Comparison of nonparametric analysis of variance methods - a Monte Carlo study
Part A: Two between subjects factors designs

Appendix 1
Tables and Graphs of the Type I Error Rates

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1. 1 equal means - equal cell counts

Table 1-1-1a:
equal means - n_i=10 - n of levels=2*4 - α=0.05

distribution type	effect	param	RT	INT	ART	ART+INT	Puri & Sen	van der Waerden	ATS
normal	A	5.54	5.50	5.48	5.30	5.56	5.46	5.54	5.48
equal variances	B	4.58	4.62	4.72	4.74	4.56	4.32	4.46	4.34
	AB	4.50	4.96	4.70	5.10	4.84	4.46	4.46	4.74
normal	A	5.68	5.34	5.58	6.98	6.24	5.20	5.44	5.28
unequal variances	B	6.44	6.00	5.52	5.80	5.36	5.56	5.20	5.20
(on B)	AB	5.86	4.82	5.28	6.34	5.92	4.60	5.02	4.58
normal	A	5.76	5.30	5.52	6.80	6.12	5.12	5.38	5.26
unequal variances	B	5.94	5.80	5.40	6.12	5.56	5.46	5.08	5.24
(on A and B)	AB	5.62	5.06	5.02	6.52	5.70	4.56	4.62	4.60
right skewed	A	5.00	5.40	5.22	5.42	4.82	5.18	5.20	5.36
	B	4.72	4.92	4.94	5.06	4.28	4.66	4.62	4.82
	AB	5.08	5.28	5.02	5.56	5.28	5.06	4.74	5.06
exponential	A	4.34	4.74	4.66	5.18	4.24	4.70	4.70	4.72
continuous	B	4.76	5.44	5.32	5.52	4.14	4.98	4.66	5.18
	AB	4.68	5.66	5.32	6.12	5.42	5.22	4.92	5.32
exponential	A	4.46	4.84	4.74	5.86	4.52	4.76	4.60	4.80
discrete	B	4.60	5.20	5.26	5.92	3.92	4.90	4.94	5.08
	AB	4.54	5.54	5.28	6.58	5.54	5.08	4.86	5.38
lognormal (0 / 0.25)	A	5.04	4.98	5.00	5.26	4.82	5.08	5.08	4.94
	B	4.56	4.90	4.92	4.86	4.66	4.68	4.66	4.86
	AB	4.46	4.88	4.86	4.82	4.78	4.62	4.44	4.54
uniform	A	5.38	5.40	5.22	4.94	5.10	5.18	5.20	5.36
continuous	B	4.90	4.92	4.94	4.96	4.84	4.66	4.62	4.82
	AB	5.18	5.28	5.02	5.34	5.08	5.06	4.74	5.06
uniform	A	5.12	5.06	5.08	5.94	5.80	4.98	5.02	5.02
discrete	B	4.90	4.82	4.70	4.80	4.30	4.48	4.48	4.62
	AB	4.82	4.82	4.92	4.94	4.72	4.56	4.68	4.70
left/right skewed	A	5.12	4.18	7.02	4.34	4.44	4.12	6.66	4.16
	B	5.16	5.12	5.20	4.42	5.20	4.90	4.96	5.00
	AB	4.76	4.78	4.82	4.86	4.76	4.48	4.40	4.48
left skewed	A	5.12	5.08	5.04	7.12	5.52	4.88	5.02	4.98
unequalvariances	B	5.40	5.38	4.58	5.24	4.56	5.14	4.32	4.84
(on B)	AB	6.26	5.54	6.42	6.70	6.66	5.18	5.98	5.22
left skewed	A	5.16	5.20	4.96	7.24	5.74	4.90	4.70	5.08
unequalvariances	B	5.36	5.24	5.06	5.50	5.20	4.92	4.78	4.72
(on A and B)	AB	5.92	5.60	6.02	6.72	6.38	5.08	5.58	5.32

Table 1-1-1b:
equal means - n_i=10 - n of levels=2*4 - α=0.01

distribution type	effect	param	RT	INT	ART	ART+ INT	Puri & Sen	van der Waerden	ATS
normal	A	0.92	1.02	0.94	1.16	1.14	0.90	0.78	1.00
equal variances	B	0.94	1.12	1.00	0.64	0.74	0.94	0.80	1.08
	AB	1.22	1.32	1.38	1.10	0.92	1.10	1.16	1.16
normal	A	0.76	0.94	0.86	1.78	1.42	0.76	0.72	1.00
unequal variances	B	1.74	1.36	1.32	1.12	1.30	1.28	1.14	1.26
(on B)	AB	1.78	1.22	1.52	1.48	1.60	1.14	1.38	1.18
normal	A	1.08	1.02	0.96	1.58	1.24	0.94	0.94	0.96
unequal variances	B	1.48	1.10	1.10	1.18	1.14	0.94	0.88	0.88
(on A and B)	AB	1.54	1.22	1.32	1.54	1.52	1.14	1.12	1.18
right skewed	A	0.86	0.98	0.82	0.94	0.70	0.70	0.66	0.92
	B	1.04	0.78	0.86	0.92	0.72	0.62	0.66	0.68
	AB	1.16	1.24	1.12	1.14	1.10	1.00	0.84	1.06
exponential	A	0.88	0.96	1.00	1.14	0.76	0.88	0.90	0.96
continuous	B	0.70	0.94	0.86	0.94	0.74	0.76	0.70	0.84
	AB	0.88	1.20	1.16	1.58	1.24	0.84	0.92	1.06
exponential	A	0.84	0.84	0.98	1.22	0.90	0.82	0.88	0.84
discrete	B	0.86	1.06	1.00	1.10	0.58	0.88	0.74	0.94
	AB	0.88	1.24	1.00	1.64	1.42	1.00	0.90	1.20
lognormal (0 / 0.25)	A	1.22	1.12	1.2	1.28	1.22	1.04	1.14	1.12
	B	1.04	1.30	1.3	1.32	1.24	0.96	1.06	1.22
	AB	0.86	0.88	0.9	0.90	0.90	0.70	0.62	0.74
uniform	A	0.88	0.98	0.82	0.94	0.98	0.70	0.66	0.92
continuous	B	0.76	0.78	0.86	0.78	0.94	0.62	0.66	0.68
	AB	1.00	1.24	1.12	1.18	0.98	1.00	0.84	1.06
uniform	A	0.90	0.94	0.98	1.08	1.14	0.80	0.80	0.94
discrete	B	0.82	0.82	0.80	0.86	0.80	0.62	0.60	0.70
	AB	1.04	1.16	1.10	1.20	1.08	0.88	0.86	1.06
left/right skewed	A	1.10	1.14	1.06	1.18	1.06	1.14	1.04	1.14
	B	0.78	0.84	1.06	0.84	0.96	0.70	0.86	0.76
	AB	1.24	1.24	1.18	1.32	1.18	0.96	0.80	1.14
left skewed	A	1.04	1.16	1.10	1.88	1.06	0.96	0.88	1.14
unequal variances	B	1.54	1.10	1.10	1.18	1.20	0.92	0.98	0.86
(on B)	AB	1.92	1.44	1.88	1.78	1.92	1.24	1.60	1.30
left skewed	A	0.92	1.08	0.98	1.64	1.02	0.94	0.74	1.08
unequal variances	B	1.32	0.96	1.22	1.24	1.22	0.86	1.04	0.80
(on A and B)	AB	1.60	1.62	1.68	1.98	1.86	1.34	1.54	1.42

1. 2   equal means - unequal cell counts

Table 1-2-1a:
equal means - average n$_i$=5 - n of levels=4*5 - n$_i$ and s$_i$ independent - α=0.05

distribution type	effect	param	RT	INT	ART	ART+INT	Puri & Sen	van der Waerden	ATS
normal	A	4.76	4.78	4.84	2.78	2.72	4.68	4.76	4.40
equal variances	B	4.80	4.96	4.80	2.98	2.86	4.66	4.66	4.22
	AB	5.34	4.72	5.24	4.66	5.28	3.66	4.00	4.24
normal	A	3.68	4.02	3.98	4.94	3.46	4.08	3.70	4.00
unequal variances	B	5.80	5.04	4.88	3.32	3.22	4.62	4.60	3.90
(on B)	AB	6.12	4.90	5.86	6.34	6.10	3.62	4.82	3.90
normal	A	6.42	4.84	5.46	3.48	2.94	4.72	5.16	3.98
unequal variances	B	6.88	5.50	5.92	3.94	3.56	4.98	5.40	3.94
(on A and B)	AB	8.28	5.38	6.62	6.52	7.42	4.10	5.40	3.90
right skewed	A	4.64	4.88	4.84	2.84	2.40	4.56	4.44	4.22
	B	5.46	5.16	5.36	3.00	2.34	4.88	4.94	4.72
	AB	5.14	4.54	5.18	4.96	5.12	3.50	3.92	4.10
exponential	A	5.62	4.94	5.14	4.16	2.56	4.78	4.78	4.42
continuous	B	5.20	5.16	5.20	3.96	2.24	4.66	4.80	4.66
	AB	6.24	4.96	4.66	6.18	5.82	3.42	3.76	4.38
exponential	A	5.94	5.56	5.34	4.50	2.60	5.22	5.16	4.84
discrete	B	4.96	4.88	4.80	3.96	2.18	4.42	4.40	4.66
	AB	6.40	5.08	4.98	6.70	6.30	3.84	3.84	4.42
lognormal (0 / 0.25)	A	4.98	4.96	5.08	3.12	2.74	4.66	4.82	4.08
	B	5.20	4.56	4.70	3.24	2.60	4.48	4.52	4.34
	AB	5.50	4.60	4.80	4.64	5.04	3.50	3.86	4.50
uniform	A	4.74	4.88	4.84	2.64	2.70	4.56	4.44	4.22
continuous	B	5.14	5.16	5.36	2.90	2.58	4.88	4.94	4.72
	AB	4.60	4.54	5.18	4.66	4.74	3.50	3.92	4.10
uniform	A	4.90	4.98	4.96	2.60	2.70	4.56	4.62	4.24
discrete	B	5.70	5.78	5.58	2.96	2.96	5.22	5.32	4.64
	AB	4.88	4.90	4.80	4.72	5.06	3.56	3.50	4.58
left/right skewed	A	4.96	5.02	4.94	2.52	2.34	4.64	4.50	4.30
	B	5.10	4.80	6.36	2.66	2.62	4.54	5.88	4.28
	AB	5.12	4.92	5.34	4.84	5.06	3.66	4.00	4.20
left skewed	A	3.78	3.92	3.68	4.48	3.08	3.62	3.24	3.76
unequal variances	B	5.62	5.76	5.28	3.10	2.82	5.54	5.04	3.98
(on B)	AB	6.30	5.08	6.68	6.40	6.44	3.74	5.12	3.56
left skewed	A	6.64	4.98	5.80	3.36	2.66	4.64	5.22	3.66
unequal variances	B	7.74	5.98	6.64	4.00	3.06	5.38	6.14	4.12
(on A and B)	AB	9.22	5.68	8.42	7.86	9.66	4.50	6.70	4.06

Table 1-2-1b:
equal means - average n_i=5 - n of levels=4*5 - n_i and s_i independent - α=0.01

distribution type	effect	param	RT	INT	ART	ART+ INT	Puri & Sen	van der Waerden	ATS
normal	A	1.16	1.00	1.16	0.54	0.50	0.84	0.90	0.98
equal variances	B	0.86	0.84	1.02	0.50	0.32	0.58	0.56	0.90
	AB	1.06	0.84	1.04	0.90	0.90	0.50	0.54	1.10
normal	A	0.94	0.82	0.90	1.06	0.52	0.66	0.66	0.74
unequal variances	B	1.76	0.96	1.22	0.62	0.44	0.86	0.94	0.76
(on B)	AB	1.44	1.00	1.12	1.16	1.30	0.44	0.60	0.76
normal	A	1.70	1.18	1.26	0.84	0.56	0.98	1.08	0.74
unequal variances	B	1.86	0.88	1.00	0.88	0.60	0.74	0.78	0.80
(on A und B)	AB	2.72	1.12	1.62	1.58	2.06	0.44	1.00	0.80
right skewed	A	1.06	0.82	0.88	0.50	0.32	0.66	0.74	0.68
	B	1.14	1.18	1.22	0.58	0.40	0.92	0.90	0.98
	AB	1.20	0.90	1.04	1.08	1.18	0.50	0.46	0.98
exponential	A	1.44	1.04	1.08	0.88	0.40	0.88	0.88	1.20
continuous	B	1.36	0.86	1.00	0.86	0.26	0.62	0.80	1.18
	AB	1.78	0.98	0.96	1.40	1.60	0.50	0.52	1.08
exponential	A	1.38	0.84	1.00	0.96	0.34	0.66	0.72	0.96
discrete	B	1.44	0.68	0.84	0.78	0.34	0.54	0.68	1.00
	AB	1.80	0.80	1.02	1.56	1.84	0.42	0.56	0.98
lognormal (0 / 0.25)	A	1.20	1.14	1.10	0.64	0.44	0.96	0.96	1.02
	B	1.04	0.82	0.86	0.62	0.44	0.66	0.68	0.90
	AB	1.32	0.98	1.12	0.96	0.92	0.48	0.42	1.14
uniform	A	0.84	0.82	0.88	0.42	0.38	0.66	0.74	0.68
continuous	B	1.18	1.18	1.22	0.52	0.44	0.92	0.90	0.98
	AB	1.00	0.90	1.04	0.98	0.78	0.50	0.46	0.98
uniform	A	0.80	0.82	0.88	0.40	0.34	0.74	0.76	0.78
discrete	B	1.14	1.08	1.18	0.52	0.46	0.96	1.02	1.12
	AB	0.86	0.86	1.02	1.06	1.02	0.48	0.50	1.00
left/right skewed	A	0.90	0.84	1.02	0.52	0.32	0.54	0.76	0.76
	B	1.18	1.00	1.54	0.46	0.46	0.80	1.18	0.92
	AB	1.06	0.90	1.16	0.94	1.02	0.52	0.70	1.06
left skewed	A	0.66	0.70	0.80	1.02	0.54	0.48	0.42	0.68
unequal variances	B	1.74	1.48	1.44	0.66	0.64	1.14	1.22	1.14
(on B)	AB	1.94	1.32	2.00	1.72	1.96	0.54	1.04	0.94
left skewed	A	1.98	1.10	1.64	0.84	0.52	0.82	1.26	0.82
unequal variances	B	2.28	1.28	1.98	0.80	0.54	1.10	1.40	0.94
(on A and B)	AB	3.26	1.42	2.66	2.10	3.20	0.80	1.72	1.08

Table 1-2-2a:
equal means - average $n_i=5$ - n of levels=4*5 - n_i and s_i dependent - $\alpha=0.05$

distribution type	effect	param	RT	INT	ART	ART+ INT	Puri & Sen	van der Waerden	ATS
normal	A	1.04	2.10	1.24	3.86	2.64	2.02	1.26	4.34
unequal variances	B	1.22	2.02	1.32	4.24	2.72	1.86	1.28	4.14
small n_i - small s_i	AB	1.04	1.84	1.28	2.02	1.34	1.30	0.76	3.66
normal	A	18.44	10.10	14.34	3.40	3.46	9.56	13.02	4.52
unequal variances	B	18.64	9.60	14.44	3.74	3.50	8.70	12.68	4.62
small n_i - large s_i	AB	23.60	11.28	17.20	14.04	19.20	8.94	14.24	5.24
left skewed	A	1.00	1.15	0.95	3.30	1.72	1.20	0.90	4.45
unequal variances	B	1.45	2.05	1.00	3.70	2.02	1.70	0.90	4.35
small n_i - small s_i	AB	1.55	2.15	1.25	2.60	1.00	1.35	0.70	3.50
left skewed	A	17.2	11.5	19.15	3.05	3.44	10.50	16.30	4.50
unequal variances	B	19.4	13.4	21.65	4.55	3.88	12.10	19.35	4.70
small n_i - large s_i	AB	24.1	15.3	27.55	17.70	25.64	12.75	23.10	5.20

Table 1-2-2b:
equal means - average $n_i=5$ - n of levels=4*5 - n_i and s_i dependent - $\alpha=0.01$

distribution type	effect	param	RT	INT	ART	ART+ INT	Puri & Sen	van der Waerden	ATS
normal	A	0.12	0.24	0.14	0.70	0.46	0.18	0.10	0.86
unequal variances	B	0.08	0.28	0.08	0.82	0.54	0.24	0.06	0.62
small n_i - small s_i	AB	0.22	0.32	0.22	0.34	0.22	0.20	0.14	0.70
normal	A	6.92	2.64	4.64	0.72	0.80	2.30	3.72	1.12
unequal variances	B	7.52	2.70	4.46	0.58	0.56	2.04	3.40	1.38
small n_i - large s_i	AB	9.54	2.90	6.20	4.06	7.06	1.60	3.64	1.66
left skewed	A	0.25	0.25	0.25	0.90	0.30	0.20	0.15	0.60
unequal variances	B	0.25	0.25	0.20	0.65	0.30	0.15	0.10	0.75
small n_i - small s_i	AB	0.35	0.35	0.25	0.60	0.18	0.10	0.15	0.60
left skewed	A	6.6	3.35	7.50	0.60	0.66	2.45	5.50	1.10
unequal variances	B	7.7	4.60	9.30	0.70	0.78	3.30	7.50	1.60
small n_i - large s_i	AB	10.1	5.15	12.35	6.45	10.74	3.25	7.85	1.45

1. 3   unequal means - equal cell counts

Table 1-3-1a:
unequal means - n_i=10 - n of levels=2*4 - A sig (0.6*s) - α=0.05

distribution type	effect	param	RT	INT	ART	ART+ INT	Puri & Sen	van der Waerden	ATS
normal equal variances	B	4.58	4.76	4.68	4.74	4.56	3.14	3.06	4.30
	AB	4.50	4.72	4.86	5.10	4.84	3.12	3.10	4.48
normal unequal.. variances (B)	B	6.44	6.12	5.58	5.80	5.36	3.88	4.08	5.08
	AB	5.86	5.84	5.62	6.34	5.92	4.18	4.00	5.46
normal unequal variances (A,B)	B	5.94	5.84	5.52	6.12	5.56	3.96	3.80	5.10
	AB	5.62	5.86	5.28	6.52	5.70	3.88	3.66	5.48
right skewed	B	4.72	4.88	4.76	5.06	4.28	3.14	2.76	4.60
	AB	5.08	5.08	5.10	5.56	5.28	3.42	2.94	4.86
exponential continuous	B	4.78	5.30	5.04	8.76	4.14	3.72	3.48	5.10
	AB	4.66	4.84	4.94	9.36	4.98	3.50	3.46	4.52
exponential discrete	B	4.70	4.88	4.94	10.40	3.90	3.52	3.40	4.70
	AB	4.82	5.10	5.14	11.88	5.46	3.52	3.42	4.68
lognormal (0 / 0.25)	B	4.56	5.28	4.86	4.86	4.66	3.48	3.40	5.08
	AB	4.46	5.02	4.72	4.82	4.78	3.28	2.90	4.62
uniform continuous	B	4.90	4.86	4.88	4.96	4.84	3.48	3.22	4.70
	AB	5.18	5.14	5.26	5.34	5.08	3.90	3.58	4.90
uniform discrete	B	4.52	4.72	4.60	4.76	4.34	3.24	3.12	4.58
	AB	4.90	4.84	5.02	5.26	5.14	3.50	3.34	4.62
left/right skewed	B	4.76	4.42	5.02	4.42	5.20	2.88	3.42	4.24
	AB	4.72	4.98	4.78	4.86	4.76	3.44	3.44	4.78
left skewed unequal variances (B)	B	5.40	5.54	4.92	5.24	4.56	3.80	3.52	4.88
	AB	6.26	6.02	6.06	6.70	6.66	4.72	4.16	5.58
left skewed unequal variances (A,B)	B	5.36	4.94	4.90	5.50	5.20	3.18	3.22	4.20
	AB	5.92	5.92	5.56	6.72	6.38	4.54	4.08	5.46

Table 1-3-1b:
unequal means - n_i=10 - n of levels=2*4 - A sig (0.6*s) - α=0.01

distribution type	effect	param	RT	INT	ART	ART+ INT	Puri & Sen	van der Waerden	ATS
normal equal variances	B	0.82	0.84	0.76	0.64	0.74	0.34	0.34	0.74
	AB	0.94	1.10	0.96	1.10	0.92	0.64	0.56	0.96
normal unequal variances (B)	B	1.72	1.32	1.32	1.12	1.30	0.62	0.64	1.02
	AB	1.48	1.32	1.30	1.48	1.60	0.80	0.80	1.28
normal unequal variances (A,B)	B	1.48	1.18	1.26	1.18	1.14	0.68	0.72	0.96
	AB	1.54	1.38	1.32	1.54	1.52	0.86	0.78	1.24
right skewed	B	1.04	0.90	1.02	0.92	0.72	0.42	0.34	0.86
	AB	1.16	1.22	1.16	1.14	1.10	0.54	0.42	1.08
exponential continuous	B	0.92	0.84	0.74	1.94	0.58	0.38	0.38	0.74
	AB	1.00	1.00	0.90	2.32	1.18	0.60	0.48	0.90
exponential discrete	B	0.82	0.98	1.00	2.80	0.72	0.48	0.46	0.84
	AB	0.88	1.16	1.06	3.46	1.38	0.74	0.74	1.00
lognormal (0 / 0.25)	B	1.04	1.26	1.24	1.32	1.24	0.60	0.58	1.18
	AB	0.86	0.90	0.82	0.90	0.90	0.50	0.34	0.82
uniform continuous	B	0.76	0.80	0.84	0.78	0.94	0.52	0.42	0.74
	AB	1.00	1.06	1.26	1.18	0.98	0.54	0.58	0.96
uniform discrete	B	0.94	1.02	1.04	0.94	0.86	0.52	0.40	0.96
	AB	1.18	1.14	1.06	1.28	1.12	0.66	0.54	1.00
left/right skewed	B	0.78	0.82	1.00	0.84	0.96	0.44	0.42	0.72
	AB	1.24	1.16	1.04	1.32	1.18	0.72	0.52	1.12
left skewed unequal variances (B)	B	1.54	1.16	1.18	1.18	1.20	0.70	0.68	0.80
	AB	1.92	1.58	1.80	1.78	1.92	1.10	1.18	1.52
left skewed unequal variances (A,B)	B	1.32	0.90	1.22	1.24	1.22	0.58	0.54	0.76
	AB	1.60	1.60	1.58	1.98	1.86	1.04	1.10	1.36

Table 1-3-2a:
unequal means - nᵢ=10 - n of levels=2*4 - A and B sig (0.8*s) - α=0.05

(Only error rates for the test of the interaction are reported.)

distribution type	param	RT	INT	ART	ART+ INT	Puri & Sen	van der Waerden	ATS
normal - equal variances	4.50	4.88	4.64	5.10	4.84	1.40	1.36	4.62
normal - uneq. variances (B)	5.86	6.80	5.94	6.34	5.92	2.18	2.00	6.20
normal - uneq. variances (A,B)	5.62	7.56	5.82	6.52	5.70	3.04	2.22	7.06
right skewed	5.08	5.12	5.56	5.56	5.28	1.46	1.34	4.84
exponential - continuous	5.30	6.02	5.64	7.90	6.10	4.48	3.94	5.68
exponential - discrete	5.30	6.06	5.88	8.12	5.76	4.40	4.36	5.70
lognormal (0 / 0.25)	4.46	4.74	4.60	4.82	4.78	1.08	1.14	4.38
uniform - continuous	5.18	4.86	4.62	5.34	5.08	1.80	1.54	4.66
uniform - discrete	5.14	4.74	4.62	5.20	5.12	1.92	1.46	4.50
left/right skewed	4.72	5.02	4.56	4.86	4.76	1.98	1.58	4.82
left skewed - uneq. var. (B)	6.26	6.44	5.66	6.70	6.66	2.94	2.34	5.96
left skewed - uneq. var. (A,B)	5.92	7.26	5.64	6.72	6.38	3.88	2.52	6.76

Table 1-3-2b:
unequal means - nᵢ=10 - n of levels=2*4 - A and B sig (0.8*s) - α=0.01

(Only error rates for the test of the interaction are reported.)

distribution type	param	RT	INT	ART	ART+ INT	Puri & Sen	van der Waerden	ATS
normal - equal variances	0.94	0.96	0.98	1.10	0.92	0.08	0.08	0.86
normal - uneq. variances (B)	1.48	1.44	1.18	1.48	1.60	0.28	0.30	1.20
normal - uneq. variances (A,B)	1.54	2.06	1.20	1.54	1.52	0.42	0.32	1.54
right skewed	1.16	1.16	1.12	1.14	1.10	0.20	0.16	0.98
exponential - continuous	1.38	1.32	1.42	2.42	1.72	0.68	0.66	1.26
exponential - discrete	1.32	1.30	1.34	2.60	1.76	0.70	0.58	1.12
lognormal (0 / 0.25)	0.86	0.80	0.88	0.90	0.90	0.16	0.10	0.66
uniform - continuous	1.00	0.98	0.88	1.18	0.98	0.12	0.18	0.80
uniform - discrete	1.18	1.12	0.98	1.34	1.32	0.10	0.12	0.90
left/right skewed	1.24	1.20	1.02	1.32	1.18	0.24	0.14	1.18
left skewed - uneq. var. (B)	1.92	1.88	1.54	1.78	1.92	0.44	0.50	1.62
left skewed - uneq. var. (A,B)	1.60	1.86	1.42	1.98	1.86	0.76	0.54	1.66

Table 1-3-3:
unequal means - n_i=10 - n of levels=2*4 - α=0.05
influence of sifnificant effects on the type I error rates for the interaction AB

(This is a summary with excerpts from tables 1-1-1a, 1-3-1a and 1-3-2a.)

distribution type	signif effects	param	RT	INT	ART	ART+ INT	Puri & Sen	van der Waerden	ATS
normal	-	5.54	5.50	5.48	5.30	5.56	5.46	5.54	5.48
equal variances	A	4.50	4.72	4.86	5.10	4.84	3.12	3.10	4.48
	A, B	4.50	4.88	4.64	5.10	4.84	1.40	1.36	4.62
normal	-	5.68	5.34	5.58	6.98	6.24	5.20	5.44	5.28
unequal variances	A	5.86	5.84	5.62	6.34	5.92	4.18	4.00	5.46
(on B)	A, B	5.86	6.80	5.94	6.34	5.92	2.18	2.00	6.20
normal	-	5.76	5.30	5.52	6.80	6.12	5.12	5.38	5.26
unequal variances	A	5.62	5.86	5.28	6.52	5.70	3.88	3.66	5.48
(on A and B)	A, B	5.62	7.56	5.82	6.52	5.70	3.04	2.22	7.06
right skewed	-	5.00	5.40	5.22	5.42	4.82	5.18	5.20	5.36
	A	5.08	5.08	5.10	5.56	5.28	3.42	2.94	4.86
	A, B	5.08	5.12	5.56	5.56	5.28	1.46	1.34	4.84
exponential	-	4.68	5.66	5.32	6.12	5.42	5.22	4.92	5.32
continuous	A	4.66	4.84	4.94	9.36	4.98	3.50	3.46	4.52
	A, B	5.30	6.02	5.64	7.90	6.10	4.48	3.94	5.68
exponential	-	4.54	5.54	5.28	6.58	5.54	5.08	4.86	5.38
discrete	A	4.82	5.10	5.14	11.88	5.46	3.52	3.42	4.68
	A, B	6.06	5.88	8.12	5.76	4.40	4.36	5.70	6.06
lognormal (0 / 0.25)	-	4.46	4.88	4.86	4.82	4.78	4.62	4.44	4.54
	A	4.46	5.02	4.72	4.82	4.78	3.28	2.90	4.62
	A, B	4.46	4.74	4.60	4.82	4.78	1.08	1.14	4.38
uniform	-	5.18	5.28	5.02	5.34	5.08	5.06	4.74	5.06
continuous	A	5.18	5.14	5.26	5.34	5.08	3.90	3.58	4.90
	A, B	5.18	4.86	4.62	5.34	5.08	1.80	1.54	4.66
uniform	-	5.12	5.06	5.08	5.94	5.80	4.98	5.02	5.02
discrete	A	4.90	4.84	5.02	5.26	5.14	3.50	3.34	4.62
	A, B	5.14	4.74	4.62	5.20	5.12	1.92	1.46	4.50
left/right skewed	-	5.12	4.18	7.02	4.34	4.44	4.12	6.66	4.16
	A	4.72	4.98	4.78	4.86	4.76	3.44	3.44	4.78
	A, B	4.72	5.02	4.56	4.86	4.76	1.98	1.58	4.82
left skewed	-	5.12	5.08	5.04	7.12	5.52	4.88	5.02	4.98
unequalvariances	A	6.26	6.02	6.06	6.70	6.66	4.72	4.16	5.58
(on B)	A, B	6.26	6.44	5.66	6.70	6.66	2.94	2.34	5.96
left skewed	-	5.16	5.20	4.96	7.24	5.74	4.90	4.70	5.08
unequalvariances	A	5.92	5.92	5.56	6.72	6.38	4.54	4.08	5.46
(on A and B)	A, B	5.92	7.26	5.64	6.72	6.38	3.88	2.52	6.76

Table 1-3-4:
unequal means - n_i=10 - n of levels=2*4 - α=0.05
influence of sifnificant effects on the type I error rates for effect B

(This is a summary with excerpts from tables 1-1-1a nad 1-3-1a),

distribution type	signif effects	param	RT	INT	ART	ART+ INT	Puri & Sen	van der Waerden	ATS
normal	-	4.58	4.62	4.72	4.74	4.56	4.32	4.46	4.34
equal variances	A	5.14	5.16	5.34	5.16	4.56	3.52	3.52	5.04
normal	-	6.44	6.00	5.52	5.80	5.36	5.56	5.20	5.20
unequal variances (B)	A	5.66	5.76	5.08	5.76	5.36	3.78	3.34	5.42
normal	-	5.94	5.80	5.40	6.12	5.56	5.46	5.08	5.24
unequal variances (A,B)	A	5.80	6.38	5.36	6.20	5.56	4.64	3.86	5.94
right skewed	-	4.72	4.92	4.94	5.06	4.28	4.66	4.62	4.82
	A	5.08	5.28	5.02	5.56	5.28	5.06	4.74	5.06
exponential	-	4.76	5.44	5.32	5.52	4.14	4.98	4.66	5.18
continuous	A	4.78	5.30	5.04	8.76	4.14	3.72	3.48	5.10
exponential	-	4.60	5.20	5.26	5.92	3.92	4.90	4.94	5.08
discrete	A	4.70	4.88	4.94	10.40	3.90	3.52	3.40	4.70
lognormal (0 / 0.25)	-	4.56	4.90	4.92	4.86	4.66	4.68	4.66	4.86
	A	4.56	5.28	4.86	4.86	4.66	3.48	3.40	5.08
uniform	-	4.90	4.92	4.94	4.96	4.84	4.66	4.62	4.82
continuous	A	4.90	4.86	4.88	4.96	4.84	3.48	3.22	4.70
uniform	-	4.90	4.82	4.70	4.80	4.30	4.48	4.48	4.62
discrete	A	4.86	4.82	4.88	4.82	4.34	3.98	3.72	4.80
left/right skewed	-	5.16	5.12	5.20	4.42	5.20	4.90	4.96	5.00
	A	4.92	4.36	5.28	4.36	5.20	3.10	3.50	4.30
left skewed	-	5.40	5.38	4.58	5.24	4.56	5.14	4.32	4.84
unequal variances (B)	A	5.22	5.84	4.72	5.84	5.56	3.82	3.30	5.38
left skewed	-	5.36	5.24	5.06	5.50	5.20	4.92	4.78	4.72
unequal variances (A,B)	A	5.86	11.10	5.76	7.52	5.20	9.08	4.46	10.96

1. 4   unequal means - unequal cell counts

Table 1-4-1a:
unequal means - average n_i=5 - n of levels=4*5 - A sig (0.6*s) - a=0.05

distribution type	effect	param	RT	INT	ART	ART+ INT	Puri & Sen	van der Waerden	ATS
normal equal variances	B	4.80	5.10	5.14	4.14	3.68	3.44	3.28	4.14
	AB	5.34	4.74	5.12	4.80	5.32	2.22	2.66	4.22
normal unequal variances (B)	B	5.80	5.12	4.94	4.52	3.88	3.70	3.62	4.02
	AB	6.12	5.40	5.76	6.42	6.32	2.56	2.82	3.86
normal unequal variances (A,B)	B	6.88	5.66	5.92	5.32	4.62	3.96	4.20	3.90
	AB	8.28	5.92	7.04	6.60	7.56	3.04	3.98	3.96
right skewed	B	5.46	5.60	5.60	4.74	4.10	3.74	3.62	4.56
	AB	5.14	5.32	5.72	5.10	5.38	2.20	2.48	4.86
exponential continuous	B	3.58	3.92	3.98	7.66	3.64	2.74	2.84	4.02
	AB	4.92	4.34	4.24	5.92	4.50	1.88	1.90	4.02
exponential discrete	B	3.30	3.42	3.16	9.54	3.78	2.42	2.30	3.94
	AB	5.16	4.28	4.10	7.30	5.08	1.90	1.90	4.04
lognormal (0 / 0.25)	B	5.20	4.94	5.40	4.04	3.44	3.36	3.48	4.38
	AB	5.50	4.86	5.50	4.82	5.24	2.06	2.66	4.62
uniform continuous	B	5.14	5.12	5.26	3.68	3.90	4.00	3.58	4.64
	AB	4.60	4.54	4.90	4.44	4.66	2.10	1.92	4.08
uniform discrete	B	5.54	5.48	5.40	4.12	4.08	4.02	3.62	4.78
	AB	4.98	4.74	4.70	5.00	5.18	2.10	1.76	4.46
left/right skewed	B	5.10	4.60	6.02	3.92	3.88	3.42	4.20	4.28
	AB	5.12	4.70	5.28	5.00	5.04	2.12	2.22	4.12
left skewed unequal variances (B)	B	5.62	5.74	5.52	3.34	3.04	4.32	4.42	4.14
	AB	6.30	5.18	6.54	6.28	6.40	2.78	3.34	3.94
left skewed unequal variances (A,B)	B	7.74	5.64	6.54	4.62	3.78	4.04	4.64	4.22
	AB	9.22	5.96	7.86	7.68	9.50	3.36	4.42	3.86

Table 1-4-1b:
unequal means - average n_i=5 - n of levels=4*5 - A sig (0.6*s) - α=0.01

distribution type	effect	param	RT	INT	ART	ART+ INT	Puri & Sen	van der Waerden	ATS
normal equal variances	B	0.86	0.96	0.94	0.80	0.80	0.42	0.38	0.98
	AB	1.06	0.98	0.96	0.88	1.04	0.32	0.34	1.10
normal unequal variances (B)	B	1.76	1.14	1.16	1.16	1.04	0.60	0.56	0.80
	AB	1.44	1.10	1.14	1.18	1.34	0.32	0.38	0.88
normal unequal variances (A,B)	B	1.86	1.04	1.28	1.22	0.94	0.56	0.58	0.78
	AB	2.72	1.28	1.68	1.52	2.08	0.48	0.56	0.88
right skewed	B	1.14	1.36	1.32	0.90	0.68	0.58	0.68	1.22
	AB	1.20	1.24	1.20	1.26	1.34	0.28	0.24	1.26
exponential continuous	B	0.94	0.72	0.78	1.70	0.68	0.48	0.54	0.88
	AB	1.50	0.88	0.84	1.40	1.34	0.14	0.16	1.02
exponential discrete	B	0.98	0.60	0.64	2.14	0.62	0.38	0.38	0.88
	AB	1.46	0.62	0.76	1.96	1.32	0.12	0.16	0.90
lognormal (0 / 0.25)	B	1.04	1.06	1.18	0.68	0.52	0.40	0.58	0.92
	AB	1.32	1.06	1.24	0.94	1.00	0.26	0.14	1.00
uniform continuous	B	1.18	1.18	1.34	0.72	0.70	0.64	0.56	1.14
	AB	1.00	0.90	0.96	0.88	0.84	0.34	0.26	0.96
uniform discrete	B	1.18	1.20	1.12	0.82	0.80	0.68	0.58	1.26
	AB	0.86	0.84	0.80	0.94	0.80	0.22	0.16	0.94
left/right skewed	B	1.18	1.00	1.42	0.74	0.66	0.58	0.72	0.80
	AB	1.06	0.94	1.10	1.00	1.00	0.38	0.32	1.12
left skewed unequal variances (B)	B	1.74	1.46	1.62	0.66	0.70	0.88	1.02	1.14
	AB	1.94	1.40	1.98	1.76	1.98	0.58	0.72	0.88
left skewed unequal variances (A,B)	B	2.28	1.22	1.90	0.88	0.74	0.66	0.86	0.84
	AB	3.26	1.52	2.64	2.12	3.24	0.64	1.08	1.12

Table 1-4-2a:
unequal means - average n_i=5 - n of levels=4*5 - A and B sig (0.8*s) - α=0.05

(Only error rates for the test of the interaction are reported.)

distribution type	param	RT	INT	ART	ART+ INT	Puri & Sen	van der Waerden	ATS
normal - equal variances	5.34	4.60	5.28	4.82	5.34	0.86	0.76	4.28
normal - uneq. variances (B)	6.12	5.54	5.74	6.24	6.28	0.88	1.12	3.98
normal - uneq. variances (A,B)	8.28	6.68	6.94	6.76	7.24	1.86	1.92	4.34
right skewed	5.14	5.60	6.84	5.14	5.72	0.90	0.72	5.54
exponential - continuous	4.42	4.52	4.22	5.48	4.34	2.04	2.22	4.40
exponential - discrete	4.52	4.28	3.94	5.40	4.48	2.04	1.80	4.64
lognormal (0 / 0.25)	5.50	5.22	5.96	4.94	5.28	0.52	0.54	4.46
uniform - continuous	4.60	3.60	5.00	4.44	4.78	0.72	0.74	4.52
uniform - discrete	4.44	3.74	4.68	4.68	4.34	0.68	0.70	4.64
left/right skewed	5.12	3.54	4.98	4.82	5.16	0.78	0.74	4.16
left skewed - uneq. var. (B)	6.30	5.30	5.94	6.22	6.32	1.34	1.46	4.00
left skewed - uneq. var. (A,B)	9.22	6.24	6.96	7.46	9.20	2.30	2.10	3.92

Table 1-4-2b:
unequal means - average n_i=5 - n of levels=4*5 - A and B sig (0.8*s) - α=0.01

(Only error rates for the test of the interaction are reported.)

distribution type	param	RT	INT	ART	ART+ INT	Puri & Sen	van der Waerden	ATS
normal - equal variances	1.06	0.94	0.94	0.86	1.00	0.14	0.14	1.02
normal - uneq. variances (B)	1.44	1.06	1.32	1.12	1.30	0.14	0.14	0.90
normal - uneq. variances (A,B)	2.72	1.62	1.80	1.54	2.18	0.42	0.32	0.90
right skewed	1.20	1.28	1.54	1.20	1.44	0.10	0.16	1.62
exponential - continuous	1.46	0.90	0.90	1.22	1.02	0.16	0.12	1.00
exponential - discrete	1.42	0.76	0.80	1.36	1.10	0.12	0.08	0.94
lognormal (0 / 0.25)	1.32	1.04	1.20	1.06	1.04	0.04	0.04	1.26
uniform - continuous	1.00	0.78	0.92	0.94	0.86	0.06	0.02	1.04
uniform - discrete	0.90	0.74	1.00	1.04	1.10	0.08	0.08	1.00
left/right skewed	1.06	0.66	0.92	0.84	0.92	0.12	0.12	1.02
left skewed - uneq. var. (B)	1.94	1.26	1.80	1.72	2.08	0.20	0.22	1.02
left skewed - uneq. var. (A,B)	3.26	1.86	2.18	2.12	3.12	0.46	0.46	1.00

Table 1-4-3:
unequal means - average n_i=5 - n of levels=4*5 - α=0.05
influence of sig effects on the type I error rates for the interaction AB

(This is a summary with excerpts from tables 1-2-1a, 1-4-1a and 1-4-2a.)

distribution type	signif effects	param	RT	INT	ART	ART+ INT	Puri & Sen	van der Waerden	ATS
normal	-	4.76	4.78	4.84	2.78	2.72	4.68	4.76	4.40
equal variances	A	5.34	4.74	5.12	4.80	5.32	2.22	2.66	4.22
	A, B	5.34	4.60	5.28	4.82	5.34	0.86	0.76	4.28
normal	-	3.68	4.02	3.98	4.94	3.46	4.08	3.70	4.00
unequal variances	A	6.12	5.40	5.76	6.42	6.32	2.56	2.82	3.86
(on B)	A, B	6.12	5.54	5.74	6.24	6.28	0.88	1.12	3.98
normal	-	6.42	4.84	5.46	3.48	2.94	4.72	5.16	3.98
unequal variances	A	8.28	5.92	7.04	6.60	7.56	3.04	3.98	3.96
(on A and B)	A, B	8.28	6.68	6.94	6.76	7.24	1.86	1.92	4.34
right skewed	-	4.64	4.88	4.84	2.84	2.40	4.56	4.44	4.22
	A	5.14	5.32	5.72	5.10	5.38	2.20	2.48	4.86
	A, B	5.14	5.60	6.84	5.14	5.72	0.90	0.72	5.54
exponential	-	6.24	4.96	4.66	6.18	5.82	3.42	3.76	4.38
continuous	A	4.92	4.34	4.24	5.92	4.50	1.88	1.90	4.02
	A, B	4.42	4.52	4.22	5.48	4.34	2.04	2.22	4.40
exponential	-	6.40	5.08	4.98	6.70	6.30	3.84	3.84	4.42
discrete	A	5.16	4.28	4.10	7.30	5.08	1.90	1.90	4.04
	A, B	4.52	4.28	3.94	5.40	4.48	2.04	1.80	4.64
lognormal (0 / 0.25)	-	5.50	4.60	4.80	4.64	5.04	3.50	3.86	4.50
	A	5.50	4.86	5.50	4.82	5.24	2.06	2.66	4.62
	A, B	5.50	5.22	5.96	4.94	5.28	0.52	0.54	4.46
uniform	-	4.60	4.54	5.18	4.66	4.74	3.50	3.92	4.10
continuous	A	4.60	4.54	4.90	4.44	4.66	2.10	1.92	4.08
	A, B	4.60	3.60	5.00	4.44	4.78	0.72	0.74	4.52
uniform	-	4.90	4.98	4.96	2.60	2.70	4.56	4.62	4.24
discrete	A	4.98	4.74	4.70	5.00	5.18	2.10	1.76	4.46
	A, B	4.44	3.74	4.68	4.68	4.34	0.68	0.70	4.64
left/right skewed	-	4.96	5.02	4.94	2.52	2.34	4.64	4.50	4.30
	A	5.12	4.70	5.28	5.00	5.04	2.12	2.22	4.12
	A, B	5.12	3.54	4.98	4.82	5.16	0.78	0.74	4.16
left skewed	-	3.78	3.92	3.68	4.48	3.08	3.62	3.24	3.76
unequal variances	A	6.30	5.18	6.54	6.28	6.40	2.78	3.34	3.94
(on B)	A, B	6.30	5.30	5.94	6.22	6.32	1.34	1.46	4.00
left skewed	-	6.64	4.98	5.80	3.36	2.66	4.64	5.22	3.66
unequal variances	A	9.22	5.96	7.86	7.68	9.50	3.36	4.42	3.86
(on A and B)	A, B	9.22	6.24	6.96	7.46	9.20	2.30	2.10	3.92

Table 1-4-5:
unequal means - average n_i=5 - n of levels=4*5 - α=0.05
influence of sig effects on the type I error rates for effect B

(This is a summary with excerpts from table 1-2-1a and 1-4-1a.)

distribution type	signif effects	param	RT	INT	ART	ART+ INT	Puri & Sen	van der Waerden	ATS
normal	-	4.80	4.96	4.80	2.98	2.86	4.66	4.66	4.22
equal variances	A	4.80	5.10	5.14	4.14	3.68	3.44	3.28	4.14
normal	-	5.80	5.04	4.88	3.32	3.22	4.62	4.60	3.90
unequal variances (B)	A	5.80	5.12	4.94	4.52	3.88	3.70	3.62	4.02
normal	-	6.88	5.50	5.92	3.94	3.56	4.98	5.40	3.94
unequal variances (A,B)	A	6.88	5.66	5.92	5.32	4.62	3.96	4.20	3.90
right skewed	-	5.46	5.16	5.36	3.00	2.34	4.88	4.94	4.72
	A	5.46	5.60	5.60	4.74	4.10	3.74	3.62	4.56
exponential	-	5.20	5.16	5.20	3.96	2.24	4.66	4.80	4.66
continuous	A	3.58	3.92	3.98	7.66	3.64	2.74	2.84	4.02
exponential	-	5.10	4.36	4.42	3.74	1.76	4.24	3.96	4.34
discrete	A	3.30	3.42	3.16	9.54	3.78	2.42	2.30	3.94
lognormal (0 / 0.25)	-	5.20	4.56	4.70	3.24	2.60	4.48	4.52	4.34
	A	5.20	4.94	5.40	4.04	3.44	3.36	3.48	4.38
uniform	-	5.14	5.16	5.36	2.90	2.58	4.88	4.94	4.72
continuous	A	5.14	5.12	5.26	3.68	3.90	4.00	3.58	4.64
uniform	-	5.70	5.78	5.58	2.96	2.96	5.22	5.32	4.64
discrete	A	5.54	5.48	5.40	4.12	4.08	4.02	3.62	4.78
left/right skewed	-	5.10	4.80	6.36	2.66	2.62	4.54	5.88	4.28
	A	5.10	4.60	6.02	3.92	3.88	3.42	4.20	4.28
left skewed	-	5.62	5.76	5.28	3.10	2.82	5.54	5.04	3.98
unequal variances (B)	A	5.62	5.74	5.52	3.34	3.04	4.32	4.42	4.14
left skewed	-	7.74	5.98	6.64	4.00	3.06	5.38	6.14	4.12
unequal variances (A,B)	A	7.74	5.64	6.54	4.62	3.78	4.04	4.64	4.22

1. 5 Figures
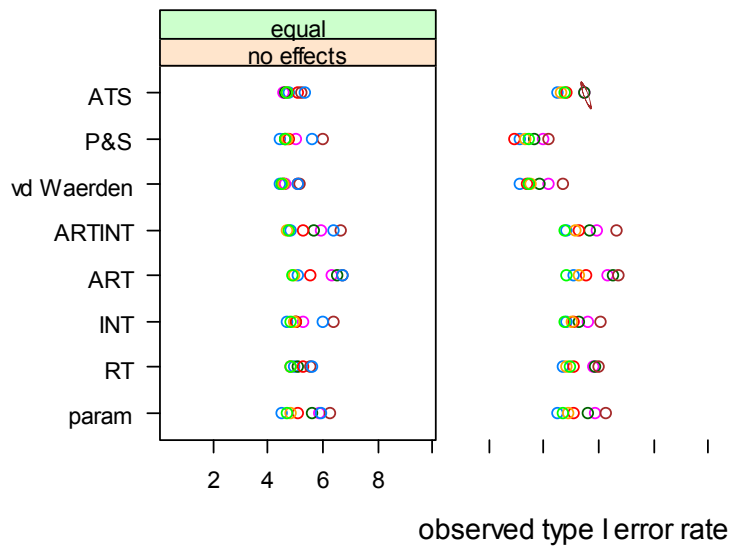
type I error rates of interaction effects

Figure A-1: type I error rates of interaction effects for equal and unequal cell counts and the situations of no other effects, one sig main effect and two sig main effects

1. 6 ART median and WA

Table 1-6-1a:
equal means - equal cell counts n_i=10 - n of levels=2*4 - α=0.05

distribution type	ART median			Wilcoxon Analysis		
	A	B	AB	A	B	AB
normal - equal variances	12.56	15.68	12.82	6.02	5.40	6.02
normal - uneq. variances (B)	11.60	17.08	13.04	7.48	8.86	8.62
normal - uneq. variances (A,B)	11.52	16.40	13.50	7.48	8.78	8.40
right skewed	19.02	29.04	23.28	6.40	6.00	6.72
uniform	26.40	47.32	34.96	17.16	21.40	21.42
left/right skewed	20.68	33.14	27.48	5.14	5.24	5.98
left skewed - uneq. var. (B)	19.94	32.24	26.50	8.92	9.56	10.10
left skewed - uneq. var. (A,B)	19.74	32.46	26.88	8.68	9.66	9.86

Table 1-6-2b:
equal means - equal cell counts n_i=10 - n of levels=2*4 - α=0.01

distribution type	ART median			Wilcoxon Analysis		
	A	B	AB	A	B	AB
normal - equal variances	4.12	4.66	4.10	1.46	1.00	1.34
normal - uneq. variances (B)	3.44	5.68	4.22	2.14	2.36	2.52
normal - uneq. variances (A,B)	3.38	5.48	4.14	1.90	2.34	2.44
right skewed	8.40	12.36	9.66	1.32	1.42	1.64
uniform	25.16	27.44	17.44	7.06	10.36	10.02
left/right skewed	9.86	15.72	12.50	1.32	1.04	1.46
left skewed - uneq. var. (B)	8.08	15.52	11.86	2.48	2.88	3.30
left skewed - uneq. var. (A,B)	8.36	14.80	11.82	2.50	2.78	3.36

Table 1-6-2a:
equal means - unequal cell counts   average n_i=5 - n of levels=4*5 - α=0.05

distribution type	ART median			Wilcoxon Analysis		
	A	B	AB	A	B	AB
normal - equal variances	11.12	11.30	12.30	7.96	7.64	9.12
normal - uneq. variances (B)	9.28	11.80	11.92	10.48	10.44	12.68
normal - uneq. variances (A,B)	9.18	10.12	13.18	12.22	12.04	14.36
right skewed	18.68	22.18	24.10	9.62	10.82	11.44
uniform	41.32	45.48	44.36	37.94	43.30	62.14
left/right skewed	27.54	30.52	31.92	7.76	7.50	8.56
left skewed - uneq. var. (B)	22.44	28.92	27.96	10.32	11.82	15.58
left skewed - uneq. var. (A,B)	23.88	28.82	31.04	12.26	14.14	16.36

Table 1-6-2b:
equal means - unequal cell counts   average n_i=5 - n of levels=4*5 - α=0.01

distribution type	ART median			Wilcoxon Analysis		
	A	B	AB	A	B	AB
normal - equal variances	2.92	2.82	2.94	2.00	1.84	2.10
normal - uneq. variances (B)	2.48	3.30	3.16	2.88	3.26	4.28
normal - uneq. variances (A,B)	2.46	2.28	3.52	3.84	3.54	4.62
right skewed	7.28	8.70	8.52	2.86	3.66	3.36
uniform	20.96	29.20	20.96	20.88	25.96	46.12
left/right skewed	11.68	12.94	12.24	1.96	2.06	2.22
left skewed - uneq. var. (B)	8.56	13.42	11.44	3.12	4.14	5.54
left skewed - uneq. var. (A,B)	9.46	12.52	12.94	3.70	4.88	5.90

1. 7   Gao and Alvo interaction test

Table 1-7-1:
equal means - equal cell counts n_i=10 - n of levels=2*4

distribution type	α=0.05		α=0.01	
	null model	main effect A significant	null model	main effect A significant
normal - equal variances	9.22	9.34	3.36	3.44
normal - uneq. variances (B)	9.20	10.54	3.50	4.04
normal - uneq. variances (A,B)	9.06	10.88	3.24	3.88
right skewed	9.10	9.74	3.70	3.90
uniform	8.98	8.86	3.26	3.28
left/right skewed	9.20	9.04	3.80	3.54
left skewed - uneq. var. (B)	9.48	10.06	3.42	3.92
left skewed - uneq. var. (A,B)	8.74	9.54	3.26	3.56