Results simulation study DelayedGSD

November 1, 2023

1 Rejection rate

1.1 2 stages

Power by method (columns) and scenario (rows): (nominal level 80%)

scenario	n.sim	missing	binding	fixC	ar	method 1	method 2	method 3
1	10000	TRUE	TRUE	FALSE	10	81.00%	80.93%	80.43%
3	10000	TRUE	TRUE	FALSE	5	80.53%	80.53%	80.14%
5	10000	TRUE	TRUE	TRUE	10	80.15%	80.35%	80.43%
7	10000	TRUE	TRUE	TRUE	5	80.08%	80.20%	80.14%
9	10000	TRUE	FALSE	TRUE	10	79.86%	80.12%	80.26%
11	10000	TRUE	FALSE	TRUE	5	79.93%	80.04%	80.06%
13	10000	TRUE	FALSE	FALSE	10	80.50%	80.44%	80.26%
15	10000	TRUE	FALSE	FALSE	5	80.37%	80.36%	80.06%
17	10000	FALSE	TRUE	FALSE	5	80.31%	80.30%	79.92%

Type 1 error by method (columns) and scenario (rows): (nominal level 2.5%)

scenario	n.sim	missing	binding	fixC	ar	method 1	method 2	method 3
2	10000	TRUE	TRUE	FALSE	10	2.42%	2.39%	2.37%
4	10000	TRUE	TRUE	FALSE	5	2.40%	2.40%	2.35%
6	10000	TRUE	TRUE	TRUE	10	2.24%	2.22%	2.37%
8	10000	TRUE	TRUE	TRUE	5	2.32%	2.31%	2.35%
10	10000	TRUE	FALSE	TRUE	10	2.45%	2.47%	2.57%
12	10000	TRUE	FALSE	TRUE	5	2.63%	2.64%	2.66%
14	10000	TRUE	FALSE	FALSE	10	2.53%	2.53%	2.57%
16	10000	TRUE	FALSE	FALSE	5	2.68%	2.68%	2.66%
18	10000	FALSE	TRUE	FALSE	5	2.46%	2.46%	2.45%

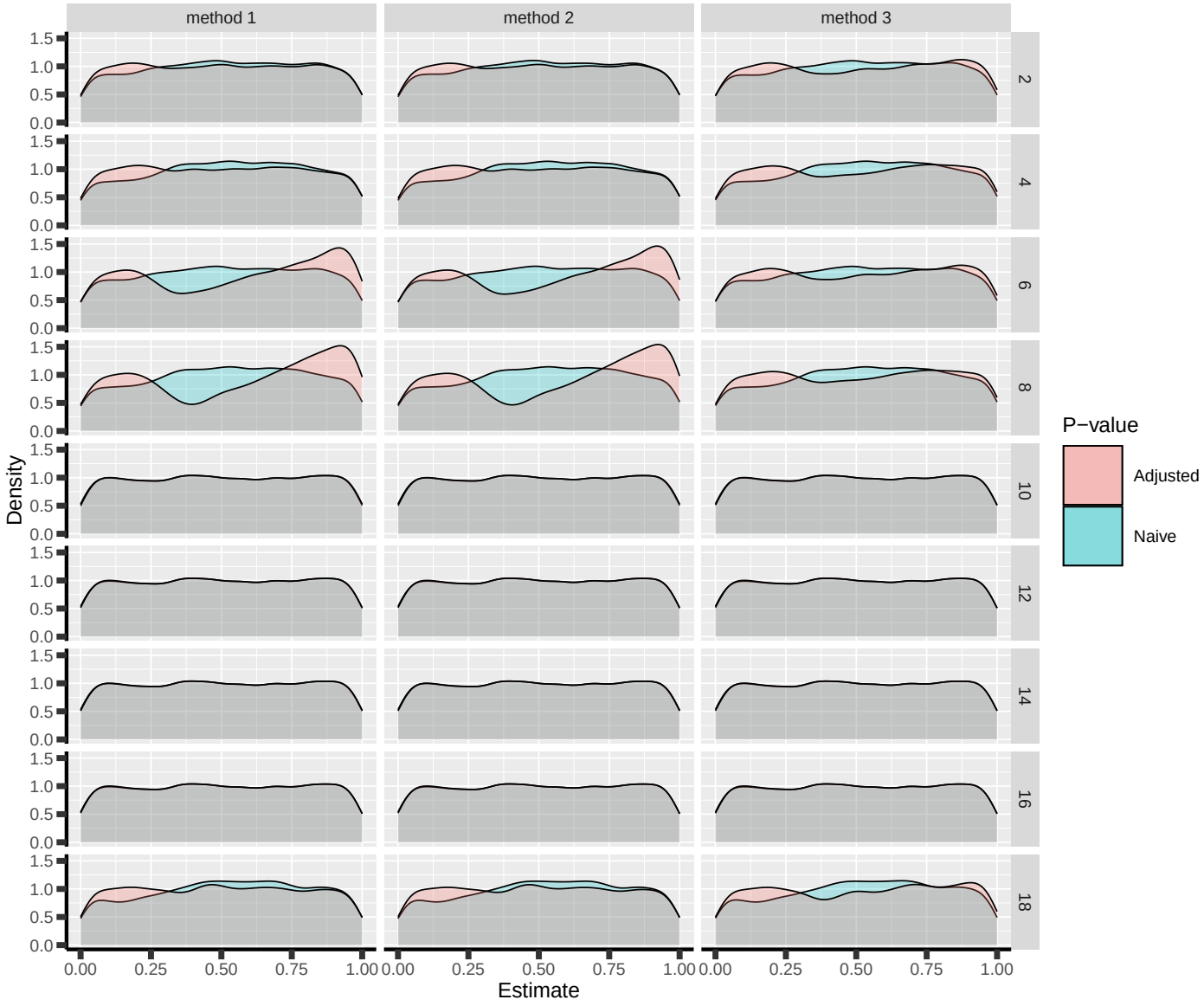

Figure 1: Naive and adjusted p-value distribution over all simulations under the null. Each row correspond to a different scenario

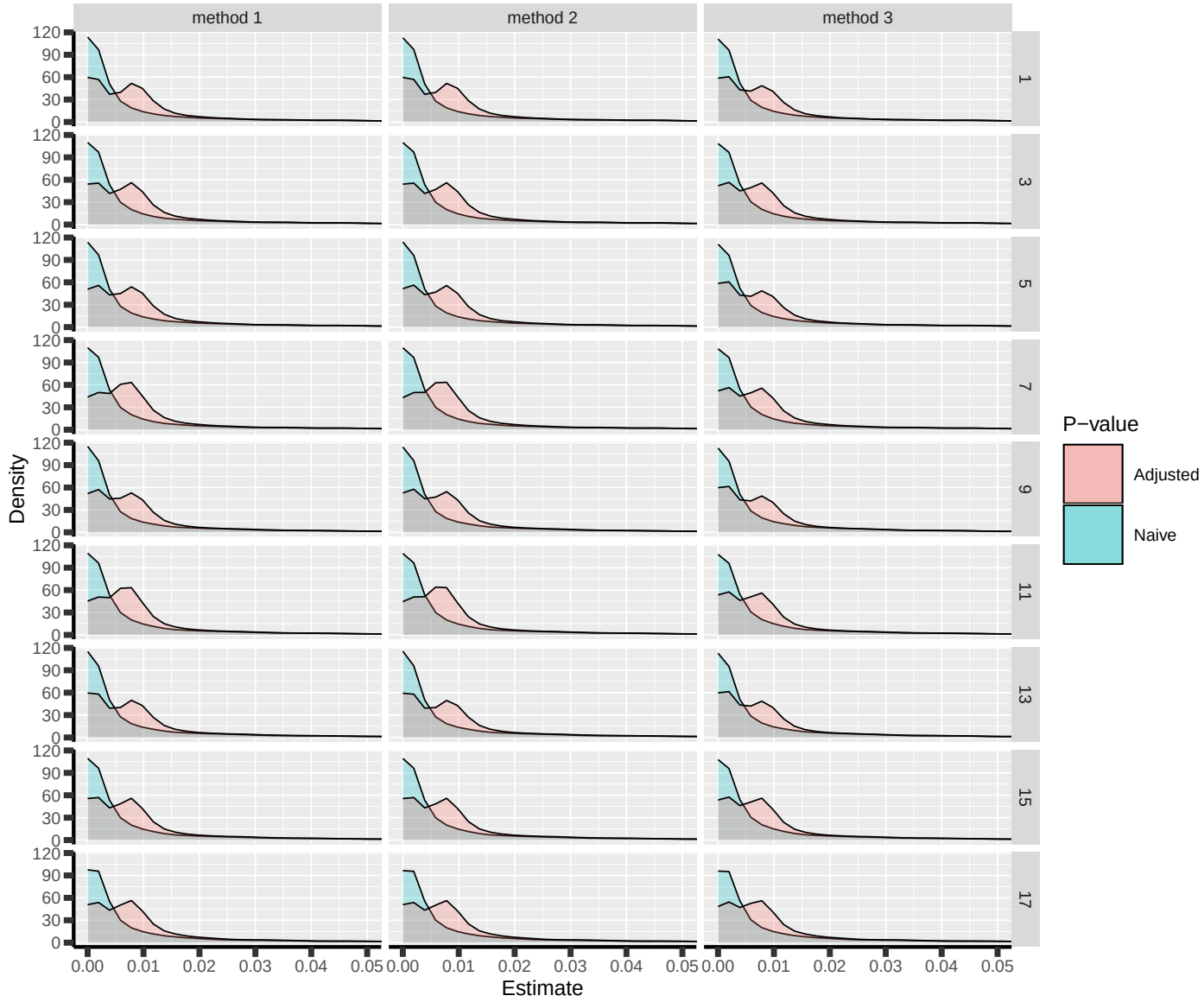

Figure 2: Naive and adjusted p-value distribution over all simulations under the alternative. Each row correspond to a different scenario

1.2 3 stages

Power by method (columns) and scenario (rows): (nominal level 80%)

scenario	n.sim	missing	binding	fixC	ar	method 1	method 2	method 3
1	10000	TRUE	TRUE	FALSE	10	80.87%	80.79%	80.14%
3	10000	TRUE	TRUE	FALSE	5	80.54%	80.53%	80.07%
5	10000	TRUE	TRUE	TRUE	10	79.84%	80.05%	80.14%
7	10000	TRUE	TRUE	TRUE	5	79.96%	80.07%	80.07%
9	10000	TRUE	FALSE	TRUE	10	79.58%	79.94%	80.06%
11	10000	TRUE	FALSE	TRUE	5	79.92%	80.15%	79.96%
13	10000	TRUE	FALSE	FALSE	10	80.52%	80.44%	80.06%
15	10000	TRUE	FALSE	FALSE	5	80.44%	80.42%	79.96%
17	10000	FALSE	TRUE	FALSE	5	80.23%	80.21%	79.80%

Type 1 error by method (columns) and scenario (rows): (nominal level 2.5%)

scenario	n.sim	missing	binding	fixC	ar	method 1	method 2	method 3
2	10000	TRUE	TRUE	FALSE	10	2.50%	2.48%	2.38%
4	10000	TRUE	TRUE	FALSE	5	2.42%	2.43%	2.40%
6	10000	TRUE	TRUE	TRUE	10	2.31%	2.33%	2.38%
8	10000	TRUE	TRUE	TRUE	5	2.37%	2.36%	2.40%
10	10000	TRUE	FALSE	TRUE	10	2.44%	2.42%	2.52%
12	10000	TRUE	FALSE	TRUE	5	2.48%	2.48%	2.54%
14	10000	TRUE	FALSE	FALSE	10	2.54%	2.53%	2.52%
16	10000	TRUE	FALSE	FALSE	5	2.61%	2.61%	2.54%
18	10000	FALSE	TRUE	FALSE	5	2.57%	2.57%	2.48%

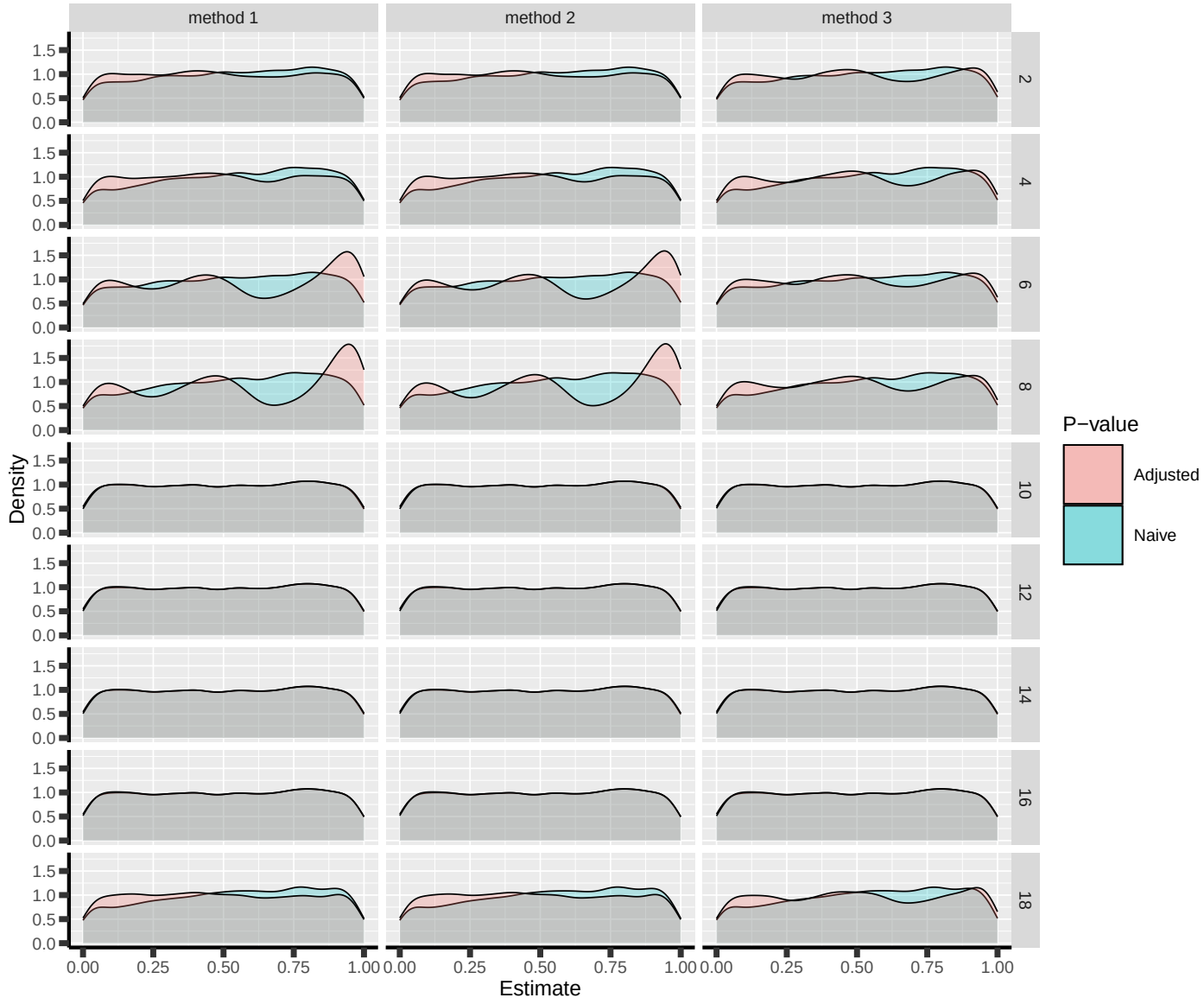

Figure 3: Naive and adjusted p-value distribution over all simulations under the null. Each row correspond to a different scenario

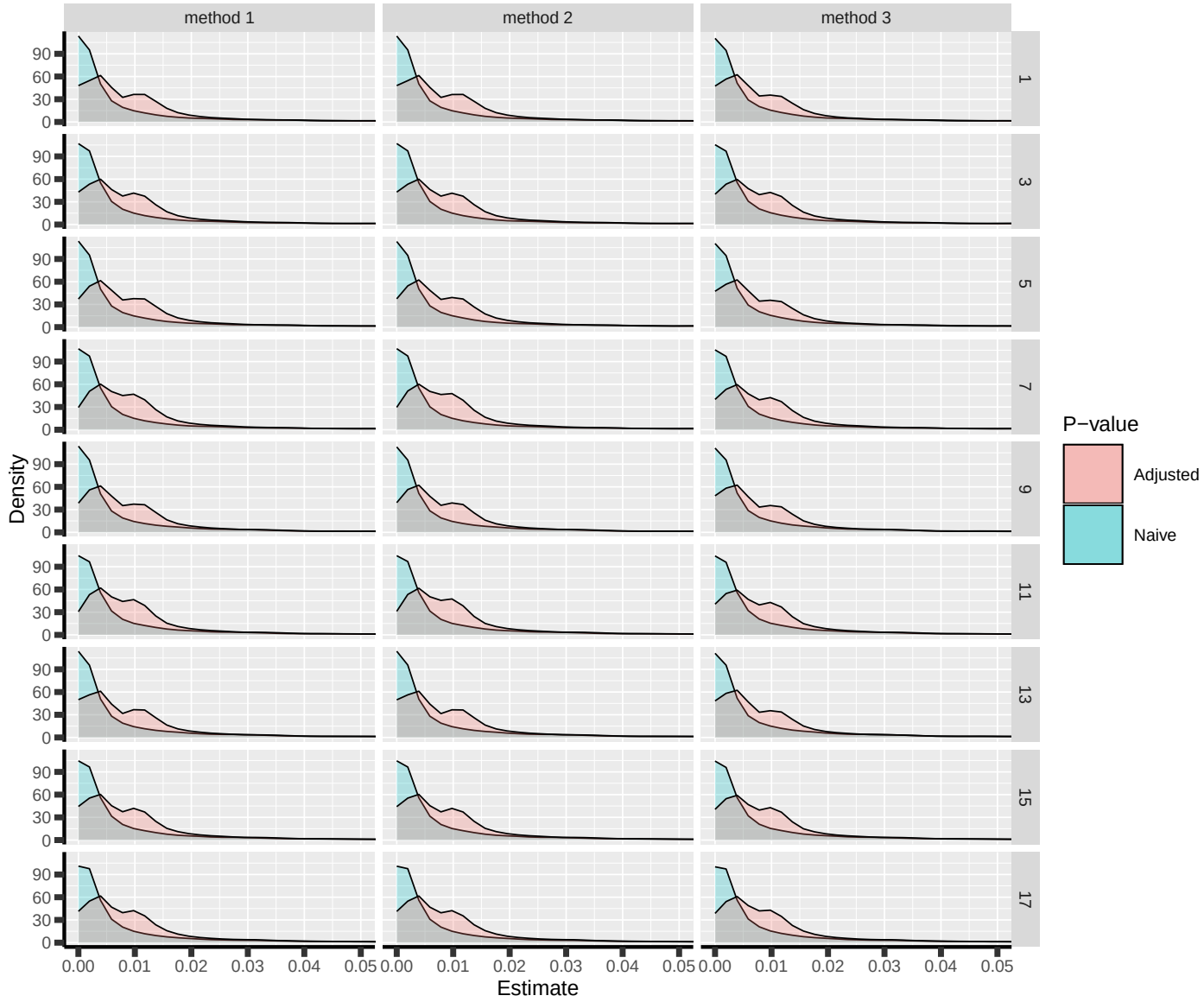

Figure 4: Naive and adjusted p-value distribution over all simulations under the alternative. Each row correspond to a different scenario

2 Conclusion of the trial

2.1 2 stages

Relative frequency of stopping for efficacy/futility at decision/final

- Method 1

	N	missing	hypo	binding	fixC	ar	decision.eff	decision.fut	final.eff	final.fut
1:	10000	TRUE	power	TRUE	FALSE	10	37.79%	5.93%	43.21%	13.07%
2:	10000	TRUE	typeI	TRUE	FALSE	10	0.80%	71.13%	1.62%	26.45%
3:	10000	TRUE	power	TRUE	FALSE	5	35.74%	5.98%	44.79%	13.49%
4:	10000	TRUE	typeI	TRUE	FALSE	5	0.74%	69.32%	1.66%	28.28%
5:	10000	TRUE	power	TRUE	TRUE	10	36.94%	6.78%	43.21%	13.07%
6:	10000	TRUE	typeI	TRUE	TRUE	10	0.62%	71.31%	1.62%	26.45%
7:	10000	TRUE	power	TRUE	TRUE	5	35.29%	6.43%	44.79%	13.49%
8:	10000	TRUE	typeI	TRUE	TRUE	5	0.66%	69.40%	1.66%	28.28%
9:	10000	TRUE	power	FALSE	TRUE	10	38.05%	6.57%	41.81%	13.57%
10:	10000	TRUE	typeI	FALSE	TRUE	10	0.61%	0.20%	1.84%	97.35%
11:	10000	TRUE	power	FALSE	TRUE	5	36.35%	6.15%	43.58%	13.92%
12:	10000	TRUE	typeI	FALSE	TRUE	5	0.70%	0.06%	1.93%	97.31%
13:	10000	TRUE	power	FALSE	FALSE	10	38.69%	5.93%	41.81%	13.57%
14:	10000	TRUE	typeI	FALSE	FALSE	10	0.69%	0.12%	1.84%	97.35%
15:	10000	TRUE	power	FALSE	FALSE	5	36.79%	5.71%	43.58%	13.92%
16:	10000	TRUE	typeI	FALSE	FALSE	5	0.75%	0.01%	1.93%	97.31%
17:	10000	FALSE	power	TRUE	FALSE	5	33.98%	5.33%	46.33%	14.36%
18:	10000	FALSE	typeI	TRUE	FALSE	5	0.74%	67.48%	1.72%	30.06%

Method 2:

	N	missing	hypo	binding	fixC	ar	decision.eff	decision.fut	final.eff	final.fut
1:	10000	TRUE	power	TRUE	FALSE	10	37.85%	6.19%	43.08%	12.88%
2:	10000	TRUE	typeI	TRUE	FALSE	10	0.79%	71.64%	1.60%	25.97%
3:	10000	TRUE	power	TRUE	FALSE	5	35.77%	5.99%	44.76%	13.48%
4:	10000	TRUE	typeI	TRUE	FALSE	5	0.74%	69.38%	1.66%	28.22%
5:	10000	TRUE	power	TRUE	TRUE	10	36.69%	6.24%	43.66%	13.41%
6:	10000	TRUE	typeI	TRUE	TRUE	10	0.59%	69.61%	1.63%	28.17%
7:	10000	TRUE	power	TRUE	TRUE	5	35.02%	6.05%	45.18%	13.75%
8:	10000	TRUE	typeI	TRUE	TRUE	5	0.63%	68.36%	1.68%	29.33%
9:	10000	TRUE	power	FALSE	TRUE	10	37.85%	6.04%	42.27%	13.84%
10:	10000	TRUE	typeI	FALSE	TRUE	10	0.61%	0.19%	1.86%	97.34%
11:	10000	TRUE	power	FALSE	TRUE	5	36.18%	5.84%	43.86%	14.12%
12:	10000	TRUE	typeI	FALSE	TRUE	5	0.69%	0.06%	1.95%	97.30%
13:	10000	TRUE	power	FALSE	FALSE	10	38.70%	6.09%	41.74%	13.47%
14:	10000	TRUE	typeI	FALSE	FALSE	10	0.69%	0.12%	1.84%	97.35%
15:	10000	TRUE	power	FALSE	FALSE	5	36.82%	5.75%	43.54%	13.89%
16:	10000	TRUE	typeI	FALSE	FALSE	5	0.75%	0.01%	1.93%	97.31%
17:	10000	FALSE	power	TRUE	FALSE	5	34.03%	5.36%	46.27%	14.34%
18:	10000	FALSE	typeI	TRUE	FALSE	5	0.74%	67.55%	1.72%	29.99%

Method 3:

	N	missing	hypo	binding	fixC	ar	decision.eff	decision.fut	final.eff	final.fut
1:	10000	TRUE	power	TRUE	FALSE	10	40.58%	6.53%	39.85%	13.04%
2:	10000	TRUE	typeI	TRUE	FALSE	10	0.74%	68.79%	1.63%	28.84%
3:	10000	TRUE	power	TRUE	FALSE	5	36.54%	6.30%	43.60%	13.56%
4:	10000	TRUE	typeI	TRUE	FALSE	5	0.69%	68.41%	1.66%	29.24%
5:	10000	TRUE	power	TRUE	TRUE	10	40.58%	6.53%	39.85%	13.04%
6:	10000	TRUE	typeI	TRUE	TRUE	10	0.74%	68.79%	1.63%	28.84%
7:	10000	TRUE	power	TRUE	TRUE	5	36.54%	6.30%	43.60%	13.56%
8:	10000	TRUE	typeI	TRUE	TRUE	5	0.69%	68.41%	1.66%	29.24%
9:	10000	TRUE	power	FALSE	TRUE	10	41.34%	6.20%	38.92%	13.54%
10:	10000	TRUE	typeI	FALSE	TRUE	10	0.77%	0.33%	1.80%	97.10%
11:	10000	TRUE	power	FALSE	TRUE	5	37.71%	6.03%	42.35%	13.91%
12:	10000	TRUE	typeI	FALSE	TRUE	5	0.73%	0.09%	1.93%	97.25%
13:	10000	TRUE	power	FALSE	FALSE	10	41.34%	6.20%	38.92%	13.54%
14:	10000	TRUE	typeI	FALSE	FALSE	10	0.77%	0.33%	1.80%	97.10%
15:	10000	TRUE	power	FALSE	FALSE	5	37.71%	6.03%	42.35%	13.91%
16:	10000	TRUE	typeI	FALSE	FALSE	5	0.73%	0.09%	1.93%	97.25%
17:	10000	FALSE	power	TRUE	FALSE	5	34.65%	5.59%	45.27%	14.49%
18:	10000	FALSE	typeI	TRUE	FALSE	5	0.68%	66.54%	1.77%	31.01%

Relative frequency of stopping for with a threshold below 1.96:

	scenario	missing	method	binding	fixC	ar	hypo	N	rejection	rejectionBelow196
1:	1	TRUE	1	TRUE	FALSE	10	power	10000	81.00%	0.85%
2:	1	TRUE	2	TRUE	FALSE	10	power	10000	80.93%	0.84%
3:	2	TRUE	1	TRUE	FALSE	10	typeI	10000	2.42%	0.18%
4:	2	TRUE	2	TRUE	FALSE	10	typeI	10000	2.39%	0.17%
5:	3	TRUE	1	TRUE	FALSE	5	power	10000	80.53%	0.45%
6:	3	TRUE	2	TRUE	FALSE	5	power	10000	80.53%	0.45%
7:	4	TRUE	1	TRUE	FALSE	5	typeI	10000	2.40%	0.08%
8:	4	TRUE	2	TRUE	FALSE	5	typeI	10000	2.40%	0.08%
9:	13	TRUE	1	FALSE	FALSE	10	power	10000	80.50%	0.64%
10:	13	TRUE	2	FALSE	FALSE	10	power	10000	80.44%	0.64%
11:	14	TRUE	1	FALSE	FALSE	10	typeI	10000	2.53%	0.08%
12:	14	TRUE	2	FALSE	FALSE	10	typeI	10000	2.53%	0.08%
13:	15	TRUE	1	FALSE	FALSE	5	power	10000	80.37%	0.44%
14:	15	TRUE	2	FALSE	FALSE	5	power	10000	80.36%	0.44%
15:	16	TRUE	1	FALSE	FALSE	5	typeI	10000	2.68%	0.05%
16:	16	TRUE	2	FALSE	FALSE	5	typeI	10000	2.68%	0.05%
17:	17	FALSE	1	TRUE	FALSE	5	power	10000	80.31%	0.42%
18:	17	FALSE	2	TRUE	FALSE	5	power	10000	80.30%	0.43%
19:	18	FALSE	1	TRUE	FALSE	5	typeI	10000	2.46%	0.08%
20:	18	FALSE	2	TRUE	FALSE	5	typeI	10000	2.46%	0.08%

2.2 3 stages

Relative frequency of stopping for efficacy/futility at decision/final

- Method 1

	N	missing	hypo	binding	fixC	ar	dec1.eff	dec1.fut	dec2.eff	dec2.fut	final.eff	final.fut
1:	10000		TRUE	power	TRUE	FALSE	10	19.91%	2.95%	29.31%	5.36%	31.65%	10.82%
2:	10000		TRUE	typeI	TRUE	FALSE	10	0.38%	46.24%	0.67%	35.38%	1.45%	15.88%
3:	10000		TRUE	power	TRUE	FALSE	5	18.32%	2.80%	28.80%	5.47%	33.42%	11.19%
4:	10000		TRUE	typeI	TRUE	FALSE	5	0.36%	44.03%	0.59%	36.50%	1.47%	17.05%
5:	10000		TRUE	power	TRUE	TRUE	10	19.39%	3.47%	28.80%	5.87%	31.65%	10.82%
6:	10000		TRUE	typeI	TRUE	TRUE	10	0.30%	46.32%	0.56%	35.49%	1.45%	15.88%
7:	10000		TRUE	power	TRUE	TRUE	5	18.06%	3.06%	28.48%	5.79%	33.42%	11.19%
8:	10000		TRUE	typeI	TRUE	TRUE	5	0.34%	44.05%	0.56%	36.53%	1.47%	17.05%
9:	10000		TRUE	power	FALSE	TRUE	10	20.80%	3.52%	27.86%	5.59%	30.92%	11.31%
10:	10000		TRUE	typeI	FALSE	TRUE	10	0.31%	0.10%	0.51%	0.63%	1.62%	96.83%
11:	10000		TRUE	power	FALSE	TRUE	5	19.31%	3.03%	28.11%	5.68%	32.50%	11.37%
12:	10000		TRUE	typeI	FALSE	TRUE	5	0.31%	0.04%	0.52%	0.10%	1.65%	97.38%
13:	10000		TRUE	power	FALSE	FALSE	10	21.28%	3.04%	28.32%	5.13%	30.92%	11.31%
14:	10000		TRUE	typeI	FALSE	FALSE	10	0.35%	0.06%	0.57%	0.57%	1.62%	96.83%
15:	10000		TRUE	power	FALSE	FALSE	5	19.50%	2.84%	28.44%	5.35%	32.50%	11.37%
16:	10000		TRUE	typeI	FALSE	FALSE	5	0.35%	0	0.61%	0.01%	1.65%	97.38%
17:	10000		FALSE	power	TRUE	FALSE	5	17.63%	2.93%	28.90%	5.11%	33.70%	11.73%
18:	10000		FALSE	typeI	TRUE	FALSE	5	0.48%	42.39%	0.71%	36.38%	1.38%	18.66%

- Method 2

	N	missing	hypo	binding	fixC	ar	dec1.eff	dec1.fut	dec2.eff	dec2.fut	final.eff	final.fut
1:	10000		TRUE	power	TRUE	FALSE	10	19.94%	2.99%	29.32%	5.69%	31.53%	10.53%
2:	10000		TRUE	typeI	TRUE	FALSE	10	0.38%	46.48%	0.66%	35.66%	1.44%	15.38%
3:	10000		TRUE	power	TRUE	FALSE	5	18.33%	2.83%	28.86%	5.49%	33.34%	11.15%
4:	10000		TRUE	typeI	TRUE	FALSE	5	0.36%	44.08%	0.59%	36.47%	1.48%	17.02%
5:	10000		TRUE	power	TRUE	TRUE	10	19.17%	3.16%	28.74%	5.67%	32.14%	11.12%
6:	10000		TRUE	typeI	TRUE	TRUE	10	0.29%	44.63%	0.56%	36.01%	1.48%	17.03%
7:	10000		TRUE	power	TRUE	TRUE	5	17.91%	2.98%	28.31%	5.40%	33.85%	11.55%
8:	10000		TRUE	typeI	TRUE	TRUE	5	0.34%	43.09%	0.54%	36.68%	1.48%	17.87%
9:	10000		TRUE	power	FALSE	TRUE	10	20.72%	3.21%	27.71%	5.29%	31.51%	11.56%
10:	10000		TRUE	typeI	FALSE	TRUE	10	0.29%	0.10%	0.50%	0.49%	1.63%	96.99%
11:	10000		TRUE	power	FALSE	TRUE	5	19.19%	2.94%	28.01%	5.23%	32.95%	11.68%
12:	10000		TRUE	typeI	FALSE	TRUE	5	0.31%	0.04%	0.50%	0.09%	1.67%	97.39%
13:	10000		TRUE	power	FALSE	FALSE	10	21.30%	3.09%	28.33%	5.27%	30.81%	11.20%
14:	10000		TRUE	typeI	FALSE	FALSE	10	0.35%	0.06%	0.57%	0.58%	1.61%	96.83%
15:	10000		TRUE	power	FALSE	FALSE	5	19.51%	2.84%	28.44%	5.39%	32.47%	11.35%

16:	10000	TRUE	typeI	FALSE	FALSE	5	0.35%	0	0.61%	0.01%	1.65%	97.38%
17:	10000	FALSE	power	TRUE	FALSE	5	17.68%	2.94%	28.89%	5.17%	33.64%	11.68%
18:	10000	FALSE	typeI	TRUE	FALSE	5	0.48%	42.46%	0.71%	36.41%	1.38%	18.56%

- Method 3

	N	missing	hypo	binding	fixC	ar	dec1.eff	dec1.fut	dec2.eff	dec2.fut	final.eff	final.fut
1:	10000	TRUE	power	TRUE	FALSE	10	21.49%	3.26%	29.79%	5.96%	28.86%	10.64%
2:	10000	TRUE	typeI	TRUE	FALSE	10	0.32%	44.14%	0.60%	35.96%	1.46%	17.52%
3:	10000	TRUE	power	TRUE	FALSE	5	18.53%	3.11%	28.98%	5.51%	32.56%	11.31%
4:	10000	TRUE	typeI	TRUE	FALSE	5	0.37%	43.25%	0.56%	36.60%	1.47%	17.75%
5:	10000	TRUE	power	TRUE	TRUE	10	21.49%	3.26%	29.79%	5.96%	28.86%	10.64%
6:	10000	TRUE	typeI	TRUE	TRUE	10	0.32%	44.14%	0.60%	35.96%	1.46%	17.52%
7:	10000	TRUE	power	TRUE	TRUE	5	18.53%	3.11%	28.98%	5.51%	32.56%	11.31%
8:	10000	TRUE	typeI	TRUE	TRUE	5	0.37%	43.25%	0.56%	36.60%	1.47%	17.75%
9:	10000	TRUE	power	FALSE	TRUE	10	22.78%	3.32%	28.92%	5.74%	28.36%	10.88%
10:	10000	TRUE	typeI	FALSE	TRUE	10	0.33%	0.14%	0.65%	0.81%	1.54%	96.53%
11:	10000	TRUE	power	FALSE	TRUE	5	19.70%	3.12%	28.62%	5.49%	31.64%	11.43%
12:	10000	TRUE	typeI	FALSE	TRUE	5	0.32%	0.06%	0.59%	0.13%	1.63%	97.27%
13:	10000	TRUE	power	FALSE	FALSE	10	22.78%	3.32%	28.92%	5.74%	28.36%	10.88%
14:	10000	TRUE	typeI	FALSE	FALSE	10	0.33%	0.14%	0.65%	0.81%	1.54%	96.53%
15:	10000	TRUE	power	FALSE	FALSE	5	19.70%	3.12%	28.62%	5.49%	31.64%	11.43%
16:	10000	TRUE	typeI	FALSE	FALSE	5	0.32%	0.06%	0.59%	0.13%	1.63%	97.27%
17:	10000	FALSE	power	TRUE	FALSE	5	18.08%	3.12%	29.02%	5.26%	32.70%	11.82%
18:	10000	FALSE	typeI	TRUE	FALSE	5	0.41%	41.65%	0.68%	36.42%	1.39%	19.45%

Relative frequency of stopping for with a threshold below 1.96:

	scenario	missing	method	binding	fixC	ar	hypo	N	rejection	rejectionBelow196
1:	1	TRUE	1	TRUE	FALSE	10	power	10000	80.87%	1.03%
2:	1	TRUE	2	TRUE	FALSE	10	power	10000	80.79%	0.96%
3:	2	TRUE	1	TRUE	FALSE	10	typeI	10000	2.50%	0.19%
4:	2	TRUE	2	TRUE	FALSE	10	typeI	10000	2.48%	0.17%
5:	3	TRUE	1	TRUE	FALSE	5	power	10000	80.54%	0.58%
6:	3	TRUE	2	TRUE	FALSE	5	power	10000	80.53%	0.58%
7:	4	TRUE	1	TRUE	FALSE	5	typeI	10000	2.42%	0.05%
8:	4	TRUE	2	TRUE	FALSE	5	typeI	10000	2.43%	0.05%
9:	13	TRUE	1	FALSE	FALSE	10	power	10000	80.52%	0.94%
10:	13	TRUE	2	FALSE	FALSE	10	power	10000	80.44%	0.92%
11:	14	TRUE	1	FALSE	FALSE	10	typeI	10000	2.54%	0.10%
12:	14	TRUE	2	FALSE	FALSE	10	typeI	10000	2.53%	0.10%
13:	15	TRUE	1	FALSE	FALSE	5	power	10000	80.44%	0.52%
14:	15	TRUE	2	FALSE	FALSE	5	power	10000	80.42%	0.50%
15:	16	TRUE	1	FALSE	FALSE	5	typeI	10000	2.61%	0.13%
16:	16	TRUE	2	FALSE	FALSE	5	typeI	10000	2.61%	0.13%
17:	17	FALSE	1	TRUE	FALSE	5	power	10000	80.23%	0.52%
18:	17	FALSE	2	TRUE	FALSE	5	power	10000	80.21%	0.51%
19:	18	FALSE	1	TRUE	FALSE	5	typeI	10000	2.57%	0.18%
20:	18	FALSE	2	TRUE	FALSE	5	typeI	10000	2.57%	0.18%

3 Bias (True effect: 0.6 under the alternative)

3.1 2 stages

Bias per estimator and method[1]:

	hypo	missing	binding	fixC	ar	biasMLE1	biasMLE2	biasMLE3	biasMUE1	biasMUE2	biasMUE3
1:	power	TRUE	TRUE	FALSE	10	0.01345	0.01315	0.01468	0.00598	0.00566	-0.00330
2:	typeI	TRUE	TRUE	FALSE	10	-0.01794	-0.01784	-0.01856	-0.00453	-0.00448	-0.01675
3:	power	TRUE	TRUE	FALSE	5	0.02257	0.02255	0.02358	0.01044	0.01047	0.00305
4:	typeI	TRUE	TRUE	FALSE	5	-0.03034	-0.03031	-0.03065	-0.01186	-0.01182	-0.02468
5:	power	TRUE	TRUE	TRUE	10	0.01345	0.01403	0.01468	-0.01705	-0.01731	-0.00330
6:	typeI	TRUE	TRUE	TRUE	10	-0.01794	-0.01871	-0.01856	-0.05000	-0.05241	-0.01675
7:	power	TRUE	TRUE	TRUE	5	0.02257	0.02309	0.02358	-0.01895	-0.01892	0.00305
8:	typeI	TRUE	TRUE	TRUE	5	-0.03034	-0.03085	-0.03065	-0.07533	-0.07692	-0.02468
9:	power	TRUE	FALSE	TRUE	10	0.01433	0.01490	0.01529	0.01725	0.01500	0.02897
10:	typeI	TRUE	FALSE	TRUE	10	0.00019	0.00019	0.00051	-0.00087	-0.00079	0.00073
11:	power	TRUE	FALSE	TRUE	5	0.02366	0.02402	0.02438	0.01667	0.01524	0.03653
12:	typeI	TRUE	FALSE	TRUE	5	0.00091	0.00085	0.00101	0.00033	0.00027	0.00086
13:	power	TRUE	FALSE	FALSE	10	0.01433	0.01416	0.01529	0.03552	0.03589	0.02897
14:	typeI	TRUE	FALSE	FALSE	10	0.00019	0.00019	0.00051	-0.00020	-0.00021	0.00073
15:	power	TRUE	FALSE	FALSE	5	0.02366	0.02365	0.02438	0.04186	0.04202	0.03653
16:	typeI	TRUE	FALSE	FALSE	5	0.00091	0.00091	0.00101	0.00087	0.00087	0.00086
17:	power	FALSE	TRUE	FALSE	5	0.02284	0.02277	0.02381	0.01197	0.01196	0.00348
18:	typeI	FALSE	TRUE	FALSE	5	-0.02952	-0.02945	-0.02992	-0.01111	-0.01106	-0.02650

Median bias [2] per estimator and method:

	hypo	missing	binding	fixC	ar	mbiasMLE1	mbiasMLE2	mbiasMLE3	mbiasMUE1	mbiasMUE2	mbiasMUE3
1:	power	TRUE	TRUE	FALSE	10	0.0261	0.0260	0.0301	-0.00240	-0.00250	-0.00545
2:	typeI	TRUE	TRUE	FALSE	10	-0.0173	-0.0170	-0.0202	0.00100	0.00075	-0.02325
3:	power	TRUE	TRUE	FALSE	5	0.0405	0.0405	0.0432	-0.00345	-0.00335	-0.00545
4:	typeI	TRUE	TRUE	FALSE	5	-0.0330	-0.0329	-0.0345	0.00055	0.00055	-0.02096
5:	power	TRUE	TRUE	TRUE	10	0.0261	0.0265	0.0301	-0.01110	-0.01050	-0.00545
6:	typeI	TRUE	TRUE	TRUE	10	-0.0173	-0.0197	-0.0202	-0.08352	-0.08396	-0.02325
7:	power	TRUE	TRUE	TRUE	5	0.0405	0.0407	0.0432	-0.00865	-0.00755	-0.00545
8:	typeI	TRUE	TRUE	TRUE	5	-0.0330	-0.0346	-0.0345	-0.10498	-0.10438	-0.02096
9:	power	TRUE	FALSE	TRUE	10	0.0326	0.0332	0.0327	0.02719	0.02475	0.02804
10:	typeI	TRUE	FALSE	TRUE	10	-0.0009	-0.0009	-0.0009	-0.00190	-0.00185	-0.00025
11:	power	TRUE	FALSE	TRUE	5	0.0462	0.0459	0.0489	0.02568	0.02469	0.02799
12:	typeI	TRUE	FALSE	TRUE	5	-0.0009	-0.0010	-0.0009	-0.00130	-0.00140	-0.00015
13:	power	TRUE	FALSE	FALSE	10	0.0326	0.0324	0.0327	0.03094	0.03184	0.02804
14:	typeI	TRUE	FALSE	FALSE	10	-0.0009	-0.0009	-0.0009	-0.00150	-0.00140	-0.00025
15:	power	TRUE	FALSE	FALSE	5	0.0462	0.0464	0.0489	0.02832	0.02865	0.02799

[1] e.g. `biasMLE1` mixed model estimator (treatment effect), method 1 (boundaries)

[2] Relative frequency at which the estimate is greater than the truth minus 0.5

```
16: typeI    TRUE   FALSE FALSE  5   -0.0009   -0.0009   -0.0009  -0.00105  -0.00105  -0.00015
17: power   FALSE    TRUE FALSE  5    0.0383    0.0383    0.0400  -0.00265  -0.00255  -0.00485
18: typeI   FALSE    TRUE FALSE  5   -0.0329   -0.0327   -0.0353   0.00420   0.00420  -0.02551
```

3.2 3 stages

Bias per estimator and method[3]:

	hypo	missing	binding	fixC	ar	biasMLE1	biasMLE2	biasMLE3	biasMUE1	biasMUE2	biasMUE3
1:	power	TRUE	TRUE	FALSE	10	0.0228	0.0226	0.0248	0.01623	0.01605	0.0058
2:	typeI	TRUE	TRUE	FALSE	10	-0.0340	-0.0338	-0.0340	-0.01485	-0.01470	-0.0284
3:	power	TRUE	TRUE	FALSE	5	0.0344	0.0344	0.0356	0.02036	0.02030	0.0114
4:	typeI	TRUE	TRUE	FALSE	5	-0.0522	-0.0522	-0.0527	-0.02540	-0.02533	-0.0397
5:	power	TRUE	TRUE	TRUE	10	0.0228	0.0234	0.0248	-0.00783	-0.00786	0.0058
6:	typeI	TRUE	TRUE	TRUE	10	-0.0340	-0.0341	-0.0340	-0.06617	-0.06797	-0.0284
7:	power	TRUE	TRUE	TRUE	5	0.0344	0.0348	0.0356	-0.01043	-0.01050	0.0114
8:	typeI	TRUE	TRUE	TRUE	5	-0.0522	-0.0527	-0.0527	-0.09895	-0.09964	-0.0397
9:	power	TRUE	FALSE	TRUE	10	0.0223	0.0230	0.0246	0.03980	0.03755	0.0524
10:	typeI	TRUE	FALSE	TRUE	10	0.0011	0.0010	0.0014	-0.00021	-0.00038	0.0016
11:	power	TRUE	FALSE	TRUE	5	0.0343	0.0348	0.0351	0.03931	0.03719	0.0579
12:	typeI	TRUE	FALSE	TRUE	5	0.0017	0.0016	0.0019	0.00064	0.00066	0.0014
13:	power	TRUE	FALSE	FALSE	10	0.0223	0.0222	0.0246	0.05767	0.05820	0.0524
14:	typeI	TRUE	FALSE	FALSE	10	0.0011	0.0011	0.0014	0.00058	0.00057	0.0016
15:	power	TRUE	FALSE	FALSE	5	0.0343	0.0343	0.0351	0.06492	0.06503	0.0579
16:	typeI	TRUE	FALSE	FALSE	5	0.0017	0.0017	0.0019	0.00170	0.00170	0.0014
17:	power	FALSE	TRUE	FALSE	5	0.0346	0.0346	0.0360	0.02204	0.02206	0.0131
18:	typeI	FALSE	TRUE	FALSE	5	-0.0491	-0.0491	-0.0492	-0.02218	-0.02221	-0.0393

Median bias [4] per estimator and method:

	hypo	missing	binding	fixC	ar	mbiasMLE1	mbiasMLE2	mbiasMLE3	mbiasMUE1	mbiasMUE2	mbiasMUE3
1:	power	TRUE	TRUE	FALSE	10	0.0359	0.0358	0.0374	-0.0038	-0.0040	-0.0095
2:	typeI	TRUE	TRUE	FALSE	10	-0.0367	-0.0365	-0.0380	0.0104	0.0102	-0.0024
3:	power	TRUE	TRUE	FALSE	5	0.0552	0.0552	0.0566	-0.0040	-0.0038	-0.0082
4:	typeI	TRUE	TRUE	FALSE	5	-0.0556	-0.0557	-0.0574	0.0088	0.0088	-0.0049
5:	power	TRUE	TRUE	TRUE	10	0.0359	0.0355	0.0374	-0.0166	-0.0171	-0.0095
6:	typeI	TRUE	TRUE	TRUE	10	-0.0367	-0.0379	-0.0380	-0.0222	-0.0278	-0.0025
7:	power	TRUE	TRUE	TRUE	5	0.0552	0.0548	0.0566	-0.0160	-0.0163	-0.0082
8:	typeI	TRUE	TRUE	TRUE	5	-0.0556	-0.0569	-0.0574	-0.0421	-0.0441	-0.0047
9:	power	TRUE	FALSE	TRUE	10	0.0321	0.0326	0.0358	0.0285	0.0249	0.0367
10:	typeI	TRUE	FALSE	TRUE	10	-0.0056	-0.0060	-0.0056	-0.0072	-0.0076	-0.0053
11:	power	TRUE	FALSE	TRUE	5	0.0498	0.0494	0.0502	0.0297	0.0258	0.0347
12:	typeI	TRUE	FALSE	TRUE	5	-0.0061	-0.0061	-0.0061	-0.0068	-0.0067	-0.0060
13:	power	TRUE	FALSE	FALSE	10	0.0321	0.0322	0.0358	0.0367	0.0376	0.0367
14:	typeI	TRUE	FALSE	FALSE	10	-0.0056	-0.0056	-0.0056	-0.0067	-0.0066	-0.0054
15:	power	TRUE	FALSE	FALSE	5	0.0498	0.0498	0.0502	0.0396	0.0398	0.0349
16:	typeI	TRUE	FALSE	FALSE	5	-0.0061	-0.0061	-0.0061	-0.0062	-0.0063	-0.0060
17:	power	FALSE	TRUE	FALSE	5	0.0573	0.0576	0.0595	0.0073	0.0075	0.0016

[3] e.g. `biasMLE1` mixed model estimator (treatment effect), method 1 (boundaries)

[4] Relative frequency at which the estimate is greater than the truth minus 0.5

```
18: typeI   FALSE    TRUE FALSE  5   -0.0529   -0.0528   -0.0540    0.0095    0.0094   -0.0070
```

4 Distribution of the estimates

4.1 2 stages

Distribution of the estimates:

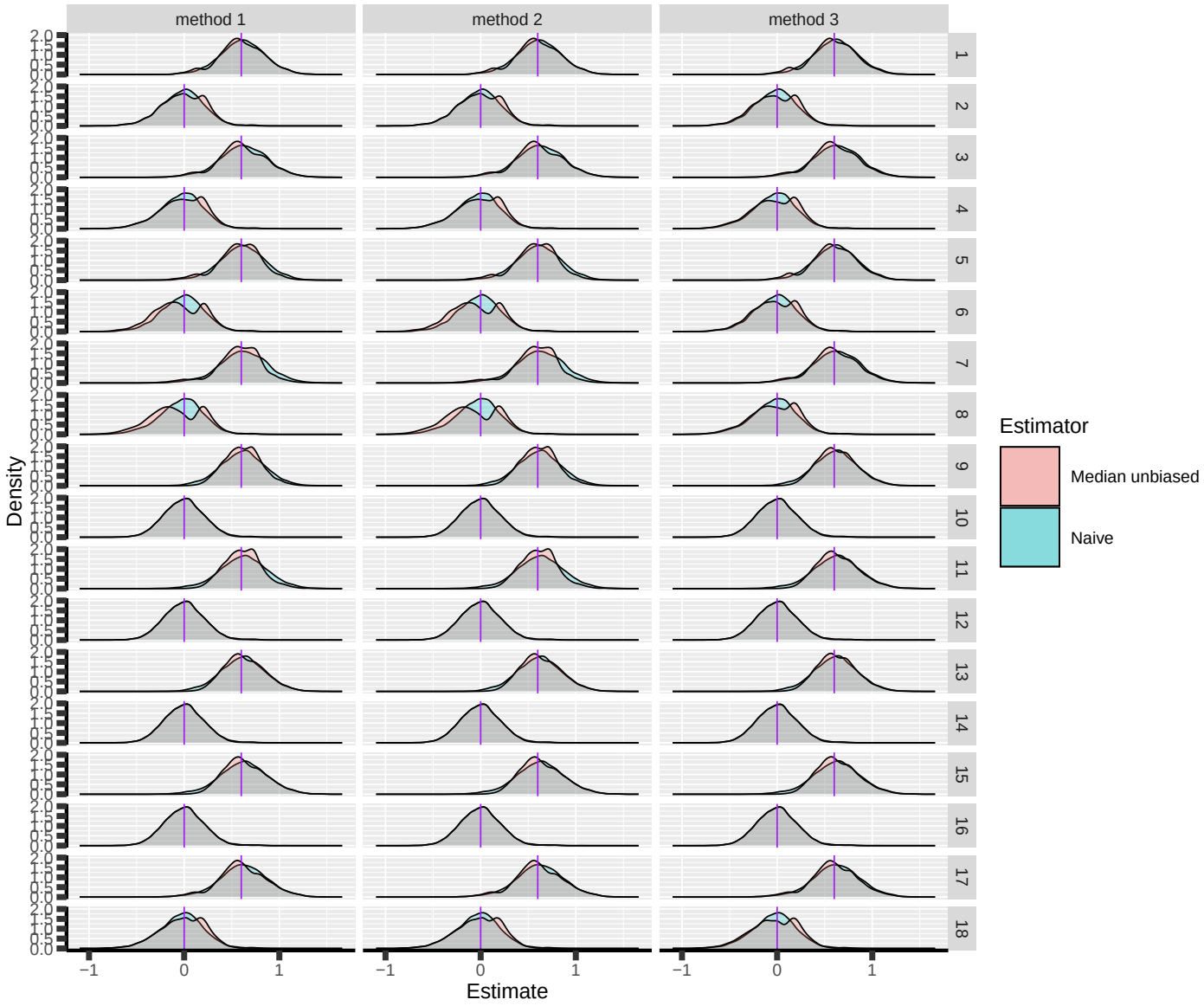

Figure 5: Naive and Median unbiased estimate distribution over all simulations. Each row correspond to a different scenario

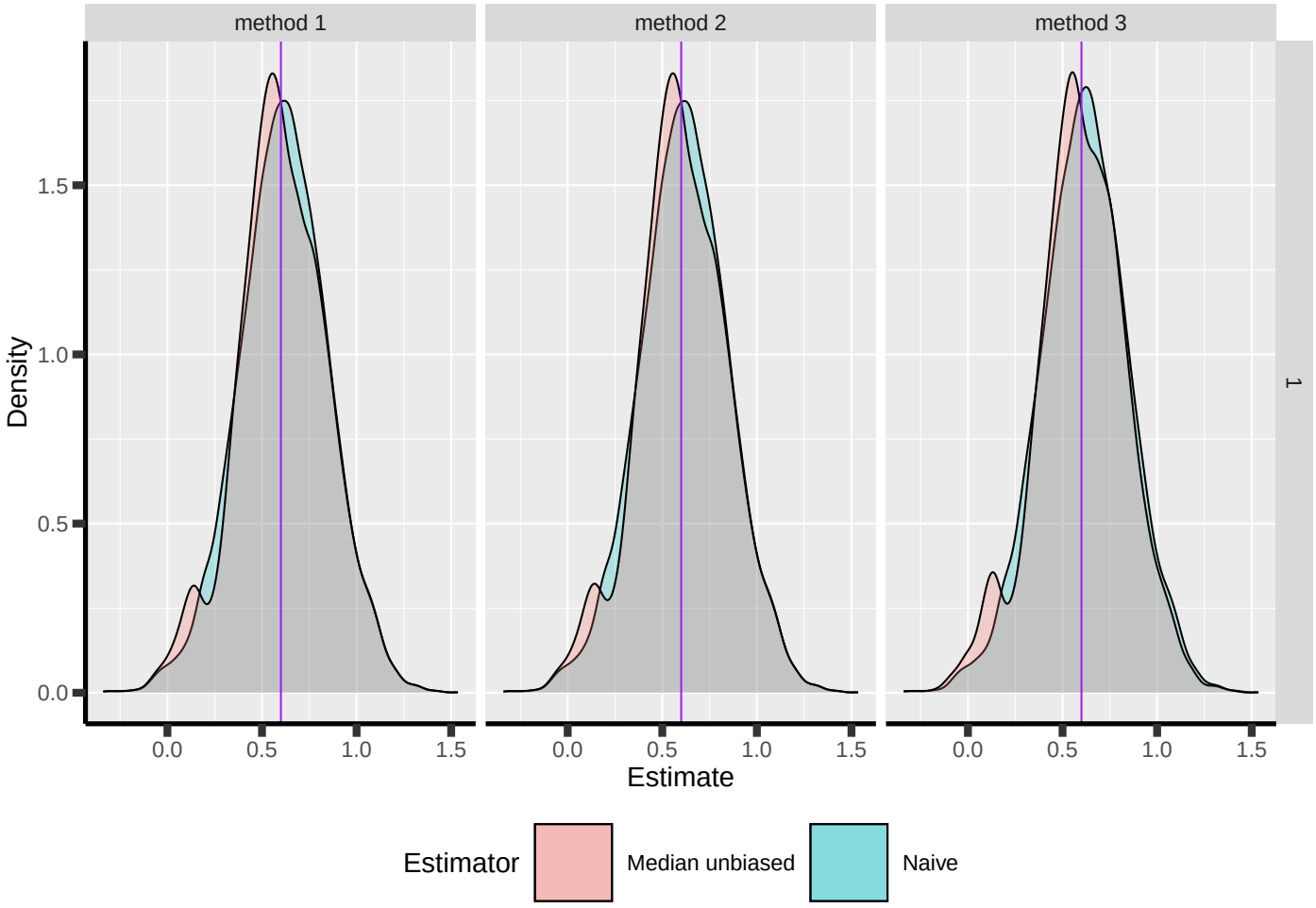

Figure 6: Same but specific to scenario 1

Distribution of the median unbiased estimate conditional to the stage:

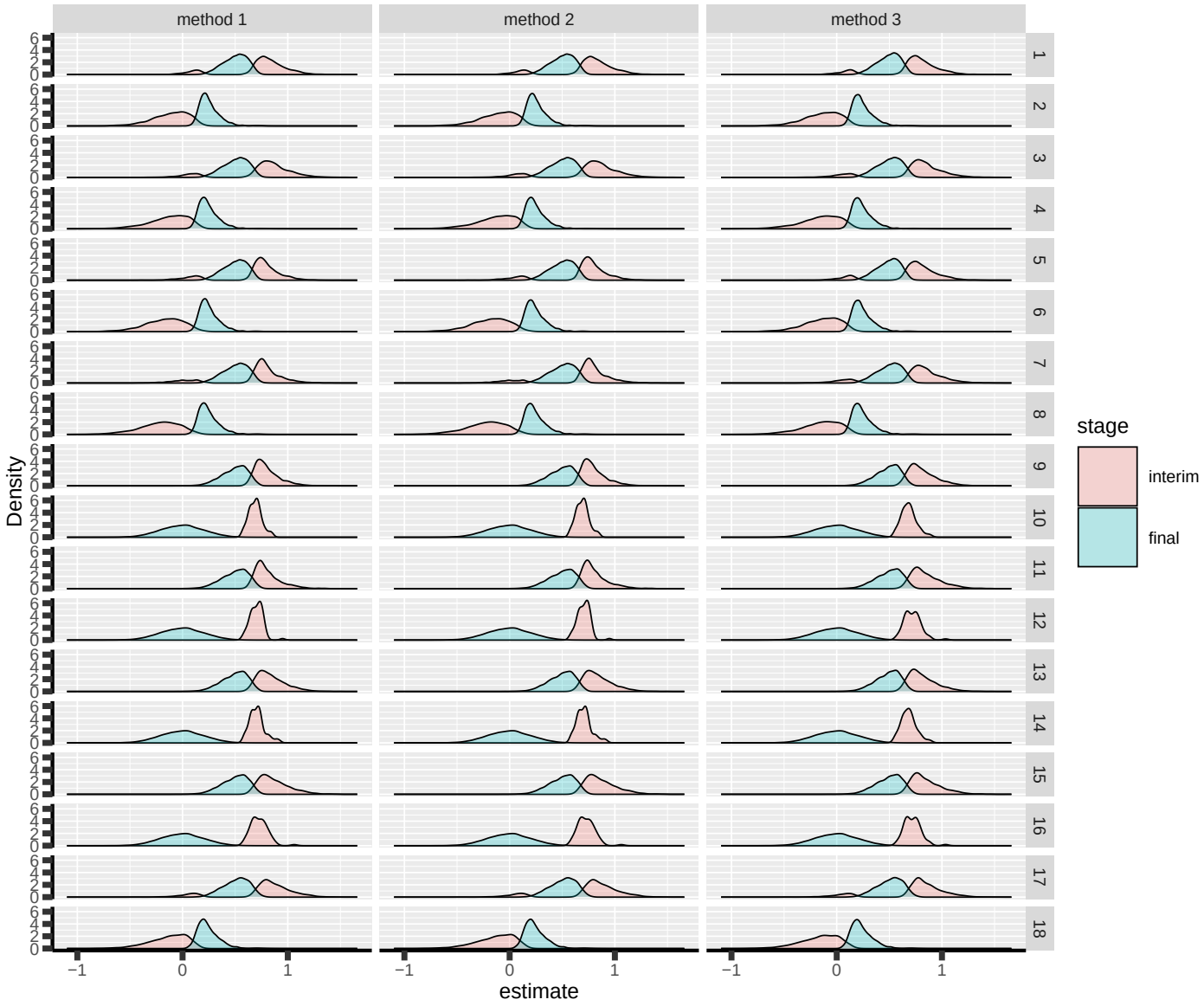

Figure 7: Median unbiased estimate distribution conditional to the stage. Each row correspond to a different scenario.

4.2 3 stages

Distribution of the estimates:

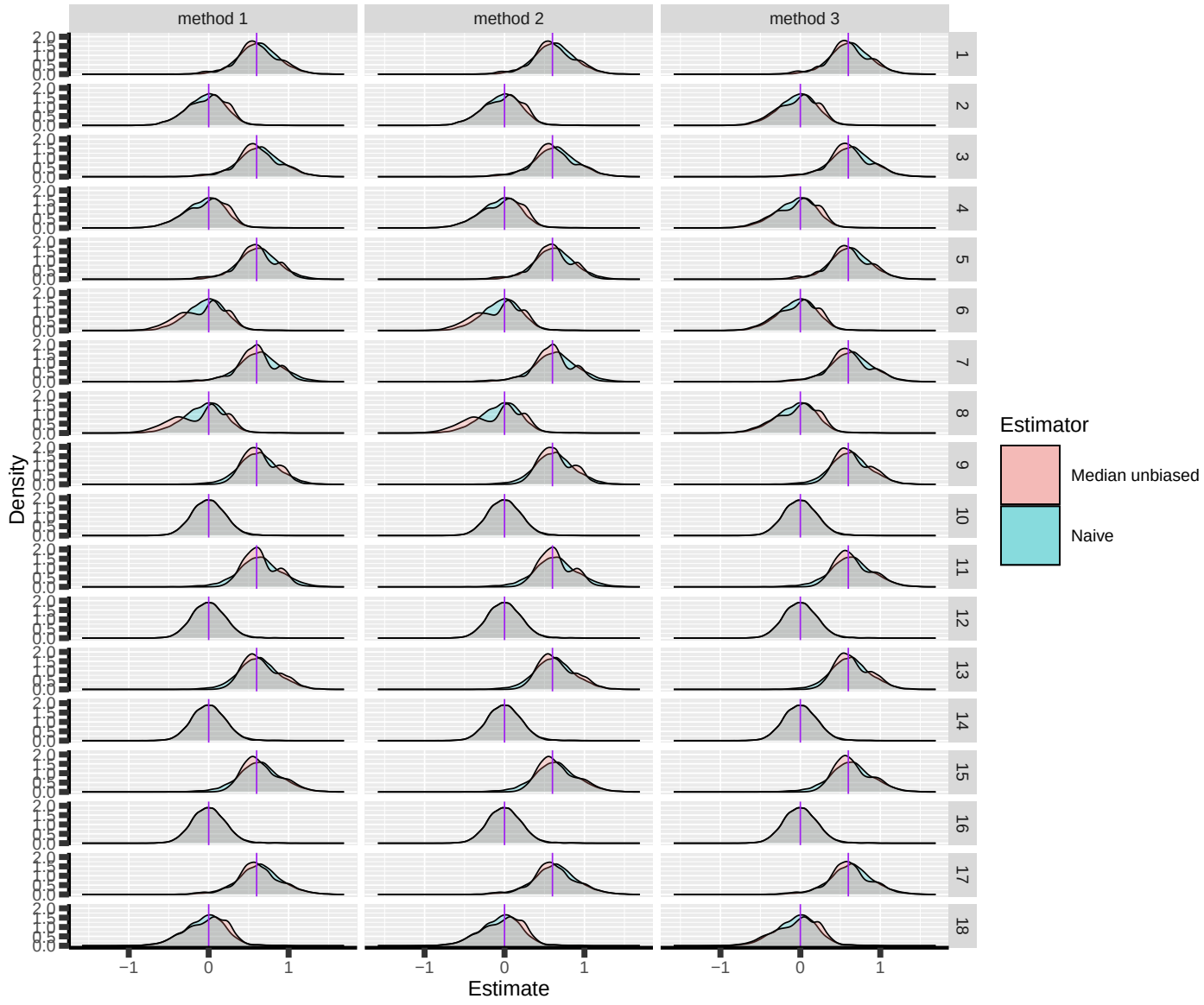

Figure 8: Naive and Median unbiased estimate distribution over all simulations. Each row correspond to a different scenario

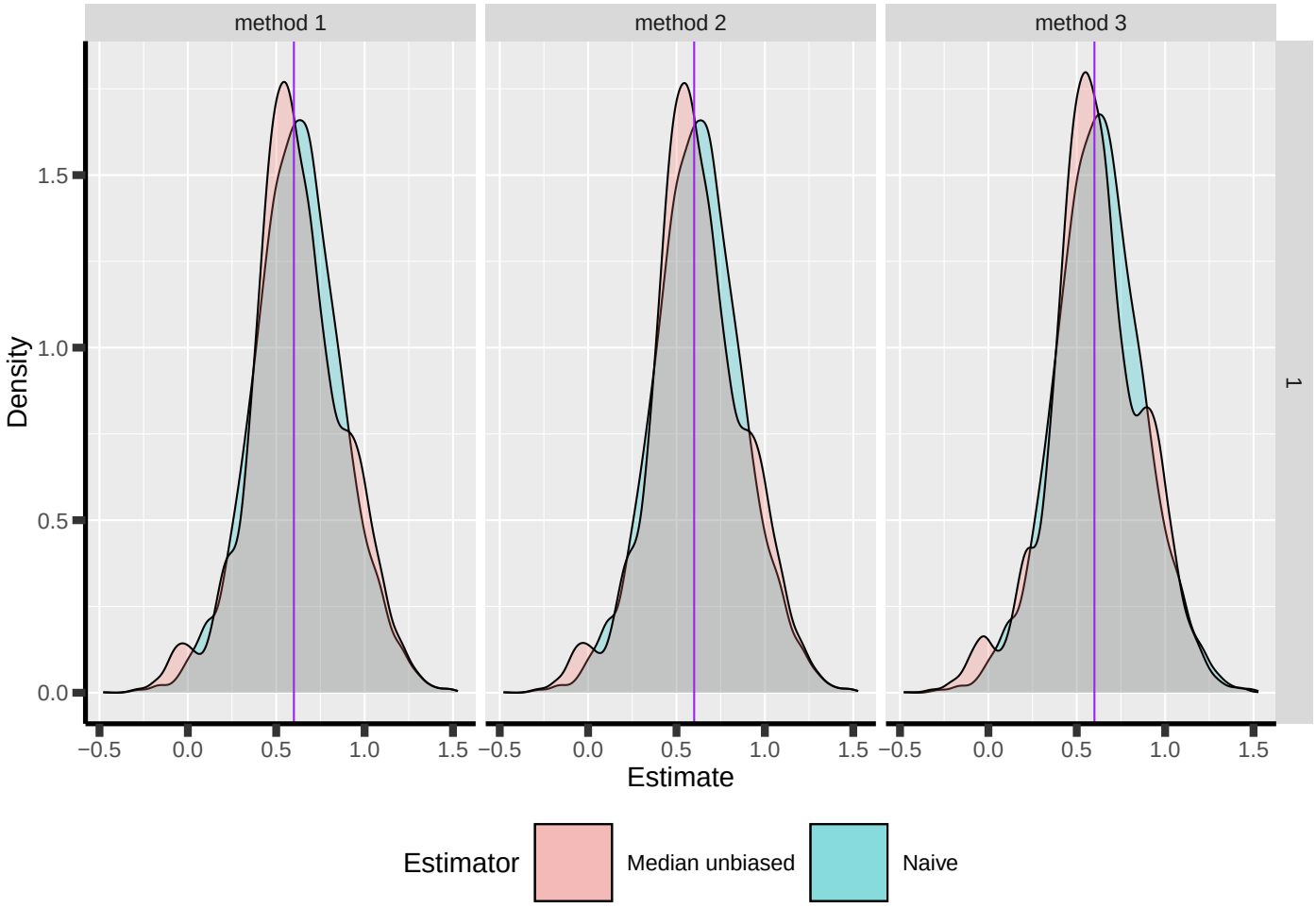

Figure 9: Same but specific to scenario 1

Distribution of the median unbiased estimate conditional to the stage:

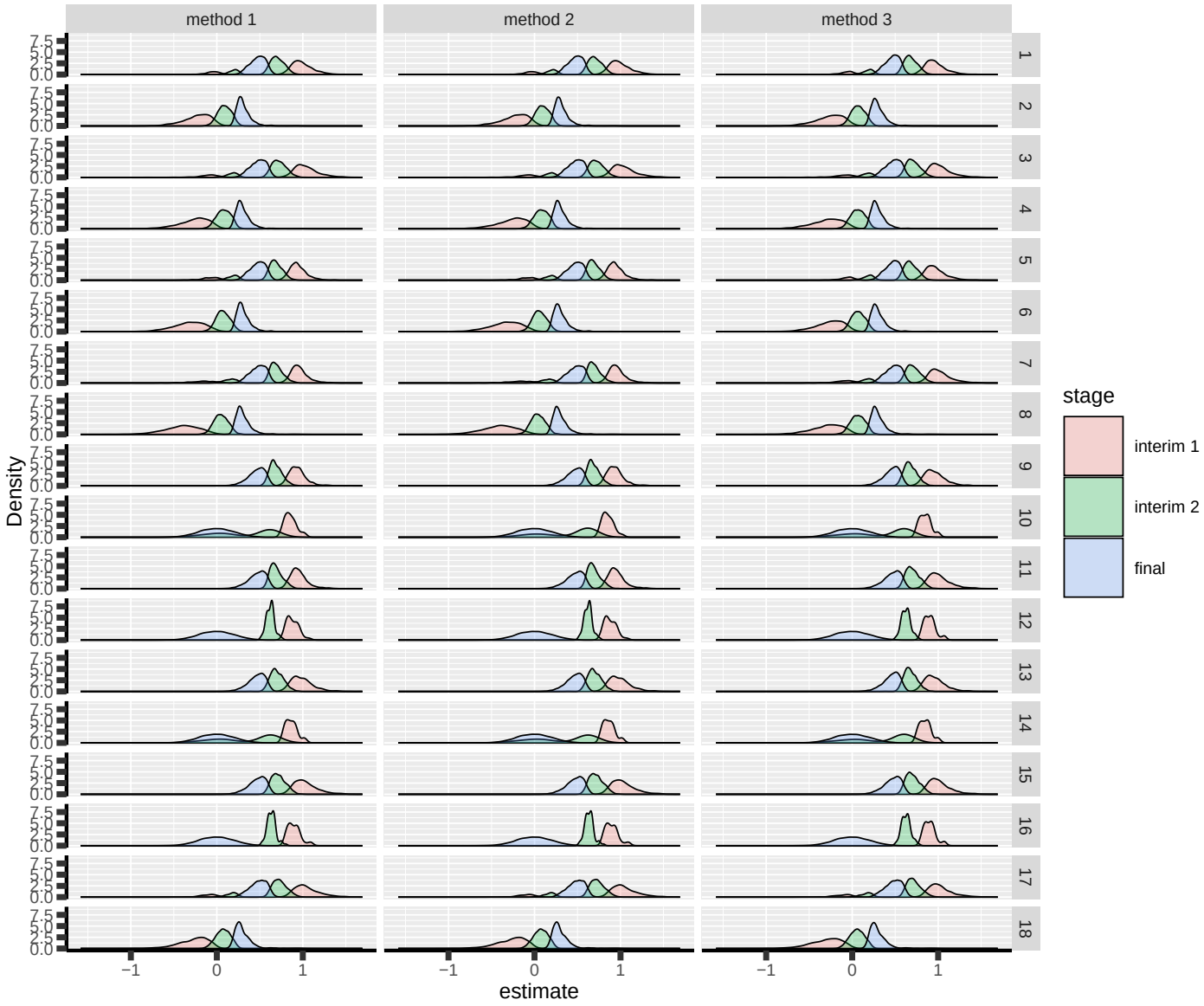

Figure 10: Median unbiased estimate distribution conditional to the stage. Each row correspond to a different scenario.

5 Special cases

5.1 2 stages

Reason for stopping (efficacy, futility, Imax reached), continuing the trial (decreasing information, no boundary crossed), or concluding (stop for futility at interim):

	scenario	1	2	3	4	5	6	7	8
reason	method								
decreasing information	1	0	0	1	1	0	0	1	1
	2	0	0	1	1	0	0	1	1
	3	0	0	1	1	0	0	1	1
efficacy	1	3739	81	3573	74	3739	81	3573	74
	2	3744	81	3576	74	3718	79	3545	71
	3	4165	108	3721	82	4165	108	3721	82
futility	1	632	7111	599	6932	632	7111	599	6932
	2	659	7161	600	6938	574	6940	562	6828
	3	545	6844	563	6828	545	6844	563	6828
Imax reached	1	1	1	0	0	1	1	0	0
	2	1	1	0	0	1	1	0	0
	3	1	1	0	0	1	1	0	0
no boundary crossed	1	5628	2807	5828	2994	5628	2807	5828	2994
	2	5596	2757	5824	2988	5707	2980	5893	3101
	3	5289	3047	5716	3090	5289	3047	5716	3090
stop for futility at interim	1	0	0	0	0	0	0	0	0
	2	0	0	0	0	0	0	0	0
	3	11	1	2	0	11	1	2	0

	scenario	9	10	11	12	13	14	15	16	17	18
reason	method										
efficacy	1	3849	81	3680	76	3849	81	3680	76	3396	74
	2	3829	80	3661	75	3850	81	3683	76	3400	74
	3	4238	110	3831	82	4238	110	3831	82	3528	80
futility	1	613	7122	570	6945	613	7122	570	6945	535	6748
	2	560	6975	541	6838	629	7164	574	6950	539	6755
	3	516	6890	543	6842	516	6890	543	6842	496	6642
no boundary crossed	1	5538	2797	5750	2979	5538	2797	5750	2979	6069	3178
	2	5611	2945	5798	3087	5521	2755	5743	2974	6061	3171
	3	5246	3000	5626	3076	5246	3000	5626	3076	5976	3278
stop for futility at interim	1	0	0	0	0	0	0	0	0	0	0
	2	0	0	0	0	0	0	0	0	0	0
	3	8	0	0	0	8	0	0	0	1	0

5.2 3 stages

Reason for stopping (efficacy, futility, Imax reached), continuing the trial (decreasing information, no boundary crossed), or concluding (stop for futility at interim):

	scenario	1	2	3	4	5	6	7	8
reason	method								
decreasing information	1	0	0	0	1	0	0	0	1
	2	0	0	0	1	0	0	0	1
	3	0	0	0	1	0	0	0	1
efficacy	1	4871	107	4709	100	4871	107	4709	100
	2	4873	107	4715	100	4846	105	4677	98
	3	5264	136	4828	105	5264	136	4828	105
futility	1	854	8147	830	8048	854	8147	830	8048
	2	890	8198	836	8050	805	8034	783	7967
	3	761	7951	785	7973	761	7951	785	7973
Imax reached	1	28	13	0	0	28	13	0	0
	2	31	13	0	0	23	10	0	0
	3	25	15	0	0	25	15	0	0
no boundary crossed	1	11961	7071	12349	7413	11961	7071	12349	7413
	2	11913	6996	12333	7406	12093	7359	12451	7592
	3	11475	7452	12223	7560	11475	7452	12223	7560
stop for futility at interim	1	0	0	0	0	0	0	0	0
	2	0	0	0	0	0	0	0	0
	3	28	2	1	0	28	2	1	0

	scenario	9	10	11	12	13	14	15	16	17
reason	method									
decreasing information	1	0	0	1	0	0	0	1	0	0
	2	0	0	1	0	0	0	1	0	0
	3	0	0	1	0	0	0	1	0	0
efficacy	1	4912	112	4794	97	4912	112	4794	97	4643
	2	4890	109	4771	94	4914	112	4797	97	4648
	3	5311	149	4921	110	5311	149	4921	110	4780
futility	1	841	12703	819	12404	841	12703	819	12404	814
	2	785	12441	766	12253	860	12774	821	12416	820
	3	741	12311	772	12273	741	12311	772	12273	768
Imax reached	1	24	43	0	0	24	43	0	0	0
	2	18	29	0	0	25	44	0	0	0
	3	24	44	0	0	24	44	0	0	0
no boundary crossed	1	11791	7101	12153	7464	11791	7101	12153	7464	12487
	2	11914	7382	12250	7618	11762	7029	12147	7452	12470
	3	11314	7449	12025	7579	11314	7449	12025	7579	12332
stop for futility at interim	1	0	0	0	0	0	0	0	0	0

2	0	0	0	0	0	0	0	0	0
3	26	0	1	0	26	0	1	0	3

6 Reversal probability

6.1 2 stages

Percentage of time we observe a reversal:

	N	hypo	missing	ar	binding	fixC	fu2eff_1	fu2eff_2	fu2eff_3	eff2fu_1	eff2fu_2	eff2fu_3
1:	10000	power	TRUE	10	TRUE	FALSE	0.57%	0.61%	0	0.17%	0.20%	1.07%
2:	10000	typeI	TRUE	10	TRUE	FALSE	0.10%	0.09%	0	0.11%	0.11%	0.34%
3:	10000	power	TRUE	5	TRUE	FALSE	0.08%	0.08%	0	0.07%	0.07%	0.67%
4:	10000	typeI	TRUE	5	TRUE	FALSE	0.02%	0.02%	0	0.02%	0.02%	0.13%
5:	10000	power	TRUE	10	TRUE	TRUE	0.22%	0.16%	0	0.67%	0.65%	1.07%
6:	10000	typeI	TRUE	10	TRUE	TRUE	0.02%	0.01%	0	0.21%	0.21%	0.34%
7:	10000	power	TRUE	5	TRUE	TRUE	0.02%	0.02%	0	0.46%	0.45%	0.67%
8:	10000	typeI	TRUE	5	TRUE	TRUE	0	0	0	0.08%	0.08%	0.13%
9:	10000	power	TRUE	10	FALSE	TRUE	0.14%	0.11%	0	0.58%	0.55%	1.04%
10:	10000	typeI	TRUE	10	FALSE	TRUE	0	0	0	0.20%	0.19%	0.33%
11:	10000	power	TRUE	5	FALSE	TRUE	0.01%	0.01%	0	0.46%	0.44%	0.60%
12:	10000	typeI	TRUE	5	FALSE	TRUE	0	0	0	0.06%	0.06%	0.09%
13:	10000	power	TRUE	10	FALSE	FALSE	0.41%	0.42%	0	0.21%	0.22%	1.04%
14:	10000	typeI	TRUE	10	FALSE	FALSE	0	0	0	0.12%	0.12%	0.33%
15:	10000	power	TRUE	5	FALSE	FALSE	0.03%	0.03%	0	0.04%	0.04%	0.60%
16:	10000	typeI	TRUE	5	FALSE	FALSE	0	0	0	0.01%	0.01%	0.09%
17:	10000	power	FALSE	5	TRUE	FALSE	0.06%	0.07%	0	0.04%	0.04%	0.63%
18:	10000	typeI	FALSE	5	TRUE	FALSE	0.01%	0.01%	0	0.01%	0.01%	0.12%

6.2 3 stages

Percentage of time we observe a reversal:

	N	hypo	missing	ar	binding	fixC	fu2eff_1	fu2eff_2	fu2eff_3	eff2fu_1	eff2fu_2	eff2fu_3
1:	10000	power	TRUE	10	TRUE	FALSE	0.68%	0.69%	0	0.39%	0.41%	1.55%
2:	10000	typeI	TRUE	10	TRUE	FALSE	0.12%	0.11%	0	0.14%	0.14%	0.44%
3:	10000	power	TRUE	5	TRUE	FALSE	0.13%	0.14%	0	0.10%	0.10%	0.77%
4:	10000	typeI	TRUE	5	TRUE	FALSE	0	0	0	0.05%	0.05%	0.12%
5:	10000	power	TRUE	10	TRUE	TRUE	0.36%	0.32%	0	1.10%	1.06%	1.55%
6:	10000	typeI	TRUE	10	TRUE	TRUE	0.04%	0.03%	0	0.25%	0.23%	0.44%
7:	10000	power	TRUE	5	TRUE	TRUE	0.01%	0.01%	0	0.56%	0.56%	0.77%
8:	10000	typeI	TRUE	5	TRUE	TRUE	0	0	0	0.10%	0.10%	0.12%
9:	10000	power	TRUE	10	FALSE	TRUE	0.36%	0.32%	0	1.00%	0.94%	1.60%
10:	10000	typeI	TRUE	10	FALSE	TRUE	0	0	0	0.30%	0.30%	0.51%
11:	10000	power	TRUE	5	FALSE	TRUE	0.02%	0.02%	0	0.54%	0.53%	0.89%
12:	10000	typeI	TRUE	5	FALSE	TRUE	0	0	0	0.14%	0.13%	0.19%
13:	10000	power	TRUE	10	FALSE	FALSE	0.68%	0.69%	0	0.38%	0.39%	1.60%
14:	10000	typeI	TRUE	10	FALSE	FALSE	0	0	0	0.20%	0.20%	0.51%
15:	10000	power	TRUE	5	FALSE	FALSE	0.11%	0.10%	0	0.11%	0.12%	0.89%
16:	10000	typeI	TRUE	5	FALSE	FALSE	0	0	0	0.01%	0.01%	0.19%
17:	10000	power	FALSE	5	TRUE	FALSE	0.15%	0.14%	0	0.05%	0.05%	0.70%
18:	10000	typeI	FALSE	5	TRUE	FALSE	0.06%	0.06%	0	0.03%	0.03%	0.17%

7 Logical consistency of p-values/CIs

7.1 Mismatch p-value / boundaries

7.1.1 2 stages

When concluding for futility:

	hypo	missing	ar	binding	fixC	method 1	method 2	method 3
1:	power	TRUE	10	TRUE	FALSE	0	0	0
2:	typeI	TRUE	10	TRUE	FALSE	0	0	0
3:	power	TRUE	5	TRUE	FALSE	0	0	0
4:	typeI	TRUE	5	TRUE	FALSE	0	0	0
5:	power	TRUE	10	TRUE	TRUE	0	0	0
6:	typeI	TRUE	10	TRUE	TRUE	0	0	0
7:	power	TRUE	5	TRUE	TRUE	0	0	0
8:	typeI	TRUE	5	TRUE	TRUE	0	0	0
9:	power	TRUE	10	FALSE	TRUE	0	0	0
10:	typeI	TRUE	10	FALSE	TRUE	0	0	0
11:	power	TRUE	5	FALSE	TRUE	0	0	0
12:	typeI	TRUE	5	FALSE	TRUE	0	0	0
13:	power	TRUE	10	FALSE	FALSE	0	0	0
14:	typeI	TRUE	10	FALSE	FALSE	0	0	0
15:	power	TRUE	5	FALSE	FALSE	0	0	0
16:	typeI	TRUE	5	FALSE	FALSE	0	0	0
17:	power	FALSE	5	TRUE	FALSE	0	0	0
18:	typeI	FALSE	5	TRUE	FALSE	0	0	0

When concluding for efficacy:

	hypo	missing	ar	binding	fixC	method 1	method 2	method 3
1:	power	TRUE	10	TRUE	FALSE	0	0	0
2:	typeI	TRUE	10	TRUE	FALSE	0	0	0
3:	power	TRUE	5	TRUE	FALSE	0	0	0
4:	typeI	TRUE	5	TRUE	FALSE	0	0	0
5:	power	TRUE	10	TRUE	TRUE	0	0	0
6:	typeI	TRUE	10	TRUE	TRUE	0	0	0
7:	power	TRUE	5	TRUE	TRUE	0	0	0
8:	typeI	TRUE	5	TRUE	TRUE	0	0	0
9:	power	TRUE	10	FALSE	TRUE	0	0	0
10:	typeI	TRUE	10	FALSE	TRUE	0	0	0
11:	power	TRUE	5	FALSE	TRUE	0	0	0
12:	typeI	TRUE	5	FALSE	TRUE	0	0	0
13:	power	TRUE	10	FALSE	FALSE	0	0	0
14:	typeI	TRUE	10	FALSE	FALSE	0	0	0

```
15: power    TRUE  5   FALSE FALSE        0        0        0
16: typeI    TRUE  5   FALSE FALSE        0        0        0
17: power   FALSE  5    TRUE FALSE        0        0        0
18: typeI   FALSE  5    TRUE FALSE        0        0        0
```

7.1.2 3 stages

When concluding for futility:

	hypo	missing	ar	binding	fixC	method 1	method 2	method 3
1:	power	TRUE	10	TRUE	FALSE	0	0	0
2:	typeI	TRUE	10	TRUE	FALSE	0	0	0
3:	power	TRUE	5	TRUE	FALSE	0	0	0
4:	typeI	TRUE	5	TRUE	FALSE	0	0	0
5:	power	TRUE	10	TRUE	TRUE	0	0	0
6:	typeI	TRUE	10	TRUE	TRUE	0	0	0
7:	power	TRUE	5	TRUE	TRUE	0	0	0
8:	typeI	TRUE	5	TRUE	TRUE	0	0	0
9:	power	TRUE	10	FALSE	TRUE	0	0.05%	0
10:	typeI	TRUE	10	FALSE	TRUE	0	0	0
11:	power	TRUE	5	FALSE	TRUE	0	0	0
12:	typeI	TRUE	5	FALSE	TRUE	0	0	0
13:	power	TRUE	10	FALSE	FALSE	0	0	0
14:	typeI	TRUE	10	FALSE	FALSE	0	0	0
15:	power	TRUE	5	FALSE	FALSE	0	0	0
16:	typeI	TRUE	5	FALSE	FALSE	0	0	0
17:	power	FALSE	5	TRUE	FALSE	0	0	0
18:	typeI	FALSE	5	TRUE	FALSE	0	0	0

Largest mismatch:

```
[1] 0.02499483653
```

When concluding for efficacy:

	hypo	missing	ar	binding	fixC	method 1	method 2	method 3
1:	power	TRUE	10	TRUE	FALSE	0	0	0
2:	typeI	TRUE	10	TRUE	FALSE	0	0	0
3:	power	TRUE	5	TRUE	FALSE	0	0	0
4:	typeI	TRUE	5	TRUE	FALSE	0	0.41%	0
5:	power	TRUE	10	TRUE	TRUE	0	0.01%	0
6:	typeI	TRUE	10	TRUE	TRUE	0	0	0
7:	power	TRUE	5	TRUE	TRUE	0	0	0
8:	typeI	TRUE	5	TRUE	TRUE	0	0	0
9:	power	TRUE	10	FALSE	TRUE	0	0	0
10:	typeI	TRUE	10	FALSE	TRUE	0	0	0
11:	power	TRUE	5	FALSE	TRUE	0	0	0
12:	typeI	TRUE	5	FALSE	TRUE	0	0	0
13:	power	TRUE	10	FALSE	FALSE	0	0	0
14:	typeI	TRUE	10	FALSE	FALSE	0	0	0
15:	power	TRUE	5	FALSE	FALSE	0	0	0

```
16: typeI    TRUE  5   FALSE FALSE        0        0        0
17: power   FALSE  5    TRUE FALSE        0        0    0.01%
18: typeI   FALSE  5    TRUE FALSE        0    0.39%        0
```

Largest mismatch:

```
[1] 0.02500576079
```

7.2 Mismatch confidence intervals / boundaries

7.2.1 2 stages

When concluding for futility:

	hypo	missing	ar	binding	fixC	method 1	method 2	method 3
1:	power	TRUE	10	TRUE	FALSE	0	0	0
2:	typeI	TRUE	10	TRUE	FALSE	0	0	0
3:	power	TRUE	5	TRUE	FALSE	0	0	0
4:	typeI	TRUE	5	TRUE	FALSE	0	0	0
5:	power	TRUE	10	TRUE	TRUE	0	0	0
6:	typeI	TRUE	10	TRUE	TRUE	0	0	0
7:	power	TRUE	5	TRUE	TRUE	0	0	0
8:	typeI	TRUE	5	TRUE	TRUE	0	0	0
9:	power	TRUE	10	FALSE	TRUE	0 (NA: 32.62%)	0 (NA: 30.38%)	0 (NA: 31.41%)
10:	typeI	TRUE	10	FALSE	TRUE	0 (NA: 0.21%)	0 (NA: 0.19%)	0 (NA: 0.34%)
11:	power	TRUE	5	FALSE	TRUE	0 (NA: 30.64%)	0 (NA: 29.26%)	0 (NA: 30.24%)
12:	typeI	TRUE	5	FALSE	TRUE	0 (NA: 0.06%)	0 (NA: 0.06%)	0 (NA: 0.09%)
13:	power	TRUE	10	FALSE	FALSE	0 (NA: 30.41%)	0 (NA: 31.13%)	0 (NA: 31.41%)
14:	typeI	TRUE	10	FALSE	FALSE	0 (NA: 0.12%)	0 (NA: 0.12%)	0 (NA: 0.34%)
15:	power	TRUE	5	FALSE	FALSE	0 (NA: 29.09%)	0 (NA: 29.28%)	0 (NA: 30.24%)
16:	typeI	TRUE	5	FALSE	FALSE	0 (NA: 0.01%)	0 (NA: 0.01%)	0 (NA: 0.09%)
17:	power	FALSE	5	TRUE	FALSE	0	0	0
18:	typeI	FALSE	5	TRUE	FALSE	0	0	0

When concluding for efficacy:

	hypo	missing	ar	binding	fixC	method 1	method 2	method 3
1:	power	TRUE	10	TRUE	FALSE	0	0	0
2:	typeI	TRUE	10	TRUE	FALSE	0	0	0
3:	power	TRUE	5	TRUE	FALSE	0	0	0
4:	typeI	TRUE	5	TRUE	FALSE	0	0	0
5:	power	TRUE	10	TRUE	TRUE	0	0	0
6:	typeI	TRUE	10	TRUE	TRUE	0	0	0
7:	power	TRUE	5	TRUE	TRUE	0	0	0
8:	typeI	TRUE	5	TRUE	TRUE	0	0	0
9:	power	TRUE	10	FALSE	TRUE	0	0	0
10:	typeI	TRUE	10	FALSE	TRUE	0	0	0
11:	power	TRUE	5	FALSE	TRUE	0	0	0
12:	typeI	TRUE	5	FALSE	TRUE	0	0	0
13:	power	TRUE	10	FALSE	FALSE	0	0	0
14:	typeI	TRUE	10	FALSE	FALSE	0	0	0
15:	power	TRUE	5	FALSE	FALSE	0	0	0
16:	typeI	TRUE	5	FALSE	FALSE	0	0	0

```
17: power   FALSE  5    TRUE FALSE        0        0        0
18: typeI   FALSE  5    TRUE FALSE        0        0        0
```

7.2.2 3 stages

When concluding for futility:

```
     hypo missing ar binding  fixC       method 1       method 2       method 3
 1: power    TRUE 10    TRUE FALSE              0              0              0
 2: typeI    TRUE 10    TRUE FALSE              0              0              0
 3: power    TRUE  5    TRUE FALSE              0              0              0
 4: typeI    TRUE  5    TRUE FALSE              0              0              0
 5: power    TRUE 10    TRUE  TRUE              0              0              0
 6: typeI    TRUE 10    TRUE  TRUE              0              0              0
 7: power    TRUE  5    TRUE  TRUE              0              0              0
 8: typeI    TRUE  5    TRUE  TRUE              0              0              0
 9: power    TRUE 10   FALSE  TRUE 0 (NA: 44.32%) 0 (NA: 42.22%) 0 (NA: 45.19%)
10: typeI    TRUE 10   FALSE  TRUE  0 (NA: 0.31%)  0 (NA: 0.31%)  0 (NA: 0.52%)
11: power    TRUE  5   FALSE  TRUE 0 (NA: 43.38%) 0 (NA: 41.16%) 0 (NA: 42.96%)
12: typeI    TRUE  5   FALSE  TRUE  0 (NA: 0.14%)  0 (NA: 0.13%)  0 (NA: 0.19%)
13: power    TRUE 10   FALSE FALSE 0 (NA: 41.63%) 0 (NA: 42.43%) 0 (NA: 45.19%)
14: typeI    TRUE 10   FALSE FALSE  0 (NA: 0.21%)  0 (NA: 0.21%)  0 (NA: 0.52%)
15: power    TRUE  5   FALSE FALSE 0 (NA: 41.87%) 0 (NA: 42.03%) 0 (NA: 42.96%)
16: typeI    TRUE  5   FALSE FALSE  0 (NA: 0.01%)  0 (NA: 0.01%)  0 (NA: 0.19%)
17: power   FALSE  5    TRUE FALSE              0              0              0
18: typeI   FALSE  5    TRUE FALSE              0              0              0
```

When concluding for efficacy:

```
     hypo missing ar binding  fixC method 1 method 2 method 3
 1: power    TRUE 10    TRUE FALSE        0        0        0
 2: typeI    TRUE 10    TRUE FALSE        0        0        0
 3: power    TRUE  5    TRUE FALSE        0        0        0
 4: typeI    TRUE  5    TRUE FALSE        0        0        0
 5: power    TRUE 10    TRUE  TRUE        0        0        0
 6: typeI    TRUE 10    TRUE  TRUE        0        0        0
 7: power    TRUE  5    TRUE  TRUE        0        0        0
 8: typeI    TRUE  5    TRUE  TRUE        0        0        0
 9: power    TRUE 10   FALSE  TRUE        0        0    0.01%
10: typeI    TRUE 10   FALSE  TRUE        0        0        0
11: power    TRUE  5   FALSE  TRUE        0        0        0
12: typeI    TRUE  5   FALSE  TRUE        0        0        0
13: power    TRUE 10   FALSE FALSE        0        0        0
14: typeI    TRUE 10   FALSE FALSE        0        0        0
```

```
15: power    TRUE  5   FALSE FALSE        0        0        0
16: typeI    TRUE  5   FALSE FALSE        0        0        0
17: power   FALSE  5    TRUE FALSE        0        0        0
18: typeI   FALSE  5    TRUE FALSE        0        0        0
```

```
[1] -2.220446049e-16
```

7.3 Range of p-values

7.3.1 2 stages

	missing	binding	fixC	ar	hypo	method 1	method 2	method 3
1:	TRUE	TRUE	FALSE	10	power	[0;0.9147]	[0;0.9147]	[0;0.919]
2:	TRUE	TRUE	FALSE	10	typeI	[1e-04;0.9999]	[1e-04;0.9999]	[1e-04;1]
3:	TRUE	TRUE	FALSE	5	power	[0;0.9015]	[0;0.9015]	[0;0.9146]
4:	TRUE	TRUE	FALSE	5	typeI	[1e-04;0.9998]	[1e-04;0.9998]	[1e-04;0.9999]
5:	TRUE	TRUE	TRUE	10	power	[0;0.9494]	[0;0.9516]	[0;0.919]
6:	TRUE	TRUE	TRUE	10	typeI	[2e-04;1]	[2e-04;1]	[1e-04;1]
7:	TRUE	TRUE	TRUE	5	power	[0;0.9533]	[0;0.9545]	[0;0.9146]
8:	TRUE	TRUE	TRUE	5	typeI	[3e-04;1]	[3e-04;1]	[1e-04;0.9999]
9:	TRUE	FALSE	TRUE	10	power	[0;1]	[0;1]	[0;1]
10:	TRUE	FALSE	TRUE	10	typeI	[1e-04;1]	[1e-04;1]	[1e-04;1]
11:	TRUE	FALSE	TRUE	5	power	[0;1]	[0;1]	[0;1]
12:	TRUE	FALSE	TRUE	5	typeI	[2e-04;1]	[2e-04;1]	[1e-04;1]
13:	TRUE	FALSE	FALSE	10	power	[0;1]	[0;1]	[0;1]
14:	TRUE	FALSE	FALSE	10	typeI	[1e-04;1]	[1e-04;1]	[1e-04;1]
15:	TRUE	FALSE	FALSE	5	power	[0;1]	[0;1]	[0;1]
16:	TRUE	FALSE	FALSE	5	typeI	[0;1]	[0;1]	[1e-04;1]
17:	FALSE	TRUE	FALSE	5	power	[0;0.9642]	[0;0.9642]	[0;0.97]
18:	FALSE	TRUE	FALSE	5	typeI	[0;1]	[0;1]	[1e-04;1]

7.3.2 3 stages

	missing	binding	fixC	ar	hypo	method 1	method 2	method 3
1:	TRUE	TRUE	FALSE	10	power	[0;0.9547]	[0;0.9547]	[0;0.9547]
2:	TRUE	TRUE	FALSE	10	typeI	[2e-04;0.9999]	[2e-04;0.9999]	[4e-04;0.9999]
3:	TRUE	TRUE	FALSE	5	power	[0;0.9954]	[0;0.9954]	[0;0.996]
4:	TRUE	TRUE	FALSE	5	typeI	[1e-04;1]	[1e-04;1]	[1e-04;1]
5:	TRUE	TRUE	TRUE	10	power	[0;0.9852]	[0;0.986]	[0;0.9547]
6:	TRUE	TRUE	TRUE	10	typeI	[6e-04;1]	[6e-04;1]	[4e-04;0.9999]
7:	TRUE	TRUE	TRUE	5	power	[0;0.9993]	[0;0.9993]	[0;0.996]
8:	TRUE	TRUE	TRUE	5	typeI	[5e-04;1]	[5e-04;1]	[1e-04;1]
9:	TRUE	FALSE	TRUE	10	power	[0;1]	[0;1]	[0;1]
10:	TRUE	FALSE	TRUE	10	typeI	[6e-04;1]	[6e-04;1]	[3e-04;1]
11:	TRUE	FALSE	TRUE	5	power	[0;1]	[0;1]	[0;1]
12:	TRUE	FALSE	TRUE	5	typeI	[6e-04;1]	[6e-04;1]	[1e-04;1]
13:	TRUE	FALSE	FALSE	10	power	[0;1]	[0;1]	[0;1]
14:	TRUE	FALSE	FALSE	10	typeI	[2e-04;1]	[2e-04;1]	[3e-04;1]
15:	TRUE	FALSE	FALSE	5	power	[0;1]	[0;1]	[0;1]
16:	TRUE	FALSE	FALSE	5	typeI	[1e-04;1]	[1e-04;1]	[1e-04;1]
17:	FALSE	TRUE	FALSE	5	power	[0;0.9812]	[0;0.9812]	[0;0.9849]
18:	FALSE	TRUE	FALSE	5	typeI	[4e-04;1]	[4e-04;1]	[4e-04;1]

8 Coverage

8.1 2 stages

	hypo	missing	ar	binding	fixC	method 1	method 2	method 3
1:	power	FALSE	5	TRUE	FALSE	94.80%	94.80%	95.07%
2:	power	TRUE	5	FALSE	FALSE	95.89% (NA: 5.71%)	95.88% (NA: 5.75%)	95.98% (NA: 5.46%)
3:	power	TRUE	5	FALSE	TRUE	97.79% (NA: 6.15%)	97.77% (NA: 5.84%)	95.98% (NA: 5.46%)
4:	power	TRUE	5	TRUE	FALSE	94.73% (NA: 0.01%)	94.74% (NA: 0.01%)	94.86% (NA: 0.01%)
5:	power	TRUE	5	TRUE	TRUE	94.92% (NA: 0.01%)	95.02% (NA: 0.01%)	94.86% (NA: 0.01%)
6:	power	TRUE	10	FALSE	FALSE	95.92% (NA: 5.93%)	95.92% (NA: 6.09%)	95.90% (NA: 5.12%)
7:	power	TRUE	10	FALSE	TRUE	97.40% (NA: 6.57%)	97.47% (NA: 6.04%)	95.90% (NA: 5.12%)
8:	power	TRUE	10	TRUE	FALSE	94.85%	94.83%	95.00%
9:	power	TRUE	10	TRUE	TRUE	94.98%	95.18%	95.00%
10:	typeI	FALSE	5	TRUE	FALSE	95.14%	95.14%	94.45%
11:	typeI	TRUE	5	FALSE	FALSE	94.87% (NA: 0.01%)	94.87% (NA: 0.01%)	94.96% (NA: 0.09%)
12:	typeI	TRUE	5	FALSE	TRUE	94.92% (NA: 0.06%)	94.91% (NA: 0.06%)	94.96% (NA: 0.09%)
13:	typeI	TRUE	5	TRUE	FALSE	94.82% (NA: 0.01%)	94.82% (NA: 0.01%)	94.30% (NA: 0.01%)
14:	typeI	TRUE	5	TRUE	TRUE	91.76% (NA: 0.01%)	91.61% (NA: 0.01%)	94.30% (NA: 0.01%)
15:	typeI	TRUE	10	FALSE	FALSE	95.01% (NA: 0.12%)	95.01% (NA: 0.12%)	95.28% (NA: 0.31%)
16:	typeI	TRUE	10	FALSE	TRUE	95.09% (NA: 0.20%)	95.07% (NA: 0.19%)	95.28% (NA: 0.31%)
17:	typeI	TRUE	10	TRUE	FALSE	95.16%	95.19%	94.70%
18:	typeI	TRUE	10	TRUE	TRUE	92.94%	92.79%	94.70%

Average width of the confidence intervals

	hypo	missing	ar	binding	fixC	method 1	method 2	method 3
1:	power	FALSE	5	TRUE	FALSE	1.0518	1.0518	1.053
2:	power	TRUE	5	FALSE	FALSE	1.0356	1.0356	1.036
3:	power	TRUE	5	FALSE	TRUE	1.0411	1.0415	1.036
4:	power	TRUE	5	TRUE	FALSE	1.0513	1.0514	1.052
5:	power	TRUE	5	TRUE	TRUE	1.0564	1.0562	1.052
6:	power	TRUE	10	FALSE	FALSE	1.0474	1.0475	1.046
7:	power	TRUE	10	FALSE	TRUE	1.0540	1.0547	1.046
8:	power	TRUE	10	TRUE	FALSE	1.0624	1.0627	1.060
9:	power	TRUE	10	TRUE	TRUE	1.0685	1.0683	1.060
10:	typeI	FALSE	5	TRUE	FALSE	1.0432	1.0431	1.045
11:	typeI	TRUE	5	FALSE	FALSE	0.9996	0.9996	1.012
12:	typeI	TRUE	5	FALSE	TRUE	0.9996	0.9996	1.012
13:	typeI	TRUE	5	TRUE	FALSE	1.0416	1.0416	1.044
14:	typeI	TRUE	5	TRUE	TRUE	1.0383	1.0388	1.044
15:	typeI	TRUE	10	FALSE	FALSE	1.0001	1.0000	1.041
16:	typeI	TRUE	10	FALSE	TRUE	1.0000	0.9996	1.041
17:	typeI	TRUE	10	TRUE	FALSE	1.0460	1.0454	1.054
18:	typeI	TRUE	10	TRUE	TRUE	1.0404	1.0417	1.054

Average ratio between the length of the MUE CIs vs. the ML CIs

	hypo	missing	ar	binding	fixC	method 1	method 2	method 3
1:	power	FALSE	5	TRUE	FALSE	1.0554	1.0554	1.056
2:	power	TRUE	5	FALSE	FALSE	1.0477	1.0477	1.049
3:	power	TRUE	5	FALSE	TRUE	1.0531	1.0531	1.049
4:	power	TRUE	5	TRUE	FALSE	1.0557	1.0557	1.056
5:	power	TRUE	5	TRUE	TRUE	1.0600	1.0597	1.056
6:	power	TRUE	10	FALSE	FALSE	1.0544	1.0547	1.053
7:	power	TRUE	10	FALSE	TRUE	1.0611	1.0612	1.053
8:	power	TRUE	10	TRUE	FALSE	1.0642	1.0645	1.062
9:	power	TRUE	10	TRUE	TRUE	1.0697	1.0694	1.062
10:	typeI	FALSE	5	TRUE	FALSE	1.0497	1.0496	1.052
11:	typeI	TRUE	5	FALSE	FALSE	0.9995	0.9995	1.013
12:	typeI	TRUE	5	FALSE	TRUE	0.9996	0.9997	1.013
13:	typeI	TRUE	5	TRUE	FALSE	1.0487	1.0486	1.052
14:	typeI	TRUE	5	TRUE	TRUE	1.0455	1.0461	1.052
15:	typeI	TRUE	10	FALSE	FALSE	1.0002	1.0002	1.042
16:	typeI	TRUE	10	FALSE	TRUE	1.0003	0.9999	1.042
17:	typeI	TRUE	10	TRUE	FALSE	1.0497	1.0492	1.059
18:	typeI	TRUE	10	TRUE	TRUE	1.0445	1.0458	1.059

8.2 3 stages

	hypo	missing	ar	binding	fixC	method 1	method 2	method 3
1:	power	FALSE	5	TRUE	FALSE	94.91% (NA: 0.01%)	94.91% (NA: 0.01%)	95.43%
2:	power	TRUE	5	FALSE	FALSE	96.44% (NA: 8.21%)	96.46% (NA: 8.25%)	96.24% (NA: 7.76%)
3:	power	TRUE	5	FALSE	TRUE	98.43% (NA: 8.73%)	98.44% (NA: 8.19%)	96.25% (NA: 7.76%)
4:	power	TRUE	5	TRUE	FALSE	95.35% (NA: 0.03%)	95.34% (NA: 0.02%)	95.80% (NA: 0.04%)
5:	power	TRUE	5	TRUE	TRUE	96.61% (NA: 0.03%)	96.60% (NA: 0.04%)	95.80% (NA: 0.03%)
6:	power	TRUE	10	FALSE	FALSE	96.09% (NA: 8.11%)	96.12% (NA: 8.30%)	95.30% (NA: 7.12%)
7:	power	TRUE	10	FALSE	TRUE	98.04% (NA: 9.05%)	98.09% (NA: 8.47%)	95.30% (NA: 7.12%)
8:	power	TRUE	10	TRUE	FALSE	95.30% (NA: 0.01%)	95.29% (NA: 0.02%)	95.62% (NA: 0.01%)
9:	power	TRUE	10	TRUE	TRUE	96.31% (NA: 0.01%)	96.32% (NA: 0.01%)	95.62% (NA: 0.01%)
10:	typeI	FALSE	5	TRUE	FALSE	95.12% (NA: 0.13%)	95.13% (NA: 0.09%)	94.24% (NA: 0.12%)
11:	typeI	TRUE	5	FALSE	FALSE	94.94% (NA: 0.40%)	94.96% (NA: 0.41%)	95.09% (NA: 0.52%)
12:	typeI	TRUE	5	FALSE	TRUE	95.06% (NA: 0.53%)	95.10% (NA: 0.57%)	95.09% (NA: 0.50%)
13:	typeI	TRUE	5	TRUE	FALSE	95.07% (NA: 0.21%)	95.06% (NA: 0.19%)	94.26% (NA: 0.17%)
14:	typeI	TRUE	5	TRUE	TRUE	89.80% (NA: 0.21%)	89.63% (NA: 0.21%)	94.26% (NA: 0.22%)
15:	typeI	TRUE	10	FALSE	FALSE	95.02% (NA: 0.64%)	95.03% (NA: 0.61%)	95.36% (NA: 0.84%)
16:	typeI	TRUE	10	FALSE	TRUE	95.11% (NA: 0.74%)	95.14% (NA: 0.75%)	95.35% (NA: 0.81%)
17:	typeI	TRUE	10	TRUE	FALSE	94.89% (NA: 0.15%)	94.91% (NA: 0.14%)	94.31% (NA: 0.13%)
18:	typeI	TRUE	10	TRUE	TRUE	91.21% (NA: 0.17%)	91.02% (NA: 0.10%)	94.31% (NA: 0.15%)

Average width of the confidence intervals

	hypo	missing	ar	binding	fixC	method 1	method 2	method 3
1:	power	FALSE	5	TRUE	FALSE	1.0729	1.0729	1.073
2:	power	TRUE	5	FALSE	FALSE	1.0552	1.0562	1.054
3:	power	TRUE	5	FALSE	TRUE	1.0592	1.0596	1.055
4:	power	TRUE	5	TRUE	FALSE	1.0722	1.0722	1.072
5:	power	TRUE	5	TRUE	TRUE	1.0759	1.0753	1.072
6:	power	TRUE	10	FALSE	FALSE	1.0834	1.0843	1.079
7:	power	TRUE	10	FALSE	TRUE	1.0899	1.0905	1.079
8:	power	TRUE	10	TRUE	FALSE	1.0983	1.0985	1.097
9:	power	TRUE	10	TRUE	TRUE	1.1040	1.1031	1.097
10:	typeI	FALSE	5	TRUE	FALSE	1.0757	1.0756	1.080
11:	typeI	TRUE	5	FALSE	FALSE	1.0000	0.9999	1.016
12:	typeI	TRUE	5	FALSE	TRUE	0.9997	0.9995	1.016
13:	typeI	TRUE	5	TRUE	FALSE	1.0722	1.0722	1.077
14:	typeI	TRUE	5	TRUE	TRUE	1.0749	1.0758	1.077
15:	typeI	TRUE	10	FALSE	FALSE	1.0013	1.0005	1.056
16:	typeI	TRUE	10	FALSE	TRUE	1.0010	0.9999	1.056
17:	typeI	TRUE	10	TRUE	FALSE	1.0984	1.0980	1.109
18:	typeI	TRUE	10	TRUE	TRUE	1.0929	1.0936	1.109

Average ratio between the length of the MUE CIs vs. the ML CIs

```
    hypo missing ar binding  fixC method 1 method 2 method 3
 1: power   FALSE  5    TRUE FALSE   1.0753   1.0753    1.075
 2: power    TRUE  5   FALSE FALSE   1.0660   1.0671    1.066
 3: power    TRUE  5   FALSE  TRUE   1.0691   1.0692    1.066
 4: power    TRUE  5    TRUE FALSE   1.0754   1.0755    1.076
 5: power    TRUE  5    TRUE  TRUE   1.0778   1.0770    1.076
 6: power    TRUE 10   FALSE FALSE   1.0890   1.0901    1.085
 7: power    TRUE 10   FALSE  TRUE   1.0951   1.0950    1.085
 8: power    TRUE 10    TRUE FALSE   1.0984   1.0986    1.097
 9: power    TRUE 10    TRUE  TRUE   1.1028   1.1017    1.097
10: typeI   FALSE  5    TRUE FALSE   1.0826   1.0825    1.088
11: typeI    TRUE  5   FALSE FALSE   0.9999   0.9997    1.016
12: typeI    TRUE  5   FALSE  TRUE   0.9999   0.9996    1.016
13: typeI    TRUE  5    TRUE FALSE   1.0796   1.0797    1.085
14: typeI    TRUE  5    TRUE  TRUE   1.0840   1.0848    1.085
15: typeI    TRUE 10   FALSE FALSE   1.0013   1.0005    1.058
16: typeI    TRUE 10   FALSE  TRUE   1.0013   1.0002    1.058
17: typeI    TRUE 10    TRUE FALSE   1.1034   1.1031    1.116
18: typeI    TRUE 10    TRUE  TRUE   1.0996   1.1002    1.116
```

9 Percentage of missing values (2 stages)

At the first interim

- `pc.all` percentage of observations with full data (with respect to all observations, i.e. patients with baseline measurement)
- `pc.missing3` percentage of observations missing the final outcome but with intermediate outcome value and baseline.
- `pc.missing23` percentage of observations with only baseline value

Here only for method 1 - values are very similar between different methods:

	method	missing	ar	hypo	fixC	binding	N	pc.all	pc.missing3	pc.missing23
1:	1	TRUE	5	power	FALSE	TRUE	10000	79.52	9.591	10.888
2:	1	TRUE	5	typeI	FALSE	TRUE	10000	79.52	9.591	10.888
3:	1	TRUE	5	power	TRUE	TRUE	10000	79.52	9.591	10.888
4:	1	TRUE	5	typeI	TRUE	TRUE	10000	79.52	9.591	10.888
5:	1	TRUE	5	power	TRUE	FALSE	10000	79.64	9.442	10.914
6:	1	TRUE	5	typeI	TRUE	FALSE	10000	79.64	9.442	10.914
7:	1	TRUE	5	power	FALSE	FALSE	10000	79.64	9.442	10.914
8:	1	TRUE	5	typeI	FALSE	FALSE	10000	79.64	9.442	10.914
9:	1	FALSE	5	power	FALSE	TRUE	10000	87.79	6.090	6.121
10:	1	FALSE	5	typeI	FALSE	TRUE	10000	87.79	6.090	6.121
11:	1	TRUE	10	power	FALSE	TRUE	10000	71.60	13.354	15.049
12:	1	TRUE	10	typeI	FALSE	TRUE	10000	71.60	13.354	15.049
13:	1	TRUE	10	power	TRUE	TRUE	10000	71.60	13.354	15.049
14:	1	TRUE	10	typeI	TRUE	TRUE	10000	71.60	13.354	15.049
15:	1	TRUE	10	power	TRUE	FALSE	10000	71.80	13.162	15.042
16:	1	TRUE	10	typeI	TRUE	FALSE	10000	71.80	13.162	15.042
17:	1	TRUE	10	power	FALSE	FALSE	10000	71.80	13.162	15.042
18:	1	TRUE	10	typeI	FALSE	FALSE	10000	71.80	13.162	15.042

10 Information

10.1 2 stages

Percentage of information for method 1[5]:

scenario	missing	binding	fixC	ar	interim	decision	final
1	TRUE	TRUE	FALSE	10	54.64	75.34	102.70
2	TRUE	TRUE	FALSE	10	54.64	74.98	102.37
3	TRUE	TRUE	FALSE	5	53.27	64.04	102.74
4	TRUE	TRUE	FALSE	5	53.27	63.58	102.37
5	TRUE	TRUE	TRUE	10	54.64	75.34	102.70
6	TRUE	TRUE	TRUE	10	54.64	74.98	102.37
7	TRUE	TRUE	TRUE	5	53.27	64.04	102.74
8	TRUE	TRUE	TRUE	5	53.27	63.58	102.37
9	TRUE	FALSE	TRUE	10	54.50	74.96	102.54
10	TRUE	FALSE	TRUE	10	54.50	75.17	103.13
11	TRUE	FALSE	TRUE	5	53.16	63.72	102.63
12	TRUE	FALSE	TRUE	5	53.16	64.61	103.13
13	TRUE	FALSE	FALSE	10	54.50	74.96	102.54
14	TRUE	FALSE	FALSE	10	54.50	75.17	103.13
15	TRUE	FALSE	FALSE	5	53.16	63.72	102.63
16	TRUE	FALSE	FALSE	5	53.16	64.61	103.13
17	FALSE	TRUE	FALSE	5	52.07	63.77	99.97
18	FALSE	TRUE	FALSE	5	52.07	63.22	99.63

Similar results for other methods.

10.2 3 stages

Percentage of information for method 1[6]:

scenario	missing	binding	fixC	ar	interim1	decision1	interim2	decision2	final3
1	TRUE	TRUE	FALSE	10	38.86	59.57	64.51	85.16	102.36
2	TRUE	TRUE	FALSE	10	38.86	59.16	64.31	84.25	102.24
3	TRUE	TRUE	FALSE	5	37.56	48.40	63.17	73.86	102.46
4	TRUE	TRUE	FALSE	5	37.56	48.00	62.95	73.10	102.23
5	TRUE	TRUE	TRUE	10	38.86	59.57	64.51	85.16	102.36
6	TRUE	TRUE	TRUE	10	38.86	59.16	64.31	84.25	102.24
7	TRUE	TRUE	TRUE	5	37.56	48.40	63.17	73.86	102.46
8	TRUE	TRUE	TRUE	5	37.56	48.00	62.95	73.10	102.23
9	TRUE	FALSE	TRUE	10	38.82	59.12	64.30	84.50	102.19
10	TRUE	FALSE	TRUE	10	38.82	60.66	64.58	90.57	103.04

[5] average over the reached stages
[6] average over the reached stages

```
11    TRUE   FALSE  TRUE  5    37.54     48.15    62.99     73.43 102.29
12    TRUE   FALSE  TRUE  5    37.54     50.04    63.24     74.77 103.11
13    TRUE   FALSE FALSE 10    38.82     59.12    64.30     84.50 102.19
14    TRUE   FALSE FALSE 10    38.82     60.66    64.58     90.57 103.04
15    TRUE   FALSE FALSE  5    37.54     48.15    62.99     73.43 102.29
16    TRUE   FALSE FALSE  5    37.54     50.04    63.24     74.77 103.11
17   FALSE    TRUE FALSE  5    36.91     48.66    61.76     73.28  99.66
18   FALSE    TRUE FALSE  5    36.91     48.19    61.53     72.56  99.38
```