3773	0.1043	0.3512	0.3774	0.1431	0.0581	0.1082	0.0342
$N = 8$	0.2135	0.0683	0.2034	0.2142	0.0884	0.5188	0.2168	0.0820
$N = 16$	0.1518	0.0467	0.1465	0.1514	0.0570	−0.4810	0.6370	0.3098
$N = 32$	0.1248	0.0325	0.1233	0.1255	0.0361	1.3664	0.9658	0.8672
$N = 64$	0.1121	0.0228	0.1115	0.1125	0.0245	1.0436	1.0000	0.9992
$N = 128$	0.1060	0.0160	0.1057	0.1061	0.0166	0.3845	1.0000	1.0000
$N = 256$	0.1030	0.0113	0.1025	0.1027	0.0116	−1.9263	1.0000	1.0000
$p = 4, q = 2, V_{rel}(\mathbf{P}) = 0.2$								
$N = 4$	0.4327	0.0843	0.3983	0.4377	0.1622	2.1772	0.2110	0.0806
$N = 8$	0.2943	0.0552	0.2784	0.2948	0.1011	0.3354	0.5266	0.2416
$N = 16$	0.2432	0.0377	0.2373	0.2428	0.0578	−0.4744	0.9880	0.9142
$N = 32$	0.2208	0.0262	0.2202	0.2212	0.0357	0.8814	1.0000	1.0000
$N = 64$	0.2102	0.0184	0.2097	0.2100	0.0220	−0.4393	1.0000	1.0000
$N = 128$	0.2050	0.0130	0.2052	0.2049	0.0146	−0.5257	1.0000	1.0000
$N = 256$	0.2025	0.0091	0.2025	0.2025	0.0096	0.2252	1.0000	1.0000
$p = 4, q = 2, V_{rel}(\mathbf{P}) = 0.4$ (This comformation is impossible)								

(*continued*)

Table S3. (*continued*)

	$E[V_{rel}(\mathbf{R})]$	$\approx SD[V_{rel}(\mathbf{R})]$	Median	Mean	ESD	T	Pow. 5%	Pow. 1%
$p = 8, q = 1, V_{rel}(\mathbf{P}) = 0.1$								
$N = 4$	0.3745	0.1516	0.3546	0.3735	0.0876	−0.7927	0.1848	0.0746
$N = 8$	0.2108	0.0993	0.1930	0.2101	0.0762	−0.6583	0.4750	0.3218
$N = 16$	0.1499	0.0678	0.1394	0.1496	0.0590	−0.3952	0.8288	0.7152
$N = 32$	0.1237	0.0472	0.1193	0.1238	0.0440	0.2041	0.9884	0.9706
$N = 64$	0.1115	0.0331	0.1091	0.1119	0.0323	0.7713	0.9998	0.9996
$N = 128$	0.1057	0.0233	0.1045	0.1053	0.0228	−1.1017	1.0000	1.0000
$N = 256$	0.1028	0.0164	0.1020	0.1030	0.0165	0.6914	1.0000	1.0000
$p = 8, q = 1, V_{rel}(\mathbf{P}) = 0.2$								
$N = 4$	0.4184	0.2228	0.3921	0.4189	0.1187	0.3123	0.3430	0.1946
$N = 8$	0.2814	0.1459	0.2643	0.2826	0.1088	0.7886	0.7554	0.6256
$N = 16$	0.2350	0.0997	0.2253	0.2336	0.0864	−1.1163	0.9706	0.9458
$N = 32$	0.2162	0.0693	0.2124	0.2164	0.0658	0.1980	1.0000	0.9998
$N = 64$	0.2078	0.0486	0.2052	0.2072	0.0480	−0.9238	1.0000	1.0000
$N = 128$	0.2038	0.0342	0.2040	0.2046	0.0333	1.6580	1.0000	1.0000
$N = 256$	0.2019	0.0242	0.2015	0.2017	0.0241	−0.6367	1.0000	1.0000
$p = 8, q = 1, V_{rel}(\mathbf{P}) = 0.4$								
$N = 4$	0.5158	0.2753	0.4939	0.5144	0.1590	−0.6168	0.6076	0.4548
$N = 8$	0.4318	0.1802	0.4270	0.4286	0.1493	−1.5260	0.9392	0.8950
$N = 16$	0.4111	0.1231	0.4143	0.4127	0.1120	1.0025	0.9990	0.9986
$N = 32$	0.4046	0.0856	0.4066	0.4046	0.0835	−0.0028	1.0000	1.0000
$N = 64$	0.4021	0.0601	0.4032	0.4023	0.0590	0.2713	1.0000	1.0000
$N = 128$	0.4010	0.0423	0.4019	0.4014	0.0419	0.7597	1.0000	1.0000
$N = 256$	0.4005	0.0299	0.4003	0.4001	0.0293	−0.8777	1.0000	1.0000
$p = 8, q = 1, V_{rel}(\mathbf{P}) = 0.6$								
$N = 4$	0.6313	0.2447	0.6492	0.6303	0.1808	−0.3763	0.8000	0.7026
$N = 8$	0.5973	0.1602	0.6178	0.5958	0.1530	−0.6788	0.9932	0.9826
$N = 16$	0.5963	0.1094	0.6130	0.5984	0.1090	1.4179	0.9998	0.9998
$N = 32$	0.5978	0.0761	0.6017	0.5954	0.0778	−2.0986	1.0000	1.0000
$N = 64$	0.5988	0.0534	0.6008	0.5984	0.0540	−0.5764	1.0000	1.0000
$N = 128$	0.5994	0.0376	0.6012	0.5992	0.0371	−0.3409	1.0000	1.0000
$N = 256$	0.5997	0.0265	0.6008	0.5995	0.0266	−0.4008	1.0000	1.0000
$p = 8, q = 1, V_{rel}(\mathbf{P}) = 0.8$								
$N = 4$	0.7768	0.1496	0.8337	0.7780	0.1658	0.5054	0.9350	0.8998
$N = 8$	0.7831	0.0979	0.8104	0.7828	0.1154	−0.2029	0.9996	0.9992
$N = 16$	0.7918	0.0669	0.8028	0.7899	0.0749	−1.8621	1.0000	1.0000
$N = 32$	0.7961	0.0465	0.8017	0.7965	0.0479	0.6755	1.0000	1.0000
$N = 64$	0.7981	0.0326	0.8001	0.7975	0.0332	−1.1567	1.0000	1.0000
$N = 128$	0.7991	0.0230	0.8008	0.7994	0.0232	0.9506	1.0000	1.0000
$N = 256$	0.7995	0.0162	0.7999	0.7993	0.0162	−1.2035	1.0000	1.0000

(*continued*)

Table S3. (*continued*)

	$E[V_{rel}(\mathbf{R})]$	$\approx SD[V_{rel}(\mathbf{R})]$	Median	Mean	ESD	T	Pow. 5%	Pow. 1%
$p = 8, q = 2, V_{rel}(\mathbf{P}) = 0.1$								
$N = 4$	0.3763	0.0874	0.3606	0.3752	0.0815	−0.9284	0.1786	0.0626
$N = 8$	0.2126	0.0572	0.2057	0.2129	0.0588	0.4217	0.5632	0.3392
$N = 16$	0.1511	0.0391	0.1473	0.1509	0.0402	−0.4468	0.9354	0.8492
$N = 32$	0.1244	0.0272	0.1231	0.1244	0.0277	−0.0301	1.0000	0.9984
$N = 64$	0.1119	0.0191	0.1107	0.1112	0.0193	−2.8395	1.0000	1.0000
$N = 128$	0.1059	0.0134	0.1058	0.1060	0.0135	0.7249	1.0000	1.0000
$N = 256$	0.1029	0.0095	0.1029	0.1029	0.0095	−0.3405	1.0000	1.0000
$p = 8, q = 2, V_{rel}(\mathbf{P}) = 0.2$								
$N = 4$	0.4270	0.0943	0.4066	0.4284	0.1047	0.9149	0.3598	0.1860
$N = 8$	0.2895	0.0617	0.2813	0.2891	0.0748	−0.4132	0.9128	0.7928
$N = 16$	0.2403	0.0422	0.2369	0.2398	0.0502	−0.7208	0.9996	0.9974
$N = 32$	0.2192	0.0293	0.2186	0.2191	0.0325	−0.2502	1.0000	1.0000
$N = 64$	0.2094	0.0206	0.2092	0.2091	0.0220	−0.7467	1.0000	1.0000
$N = 128$	0.2046	0.0145	0.2045	0.2046	0.0149	−0.1112	1.0000	1.0000
$N = 256$	0.2023	0.0102	0.2024	0.2023	0.0101	−0.1530	1.0000	1.0000
$p = 8, q = 2, V_{rel}(\mathbf{P}) = 0.4$								
$N = 4$	0.5793	0.0182	0.5317	0.5781	0.1562	−0.5295	0.7550	0.5354
$N = 8$	0.4772	0.0119	0.4436	0.4764	0.0891	−0.6747	1.0000	1.0000
$N = 16$	0.4363	0.0082	0.4192	0.4355	0.0469	−1.0874	1.0000	1.0000
$N = 32$	0.4176	0.0057	0.4098	0.4178	0.0244	0.5427	1.0000	1.0000
$N = 64$	0.4087	0.0040	0.4053	0.4086	0.0126	−0.1456	1.0000	1.0000
$N = 128$	0.4043	0.0028	0.4030	0.4043	0.0066	0.2277	1.0000	1.0000
$N = 256$	0.4021	0.0020	0.4016	0.4022	0.0037	0.5998	1.0000	1.0000
$p = 8, q = 4, V_{rel}(\mathbf{P}) = 0.1$								
$N = 4$	0.3856	0.0207	0.3724	0.3860	0.0845	0.3568	0.2128	0.0802
$N = 8$	0.2206	0.0136	0.2147	0.2213	0.0493	0.9737	0.6566	0.3774
$N = 16$	0.1561	0.0093	0.1529	0.1564	0.0271	0.8081	0.9998	0.9846
$N = 32$	0.1271	0.0064	0.1256	0.1271	0.0142	0.1225	1.0000	1.0000
$N = 64$	0.1133	0.0045	0.1127	0.1134	0.0080	0.7534	1.0000	1.0000
$N = 128$	0.1066	0.0032	0.1064	0.1066	0.0046	−0.6650	1.0000	1.0000
$N = 256$	0.1033	0.0022	0.1032	0.1033	0.0028	−1.0577	1.0000	1.0000
$p = 8, q = 4, V_{rel}(\mathbf{P}) = 0.2$ (This comformation is impossible)								

(*continued*)

Table S3. (*continued*)

	E[V_{rel}(**R**)]	≈ SD[V_{rel}(**R**)]	Median	Mean	ESD	*T*	Pow. 5%	Pow. 1%
$p = 16$, $q = 1$, $V_{rel}(\mathbf{P}) = 0.1$								
$N = 4$	0.3745	0.1309	0.3567	0.3753	0.0655	0.8685	0.3218	0.2192
$N = 8$	0.2108	0.0857	0.1975	0.2120	0.0627	1.3379	0.7088	0.5934
$N = 16$	0.1499	0.0585	0.1417	0.1494	0.0505	−0.6621	0.9526	0.9194
$N = 32$	0.1237	0.0407	0.1198	0.1236	0.0382	−0.1200	0.9994	0.9990
$N = 64$	0.1115	0.0286	0.1090	0.1117	0.0279	0.3795	1.0000	1.0000
$N = 128$	0.1057	0.0201	0.1049	0.1058	0.0199	0.4730	1.0000	1.0000
$N = 256$	0.1028	0.0142	0.1024	0.1028	0.0141	0.0272	1.0000	1.0000
$p = 16$, $q = 1$, $V_{rel}(\mathbf{P}) = 0.2$								
$N = 4$	0.4184	0.2009	0.3923	0.4189	0.0975	0.3846	0.5308	0.4138
$N = 8$	0.2814	0.1315	0.2670	0.2819	0.0970	0.3873	0.8970	0.8414
$N = 16$	0.2350	0.0898	0.2273	0.2353	0.0780	0.2734	0.9974	0.9944
$N = 32$	0.2162	0.0625	0.2130	0.2152	0.0580	−1.2665	1.0000	1.0000
$N = 64$	0.2078	0.0438	0.2068	0.2077	0.0425	−0.1913	1.0000	1.0000
$N = 128$	0.2038	0.0309	0.2026	0.2032	0.0303	−1.4818	1.0000	1.0000
$N = 256$	0.2019	0.0218	0.2014	0.2018	0.0216	−0.1586	1.0000	1.0000
$p = 16$, $q = 1$, $V_{rel}(\mathbf{P}) = 0.4$								
$N = 4$	0.5158	0.2570	0.4947	0.5167	0.1433	0.4595	0.7744	0.6966
$N = 8$	0.4318	0.1682	0.4321	0.4329	0.1391	0.5780	0.9820	0.9714
$N = 16$	0.4111	0.1149	0.4149	0.4120	0.1073	0.5980	1.0000	1.0000
$N = 32$	0.4046	0.0799	0.4084	0.4055	0.0773	0.7996	1.0000	1.0000
$N = 64$	0.4021	0.0561	0.4030	0.4021	0.0552	−0.0283	1.0000	1.0000
$N = 128$	0.4010	0.0395	0.4022	0.4019	0.0395	1.7153	1.0000	1.0000
$N = 256$	0.4005	0.0279	0.4005	0.4003	0.0281	−0.4201	1.0000	1.0000
$p = 16$, $q = 1$, $V_{rel}(\mathbf{P}) = 0.6$								
$N = 4$	0.6313	0.2322	0.6468	0.6306	0.1707	−0.2806	0.8956	0.8606
$N = 8$	0.5973	0.1520	0.6162	0.5970	0.1467	−0.1359	0.9974	0.9960
$N = 16$	0.5963	0.1039	0.6084	0.5967	0.1047	0.3048	1.0000	1.0000
$N = 32$	0.5978	0.0722	0.6040	0.5979	0.0726	0.1795	1.0000	1.0000
$N = 64$	0.5988	0.0507	0.6013	0.5986	0.0510	−0.2188	1.0000	1.0000
$N = 128$	0.5994	0.0357	0.6010	0.5997	0.0362	0.6137	1.0000	1.0000
$N = 256$	0.5997	0.0252	0.6001	0.5994	0.0253	−0.8911	1.0000	1.0000
$p = 16$, $q = 1$, $V_{rel}(\mathbf{P}) = 0.8$								
$N = 4$	0.7768	0.1435	0.8260	0.7751	0.1589	−0.7708	0.9692	0.9554
$N = 8$	0.7831	0.0939	0.8102	0.7835	0.1116	0.2370	0.9998	0.9998
$N = 16$	0.7918	0.0642	0.8045	0.7913	0.0716	−0.5326	1.0000	1.0000
$N = 32$	0.7961	0.0446	0.8035	0.7976	0.0457	2.4043	1.0000	1.0000
$N = 64$	0.7981	0.0313	0.8013	0.7984	0.0325	0.7108	1.0000	1.0000
$N = 128$	0.7991	0.0221	0.7997	0.7985	0.0224	−1.8772	1.0000	1.0000
$N = 256$	0.7995	0.0156	0.7998	0.7995	0.0157	−0.3465	1.0000	1.0000

(*continued*)

Table S3. (*continued*)

	E[V_{rel}(**R**)]	≈ SD[V_{rel}(**R**)]	Median	Mean	ESD	T	Pow. 5%	Pow. 1%
$p = 16$, $q = 2$, V_{rel}(**P**) = 0.1								
$N = 4$	0.3760	0.0759	0.3629	0.3754	0.0568	−0.7850	0.3492	0.2086
$N = 8$	0.2123	0.0497	0.2064	0.2116	0.0442	−1.0713	0.8342	0.7150
$N = 16$	0.1510	0.0340	0.1484	0.1508	0.0321	−0.2952	0.9966	0.9900
$N = 32$	0.1243	0.0236	0.1239	0.1246	0.0236	0.8037	1.0000	1.0000
$N = 64$	0.1119	0.0166	0.1114	0.1120	0.0165	0.5617	1.0000	1.0000
$N = 128$	0.1059	0.0117	0.1055	0.1057	0.0116	−1.1433	1.0000	1.0000
$N = 256$	0.1029	0.0082	0.1024	0.1027	0.0083	−1.6560	1.0000	1.0000
$p = 16$, $q = 2$, V_{rel}(**P**) = 0.2								
$N = 4$	0.4256	0.0909	0.4075	0.4256	0.0827	0.0263	0.6414	0.4660
$N = 8$	0.2882	0.0595	0.2814	0.2885	0.0624	0.2671	0.9890	0.9756
$N = 16$	0.2395	0.0406	0.2368	0.2388	0.0439	−1.0447	1.0000	1.0000
$N = 32$	0.2188	0.0283	0.2180	0.2186	0.0298	−0.2548	1.0000	1.0000
$N = 64$	0.2091	0.0198	0.2087	0.2084	0.0205	−2.4858	1.0000	1.0000
$N = 128$	0.2045	0.0140	0.2045	0.2044	0.0142	−0.7333	1.0000	1.0000
$N = 256$	0.2022	0.0099	0.2024	0.2025	0.0096	1.5185	1.0000	1.0000
$p = 16$, $q = 2$, V_{rel}(**P**) = 0.4								
$N = 4$	0.5640	0.0370	0.5251	0.5645	0.1328	0.2332	0.9850	0.9482
$N = 8$	0.4687	0.0242	0.4450	0.4679	0.0790	−0.7910	1.0000	1.0000
$N = 16$	0.4322	0.0165	0.4220	0.4323	0.0439	0.2191	1.0000	1.0000
$N = 32$	0.4156	0.0115	0.4115	0.4153	0.0229	−1.0161	1.0000	1.0000
$N = 64$	0.4077	0.0081	0.4064	0.4076	0.0128	−0.6659	1.0000	1.0000
$N = 128$	0.4038	0.0057	0.4033	0.4039	0.0078	0.2858	1.0000	1.0000
$N = 256$	0.4019	0.0040	0.4017	0.4018	0.0048	−1.0195	1.0000	1.0000
$p = 16$, $q = 4$, V_{rel}(**P**) = 0.1								
$N = 4$	0.3808	0.0305	0.3711	0.3802	0.0542	−0.7788	0.3896	0.2272
$N = 8$	0.2168	0.0199	0.2115	0.2161	0.0343	−1.4581	0.9428	0.8348
$N = 16$	0.1538	0.0136	0.1516	0.1542	0.0213	1.0745	1.0000	1.0000
$N = 32$	0.1259	0.0095	0.1249	0.1255	0.0127	−2.3988	1.0000	1.0000
$N = 64$	0.1127	0.0066	0.1127	0.1127	0.0079	−0.1133	1.0000	1.0000
$N = 128$	0.1063	0.0047	0.1063	0.1064	0.0052	1.6837	1.0000	1.0000
$N = 256$	0.1031	0.0033	0.1031	0.1031	0.0035	−0.2266	1.0000	1.0000
$p = 16$, $q = 4$, V_{rel}(**P**) = 0.2								
$N = 4$	0.4667	0*	0.4502	0.4641	0.0972	−1.8454	0.7790	0.6708
$N = 8$	0.3143	0*	0.3049	0.3131	0.0529	−1.6415	1.0000	1.0000
$N = 16$	0.2533	0*	0.2485	0.2528	0.0275	−1.2473	1.0000	1.0000
$N = 32$	0.2258	0*	0.2234	0.2258	0.0142	0.1036	1.0000	1.0000
$N = 64$	0.2127	0*	0.2113	0.2126	0.0071	−1.1940	1.0000	1.0000
$N = 128$	0.2063	0*	0.2057	0.2064	0.0036	1.7598	1.0000	1.0000
$N = 256$	0.2031	0*	0.2028	0.2031	0.0018	−0.4979	1.0000	1.0000

*In this case, **P** is singular and the asymptotic expression yields 0 (which is obviously spurious).

(*continued*)

Table S3. (*continued*)

	$E[V_{rel}(\mathbf{R})]$	$\approx SD[V_{rel}(\mathbf{R})]$	Median	Mean	ESD	T	Pow. 5%	Pow. 1%
$p = 32, q = 1, V_{rel}(\mathbf{P}) = 0.1$								
$N = 4$	0.3745	0.1211	0.3560	0.3737	0.0551	−1.1234	0.4740	0.3322
$N = 8$	0.2108	0.0793	0.1957	0.2087	0.0550	−2.6857	0.8568	0.8010
$N = 16$	0.1499	0.0542	0.1442	0.1511	0.0463	1.8301	0.9952	0.9878
$N = 32$	0.1237	0.0377	0.1203	0.1240	0.0345	0.6352	1.0000	1.0000
$N = 64$	0.1115	0.0264	0.1100	0.1117	0.0254	0.3329	1.0000	1.0000
$N = 128$	0.1057	0.0186	0.1046	0.1051	0.0184	−2.2279	1.0000	1.0000
$N = 256$	0.1028	0.0131	0.1019	0.1024	0.0128	−2.1683	1.0000	1.0000
$p = 32, q = 1, V_{rel}(\mathbf{P}) = 0.2$								
$N = 4$	0.4184	0.1905	0.3874	0.4152	0.0870	−2.5287	0.6732	0.5566
$N = 8$	0.2814	0.1247	0.2661	0.2821	0.0911	0.5770	0.9640	0.9422
$N = 16$	0.2350	0.0852	0.2265	0.2329	0.0728	−2.0126	0.9996	0.9996
$N = 32$	0.2162	0.0593	0.2132	0.2168	0.0560	0.7146	1.0000	1.0000
$N = 64$	0.2078	0.0416	0.2069	0.2084	0.0400	1.1078	1.0000	1.0000
$N = 128$	0.2038	0.0293	0.2038	0.2044	0.0283	1.3960	1.0000	1.0000
$N = 256$	0.2019	0.0207	0.2017	0.2020	0.0202	0.4522	1.0000	1.0000
$p = 32, q = 1, V_{rel}(\mathbf{P}) = 0.4$								
$N = 4$	0.5158	0.2484	0.4965	0.5174	0.1383	0.8217	0.8696	0.8084
$N = 8$	0.4318	0.1626	0.4294	0.4304	0.1324	−0.7173	0.9966	0.9946
$N = 16$	0.4111	0.1111	0.4124	0.4104	0.1016	−0.5116	1.0000	1.0000
$N = 32$	0.4046	0.0773	0.4082	0.4056	0.0764	0.9578	1.0000	1.0000
$N = 64$	0.4021	0.0542	0.4033	0.4021	0.0533	0.0552	1.0000	1.0000
$N = 128$	0.4010	0.0382	0.4021	0.4019	0.0383	1.6504	1.0000	1.0000
$N = 256$	0.4005	0.0269	0.4002	0.4002	0.0265	−0.6218	1.0000	1.0000
$p = 32, q = 1, V_{rel}(\mathbf{P}) = 0.6$								
$N = 4$	0.6313	0.2264	0.6504	0.6334	0.1637	0.9116	0.9400	0.9140
$N = 8$	0.5973	0.1482	0.6168	0.5978	0.1394	0.2755	1.0000	0.9998
$N = 16$	0.5963	0.1013	0.6071	0.5952	0.1026	−0.7337	1.0000	1.0000
$N = 32$	0.5978	0.0704	0.6041	0.5976	0.0717	−0.1040	1.0000	1.0000
$N = 64$	0.5988	0.0494	0.6023	0.5994	0.0496	0.8511	1.0000	1.0000
$N = 128$	0.5994	0.0348	0.5994	0.5986	0.0349	−1.5793	1.0000	1.0000
$N = 256$	0.5997	0.0246	0.6006	0.5997	0.0245	−0.0753	1.0000	1.0000
$p = 32, q = 1, V_{rel}(\mathbf{P}) = 0.8$								
$N = 4$	0.7768	0.1406	0.8222	0.7737	0.1558	−1.3932	0.9822	0.9742
$N = 8$	0.7831	0.0921	0.8099	0.7846	0.1075	0.9636	1.0000	1.0000
$N = 16$	0.7918	0.0629	0.8024	0.7906	0.0703	−1.2364	1.0000	1.0000
$N = 32$	0.7961	0.0438	0.8022	0.7965	0.0458	0.6030	1.0000	1.0000
$N = 64$	0.7981	0.0307	0.8001	0.7977	0.0310	−0.9765	1.0000	1.0000
$N = 128$	0.7991	0.0216	0.8008	0.7995	0.0215	1.4951	1.0000	1.0000
$N = 256$	0.7995	0.0153	0.7999	0.7992	0.0154	−1.2828	1.0000	1.0000

(*continued*)

Table S3. (*continued*)

	E[V_{rel}(**R**)]	≈ SD[V_{rel}(**R**)]	Median	Mean	ESD	*T*	Pow. 5%	Pow. 1%
$p = 32$, $q = 2$, V_{rel}(**P**) = 0.1								
$N = 4$	0.3759	0.0699	0.3654	0.3756	0.0446	−0.5018	0.5744	0.3864
$N = 8$	0.2122	0.0458	0.2063	0.2115	0.0385	−1.2294	0.9618	0.9252
$N = 16$	0.1509	0.0313	0.1477	0.1500	0.0289	−2.1212	0.9998	0.9998
$N = 32$	0.1243	0.0218	0.1230	0.1241	0.0211	−0.6802	1.0000	1.0000
$N = 64$	0.1119	0.0153	0.1115	0.1119	0.0150	0.3859	1.0000	1.0000
$N = 128$	0.1059	0.0107	0.1056	0.1058	0.0105	−0.4723	1.0000	1.0000
$N = 256$	0.1029	0.0076	0.1030	0.1030	0.0075	1.0315	1.0000	1.0000
$p = 32$, $q = 2$, V_{rel}(**P**) = 0.2								
$N = 4$	0.4250	0.0881	0.4112	0.4255	0.0721	0.4438	0.8450	0.7344
$N = 8$	0.2877	0.0577	0.2840	0.2892	0.0578	1.7986	0.9992	0.9984
$N = 16$	0.2392	0.0394	0.2385	0.2394	0.0402	0.3791	1.0000	1.0000
$N = 32$	0.2186	0.0274	0.2183	0.2188	0.0285	0.5549	1.0000	1.0000
$N = 64$	0.2091	0.0192	0.2095	0.2094	0.0199	1.3979	1.0000	1.0000
$N = 128$	0.2045	0.0135	0.2045	0.2044	0.0136	−0.3347	1.0000	1.0000
$N = 256$	0.2022	0.0096	0.2022	0.2022	0.0095	−0.1785	1.0000	1.0000
$p = 32$, $q = 2$, V_{rel}(**P**) = 0.4								
$N = 4$	0.5591	0.0436	0.5191	0.5568	0.1217	−1.3170	0.9976	0.9924
$N = 8$	0.4656	0.0285	0.4458	0.4652	0.0759	−0.3893	1.0000	1.0000
$N = 16$	0.4306	0.0195	0.4235	0.4311	0.0424	0.7716	1.0000	1.0000
$N = 32$	0.4148	0.0136	0.4117	0.4149	0.0238	0.1904	1.0000	1.0000
$N = 64$	0.4073	0.0095	0.4065	0.4073	0.0134	−0.2999	1.0000	1.0000
$N = 128$	0.4036	0.0067	0.4035	0.4037	0.0083	0.3745	1.0000	1.0000
$N = 256$	0.4018	0.0047	0.4019	0.4019	0.0053	1.3114	1.0000	1.0000
$p = 32$, $q = 4$, V_{rel}(**P**) = 0.1								
$N = 4$	0.3797	0.0310	0.3717	0.3802	0.0418	0.8412	0.6484	0.4402
$N = 8$	0.2158	0.0203	0.2114	0.2156	0.0293	−0.4720	0.9966	0.9904
$N = 16$	0.1532	0.0139	0.1517	0.1533	0.0184	0.3585	1.0000	1.0000
$N = 32$	0.1256	0.0097	0.1251	0.1255	0.0117	−0.3757	1.0000	1.0000
$N = 64$	0.1126	0.0068	0.1126	0.1127	0.0076	1.0420	1.0000	1.0000
$N = 128$	0.1062	0.0048	0.1063	0.1062	0.0051	−0.1750	1.0000	1.0000
$N = 256$	0.1031	0.0034	0.1031	0.1031	0.0034	−0.5193	1.0000	1.0000
$p = 32$, $q = 4$, V_{rel}(**P**) = 0.2								
$N = 4$	0.4513	0.0104	0.4391	0.4515	0.0789	0.2035	0.9148	0.8394
$N = 8$	0.3073	0.0068	0.3008	0.3073	0.0460	−0.0126	1.0000	1.0000
$N = 16$	0.2502	0.0046	0.2459	0.2497	0.0246	−1.3316	1.0000	1.0000
$N = 32$	0.2243	0.0032	0.2220	0.2240	0.0126	−1.7985	1.0000	1.0000
$N = 64$	0.2120	0.0023	0.2110	0.2118	0.0065	−1.2715	1.0000	1.0000
$N = 128$	0.2059	0.0016	0.2054	0.2060	0.0036	0.2589	1.0000	1.0000
$N = 256$	0.2030	0.0011	0.2028	0.2030	0.0019	0.3123	1.0000	1.0000

(*continued*)

Table S3. (*continued*)

	E[V_{rel}(**R**)]	≈ SD[V_{rel}(**R**)]	Median	Mean	ESD	*T*	Pow. 5%	Pow. 1%
$p = 64$, $q = 1$, $V_{rel}(\mathbf{P}) = 0.1$								
$N = 4$	0.3745	0.1163	0.3556	0.3741	0.0519	−0.5438	0.6180	0.5168
$N = 8$	0.2108	0.0762	0.1968	0.2103	0.0532	−0.6481	0.9514	0.9188
$N = 16$	0.1499	0.0520	0.1437	0.1497	0.0438	−0.3383	0.9998	0.9988
$N = 32$	0.1237	0.0362	0.1202	0.1239	0.0334	0.4985	1.0000	1.0000
$N = 64$	0.1115	0.0254	0.1098	0.1114	0.0249	−0.3128	1.0000	1.0000
$N = 128$	0.1057	0.0179	0.1050	0.1057	0.0174	−0.1546	1.0000	1.0000
$N = 256$	0.1028	0.0126	0.1025	0.1029	0.0126	0.5461	1.0000	1.0000
$p = 64$, $q = 1$, $V_{rel}(\mathbf{P}) = 0.2$								
$N = 4$	0.4184	0.1855	0.3898	0.4192	0.0880	0.6633	0.7800	0.7118
$N = 8$	0.2814	0.1214	0.2667	0.2808	0.0868	−0.4795	0.9898	0.9808
$N = 16$	0.2350	0.0829	0.2309	0.2361	0.0718	1.1428	0.9998	0.9998
$N = 32$	0.2162	0.0577	0.2145	0.2169	0.0541	0.8648	1.0000	1.0000
$N = 64$	0.2078	0.0405	0.2059	0.2073	0.0391	−0.9173	1.0000	1.0000
$N = 128$	0.2038	0.0285	0.2026	0.2033	0.0284	−1.2701	1.0000	1.0000
$N = 256$	0.2019	0.0201	0.2015	0.2020	0.0199	0.2640	1.0000	1.0000
$p = 64$, $q = 1$, $V_{rel}(\mathbf{P}) = 0.4$								
$N = 4$	0.5158	0.2442	0.4971	0.5163	0.1365	0.2233	0.9130	0.8796
$N = 8$	0.4318	0.1598	0.4366	0.4332	0.1304	0.7802	0.9978	0.9970
$N = 16$	0.4111	0.1092	0.4144	0.4129	0.1015	1.2079	1.0000	1.0000
$N = 32$	0.4046	0.0760	0.4052	0.4039	0.0733	−0.6457	1.0000	1.0000
$N = 64$	0.4021	0.0533	0.4029	0.4021	0.0535	0.0493	1.0000	1.0000
$N = 128$	0.4010	0.0375	0.4022	0.4014	0.0373	0.8757	1.0000	1.0000
$N = 256$	0.4005	0.0265	0.4009	0.4006	0.0262	0.3899	1.0000	1.0000
$p = 64$, $q = 1$, $V_{rel}(\mathbf{P}) = 0.6$								
$N = 4$	0.6313	0.2236	0.6456	0.6312	0.1616	−0.0385	0.9674	0.9538
$N = 8$	0.5973	0.1464	0.6171	0.5990	0.1390	0.8570	0.9998	0.9998
$N = 16$	0.5963	0.1000	0.6063	0.5966	0.1005	0.2119	1.0000	1.0000
$N = 32$	0.5978	0.0696	0.6042	0.5981	0.0705	0.2972	1.0000	1.0000
$N = 64$	0.5988	0.0488	0.6020	0.5992	0.0487	0.5630	1.0000	1.0000
$N = 128$	0.5994	0.0344	0.6006	0.5993	0.0343	−0.2839	1.0000	1.0000
$N = 256$	0.5997	0.0243	0.6004	0.5997	0.0242	0.1422	1.0000	1.0000
$p = 64$, $q = 1$, $V_{rel}(\mathbf{P}) = 0.8$								
$N = 4$	0.7768	0.1393	0.8244	0.7723	0.1573	−2.0189	0.9896	0.9850
$N = 8$	0.7831	0.0912	0.8098	0.7841	0.1083	0.6205	1.0000	1.0000
$N = 16$	0.7918	0.0623	0.8046	0.7928	0.0687	0.9579	1.0000	1.0000
$N = 32$	0.7961	0.0433	0.8009	0.7955	0.0452	−0.9741	1.0000	1.0000
$N = 64$	0.7981	0.0304	0.8012	0.7983	0.0309	0.4419	1.0000	1.0000
$N = 128$	0.7991	0.0214	0.8010	0.7996	0.0217	1.7584	1.0000	1.0000
$N = 256$	0.7995	0.0151	0.8004	0.7995	0.0153	−0.3298	1.0000	1.0000

(*continued*)

Table S3. (*continued*)

	E[V_{rel}(**R**)]	≈ SD[V_{rel}(**R**)]	Median	Mean	ESD	*T*	Pow. 5%	Pow. 1%
$p = 64$, $q = 2$, $V_{rel}(\mathbf{P}) = 0.1$								
$N = 4$	0.3759	0.0669	0.3657	0.3763	0.0404	0.7925	0.7720	0.6518
$N = 8$	0.2122	0.0438	0.2069	0.2121	0.0364	−0.0292	0.9936	0.9878
$N = 16$	0.1509	0.0299	0.1487	0.1511	0.0280	0.6190	1.0000	1.0000
$N = 32$	0.1242	0.0208	0.1233	0.1241	0.0204	−0.4629	1.0000	1.0000
$N = 64$	0.1118	0.0146	0.1114	0.1118	0.0142	−0.0792	1.0000	1.0000
$N = 128$	0.1059	0.0103	0.1058	0.1060	0.0102	0.8201	1.0000	1.0000
$N = 256$	0.1029	0.0073	0.1029	0.1029	0.0072	0.1922	1.0000	1.0000
$p = 64$, $q = 2$, $V_{rel}(\mathbf{P}) = 0.2$								
$N = 4$	0.4248	0.0866	0.4108	0.4247	0.0675	−0.0638	0.9378	0.8990
$N = 8$	0.2875	0.0567	0.2828	0.2886	0.0558	1.4147	1.0000	1.0000
$N = 16$	0.2390	0.0387	0.2379	0.2389	0.0400	−0.2156	1.0000	1.0000
$N = 32$	0.2185	0.0269	0.2184	0.2186	0.0277	0.3109	1.0000	1.0000
$N = 64$	0.2090	0.0189	0.2090	0.2087	0.0189	−1.1574	1.0000	1.0000
$N = 128$	0.2045	0.0133	0.2045	0.2046	0.0135	0.7096	1.0000	1.0000
$N = 256$	0.2022	0.0094	0.2024	0.2021	0.0095	−0.4674	1.0000	1.0000
$p = 64$, $q = 2$, $V_{rel}(\mathbf{P}) = 0.4$								
$N = 4$	0.5570	0.0463	0.5220	0.5603	0.1204	1.9801	0.9990	0.9984
$N = 8$	0.4643	0.0303	0.4463	0.4627	0.0728	−1.5320	1.0000	1.0000
$N = 16$	0.4299	0.0207	0.4241	0.4308	0.0405	1.6245	1.0000	1.0000
$N = 32$	0.4145	0.0144	0.4121	0.4149	0.0237	1.1474	1.0000	1.0000
$N = 64$	0.4071	0.0101	0.4063	0.4070	0.0137	−0.7212	1.0000	1.0000
$N = 128$	0.4035	0.0071	0.4032	0.4035	0.0084	−0.6864	1.0000	1.0000
$N = 256$	0.4018	0.0050	0.4016	0.4017	0.0056	−0.8478	1.0000	1.0000
$p = 64$, $q = 4$, $V_{rel}(\mathbf{P}) = 0.1$								
$N = 4$	0.3793	0.0307	0.3714	0.3788	0.0354	−0.9303	0.8442	0.7356
$N = 8$	0.2154	0.0201	0.2121	0.2150	0.0257	−0.9970	1.0000	1.0000
$N = 16$	0.1530	0.0137	0.1517	0.1529	0.0170	−0.3265	1.0000	1.0000
$N = 32$	0.1255	0.0095	0.1249	0.1255	0.0111	0.0425	1.0000	1.0000
$N = 64$	0.1125	0.0067	0.1125	0.1126	0.0074	0.9617	1.0000	1.0000
$N = 128$	0.1062	0.0047	0.1062	0.1061	0.0050	−1.1861	1.0000	1.0000
$N = 256$	0.1031	0.0033	0.1031	0.1031	0.0034	0.4460	1.0000	1.0000
$p = 64$, $q = 4$, $V_{rel}(\mathbf{P}) = 0.2$								
$N = 4$	0.4473	0.0142	0.4362	0.4472	0.0703	−0.0188	0.9738	0.9562
$N = 8$	0.3049	0.0093	0.2990	0.3053	0.0440	0.6636	1.0000	1.0000
$N = 16$	0.2490	0.0063	0.2455	0.2488	0.0231	−0.5385	1.0000	1.0000
$N = 32$	0.2237	0.0044	0.2222	0.2237	0.0124	0.1394	1.0000	1.0000
$N = 64$	0.2117	0.0031	0.2108	0.2117	0.0067	0.4724	1.0000	1.0000
$N = 128$	0.2058	0.0022	0.2056	0.2058	0.0037	0.7531	1.0000	1.0000
$N = 256$	0.2029	0.0015	0.2028	0.2029	0.0021	−0.1420	1.0000	1.0000

(*continued*)

Table S3. (*continued*)

	E[V_{rel}(**R**)]	≈ SD[V_{rel}(**R**)]	Median	Mean	ESD	*T*	Pow. 5%	Pow. 1%
$p = 128$, $q = 1$, $V_{rel}(\mathbf{P}) = 0.1$								
$N = 4$	0.3745	0.1140	0.3554	0.3736	0.0496	−1.3663	0.7384	0.6688
$N = 8$	0.2108	0.0746	0.1999	0.2121	0.0532	1.7827	0.9838	0.9758
$N = 16$	0.1499	0.0510	0.1440	0.1502	0.0432	0.5427	1.0000	1.0000
$N = 32$	0.1237	0.0355	0.1216	0.1242	0.0325	1.1239	1.0000	1.0000
$N = 64$	0.1115	0.0249	0.1095	0.1111	0.0240	−1.2279	1.0000	1.0000
$N = 128$	0.1057	0.0175	0.1045	0.1054	0.0172	−1.0755	1.0000	1.0000
$N = 256$	0.1028	0.0124	0.1027	0.1028	0.0122	−0.1024	1.0000	1.0000
$p = 128$, $q = 1$, $V_{rel}(\mathbf{P}) = 0.2$								
$N = 4$	0.4184	0.1830	0.3917	0.4178	0.0829	−0.5103	0.8690	0.8286
$N = 8$	0.2814	0.1198	0.2677	0.2831	0.0873	1.4148	0.9962	0.9950
$N = 16$	0.2350	0.0818	0.2291	0.2352	0.0723	0.2642	1.0000	1.0000
$N = 32$	0.2162	0.0569	0.2138	0.2164	0.0530	0.2451	1.0000	1.0000
$N = 64$	0.2078	0.0399	0.2071	0.2081	0.0383	0.5487	1.0000	1.0000
$N = 128$	0.2038	0.0281	0.2035	0.2045	0.0278	1.7509	1.0000	1.0000
$N = 256$	0.2019	0.0198	0.2014	0.2018	0.0197	−0.4400	1.0000	1.0000
$p = 128$, $q = 1$, $V_{rel}(\mathbf{P}) = 0.4$								
$N = 4$	0.5158	0.2421	0.4971	0.5166	0.1339	0.4348	0.9574	0.9414
$N = 8$	0.4318	0.1585	0.4334	0.4314	0.1291	−0.2045	0.9996	0.9996
$N = 16$	0.4111	0.1083	0.4105	0.4082	0.0999	−2.0899	1.0000	1.0000
$N = 32$	0.4046	0.0753	0.4064	0.4055	0.0722	0.9047	1.0000	1.0000
$N = 64$	0.4021	0.0528	0.4013	0.4019	0.0518	−0.2472	1.0000	1.0000
$N = 128$	0.4010	0.0372	0.4018	0.4007	0.0373	−0.5842	1.0000	1.0000
$N = 256$	0.4005	0.0263	0.4014	0.4012	0.0259	2.0216	1.0000	1.0000
$p = 128$, $q = 1$, $V_{rel}(\mathbf{P}) = 0.6$								
$N = 4$	0.6313	0.2222	0.6428	0.6302	0.1624	−0.4981	0.9826	0.9758
$N = 8$	0.5973	0.1455	0.6166	0.5969	0.1405	−0.1875	1.0000	1.0000
$N = 16$	0.5963	0.0994	0.6073	0.5965	0.0993	0.1776	1.0000	1.0000
$N = 32$	0.5978	0.0691	0.6027	0.5975	0.0708	−0.2100	1.0000	1.0000
$N = 64$	0.5988	0.0485	0.6024	0.5991	0.0489	0.4259	1.0000	1.0000
$N = 128$	0.5994	0.0342	0.6012	0.5997	0.0340	0.6170	1.0000	1.0000
$N = 256$	0.5997	0.0241	0.6005	0.5996	0.0242	−0.2387	1.0000	1.0000
$p = 128$, $q = 1$, $V_{rel}(\mathbf{P}) = 0.8$								
$N = 4$	0.7768	0.1386	0.8248	0.7760	0.1528	−0.3781	0.9942	0.9918
$N = 8$	0.7831	0.0907	0.8035	0.7804	0.1076	−1.8237	1.0000	1.0000
$N = 16$	0.7918	0.0620	0.8028	0.7905	0.0683	−1.4145	1.0000	1.0000
$N = 32$	0.7961	0.0431	0.8009	0.7957	0.0453	−0.5783	1.0000	1.0000
$N = 64$	0.7981	0.0302	0.8012	0.7985	0.0313	1.0163	1.0000	1.0000
$N = 128$	0.7991	0.0213	0.8006	0.7994	0.0215	0.9895	1.0000	1.0000
$N = 256$	0.7995	0.0150	0.7999	0.7991	0.0152	−1.8261	1.0000	1.0000

(*continued*)

Table S3. (*continued*)

	E[V_{rel}(**R**)]	≈ SD[V_{rel}(**R**)]	Median	Mean	ESD	T	Pow. 5%	Pow. 1%
$p = 128$, $q = 2$, $V_{rel}(\mathbf{P}) = 0.1$								
$N = 4$	0.3759	0.0654	0.3662	0.3749	0.0366	−1.8246	0.8902	0.8370
$N = 8$	0.2121	0.0428	0.2074	0.2125	0.0350	0.6874	0.9988	0.9984
$N = 16$	0.1508	0.0292	0.1483	0.1505	0.0264	−0.7843	1.0000	1.0000
$N = 32$	0.1242	0.0203	0.1230	0.1238	0.0193	−1.7367	1.0000	1.0000
$N = 64$	0.1118	0.0143	0.1117	0.1121	0.0140	1.3424	1.0000	1.0000
$N = 128$	0.1059	0.0100	0.1057	0.1060	0.0100	0.8314	1.0000	1.0000
$N = 256$	0.1029	0.0071	0.1027	0.1029	0.0070	0.2004	1.0000	1.0000
$p = 128$, $q = 2$, $V_{rel}(\mathbf{P}) = 0.2$								
$N = 4$	0.4247	0.0857	0.4087	0.4234	0.0644	−1.3764	0.9832	0.9696
$N = 8$	0.2874	0.0561	0.2826	0.2883	0.0544	1.0797	1.0000	1.0000
$N = 16$	0.2390	0.0383	0.2370	0.2386	0.0398	−0.6199	1.0000	1.0000
$N = 32$	0.2185	0.0267	0.2179	0.2185	0.0267	0.0300	1.0000	1.0000
$N = 64$	0.2090	0.0187	0.2091	0.2089	0.0192	−0.4189	1.0000	1.0000
$N = 128$	0.2044	0.0132	0.2044	0.2044	0.0134	−0.1665	1.0000	1.0000
$N = 256$	0.2022	0.0093	0.2023	0.2022	0.0094	−0.1209	1.0000	1.0000
$p = 128$, $q = 2$, $V_{rel}(\mathbf{P}) = 0.4$								
$N = 4$	0.5560	0.0476	0.5211	0.5574	0.1170	0.8814	0.9994	0.9992
$N = 8$	0.4636	0.0312	0.4472	0.4638	0.0740	0.1420	1.0000	1.0000
$N = 16$	0.4296	0.0213	0.4233	0.4293	0.0415	−0.4751	1.0000	1.0000
$N = 32$	0.4143	0.0148	0.4124	0.4144	0.0236	0.3334	1.0000	1.0000
$N = 64$	0.4071	0.0104	0.4066	0.4072	0.0137	0.5258	1.0000	1.0000
$N = 128$	0.4035	0.0073	0.4033	0.4034	0.0087	−0.5183	1.0000	1.0000
$N = 256$	0.4017	0.0052	0.4018	0.4018	0.0056	0.8376	1.0000	1.0000
$p = 128$, $q = 4$, $V_{rel}(\mathbf{P}) = 0.1$								
$N = 4$	0.3791	0.0304	0.3725	0.3793	0.0325	0.3717	0.9568	0.9226
$N = 8$	0.2152	0.0199	0.2116	0.2148	0.0250	−1.2699	1.0000	1.0000
$N = 16$	0.1529	0.0136	0.1519	0.1531	0.0164	0.8764	1.0000	1.0000
$N = 32$	0.1254	0.0095	0.1249	0.1253	0.0107	−0.4537	1.0000	1.0000
$N = 64$	0.1125	0.0066	0.1123	0.1124	0.0072	−0.9179	1.0000	1.0000
$N = 128$	0.1062	0.0047	0.1062	0.1061	0.0048	−0.4628	1.0000	1.0000
$N = 256$	0.1031	0.0033	0.1030	0.1030	0.0034	−1.6580	1.0000	1.0000
$p = 128$, $q = 4$, $V_{rel}(\mathbf{P}) = 0.2$								
$N = 4$	0.4456	0.0158	0.4326	0.4435	0.0656	−2.3155	0.9932	0.9874
$N = 8$	0.3039	0.0103	0.2988	0.3042	0.0415	0.5443	1.0000	1.0000
$N = 16$	0.2485	0.0071	0.2455	0.2486	0.0225	0.4644	1.0000	1.0000
$N = 32$	0.2235	0.0049	0.2217	0.2234	0.0122	−0.4670	1.0000	1.0000
$N = 64$	0.2115	0.0034	0.2108	0.2115	0.0066	−1.0065	1.0000	1.0000
$N = 128$	0.2057	0.0024	0.2056	0.2058	0.0037	0.4702	1.0000	1.0000
$N = 256$	0.2029	0.0017	0.2028	0.2028	0.0022	−0.1830	1.0000	1.0000

(*continued*)

Table S3. (*continued*)

	E[V_{rel}(**R**)]	≈ SD[V_{rel}(**R**)]	Median	Mean	ESD	*T*	Pow. 5%	Pow. 1%
$p = 256$, $q = 1$, $V_{rel}(\mathbf{P}) = 0.1$								
$N = 4$	0.3745	0.1128	0.3559	0.3741	0.0484	−0.6148	0.8268	0.7730
$N = 8$	0.2108	0.0739	0.1966	0.2094	0.0510	−1.8791	0.9940	0.9892
$N = 16$	0.1499	0.0505	0.1435	0.1495	0.0415	−0.7639	1.0000	1.0000
$N = 32$	0.1237	0.0351	0.1196	0.1227	0.0318	−2.2709	1.0000	1.0000
$N = 64$	0.1115	0.0246	0.1101	0.1116	0.0234	0.2559	1.0000	1.0000
$N = 128$	0.1057	0.0173	0.1051	0.1057	0.0169	−0.0901	1.0000	1.0000
$N = 256$	0.1028	0.0122	0.1022	0.1028	0.0122	−0.3173	1.0000	1.0000
$p = 256$, $q = 1$, $V_{rel}(\mathbf{P}) = 0.2$								
$N = 4$	0.4184	0.1818	0.3913	0.4174	0.0825	−0.8586	0.9208	0.8878
$N = 8$	0.2814	0.1190	0.2651	0.2802	0.0856	−0.9368	0.9996	0.9994
$N = 16$	0.2350	0.0813	0.2284	0.2351	0.0702	0.1706	1.0000	1.0000
$N = 32$	0.2162	0.0565	0.2128	0.2155	0.0527	−0.8742	1.0000	1.0000
$N = 64$	0.2078	0.0397	0.2074	0.2079	0.0392	0.2748	1.0000	1.0000
$N = 128$	0.2038	0.0279	0.2041	0.2044	0.0272	1.4626	1.0000	1.0000
$N = 256$	0.2019	0.0197	0.2015	0.2020	0.0195	0.5562	1.0000	1.0000
$p = 256$, $q = 1$, $V_{rel}(\mathbf{P}) = 0.4$								
$N = 4$	0.5158	0.2411	0.4975	0.5148	0.1320	−0.5622	0.9706	0.9582
$N = 8$	0.4318	0.1578	0.4348	0.4343	0.1278	1.3865	1.0000	1.0000
$N = 16$	0.4111	0.1078	0.4118	0.4091	0.0995	−1.4526	1.0000	1.0000
$N = 32$	0.4046	0.0750	0.4078	0.4052	0.0726	0.5664	1.0000	1.0000
$N = 64$	0.4021	0.0526	0.4033	0.4024	0.0522	0.4500	1.0000	1.0000
$N = 128$	0.4010	0.0371	0.3999	0.4004	0.0366	−1.0479	1.0000	1.0000
$N = 256$	0.4005	0.0262	0.4011	0.4007	0.0260	0.6241	1.0000	1.0000
$p = 256$, $q = 1$, $V_{rel}(\mathbf{P}) = 0.6$								
$N = 4$	0.6313	0.2215	0.6451	0.6291	0.1586	−0.9820	0.9896	0.9844
$N = 8$	0.5973	0.1450	0.6166	0.5992	0.1353	0.9907	1.0000	1.0000
$N = 16$	0.5963	0.0991	0.6059	0.5966	0.0983	0.2590	1.0000	1.0000
$N = 32$	0.5978	0.0689	0.6044	0.5988	0.0696	1.0898	1.0000	1.0000
$N = 64$	0.5988	0.0483	0.6006	0.5977	0.0487	−1.5654	1.0000	1.0000
$N = 128$	0.5994	0.0340	0.6009	0.5993	0.0344	−0.2590	1.0000	1.0000
$N = 256$	0.5997	0.0240	0.6003	0.5997	0.0241	0.0156	1.0000	1.0000
$p = 256$, $q = 1$, $V_{rel}(\mathbf{P}) = 0.8$								
$N = 4$	0.7768	0.1383	0.8208	0.7728	0.1551	−1.8239	0.9960	0.9946
$N = 8$	0.7831	0.0905	0.8098	0.7857	0.1056	1.7052	1.0000	1.0000
$N = 16$	0.7918	0.0618	0.8031	0.7915	0.0681	−0.3408	1.0000	1.0000
$N = 32$	0.7961	0.0430	0.8022	0.7963	0.0460	0.3738	1.0000	1.0000
$N = 64$	0.7981	0.0302	0.8004	0.7977	0.0305	−0.9565	1.0000	1.0000
$N = 128$	0.7991	0.0212	0.8007	0.7993	0.0212	0.6642	1.0000	1.0000
$N = 256$	0.7995	0.0150	0.8002	0.7996	0.0153	0.4570	1.0000	1.0000

(*continued*)

Table S3. (*continued*)

	E[V_{rel}(**R**)]	≈ SD[V_{rel}(**R**)]	Median	Mean	ESD	*T*	Pow. 5%	Pow. 1%
$p = 256$, $q = 2$, $V_{rel}(\mathbf{P}) = 0.1$								
$N = 4$	0.3759	0.0646	0.3667	0.3751	0.0357	−1.4520	0.9512	0.9198
$N = 8$	0.2121	0.0423	0.2078	0.2126	0.0340	0.9840	1.0000	1.0000
$N = 16$	0.1508	0.0289	0.1483	0.1500	0.0263	−2.1534	1.0000	1.0000
$N = 32$	0.1242	0.0201	0.1229	0.1239	0.0189	−1.1190	1.0000	1.0000
$N = 64$	0.1118	0.0141	0.1113	0.1119	0.0139	0.1824	1.0000	1.0000
$N = 128$	0.1058	0.0099	0.1055	0.1057	0.0099	−0.9821	1.0000	1.0000
$N = 256$	0.1029	0.0070	0.1030	0.1031	0.0071	1.5009	1.0000	1.0000
$p = 256$, $q = 2$, $V_{rel}(\mathbf{P}) = 0.2$								
$N = 4$	0.4246	0.0853	0.4108	0.4236	0.0622	−1.1437	0.9914	0.9872
$N = 8$	0.2874	0.0558	0.2829	0.2871	0.0534	−0.3519	1.0000	1.0000
$N = 16$	0.2389	0.0382	0.2382	0.2388	0.0385	−0.2851	1.0000	1.0000
$N = 32$	0.2184	0.0265	0.2181	0.2180	0.0270	−1.1649	1.0000	1.0000
$N = 64$	0.2090	0.0186	0.2090	0.2088	0.0189	−0.6108	1.0000	1.0000
$N = 128$	0.2044	0.0131	0.2045	0.2046	0.0131	1.0852	1.0000	1.0000
$N = 256$	0.2022	0.0093	0.2023	0.2021	0.0092	−0.5046	1.0000	1.0000
$p = 256$, $q = 2$, $V_{rel}(\mathbf{P}) = 0.4$								
$N = 4$	0.5555	0.0482	0.5217	0.5576	0.1141	1.2655	0.9996	0.9996
$N = 8$	0.4633	0.0315	0.4466	0.4616	0.0721	−1.6268	1.0000	1.0000
$N = 16$	0.4294	0.0215	0.4244	0.4307	0.0414	2.1603	1.0000	1.0000
$N = 32$	0.4142	0.0150	0.4130	0.4146	0.0231	1.2190	1.0000	1.0000
$N = 64$	0.4070	0.0105	0.4064	0.4069	0.0137	−0.8165	1.0000	1.0000
$N = 128$	0.4035	0.0074	0.4034	0.4034	0.0088	−1.0027	1.0000	1.0000
$N = 256$	0.4017	0.0052	0.4019	0.4018	0.0058	0.4936	1.0000	1.0000
$p = 256$, $q = 4$, $V_{rel}(\mathbf{P}) = 0.1$								
$N = 4$	0.3790	0.0302	0.3724	0.3791	0.0312	0.1148	0.9894	0.9778
$N = 8$	0.2152	0.0198	0.2118	0.2148	0.0236	−1.1456	1.0000	1.0000
$N = 16$	0.1528	0.0135	0.1515	0.1525	0.0157	−1.3028	1.0000	1.0000
$N = 32$	0.1254	0.0094	0.1246	0.1252	0.0105	−0.9418	1.0000	1.0000
$N = 64$	0.1124	0.0066	0.1125	0.1125	0.0071	1.0205	1.0000	1.0000
$N = 128$	0.1062	0.0046	0.1062	0.1062	0.0048	−0.0593	1.0000	1.0000
$N = 256$	0.1031	0.0033	0.1031	0.1031	0.0033	1.2325	1.0000	1.0000
$p = 256$, $q = 4$, $V_{rel}(\mathbf{P}) = 0.2$								
$N = 4$	0.4449	0.0165	0.4348	0.4454	0.0668	0.5683	0.9978	0.9972
$N = 8$	0.3034	0.0108	0.2979	0.3032	0.0401	−0.3479	1.0000	1.0000
$N = 16$	0.2482	0.0074	0.2452	0.2483	0.0223	0.2351	1.0000	1.0000
$N = 32$	0.2233	0.0051	0.2217	0.2234	0.0122	0.4341	1.0000	1.0000
$N = 64$	0.2115	0.0036	0.2108	0.2115	0.0065	0.0211	1.0000	1.0000
$N = 128$	0.2057	0.0025	0.2055	0.2057	0.0039	0.8353	1.0000	1.0000
$N = 256$	0.2028	0.0018	0.2028	0.2028	0.0022	0.1085	1.0000	1.0000

(*continued*)

Table S3. (*continued*)

	E[V_{rel}(**R**)]	≈ SD[V_{rel}(**R**)]	Median	Mean	ESD	*T*	Pow. 5%	Pow. 1%
$p = 1024$, $q = 1$, $V_{rel}(\mathbf{P}) = 0.1$								
$N = 4$	0.3745	0.1119	0.3575	0.3740	0.0464	−0.8598	0.9402	0.9184
$N = 8$	0.2108	0.0733	0.1994	0.2114	0.0517	0.8268	0.9992	0.9988
$N = 16$	0.1499	0.0501	0.1440	0.1498	0.0421	−0.1942	1.0000	1.0000
$N = 32$	0.1237	0.0348	0.1195	0.1232	0.0317	−1.1238	1.0000	1.0000
$N = 64$	0.1115	0.0244	0.1100	0.1116	0.0235	0.0669	1.0000	1.0000
$N = 128$	0.1057	0.0172	0.1046	0.1053	0.0167	−1.4923	1.0000	1.0000
$N = 256$	0.1028	0.0121	0.1022	0.1027	0.0120	−1.0207	1.0000	1.0000
$p = 1024$, $q = 1$, $V_{rel}(\mathbf{P}) = 0.2$								
$N = 4$	0.4184	0.1808	0.3901	0.4175	0.0832	−0.7299	0.9720	0.9636
$N = 8$	0.2814	0.1184	0.2681	0.2808	0.0852	−0.4595	1.0000	1.0000
$N = 16$	0.2350	0.0809	0.2314	0.2361	0.0695	1.1295	1.0000	1.0000
$N = 32$	0.2162	0.0563	0.2130	0.2156	0.0525	−0.8736	1.0000	1.0000
$N = 64$	0.2078	0.0395	0.2072	0.2083	0.0384	0.9543	1.0000	1.0000
$N = 128$	0.2038	0.0278	0.2026	0.2030	0.0273	−2.2022	1.0000	1.0000
$N = 256$	0.2019	0.0196	0.2010	0.2013	0.0193	−2.1799	1.0000	1.0000
$p = 1024$, $q = 1$, $V_{rel}(\mathbf{P}) = 0.4$								
$N = 4$	0.5158	0.2403	0.4926	0.5118	0.1306	−2.1637	0.9890	0.9848
$N = 8$	0.4318	0.1573	0.4266	0.4286	0.1287	−1.7550	1.0000	1.0000
$N = 16$	0.4111	0.1075	0.4127	0.4111	0.1008	−0.0454	1.0000	1.0000
$N = 32$	0.4046	0.0748	0.4072	0.4055	0.0726	0.8769	1.0000	1.0000
$N = 64$	0.4021	0.0524	0.4035	0.4024	0.0524	0.4578	1.0000	1.0000
$N = 128$	0.4010	0.0369	0.4006	0.4007	0.0367	−0.5419	1.0000	1.0000
$N = 256$	0.4005	0.0261	0.4015	0.4007	0.0263	0.6336	1.0000	1.0000
$p = 1024$, $q = 1$, $V_{rel}(\mathbf{P}) = 0.6$								
$N = 4$	0.6313	0.2210	0.6412	0.6285	0.1592	−1.2475	0.9946	0.9932
$N = 8$	0.5973	0.1447	0.6157	0.5975	0.1355	0.1026	1.0000	1.0000
$N = 16$	0.5963	0.0988	0.6088	0.5965	0.0979	0.1669	1.0000	1.0000
$N = 32$	0.5978	0.0688	0.6035	0.5971	0.0703	−0.6285	1.0000	1.0000
$N = 64$	0.5988	0.0482	0.6019	0.5985	0.0479	−0.4679	1.0000	1.0000
$N = 128$	0.5994	0.0340	0.6006	0.5996	0.0335	0.3479	1.0000	1.0000
$N = 256$	0.5997	0.0240	0.6002	0.5995	0.0240	−0.4863	1.0000	1.0000
$p = 1024$, $q = 1$, $V_{rel}(\mathbf{P}) = 0.8$								
$N = 4$	0.7768	0.1380	0.8236	0.7733	0.1543	−1.5756	0.9986	0.9980
$N = 8$	0.7831	0.0903	0.8088	0.7830	0.1074	−0.0831	1.0000	1.0000
$N = 16$	0.7918	0.0617	0.8057	0.7930	0.0683	1.2443	1.0000	1.0000
$N = 32$	0.7961	0.0429	0.8014	0.7954	0.0454	−0.9758	1.0000	1.0000
$N = 64$	0.7981	0.0301	0.8006	0.7981	0.0308	0.0710	1.0000	1.0000
$N = 128$	0.7991	0.0212	0.8006	0.7988	0.0220	−0.7670	1.0000	1.0000
$N = 256$	0.7995	0.0150	0.7994	0.7989	0.0154	−2.7764	1.0000	1.0000

(*continued*)

Table S3. (*continued*)

	E[V_{rel}(**R**)]	≈ SD[V_{rel}(**R**)]	Median	Mean	ESD	*T*	Pow. 5%	Pow. 1%
$p = 1024$, $q = 2$, $V_{rel}(\mathbf{P}) = 0.1$								
$N = 4$	0.3759	0.0640	0.3678	0.3762	0.0350	0.7678	0.9934	0.9886
$N = 8$	0.2121	0.0419	0.2076	0.2116	0.0327	−1.0455	1.0000	1.0000
$N = 16$	0.1508	0.0286	0.1485	0.1505	0.0259	−0.8294	1.0000	1.0000
$N = 32$	0.1242	0.0199	0.1231	0.1241	0.0192	−0.5213	1.0000	1.0000
$N = 64$	0.1118	0.0140	0.1119	0.1121	0.0138	1.5748	1.0000	1.0000
$N = 128$	0.1058	0.0098	0.1058	0.1059	0.0096	0.5372	1.0000	1.0000
$N = 256$	0.1029	0.0069	0.1027	0.1029	0.0069	0.0563	1.0000	1.0000
$p = 1024$, $q = 2$, $V_{rel}(\mathbf{P}) = 0.2$								
$N = 4$	0.4246	0.0850	0.4104	0.4236	0.0623	−1.1057	0.9990	0.9986
$N = 8$	0.2873	0.0556	0.2833	0.2877	0.0534	0.4989	1.0000	1.0000
$N = 16$	0.2389	0.0380	0.2370	0.2384	0.0382	−0.9306	1.0000	1.0000
$N = 32$	0.2184	0.0264	0.2186	0.2186	0.0271	0.4335	1.0000	1.0000
$N = 64$	0.2090	0.0185	0.2086	0.2087	0.0186	−1.0366	1.0000	1.0000
$N = 128$	0.2044	0.0131	0.2048	0.2044	0.0130	−0.1240	1.0000	1.0000
$N = 256$	0.2022	0.0092	0.2025	0.2023	0.0092	0.9339	1.0000	1.0000
$p = 1024$, $q = 2$, $V_{rel}(\mathbf{P}) = 0.4$								
$N = 4$	0.5552	0.0486	0.5181	0.5524	0.1116	−1.7454	1.0000	1.0000
$N = 8$	0.4631	0.0318	0.4460	0.4617	0.0722	−1.3874	1.0000	1.0000
$N = 16$	0.4293	0.0217	0.4240	0.4295	0.0407	0.3579	1.0000	1.0000
$N = 32$	0.4142	0.0151	0.4120	0.4141	0.0240	−0.1373	1.0000	1.0000
$N = 64$	0.4070	0.0106	0.4064	0.4070	0.0137	0.2280	1.0000	1.0000
$N = 128$	0.4035	0.0075	0.4038	0.4037	0.0087	2.2263	1.0000	1.0000
$N = 256$	0.4017	0.0053	0.4017	0.4017	0.0057	0.1438	1.0000	1.0000
$p = 1024$, $q = 4$, $V_{rel}(\mathbf{P}) = 0.1$								
$N = 4$	0.3790	0.0301	0.3724	0.3792	0.0307	0.4532	0.9996	0.9994
$N = 8$	0.2151	0.0197	0.2122	0.2155	0.0237	1.1716	1.0000	1.0000
$N = 16$	0.1528	0.0134	0.1515	0.1528	0.0159	−0.0284	1.0000	1.0000
$N = 32$	0.1253	0.0094	0.1248	0.1251	0.0106	−1.6034	1.0000	1.0000
$N = 64$	0.1124	0.0066	0.1123	0.1123	0.0070	−1.7393	1.0000	1.0000
$N = 128$	0.1062	0.0046	0.1061	0.1062	0.0048	0.4660	1.0000	1.0000
$N = 256$	0.1031	0.0033	0.1031	0.1031	0.0033	0.1723	1.0000	1.0000
$p = 1024$, $q = 4$, $V_{rel}(\mathbf{P}) = 0.2$								
$N = 4$	0.4444	0.0171	0.4343	0.4457	0.0657	1.4518	1.0000	1.0000
$N = 8$	0.3030	0.0112	0.2979	0.3037	0.0405	1.2073	1.0000	1.0000
$N = 16$	0.2480	0.0076	0.2455	0.2486	0.0220	1.7390	1.0000	1.0000
$N = 32$	0.2232	0.0053	0.2220	0.2234	0.0120	0.8155	1.0000	1.0000
$N = 64$	0.2114	0.0037	0.2109	0.2114	0.0065	−0.6746	1.0000	1.0000
$N = 128$	0.2057	0.0026	0.2054	0.2056	0.0038	−1.4728	1.0000	1.0000
$N = 256$	0.2028	0.0019	0.2028	0.2028	0.0023	−0.1714	1.0000	1.0000

(*continued*)

Table S3. (*continued*)

	E[V_{rel}(**R**)]	≈ SD[V_{rel}(**R**)]	Median	Mean	ESD	*T*	Pow. 5%	Pow. 1%
p = 2, linearly decreasing λ (V_{rel}(**P**) = 0.1111)								
N = 4	0.3793	0.3103	0.3202	0.3782	0.3087	−0.2446	0.0640	0.0134
N = 8	0.2185	0.2096	0.1575	0.2187	0.2095	0.0654	0.1256	0.0354
N = 16	0.1593	0.1461	0.1207	0.1601	0.1476	0.4067	0.2536	0.0924
N = 32	0.1339	0.1035	0.1163	0.1362	0.1048	1.5246	0.4890	0.2662
N = 64	0.1222	0.0736	0.1139	0.1227	0.0740	0.4641	0.7850	0.6022
N = 128	0.1166	0.0522	0.1128	0.1173	0.0534	0.8838	0.9780	0.9248
N = 256	0.1138	0.0370	0.1115	0.1136	0.0369	−0.3938	0.9998	0.9986
p = 4, linearly decreasing λ (V_{rel}(**P**) = 0.0667)								
N = 4	0.3607	0.1023	0.3405	0.3602	0.1328	−0.2992	0.0808	0.0214
N = 8	0.1881	0.0670	0.1769	0.1876	0.0810	−0.4529	0.1366	0.0428
N = 16	0.1221	0.0458	0.1145	0.1217	0.0511	−0.5361	0.3872	0.1528
N = 32	0.0932	0.0318	0.0878	0.0925	0.0344	−1.5091	0.8004	0.5156
N = 64	0.0796	0.0223	0.0777	0.0801	0.0229	1.2955	0.9956	0.9664
N = 128	0.0731	0.0157	0.0717	0.0729	0.0160	−0.6557	1.0000	1.0000
N = 256	0.0699	0.0111	0.0696	0.0702	0.0111	1.9461	1.0000	1.0000
p = 8, linearly decreasing λ (V_{rel}(**P**) = 0.0370)								
N = 4	0.3485	0.0338	0.3374	0.3479	0.0631	−0.7111	0.0804	0.0214
N = 8	0.1679	0.0221	0.1630	0.1672	0.0378	−1.4542	0.1808	0.0612
N = 16	0.0974	0.0151	0.0946	0.0971	0.0219	−1.1963	0.4982	0.2516
N = 32	0.0661	0.0105	0.0650	0.0664	0.0136	1.4437	0.9468	0.8070
N = 64	0.0513	0.0074	0.0506	0.0513	0.0084	0.3549	1.0000	0.9998
N = 128	0.0441	0.0052	0.0437	0.0440	0.0055	−1.0232	1.0000	1.0000
N = 256	0.0405	0.0037	0.0404	0.0406	0.0038	1.1287	1.0000	1.0000
p = 16, linearly decreasing λ (V_{rel}(**P**) = 0.0196)								
N = 4	0.3415	0.0115	0.3360	0.3417	0.0318	0.4905	0.0956	0.0280
N = 8	0.1563	0.0075	0.1542	0.1564	0.0185	0.4621	0.2146	0.0758
N = 16	0.0831	0.0052	0.0823	0.0832	0.0103	0.9491	0.5530	0.2952
N = 32	0.0502	0.0036	0.0498	0.0503	0.0060	0.5576	0.9854	0.9070
N = 64	0.0347	0.0025	0.0345	0.0346	0.0035	−0.3910	1.0000	1.0000
N = 128	0.0271	0.0018	0.0270	0.0271	0.0021	−0.2154	1.0000	1.0000
N = 256	0.0233	0.0012	0.0233	0.0233	0.0014	−0.0289	1.0000	1.0000
p = 32, linearly decreasing λ (V_{rel}(**P**) = 0.0101)								
N = 4	0.3375	0.0040	0.3343	0.3376	0.0157	0.3965	0.0998	0.0242
N = 8	0.1497	0.0026	0.1487	0.1496	0.0091	−1.2013	0.2206	0.0844
N = 16	0.0751	0.0018	0.0747	0.0750	0.0050	−0.9852	0.6218	0.3566
N = 32	0.0415	0.0012	0.0414	0.0415	0.0027	−0.4252	0.9896	0.9576
N = 64	0.0255	0.0009	0.0255	0.0255	0.0015	0.1871	1.0000	1.0000
N = 128	0.0178	0.0006	0.0177	0.0178	0.0009	0.9912	1.0000	1.0000
N = 256	0.0139	0.0004	0.0139	0.0139	0.0005	−0.3046	1.0000	1.0000

(*continued*)

Table S3. (*continued*)

	$E[V_{rel}(\mathbf{R})]$	$\approx SD[V_{rel}(\mathbf{R})]$	Median	Mean	ESD	T	Pow. 5%	Pow. 1%
$p = 64$, linearly decreasing λ ($V_{rel}(\mathbf{P}) = 0.0051$)								
$N = 4$	0.3355	0.00140	0.3341	0.3356	0.00789	0.7901	0.0940	0.0272
$N = 8$	0.1464	0.00092	0.1459	0.1464	0.00466	−0.4444	0.2506	0.0858
$N = 16$	0.0710	0.00063	0.0708	0.0709	0.00247	−1.4701	0.6356	0.3802
$N = 32$	0.0370	0.00044	0.0369	0.0370	0.00132	0.6883	0.9942	0.9640
$N = 64$	0.0208	0.00031	0.0208	0.0208	0.00070	1.0001	1.0000	1.0000
$N = 128$	0.0129	0.00022	0.0129	0.0129	0.00038	−1.1839	1.0000	1.0000
$N = 256$	0.0090	0.00015	0.0090	0.0090	0.00022	−2.0294	1.0000	1.0000
$p = 128$, linearly decreasing λ ($V_{rel}(\mathbf{P}) = 0.0026$)								
$N = 4$	0.3344	0.00049	0.3335	0.3343	0.00396	−1.2815	0.1000	0.0318
$N = 8$	0.1446	0.00032	0.1445	0.1447	0.00231	0.6599	0.2520	0.0992
$N = 16$	0.0688	0.00022	0.0688	0.0688	0.00124	−1.3645	0.6396	0.3790
$N = 32$	0.0346	0.00015	0.0346	0.0346	0.00065	−0.4754	0.9924	0.9744
$N = 64$	0.0183	0.00011	0.0183	0.0183	0.00033	−0.2605	1.0000	1.0000
$N = 128$	0.0104	0.00008	0.0104	0.0104	0.00018	0.5676	1.0000	1.0000
$N = 256$	0.0065	0.00005	0.0065	0.0065	0.00010	2.0255	1.0000	1.0000
$p = 256$, linearly decreasing λ ($V_{rel}(\mathbf{P}) = 0.0013$)								
$N = 4$	0.3339	0.00017	0.3334	0.3338	0.00197	−1.4148	0.0930	0.0230
$N = 8$	0.1438	0.00011	0.1437	0.1438	0.00117	0.7633	0.2498	0.0956
$N = 16$	0.0678	0.00008	0.0677	0.0678	0.00062	2.7597	0.6702	0.4300
$N = 32$	0.0334	0.00005	0.0334	0.0334	0.00032	−0.4550	0.9962	0.9750
$N = 64$	0.0171	0.00004	0.0171	0.0171	0.00016	0.6150	1.0000	1.0000
$N = 128$	0.0091	0.00003	0.0091	0.0091	0.00009	0.2258	1.0000	1.0000
$N = 256$	0.0052	0.00002	0.0052	0.0052	0.00004	−0.0664	1.0000	1.0000
$p = 1024$, linearly decreasing λ ($V_{rel}(\mathbf{P}) = 0.0003$)								
$N = 4$	0.3335	0.00002	0.3334	0.3335	0.00049	0.6559	0.0972	0.0288
$N = 8$	0.1431	0.00001	0.1431	0.1431	0.00029	−0.0088	0.2516	0.0904
$N = 16$	0.0669	0.00001	0.0669	0.0669	0.00016	−0.5107	0.6618	0.4206
$N = 32$	0.0326	0.00001	0.0326	0.0326	0.00008	1.3157	0.9974	0.9772
$N = 64$	0.0162	0.00000	0.0162	0.0162	0.00004	−0.9976	1.0000	1.0000
$N = 128$	0.0082	0.00000	0.0082	0.0082	0.00002	−0.8058	1.0000	1.0000
$N = 256$	0.0042	0.00000	0.0042	0.0042	0.00001	0.4128	1.0000	1.0000

(*continued*)

Table S3. (*continued*)

	E[V_{rel}(**R**)]	≈ SD[V_{rel}(**R**)]	Median	Mean	ESD	*T*	Pow. 5%	Pow. 1%
$p = 2$, quadratically decreasing λ (V_{rel}(**P**) = 0.3600)								
$N = 4$	0.4951	0.3210	0.5073	0.4913	0.3196	−0.8490	0.1268	0.0234
$N = 8$	0.4006	0.2490	0.3987	0.3998	0.2514	−0.2231	0.3764	0.1568
$N = 16$	0.3752	0.1848	0.3766	0.3740	0.1853	−0.4712	0.7346	0.4780
$N = 32$	0.3665	0.1335	0.3654	0.3654	0.1326	−0.6016	0.9654	0.8998
$N = 64$	0.3630	0.0952	0.3640	0.3637	0.0954	0.4645	1.0000	0.9978
$N = 128$	0.3615	0.0676	0.3612	0.3622	0.0675	0.7336	1.0000	1.0000
$N = 256$	0.3607	0.0479	0.3615	0.3603	0.0482	−0.5713	1.0000	1.0000
$p = 4$, quadratically decreasing λ (V_{rel}(**P**) = 0.1911)								
$N = 4$	0.4160	0.1703	0.3858	0.4156	0.1516	−0.1564	0.1596	0.0568
$N = 8$	0.2766	0.1115	0.2647	0.2764	0.1019	−0.1091	0.4706	0.2268
$N = 16$	0.2284	0.0762	0.2182	0.2269	0.0722	−1.4661	0.9412	0.7528
$N = 32$	0.2085	0.0530	0.2054	0.2086	0.0524	0.1041	1.0000	0.9992
$N = 64$	0.1995	0.0372	0.1969	0.1991	0.0367	−0.8045	1.0000	1.0000
$N = 128$	0.1953	0.0262	0.1942	0.1954	0.0261	0.3599	1.0000	1.0000
$N = 256$	0.1932	0.0185	0.1928	0.1931	0.0182	−0.2212	1.0000	1.0000
$p = 8$, quadratically decreasing λ (V_{rel}(**P**) = 0.0980)								
$N = 4$	0.3757	0.0545	0.3645	0.3773	0.0786	1.4665	0.1776	0.0600
$N = 8$	0.2114	0.0357	0.2056	0.2111	0.0468	−0.3972	0.5748	0.3076
$N = 16$	0.1496	0.0244	0.1462	0.1493	0.0289	−0.8012	0.9890	0.9326
$N = 32$	0.1227	0.0169	0.1213	0.1226	0.0188	−0.3686	1.0000	1.0000
$N = 64$	0.1101	0.0119	0.1094	0.1100	0.0126	−0.5086	1.0000	1.0000
$N = 128$	0.1040	0.0084	0.1038	0.1040	0.0086	−0.2554	1.0000	1.0000
$N = 256$	0.1010	0.0059	0.1008	0.1010	0.0060	0.4807	1.0000	1.0000
$p = 16$, quadratically decreasing λ (V_{rel}(**P**) = 0.0496)								
$N = 4$	0.3560	0.0200	0.3485	0.3558	0.0395	−0.3027	0.2010	0.0854
$N = 8$	0.1786	0.0131	0.1757	0.1785	0.0244	−0.2391	0.6058	0.3646
$N = 16$	0.1092	0.0089	0.1079	0.1092	0.0144	−0.0334	0.9916	0.9524
$N = 32$	0.0783	0.0062	0.0777	0.0783	0.0084	−0.2148	1.0000	1.0000
$N = 64$	0.0637	0.0044	0.0634	0.0637	0.0052	−0.0525	1.0000	1.0000
$N = 128$	0.0565	0.0031	0.0564	0.0565	0.0034	−0.8445	1.0000	1.0000
$N = 256$	0.0530	0.0022	0.0530	0.0531	0.0023	1.9474	1.0000	1.0000
$p = 32$, quadratically decreasing λ (V_{rel}(**P**) = 0.0249)								
$N = 4$	0.3444	0.0071	0.3400	0.3443	0.0204	−0.1348	0.2064	0.0736
$N = 8$	0.1605	0.0047	0.1591	0.1605	0.0123	−0.2153	0.5998	0.3796
$N = 16$	0.0879	0.0032	0.0873	0.0877	0.0068	−1.3347	0.9948	0.9652
$N = 32$	0.0553	0.0022	0.0551	0.0554	0.0038	1.4091	1.0000	1.0000
$N = 64$	0.0398	0.0016	0.0397	0.0398	0.0022	−0.7987	1.0000	1.0000
$N = 128$	0.0323	0.0011	0.0323	0.0323	0.0014	0.6379	1.0000	1.0000
$N = 256$	0.0286	0.0008	0.0286	0.0286	0.0009	1.7252	1.0000	1.0000

(*continued*)

Table S3. (*continued*)

	E[V_{rel}(**R**)]	≈ SD[V_{rel}(**R**)]	Median	Mean	ESD	*T*	Pow. 5%	Pow. 1%
p = 64, quadratically decreasing λ (V_{rel}(**P**) = 0.0125)								
N = 4	0.3391	0.00251	0.3372	0.3392	0.01029	0.8681	0.2072	0.0882
N = 8	0.1519	0.00165	0.1512	0.1518	0.00621	−0.3255	0.6328	0.3828
N = 16	0.0774	0.00112	0.0773	0.0775	0.00340	2.0673	0.9936	0.9736
N = 32	0.0439	0.00078	0.0438	0.0439	0.00181	0.0530	1.0000	1.0000
N = 64	0.0279	0.00055	0.0279	0.0279	0.00100	2.2327	1.0000	1.0000
N = 128	0.0201	0.00039	0.0201	0.0201	0.00057	−2.0319	1.0000	1.0000
N = 256	0.0163	0.00027	0.0163	0.0163	0.00035	0.4608	1.0000	1.0000
p = 128, quadratically decreasing λ (V_{rel}(**P**) = 0.0062)								
N = 4	0.3362	0.00089	0.3351	0.3362	0.00519	0.6706	0.2084	0.0942
N = 8	0.1473	0.00058	0.1471	0.1474	0.00304	0.3257	0.6450	0.4050
N = 16	0.0720	0.00040	0.0719	0.0720	0.00165	−0.1768	0.9946	0.9700
N = 32	0.0381	0.00028	0.0380	0.0380	0.00087	−1.2068	1.0000	1.0000
N = 64	0.0219	0.00019	0.0219	0.0219	0.00046	−1.1815	1.0000	1.0000
N = 128	0.0140	0.00014	0.0140	0.0140	0.00025	0.1212	1.0000	1.0000
N = 256	0.0101	0.00010	0.0101	0.0101	0.00014	−0.2988	1.0000	1.0000
p = 256, quadratically decreasing λ (V_{rel}(**P**) = 0.0031)								
N = 4	0.3347	0.00031	0.3342	0.3347	0.00253	−0.0296	0.2004	0.0746
N = 8	0.1451	0.00020	0.1449	0.1451	0.00153	−0.8455	0.6272	0.3982
N = 16	0.0693	0.00014	0.0693	0.0693	0.00082	−1.5371	0.9944	0.9700
N = 32	0.0352	0.00010	0.0351	0.0352	0.00044	0.3984	1.0000	1.0000
N = 64	0.0189	0.00007	0.0189	0.0189	0.00022	−1.3213	1.0000	1.0000
N = 128	0.0109	0.00005	0.0109	0.0109	0.00012	−2.1747	1.0000	1.0000
N = 256	0.0070	0.00003	0.0070	0.0070	0.00006	0.5172	1.0000	1.0000
p = 1024, quadratically decreasing λ (V_{rel}(**P**) = 0.0008)								
N = 4	0.3337	0.000039	0.3336	0.3337	0.00062	−0.0472	0.1970	0.0824
N = 8	0.1434	0.000026	0.1434	0.1434	0.00039	0.3587	0.6418	0.3862
N = 16	0.0673	0.000017	0.0673	0.0673	0.00020	−1.8148	0.9940	0.9722
N = 32	0.0330	0.000012	0.0330	0.0330	0.00010	0.7257	1.0000	1.0000
N = 64	0.0166	0.000009	0.0166	0.0166	0.00005	−1.0370	1.0000	1.0000
N = 128	0.0086	0.000006	0.0086	0.0086	0.00003	−1.2065	1.0000	1.0000
N = 256	0.0047	0.000004	0.0047	0.0047	0.00001	0.0830	1.0000	1.0000

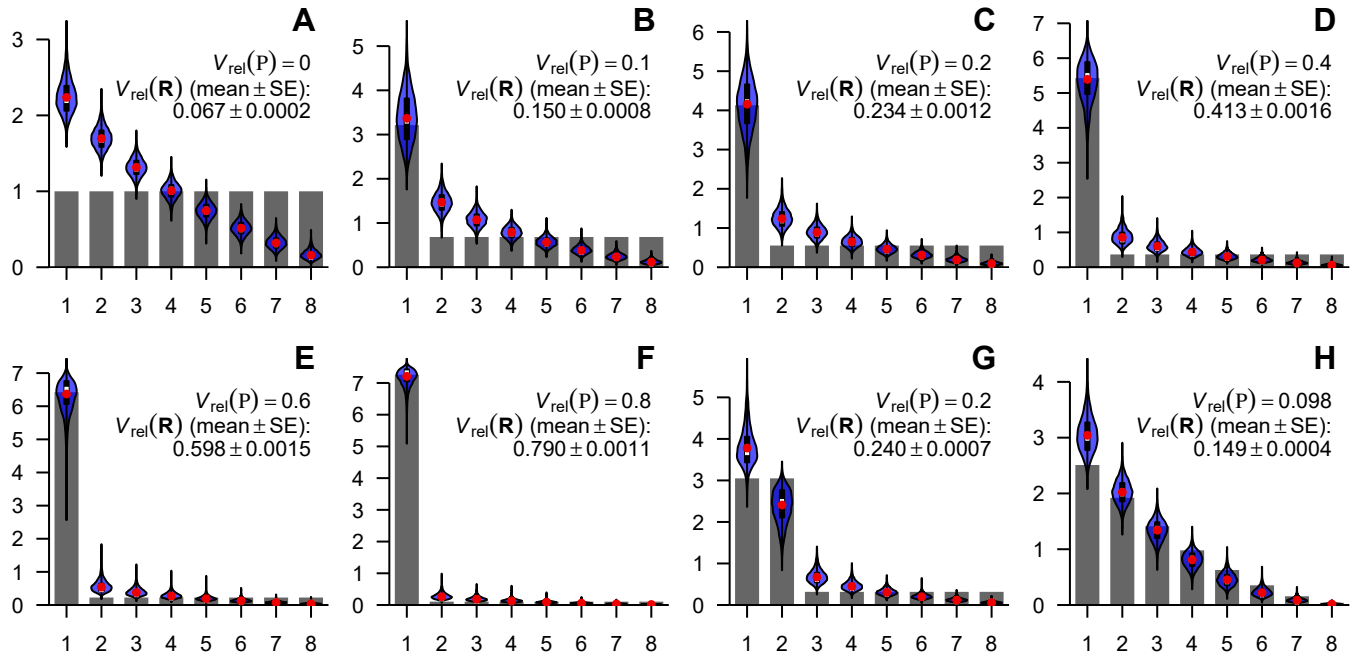

Figure S1. Selected population eigenvalue structures used in simulations and distributions of sample eigenvalues, examples for $p = 8$. The eigenvalues of population correlation matrix are shown as scree plots, and distributions of sample eigenvalues with $N = 16$ are shown as violin plots. The conditions are as in Figure 4. **A**, null condition; **B–G**, q-large λ conditions, $q = 1$ (**B–F**) or 2 (**G**), with $V_{rel}(\mathbf{\Sigma}) = 0.1$, 0.2, 0.4, 0.6, 0.8, and 0.2, respectively; **H**, quadratically decreasing λ condition. Red dots denote empirical means of sample eigenvalues, whereas white bars (mostly overlapping with red dots) denote medians. Thick black bars within violins denote interquartile ranges. Note different scales of vertical axes.

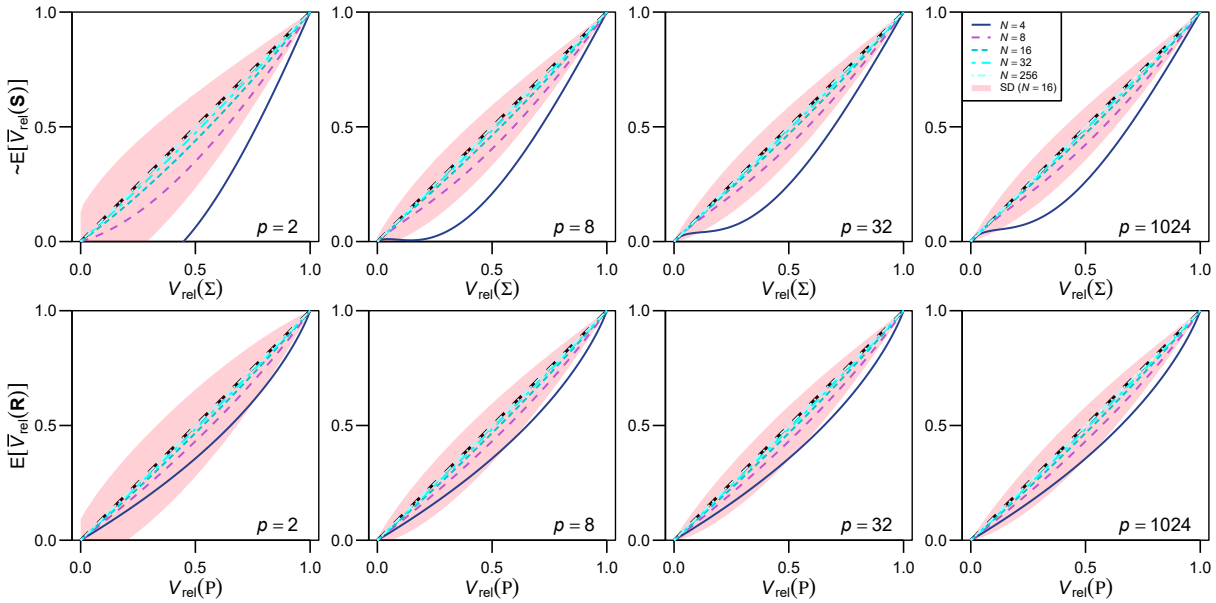

Figure S2. Profiles of the expectations of adjusted eigenvalue dispersion indices in selected conditions. The expectations of $\overline{V}_{rel}$(**S**) (approximate; top row) and $\overline{V}_{rel}$(**R**) (bottom row) are drawn with solid lines, for p = 2, 8, 32, and 1024 (from left to right) and for N = 4, 8, 16, 32, and 256. In all cases, $n = N - 1$. The breadth of one standard deviation at N = 16 is also shown around the mean profiles with pink fills; these are approximations except for $\overline{V}_{rel}$(**R**) for p = 2. Note that actual distributions might be skewed unlike these fills. All profiles are from 1-large λ conditions as in Figure 2. The initial decrease of the E[$\overline{V}_{rel}$(**S**)] profiles in some cases seems to be an artifact of approximation, so the negative excursion in profiles should be ignored.

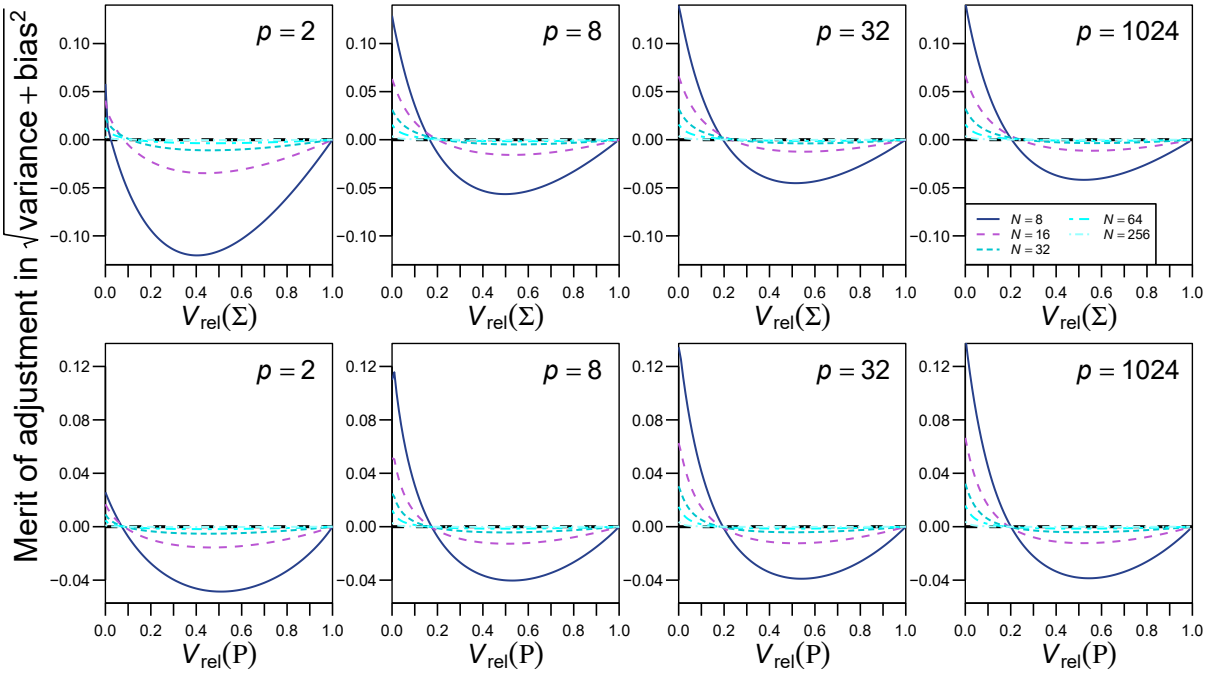

Figure S3. Merit of adjustment for eigenvalue dispersion indices. Square root of inaccuracy (= Var[V_{rel}(**S**)] + {E[V_{rel}(**S**)] − V_{rel}(**Σ**)}^{2}, and so on) is compared between $\bar{V}_{rel}$(**S**) and V_{rel}(**S**) (top row), and between $\bar{V}_{rel}$(**R**) and V_{rel}(**R**) (bottom row) across varying parameter values, for p = 2, 8, 32, and 1024 (from left to right) and for N = 8, 16, 32, 64, and 256. In all cases, $n = N - 1$. Positive values correspond to smaller inaccuracy in the adjusted indices—merit of adjustment. Note that these profiles are approximations, except under the null conditions (left-hand end of each plot) and for V_{rel}(**R**) with p = 2. Deflection of the profile near the null condition in some cases correspond to a discrepancy between exact and approximate results. All profiles are from 1-large λ conditions as in Figure 2.

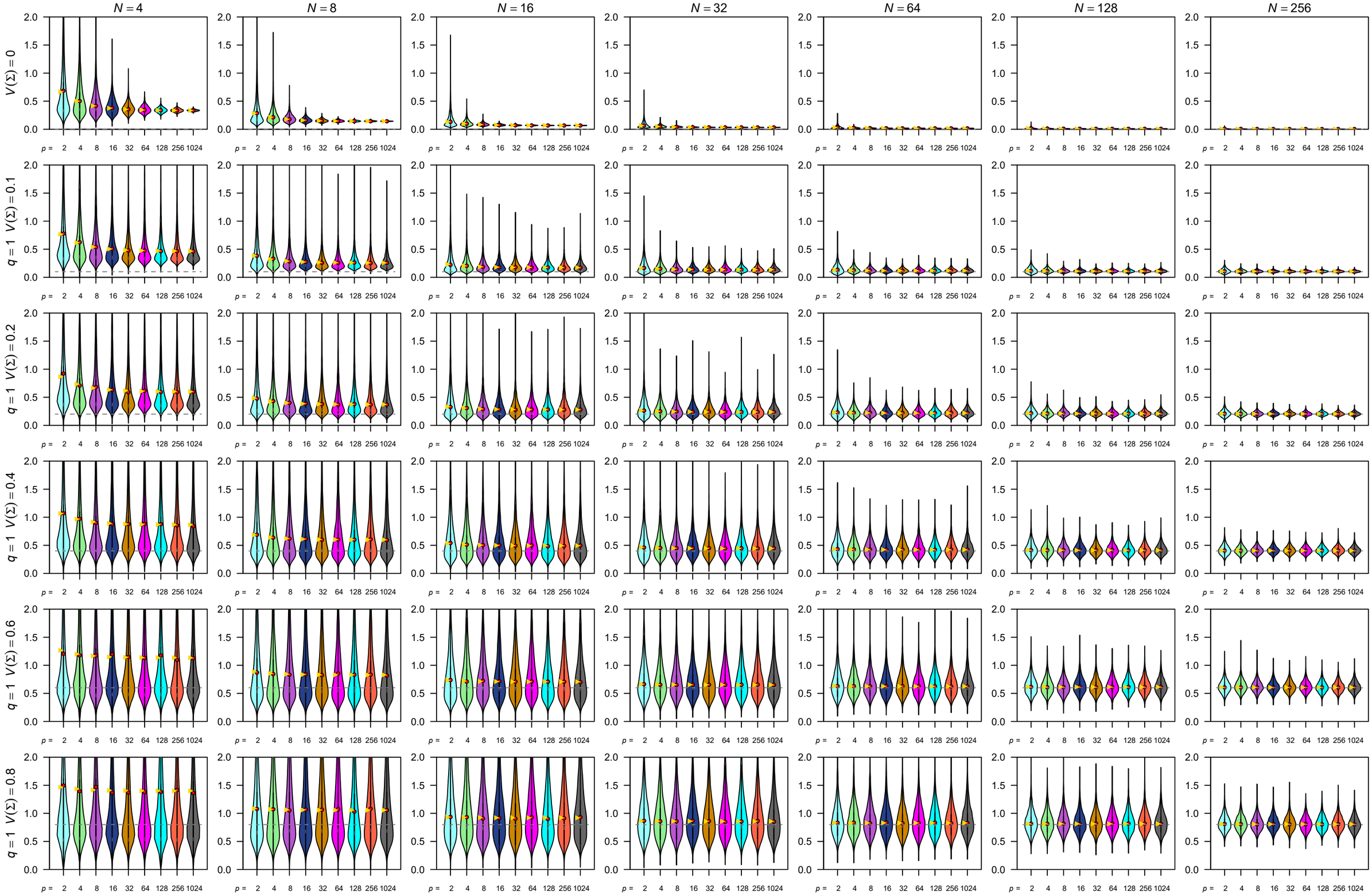

Figure S4. Simulation results for the eigenvalue variance of covariance matrix $V(\mathbf{S})$, $q = 1$. See Figure 5 for legends. Note that extreme values in some panels are cropped for visual clarity.

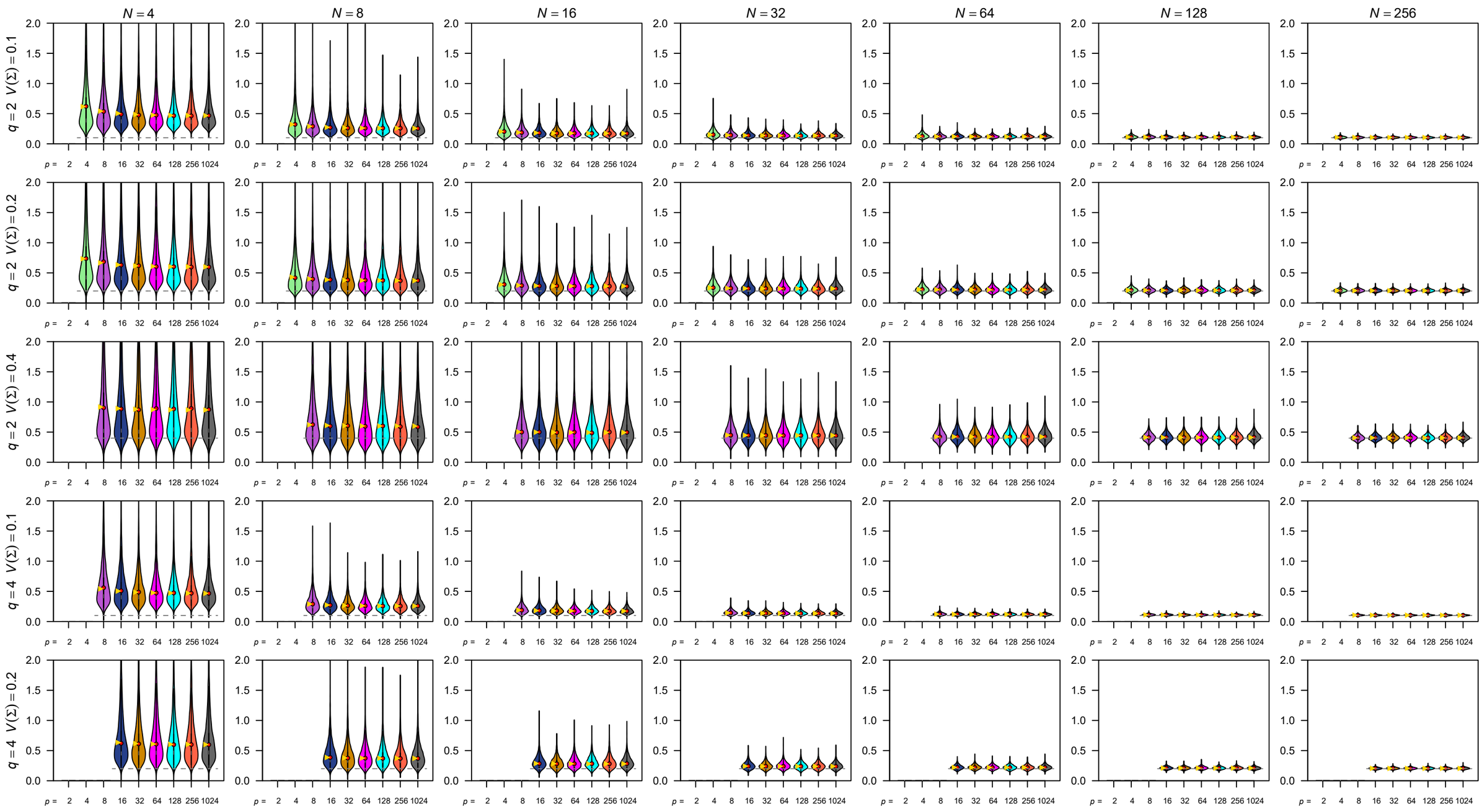

Figure S5. Simulation results for the eigenvalue variance of covariance matrix $V(\mathbf{S})$, $q = 2$ and 4. See Figure 5 for legends. Note that extreme values in some panels are cropped for visual clarity.

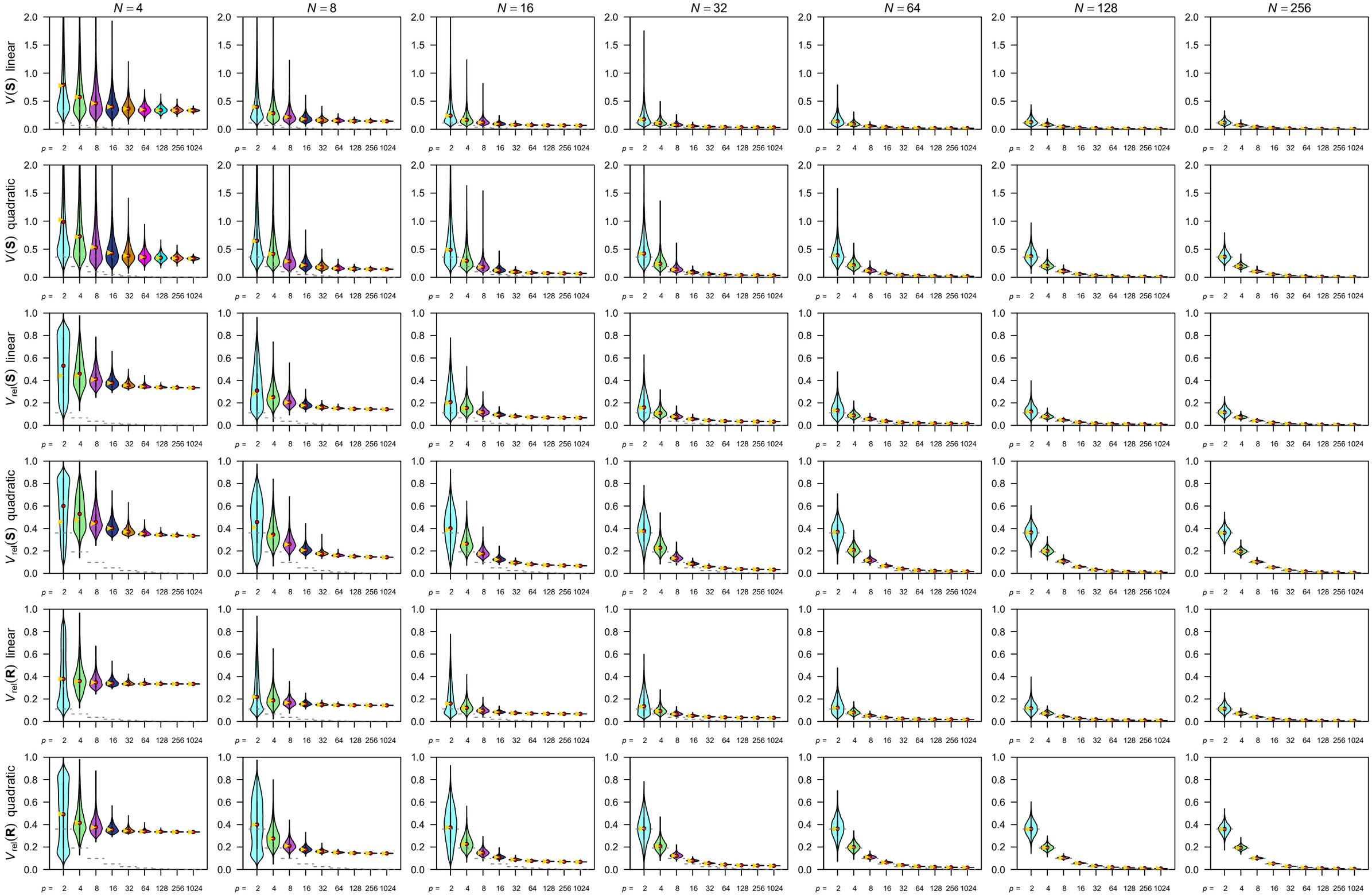

Figure S6. Simulation results, linearly- and quadratically decreasing λ conditions. Empirical distributions of simulated $V(\mathbf{S})$, $V_{rel}(\mathbf{S})$, and $V_{rel}(\mathbf{R})$ are shown in violin plots. See Figure 5 for legends. Note that extreme values in some panels for $V(\mathbf{S})$ are cropped for visual clarity.

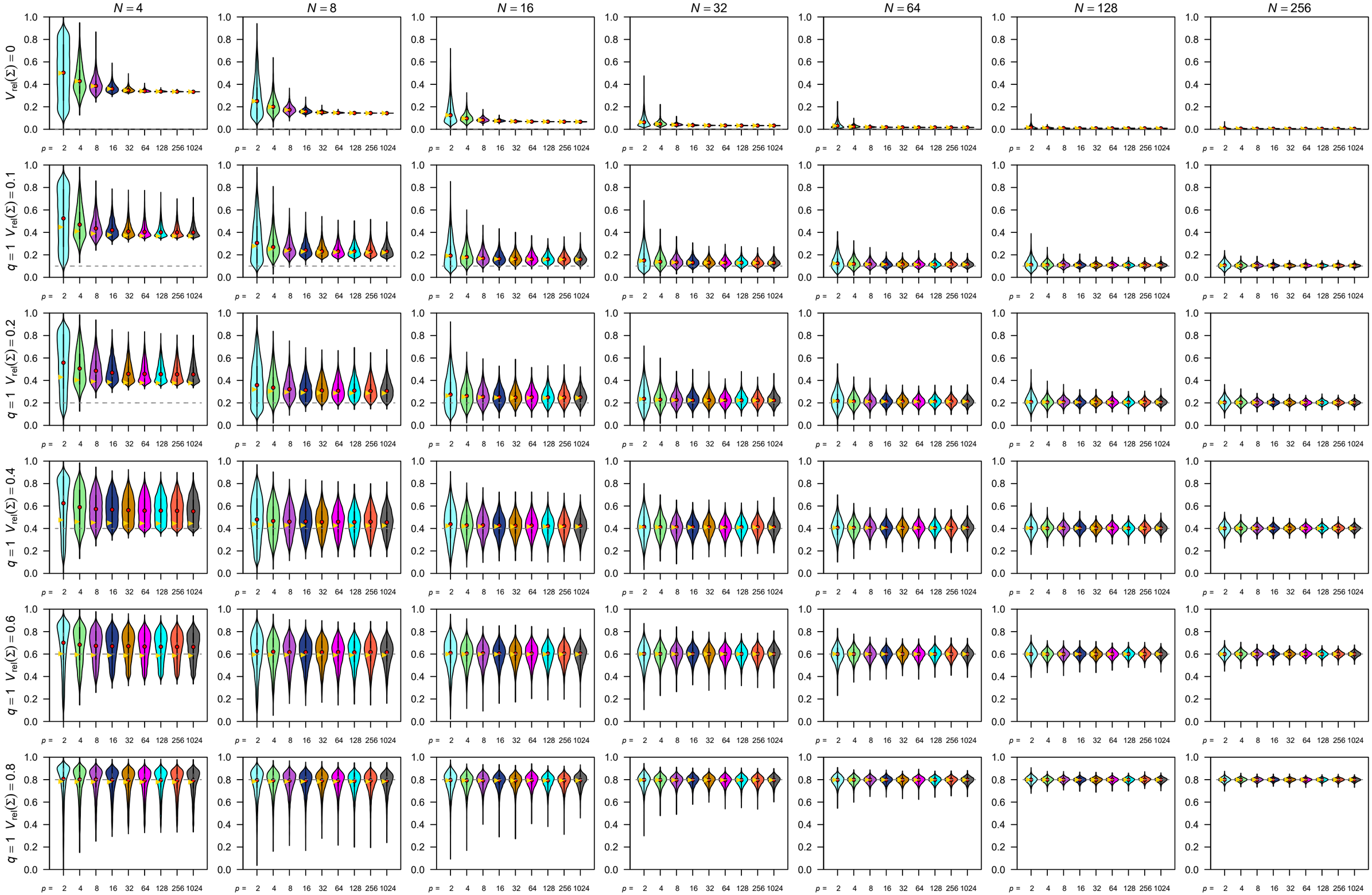

Figure S7. Simulation results for the relative eigenvalue variance of covariance matrix $V_{\text{rel}}(\mathbf{S})$, $q = 1$. See Figure 5 for legends.

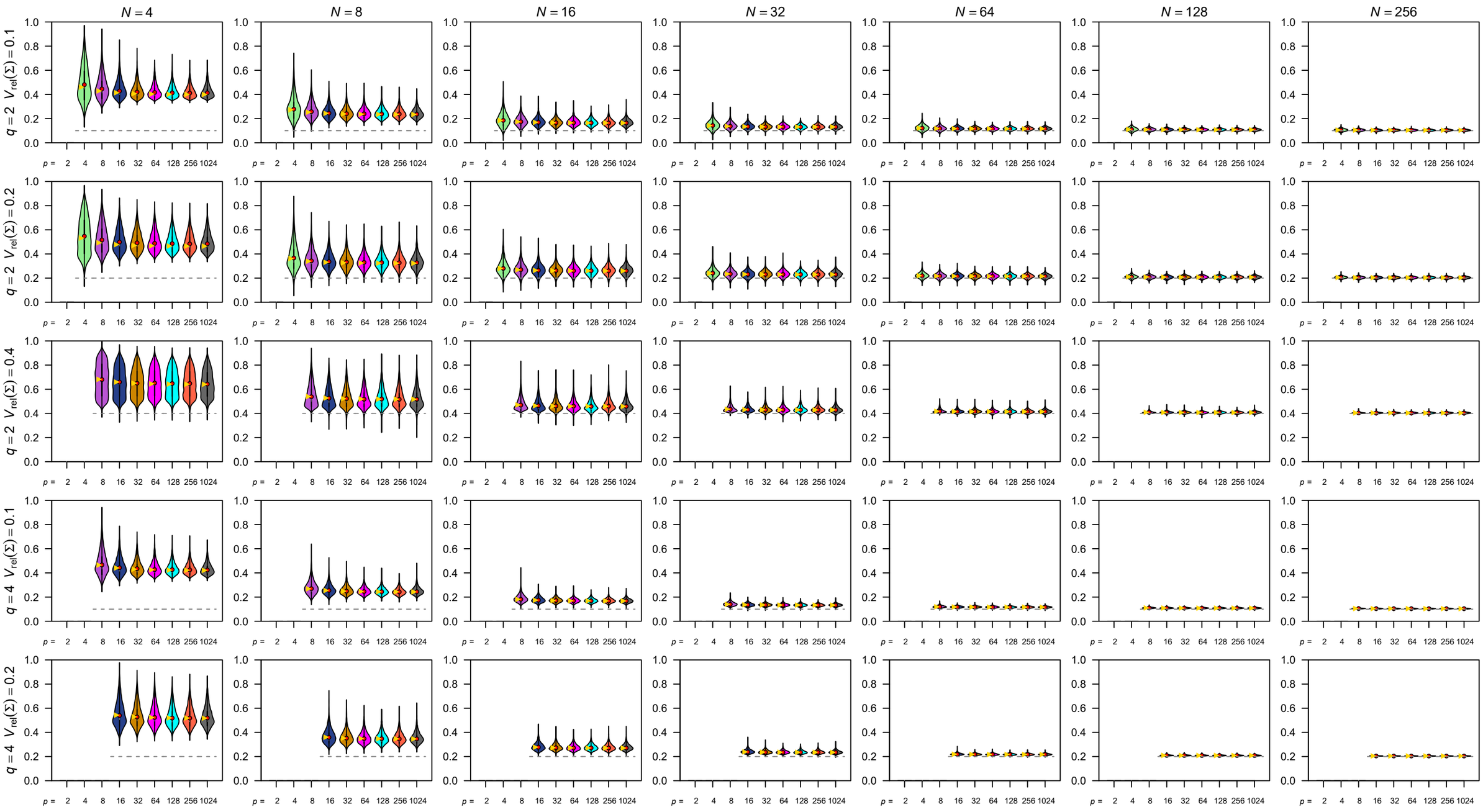

Figure S8. Simulation results for the relative eigenvalue variance of covariance matrix $V_{\text{rel}}(\mathbf{S})$, $q = 2$ and 4. See Figure 5 for legends.

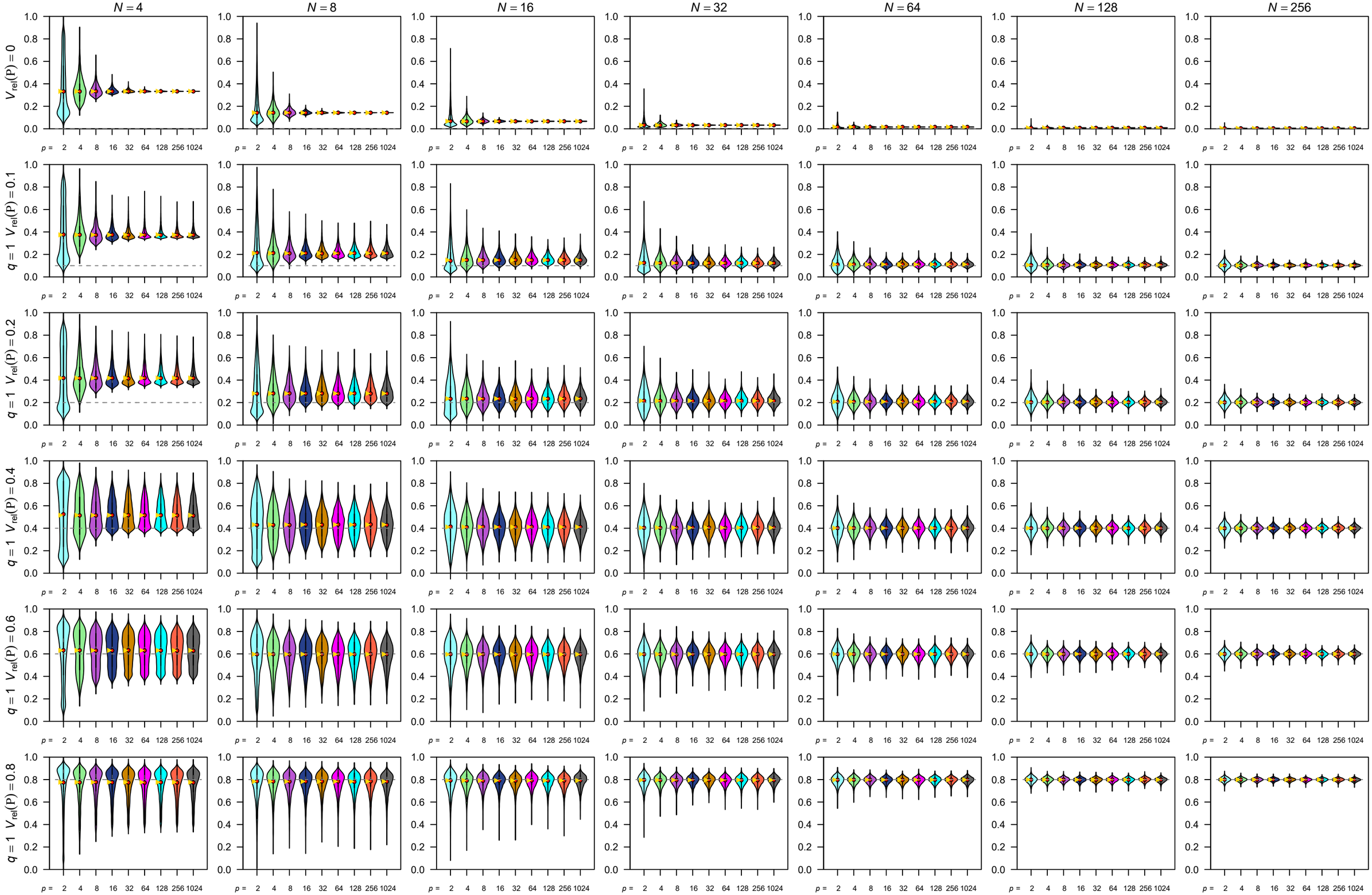

Figure S9. Simulation results for the relative eigenvalue variance of correlation matrix $V_{rel}(\mathbf{R})$, $q = 1$. See Figure 5 for legends. Note that a peak is usually present near 0 when $p = 2$ and $N \leq 8$ (only), but this is invisible due to smoothing in the violin plot.

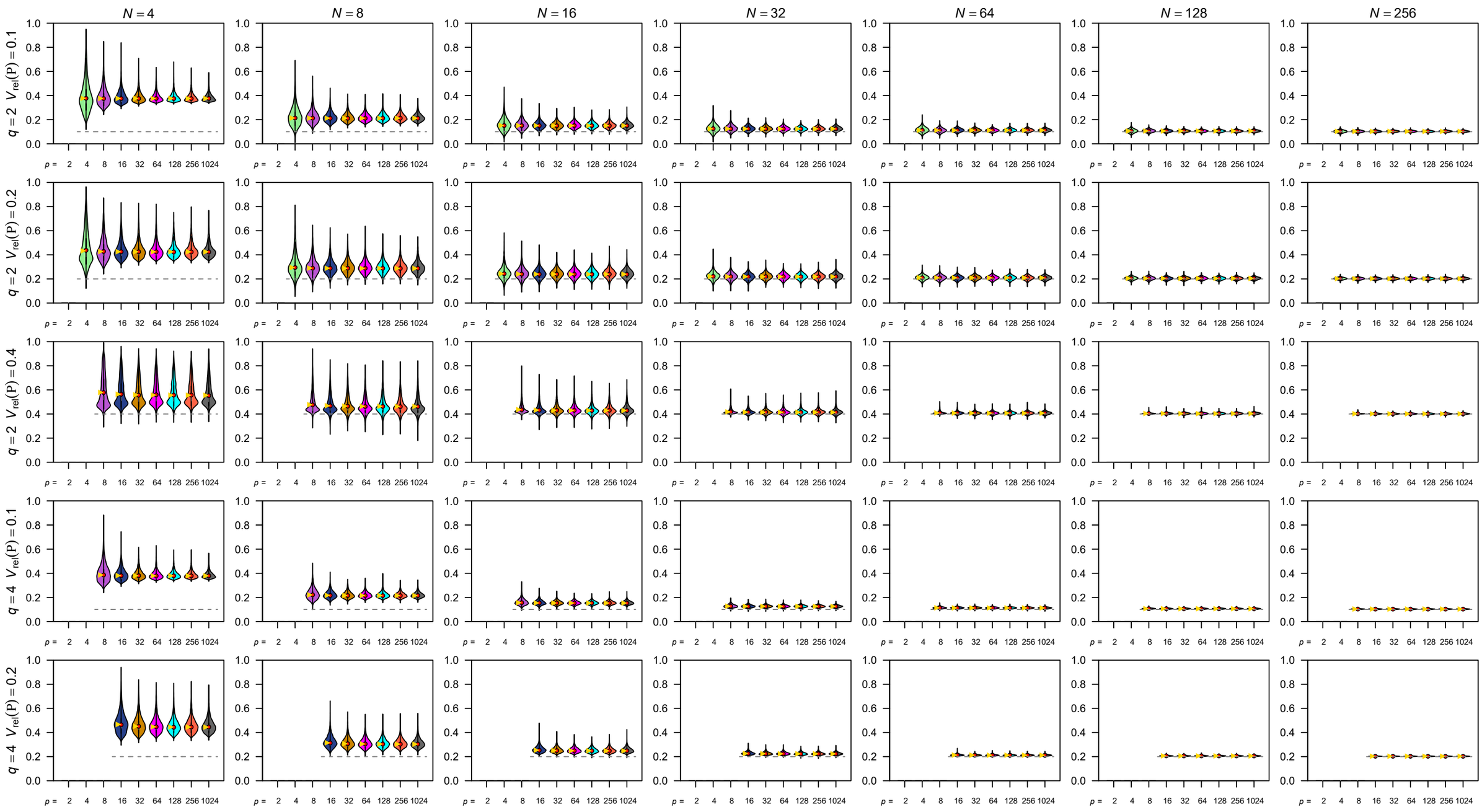

Figure S10. Simulation results for the relative eigenvalue variance of correlation matrix $V_{rel}(\mathbf{R})$, $q = 2$ and 4. See Figure 5 for legends.