

ANOVA with binary variables - The F-test and some Alternatives

Appendix B 6

Tables and Graphs of the Power of all considered methods in relation to n_{ij} (5,10,...,50) in between subject designs

All tables refer to $\alpha=0.05$ and $\alpha=0.01$, graphs to $\alpha=0.05$. Reported are the proportions of rejections of the corresponding null hypothesis.

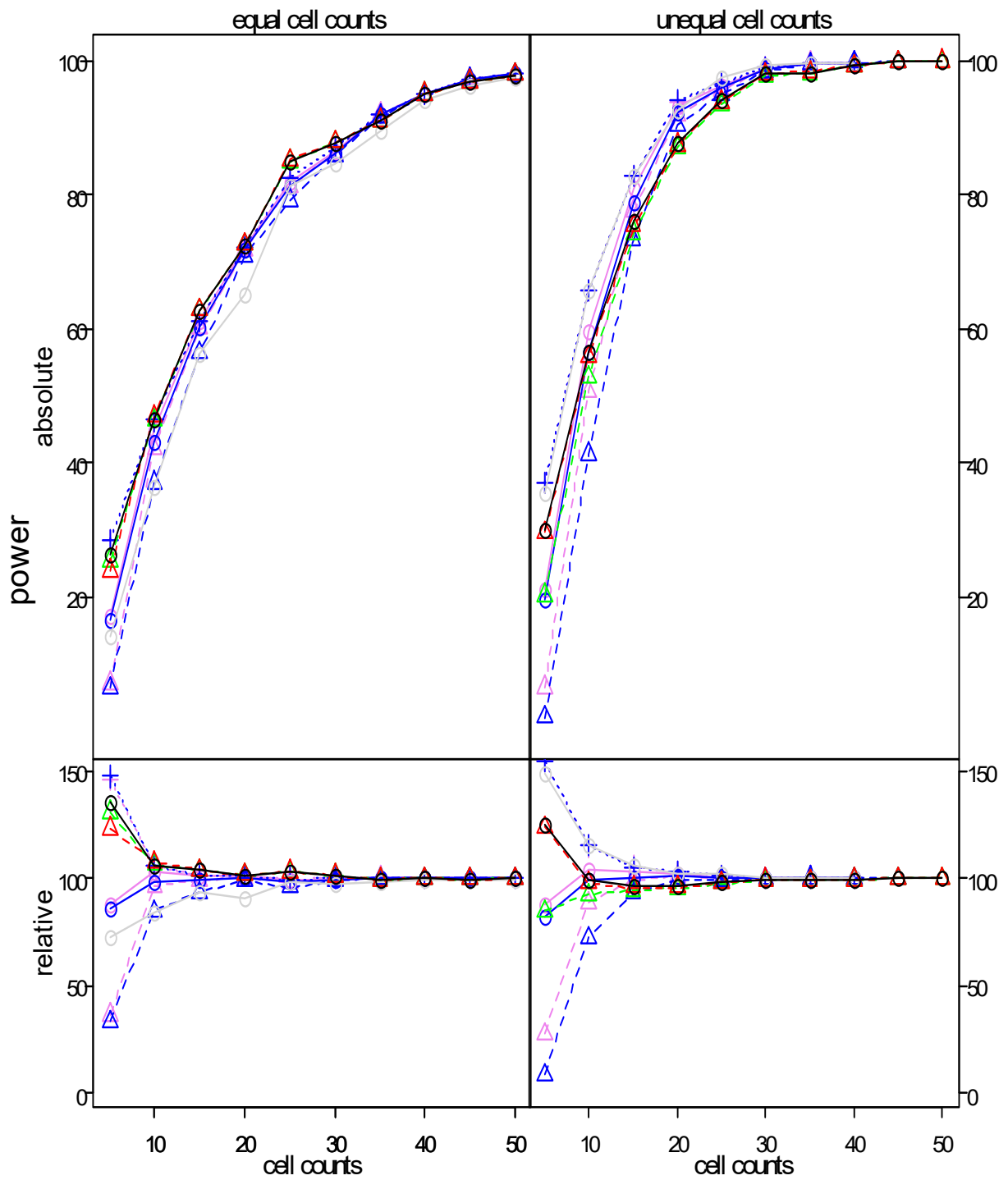
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6. 1. Main effect A (effects $a_i = 0.4*s$)**6. 1. 1 $p = 0.5$**

		equal cell counts (levels = 2*4)									
α	method	5	10	15	20	25	30	35	40	45	50
0.05	parametric	26.25	46.50	62.85	72.60	85.00	87.85	91.15	95.05	96.90	97.90
	Puri & Sen	23.95	46.95	62.85	72.60	85.20	87.85	91.15	95.05	96.90	97.90
	ATS	25.45	46.50	62.85	72.60	85.00	87.85	91.15	95.05	96.90	97.90
	logistic Wald	6.50	37.10	56.45	70.90	79.25	85.95	91.70	94.85	97.25	98.00
	logistic LR	28.65	46.40	61.25	72.25	82.40	87.10	92.10	94.95	97.30	98.00
	logistic W-LR	16.65	43.05	60.15	71.90	81.20	86.10	92.05	94.95	97.30	98.00
	probit Wald	7.15	42.15	60.10	71.85	81.30	86.25	92.10	94.95	97.30	98.00
	probit LR	28.40	46.40	61.30	72.30	82.40	87.05	92.15	94.95	97.30	98.00
	probit W-LR	17.10	45.00	61.10	72.10	82.05	86.50	92.10	94.95	97.30	98.00
chi-squared	14.05	36.60	56.45	65.15	81.25	84.75	89.70	94.20	96.25	97.50	
0.01	parametric	10.80	20.30	35.95	48.10	59.95	71.35	78.80	85.55	88.75	93.40
	Puri & Sen	8.25	19.65	33.70	47.55	59.25	72.50	78.80	84.65	88.75	93.40
	ATS	9.85	20.15	35.95	48.10	59.95	71.35	78.80	85.55	88.75	93.40
	logistic Wald	0.70	14.95	30.30	45.85	57.20	68.75	77.65	83.55	90.05	91.95
	logistic LR	12.25	23.25	38.85	50.05	61.55	72.70	78.75	85.55	90.45	92.80
	logistic W-LR	3.95	19.80	32.65	47.95	58.70	70.55	78.55	84.25	90.45	92.70
	probit Wald	0.70	18.70	32.55	48.10	58.70	70.95	78.55	84.30	90.45	92.75
	probit LR	12.20	23.40	38.80	49.80	61.35	72.70	78.80	85.55	90.45	92.80
	probit W-LR	4.95	21.65	34.75	48.55	59.45	72.15	78.70	84.85	90.45	92.80
chi-squared	4.55	14.00	27.40	41.50	53.45	67.35	74.15	82.10	86.50	92.05	
		unequal cell counts (levels = 4*5)									
0.05	parametric	30.00	56.55	76.10	87.80	94.05	98.10	98.25	99.30	99.85	99.95
	Puri & Sen	29.65	55.85	75.35	87.50	93.85	98.00	98.30	99.30	99.85	99.95
	ATS	20.30	52.90	74.30	87.00	93.45	97.75	98.20	99.30	99.80	99.90
	logistic Wald	2.10	41.40	73.25	90.45	95.05	98.40	99.60	99.75	99.9	99.95
	logistic LR	37.10	65.80	82.85	94.00	96.60	99.00	99.70	99.75	99.95	99.95
	logistic W-LR	19.70	56.55	78.90	92.45	95.95	98.80	99.65	99.75	99.95	99.95
	probit Wald	6.60	50.70	77.75	91.95	95.75	98.80	99.65	99.75	99.95	99.95
	probit LR	37.05	65.75	82.95	93.95	96.65	99.00	99.70	99.75	99.95	99.95
	probit W-LR	21.05	59.70	81.10	93.30	96.20	98.85	99.70	99.75	99.95	99.95
chi-squared	35.65	65.85	83.00	92.75	97.65	99.40	99.50	99.75	99.90	99.90	
0.01	parametric	11.45	32.25	54.75	72.80	83.75	92.60	95.10	98.00	98.90	99.75
	Puri & Sen	10.50	31.25	53.80	71.75	83.25	92.10	94.90	97.95	98.80	99.75
	ATS	6.10	29.05	51.10	69.95	82.15	91.65	94.70	97.65	98.75	99.65
	logistic Wald	0.15	17.85	47.85	73.70	86.80	93.60	97.50	99.05	99.45	99.90
	logistic LR	16.45	39.25	64.50	82.25	90.65	95.25	98.30	99.30	99.55	99.95
	logistic W-LR	5.85	28.75	56.75	78.75	89.15	94.85	98.05	99.20	99.50	99.95
	probit Wald	0.75	24.80	55.55	77.95	89.20	94.85	98.05	99.20	99.50	99.95
	probit LR	16.45	39.40	64.50	82.25	90.60	95.25	98.30	99.30	99.55	99.95
	probit W-LR	6.15	32.25	60.25	80.40	89.50	95.10	98.10	99.25	99.50	99.95
chi-squared	14.90	41.35	64.70	82.05	90.95	96.70	98.15	99.15	99.95	99.95	

Graphic for $\alpha=0.05$:



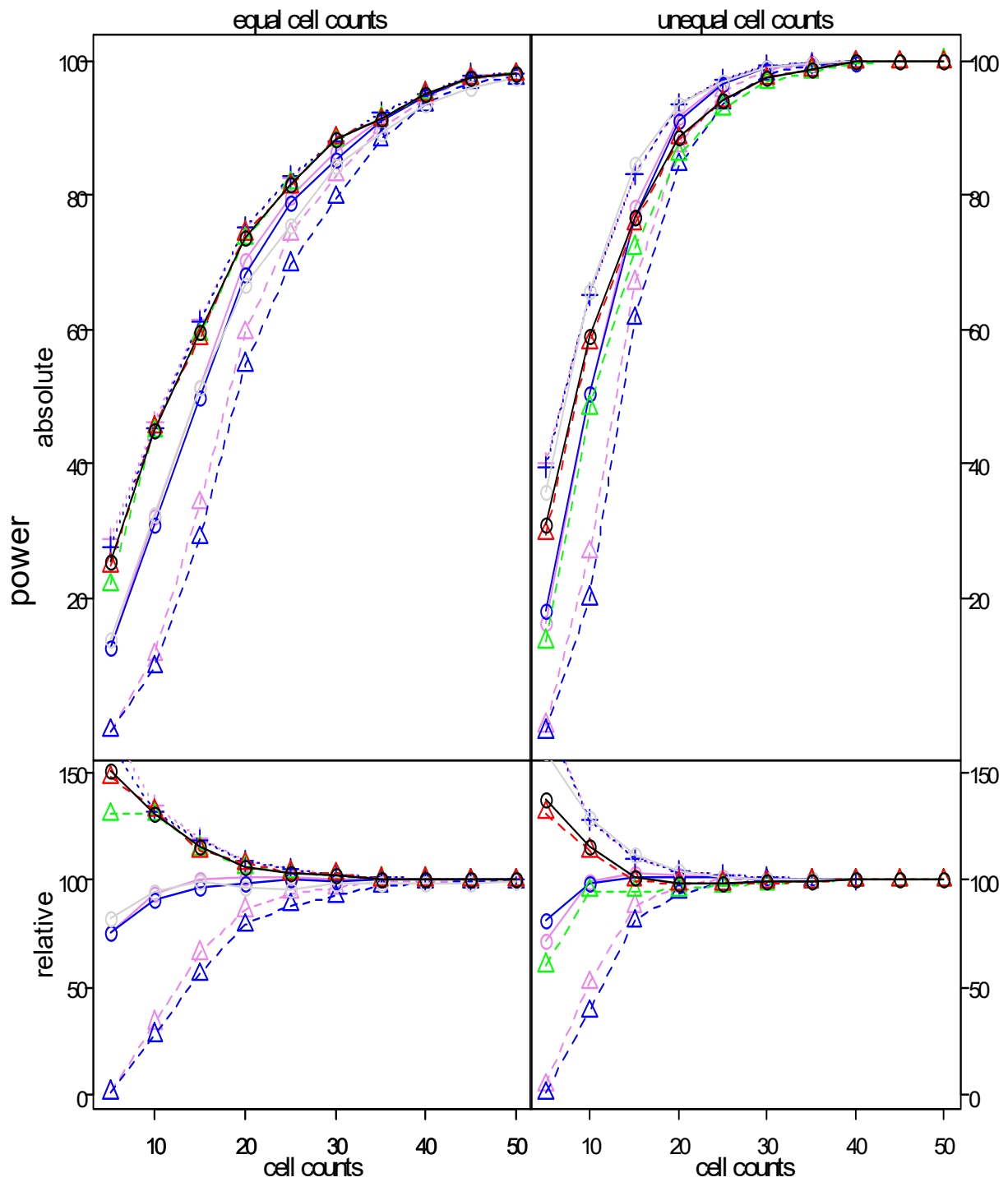
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|-------------|-------------|-------------|------------------|
| —○— | parametric | - - -△- - - | logistic/Wald |
| - - -△- - - | Furi & Sen | ⋯+⋯ | logistic/LR |
| - - -△- - - | ATS | —○— | logistic/Wald+LR |
| —○— | chi-squared | - - -△- - - | probit/Wald |
| | | ⋯+⋯ | probit/LR |
| | | —○— | probit/Wald+LR |

6.1.2 p = 0.8

		equal cell counts (levels = 2*4)									
α	method	5	10	15	20	25	30	35	40	45	50
0.05	parametric	25.35	45.05	59.55	73.65	81.75	88.30	91.45	95.20	97.35	98.00
	Puri & Sen	24.85	45.55	58.65	74.35	81.40	88.55	91.35	95.10	97.35	98.00
	ATS	22.00	44.95	59.25	73.50	81.75	88.25	91.40	95.20	97.35	98.00
	logistic Wald	0.25	9.70	28.95	54.80	69.70	79.60	88.30	93.60	96.90	97.45
	logistic LR	27.55	45.30	61.10	75.15	82.85	87.90	92.35	95.20	97.95	98.10
	logistic W-LR	12.70	31.10	49.85	68.10	78.80	85.15	91.00	94.65	97.60	98.00
	probit Wald	0.25	11.60	34.15	59.55	74.25	83.00	90.20	94.35	97.40	97.95
	probit LR	28.70	46.25	61.35	75.20	82.55	88.15	92.30	95.15	97.90	98.15
	probit W-LR	12.80	32.20	51.55	70.35	79.95	86.60	91.50	94.85	97.70	98.05
chi-squared	13.90	32.45	51.35	66.65	75.65	84.50	89.35	93.55	96.05	97.50	
0.01	parametric	8.90	21.75	35.50	49.75	59.05	72.10	79.10	85.90	90.45	92.80
	Puri & Sen	8.75	19.65	34.95	49.05	57.90	71.80	79.00	85.40	90.45	92.65
	ATS	6.60	20.65	35.10	49.45	58.90	71.80	79.00	85.85	90.45	92.80
	logistic Wald	0.10	1.05	9.60	25.10	40.60	56.95	69.50	79.70	86.95	89.80
	logistic LR	12.95	24.75	35.55	52.70	62.60	71.60	78.75	86.25	91.05	93.35
	logistic W-LR	1.80	9.80	22.55	39.75	53.80	65.60	74.40	83.60	89.95	92.00
	probit Wald	0.05	2.05	12.80	32.00	48.35	62.80	73.60	83.05	89.85	92.15
	probit LR	13.65	24.85	35.95	52.40	62.75	71.40	78.75	86.15	91.15	93.40
	probit W-LR	1.95	11.20	24.15	43.15	57.05	68.00	76.50	84.90	90.60	93.00
chi-squared	2.40	13.55	26.80	41.15	51.45	65.25	73.30	82.45	88.20	91.20	
		unequal cell counts (levels = 4*5)									
0.05	parametric	30.95	59.00	76.80	88.80	94.10	97.40	98.85	99.85	99.90	99.90
	Puri & Sen	29.55	58.05	75.85	88.45	94.05	97.35	98.80	99.85	99.90	99.90
	ATS	13.65	48.45	72.15	86.05	92.95	96.75	98.35	99.75	99.85	99.95
	logistic Wald	0.20	20.00	61.65	84.50	93.65	98.20	99.25	99.80	99.95	99.95
	logistic LR	39.45	65.15	83.25	93.50	97.30	99.35	99.55	99.85	99.95	99.95
	logistic W-LR	18.25	50.40	76.85	91.15	96.45	99.00	99.60	99.75	99.95	99.95
	probit Wald	1.10	26.80	67.00	87.30	95.50	98.60	99.40	99.75	99.95	99.95
	probit LR	40.00	65.30	83.25	93.50	97.30	99.40	99.55	99.85	99.95	99.95
	probit W-LR	16.20	50.60	78.30	91.80	96.95	99.15	99.55	99.75	99.95	99.95
chi-squared	35.95	65.75	84.80	93.60	96.75	99.05	99.75	99.90	99.90	99.90	
0.01	parametric	14.55	35.90	56.20	73.45	84.65	92.20	95.35	97.90	99.40	99.75
	Puri & Sen	12.25	34.25	55.35	72.35	83.80	91.85	95.15	97.85	99.40	99.75
	ATS	4.25	21.35	45.30	65.35	79.20	88.95	94.05	97.50	99.10	99.70
	logistic Wald	0.10	5.45	33.25	62.90	81.55	92.30	97.10	98.50	99.75	99.85
	logistic LR	19.70	41.90	66.00	82.35	90.70	96.00	98.45	99.00	99.95	99.95
	logistic W-LR	4.60	23.05	53.95	74.80	87.55	94.60	98.15	98.75	99.95	99.90
	probit Wald	0.10	8.65	41.75	68.55	84.50	93.85	97.75	98.70	99.90	99.90
	probit LR	19.90	42.00	65.95	82.00	90.75	96.00	98.45	98.95	99.90	99.95
	probit W-LR	3.85	23.90	56.15	76.40	88.80	95.30	98.25	98.75	99.90	99.90
chi-squared	16.05	42.90	65.55	83.05	91.45	96.05	98.45	99.55	99.75	99.95	

Graphic for $\alpha=0.05$:



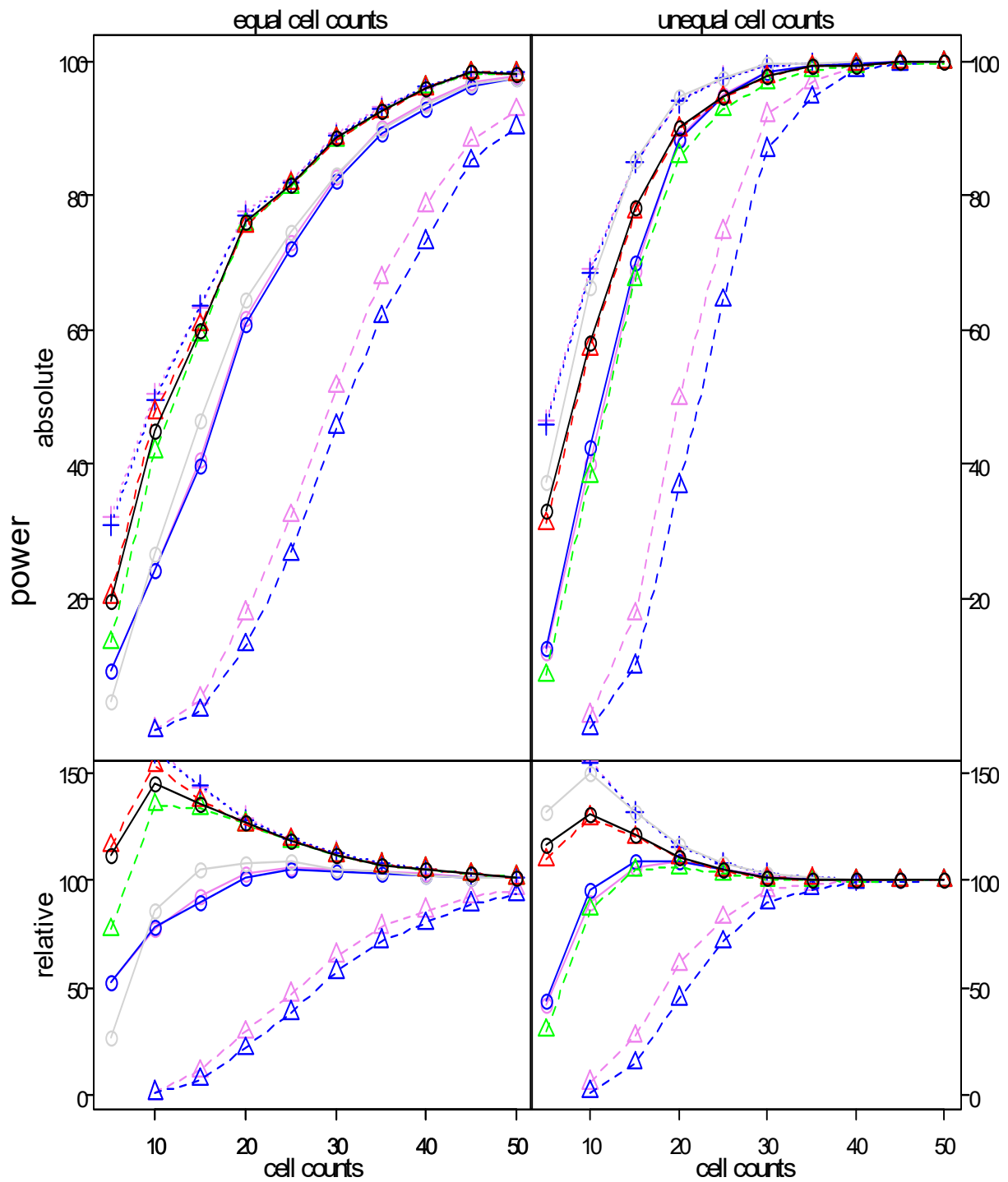
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|-------------|-------------|-------------|------------------|
| —○— | parametric | ---△--- | logistic/Wald |
| - - -△- - - | Furi & Sen | ⋯+⋯ | logistic/LR |
| - - -△- - - | ATS | —○— | logistic/Wald+LR |
| —○— | chi-squared | - - -△- - - | probit/Wald |
| | | ⋯+⋯ | probit/LR |
| | | —○— | probit/Wald+LR |

6.1.3 p = 0.9

		equal cell counts (levels = 2*4)									
α	method	5	10	15	20	25	30	35	40	45	50
0.05	parametric	19.60	45.00	59.85	76.10	81.60	88.50	92.55	96.10	98.30	98.10
	Puri & Sen	20.30	47.80	60.70	75.45	81.75	88.45	92.45	96.05	98.30	98.10
	ATS	13.50	41.95	59.15	75.80	81.40	88.35	92.55	96.10	98.25	98.10
	logistic Wald	0.10	0.40	3.30	13.10	26.6	45.60	62.05	73.10	85.15	90.25
	logistic LR	31.00	49.65	63.70	77.05	81.9	89.05	92.95	96.30	98.35	98.30
	logistic W-LR	9.30	24.25	39.80	60.90	72.3	82.30	89.40	93.05	96.40	97.65
	probit Wald	0.10	0.45	5.15	17.85	32.3	51.55	67.80	78.60	88.40	92.75
	probit LR	32.15	50.50	63.20	77.70	82.3	89.30	93.15	96.10	98.25	98.25
	probit W-LR	9.30	24.15	40.80	61.90	73.2	82.95	90.05	93.90	96.90	97.85
chi-squared	4.80	26.60	46.40	64.60	74.65	83.20	89.80	93.40	96.70	97.60	
0.01	parametric	3.95	18.25	33.80	52.40	61.55	71.65	80.15	85.95	91.50	94.00
	Puri & Sen	4.40	15.90	33.50	52.40	61.25	72.30	79.95	85.95	91.50	94.15
	ATS	2.05	16.10	33.30	51.80	61.00	71.15	80.00	85.95	91.50	94.00
	logistic Wald	0.10	0.10	0.25	1.80	5.85	15.50	30.95	46.85	61.30	71.25
	logistic LR	10.35	29.7	39.05	54.75	64.70	74.55	81.90	87.65	92.00	94.40
	logistic W-LR	0.60	5.0	13.55	29.30	40.75	55.95	68.35	78.15	85.85	90.05
	probit Wald	0.10	0.10	0.65	2.90	10.30	23.00	39.70	55.85	69.20	78.35
	probit LR	10.45	29.5	38.50	55.55	64.65	74.25	82.05	87.30	92.15	94.40
	probit W-LR	0.60	5.2	14.45	30.40	41.95	57.60	70.60	80.20	87.50	91.55
chi-squared	0.55	9.80	19.85	38.40	50.35	62.90	75.25	80.80	87.60	91.55	
		unequal cell counts (levels = 4*5)									
0.05	parametric	31.20	57.30	77.55	89.85	94.55	97.70	99.30	99.45	99.90	99.90
	Puri & Sen	8.60	38.35	67.65	85.95	92.95	96.70	98.80	99.35	99.75	99.75
	ATS	0.05	0.75	10.00	36.85	64.50	86.85	94.65	98.60	99.60	99.85
	logistic Wald	0.10	0.75	10.00	36.85	64.50	86.85	94.65	98.60	99.60	99.85
	logistic LR	45.95	68.60	84.95	94.00	97.60	99.35	99.50	99.75	99.95	99.95
	logistic W-LR	12.70	42.45	70.15	88.30	94.75	98.30	99.30	99.70	99.95	99.95
	probit Wald	0.10	2.65	17.75	49.70	74.65	92.00	96.85	99.20	99.90	99.90
	probit LR	46.60	69.05	85.10	94.10	97.65	99.35	99.55	99.75	99.95	99.95
	probit W-LR	12.00	40.00	68.75	88.55	95.05	98.45	99.40	99.75	99.95	99.95
chi-squared	15.7	34.80	58.35	76.40	84.85	92.65	96.70	98.40	99.40	99.45	
0.01	parametric	13.5	32.95	56.50	75.50	84.35	92.20	96.35	98.30	99.40	99.40
	Puri & Sen	2.4	10.95	37.45	61.70	77.35	88.95	94.25	96.75	98.90	99.35
	ATS	0.05	0.10	1.65	13.00	35.75	63.85	83.45	92.25	97.75	99.05
	logistic Wald	0.10	0.10	1.65	13.00	35.75	63.85	83.45	92.25	97.75	99.05
	logistic LR	23.60	46.95	69.15	84.65	91.70	96.80	98.30	99.30	99.95	99.95
	logistic W-LR	1.40	15.00	41.55	67.40	81.65	92.75	96.80	98.95	99.65	99.90
	probit Wald	0.10	0.25	4.00	22.35	48.35	75.45	88.55	96.05	98.40	99.60
	probit LR	23.80	46.85	69.00	84.75	91.70	96.90	98.40	99.35	99.95	99.95
	probit W-LR	1.55	13.55	40.05	67.45	82.75	93.40	97.15	98.95	99.75	99.90
chi-squared	31.20	57.30	77.55	89.85	94.55	97.70	99.30	99.45	99.90	99.90	

Graphic for $\alpha=0.05$:



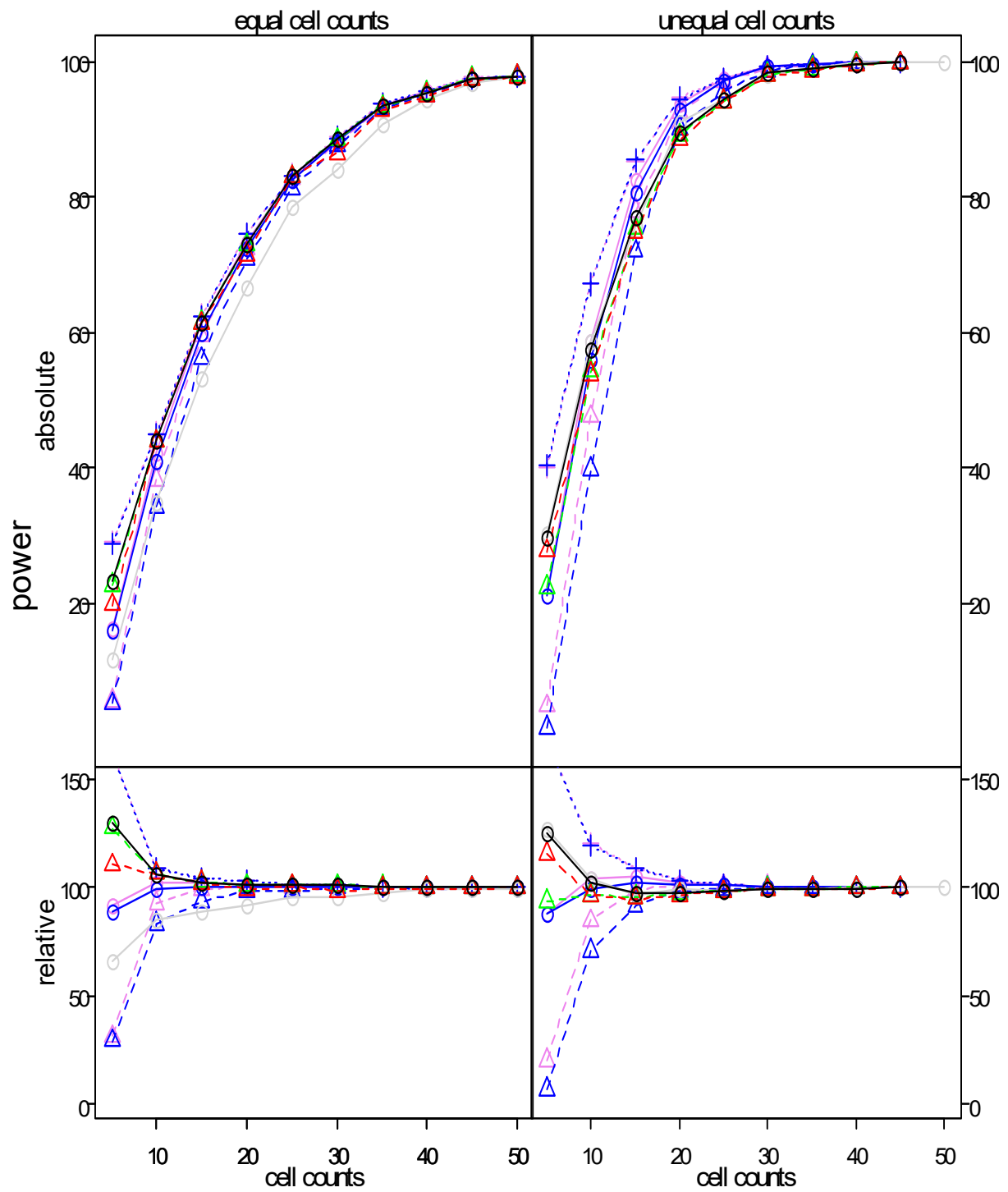
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|-------------|-------------|-------------|------------------|
| —○— | parametric | ---△--- | logistic/Wald |
| - - -△- - - | Puri & Sen | ⋯+⋯ | logistic/LR |
| - - -△- - - | ATS | —○— | logistic/Wald+LR |
| —○— | chi-squared | - - -△- - - | probit/Wald |
| | | ⋯+⋯ | probit/LR |
| | | —○— | probit/Wald+LR |

6. 2. Main effect A - B significant (effects $a_i = 0.4*s$ $b_j = 0.4*s$)**6. 2. 1 $p = 0.5$**

		equal cell counts (levels = 2*4)									
α	method	5	10	15	20	25	30	35	40	45	50
0.05	parametric	23.30	44.00	61.55	73.05	83.10	88.55	93.50	95.40	97.50	97.90
	Puri & Sen	19.80	44.00	61.40	71.60	83.05	86.50	92.90	95.10	97.30	97.85
	ATS	22.80	44.00	61.55	73.05	83.10	88.55	93.50	95.40	97.50	97.90
	logistic Wald	5.25	34.40	56.15	71.00	81.25	87.55	93.15	95.10	97.35	97.90
	logistic LR	28.85	44.95	62.35	74.70	83.20	88.80	93.85	95.75	97.65	97.95
	logistic W-LR	15.95	40.95	59.95	72.55	82.65	88.25	93.45	95.35	97.65	97.90
	probit Wald	5.65	38.35	59.55	72.55	82.80	88.15	93.40	95.40	97.50	97.90
	probit LR	29.00	45.15	62.55	74.50	83.30	88.85	93.85	95.65	97.70	97.95
	probit W-LR	16.40	42.35	61.35	73.45	83.05	88.40	93.50	95.60	97.60	97.90
	chi-squared	11.85	35.05	53.30	66.70	78.50	83.95	90.70	94.30	96.85	97.70
0.01	parametric	10.35	22.60	37.20	52.45	62.10	71.95	81.40	86.60	90.95	93.75
	Puri & Sen	6.65	20.45	31.85	48.60	57.50	71.85	79.85	84.35	90.30	93.35
	ATS	8.95	22.30	37.10	52.45	62.10	71.95	81.35	86.60	90.95	93.75
	logistic Wald	0.65	13.35	29.80	46.50	58.00	69.70	79.40	85.00	90.40	93.25
	logistic LR	12.30	24.35	38.90	54.10	63.35	72.45	81.80	86.80	91.45	93.85
	logistic W-LR	3.75	18.80	34.60	50.80	60.20	71.40	80.30	86.30	90.80	93.45
	probit Wald	0.75	17.00	34.15	50.65	60.50	71.55	80.65	86.45	90.90	93.65
	probit LR	12.80	24.35	38.85	54.25	63.25	72.30	81.75	86.85	91.40	93.95
	probit W-LR	4.05	20.25	37.35	52.35	62.15	71.95	81.10	86.85	91.20	93.75
	chi-squared	3.50	14.65	25.80	41.50	51.15	67.45	76.45	81.30	88.80	92.10
		unequal cell counts (levels = 4*5)									
0.05	parametric	29.90	57.40	76.95	89.45	94.60	98.30	98.95	99.65	99.9	99.95
	Puri & Sen	27.75	53.90	74.85	88.45	94.20	97.95	98.80	99.55	99.9	99.95
	ATS	22.50	54.30	75.35	89.15	94.15	98.10	99.00	99.70	99.9	99.95
	logistic Wald	1.70	39.85	72.05	90.20	95.65	98.80	99.55	99.85	99.9	99.95
	logistic LR	40.35	67.15	85.45	94.60	97.50	99.25	99.70	99.90	99.9	99.95
	logistic W-LR	21.05	56.00	80.70	92.95	97.05	99.25	99.60	99.90	99.9	99.95
	probit Wald	4.90	47.65	78.05	92.60	97.05	99.15	99.60	99.85	99.9	99.95
	probit LR	40.25	67.35	85.40	94.70	97.50	99.25	99.70	99.90	99.9	99.95
	probit W-LR	21.05	58.70	82.65	93.70	97.35	99.25	99.70	99.90	99.9	99.95
	chi-squared	30.40	58.70	75.95	91.10	94.55	98.20	99.10	99.80	99.9	99.85
0.01	parametric	12.85	33.70	54.40	74.70	84.70	91.60	96.15	98.20	99.65	99.60
	Puri & Sen	10.55	29.70	51.30	71.75	82.60	90.65	95.70	97.70	99.55	99.55
	ATS	7.25	30.80	52.95	73.20	84.10	91.15	95.95	98.00	99.60	99.65
	logistic Wald	0.20	15.25	47.20	73.60	86.60	94.00	97.75	98.90	99.80	99.85
	logistic LR	19.50	43.90	66.85	84.60	91.55	96.25	98.35	99.30	99.85	99.85
	logistic W-LR	5.75	29.65	57.55	80.25	89.45	95.30	98.10	99.05	99.85	99.85
	probit Wald	0.45	22.60	54.75	78.90	89.10	95.20	98.10	99.05	99.85	99.85
	probit LR	19.30	43.85	66.85	84.65	91.65	96.20	98.35	99.30	99.85	99.85
	probit W-LR	5.80	33.60	60.40	82.45	90.60	95.70	98.30	99.20	99.85	99.85
	chi-squared	11.75	32.45	55.40	75.30	84.70	92.85	96.15	98.55	99.45	99.50

Graphic for $\alpha=0.05$:



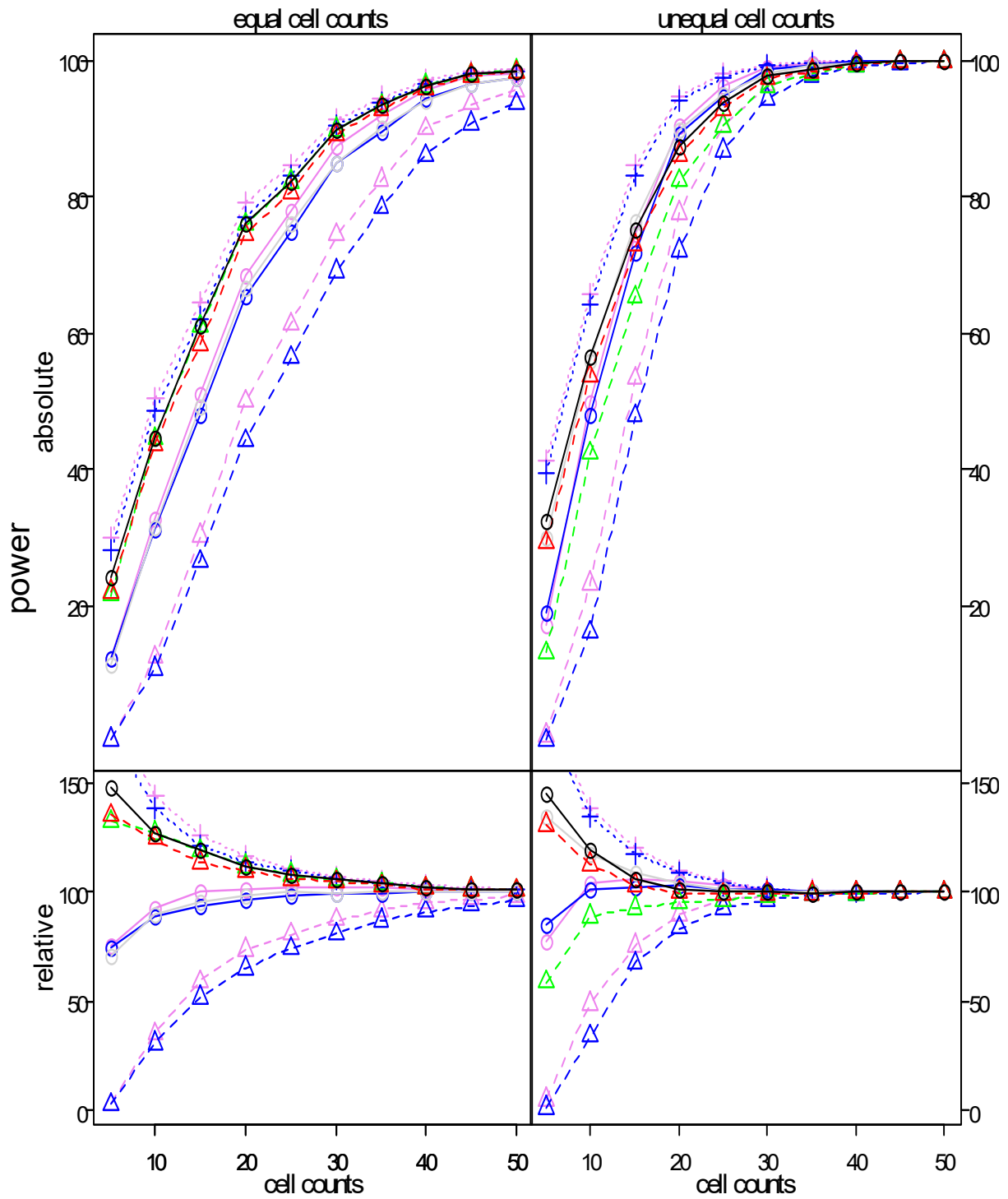
legend

- parametric
- - -△- - - Puri & Sen
- - -△- - - ATS
- chi-squared
- - -△- - - logisticWald
- ⋯+⋯ logistic/LR
- logisticWald+LR
- - -△- - - probitWald
- ⋯+⋯ probit/LR
- probitWald+LR

6. 2. 2 p = 0.8

		equal cell counts (levels = 2*4)									
α	method	5	10	15	20	25	30	35	40	45	50
0.05	parametric	24.20	44.75	61.25	76.10	82.35	89.95	93.50	96.40	98.00	98.45
	Puri & Sen	22.10	43.75	58.40	74.50	80.75	89.20	92.90	95.85	97.80	98.35
	ATS	21.65	44.60	61.00	75.95	82.25	89.90	93.50	96.35	98.00	98.45
	logistic Wald	0.50	10.90	26.65	44.30	56.45	69.10	78.50	86.10	90.85	93.80
	logistic LR	28.30	48.65	62.25	77.05	83.15	90.50	93.75	96.65	98.00	98.50
	logistic W-LR	12.20	31.30	47.95	65.60	74.95	84.95	89.55	94.45	96.60	97.55
	probit Wald	0.50	12.45	30.40	50.15	61.40	74.40	82.60	90.05	93.65	95.55
	probit LR	30.05	50.50	64.45	79.30	84.55	91.45	94.60	97.25	98.50	98.80
	probit W-LR	12.35	32.75	51.25	68.60	78.00	87.35	92.05	95.80	97.70	98.15
chi-squared	11.55	31.70	49.25	66.60	76.15	84.90	90.05	94.25	96.60	97.50	
0.01	parametric	8.55	22.20	35.20	52.30	62.35	73.35	81.00	87.65	91.25	93.90
	Puri & Sen	7.30	19.50	32.50	50.15	59.10	71.25	79.40	86.15	90.15	93.10
	ATS	6.05	21.55	34.65	51.80	62.15	73.20	80.80	87.60	91.20	93.85
	logistic Wald	0.05	1.40	7.50	18.40	29.05	42.80	57.00	66.85	74.35	81.00
	logistic LR	11.95	25.45	37.95	54.40	64.05	74.60	81.50	88.05	91.45	94.20
	logistic W-LR	2.10	10.85	22.40	38.70	48.60	61.40	73.05	81.25	87.30	91.05
	probit Wald	0.05	2.65	10.55	24.45	35.45	50.20	63.45	74.90	81.65	86.90
	probit LR	12.40	26.60	39.30	57.10	66.20	76.25	83.30	89.65	92.85	94.55
	probit W-LR	2.20	11.90	25.05	42.10	53.30	66.40	76.65	85.15	89.85	93.00
chi-squared	2.05	13.25	24.85	41.00	51.70	63.80	74.75	82.85	88.15	91.65	
		unequal cell counts (levels = 4*5)									
0.05	parametric	32.45	56.70	75.15	87.55	93.85	97.80	98.75	99.50	99.90	99.95
	Puri & Sen	29.25	53.75	72.90	86.25	92.90	97.40	98.50	99.45	99.85	99.90
	ATS	13.15	42.40	65.40	82.35	90.55	96.25	98.15	99.20	99.80	99.80
	logistic Wald	0.30	16.20	47.90	72.25	86.80	94.45	97.75	99.15	99.70	99.90
	logistic LR	39.65	64.20	83.15	94.20	97.55	99.30	99.65	99.85	99.95	99.95
	logistic W-LR	19.00	48.20	71.90	89.15	94.85	98.75	99.40	99.85	99.95	99.95
	probit Wald	1.15	23.40	53.35	77.70	90.35	96.40	98.95	99.70	99.85	99.95
	probit LR	41.25	65.85	84.75	94.85	98.10	99.45	99.80	99.90	99.95	99.95
	probit W-LR	17.25	49.75	74.75	90.60	96.25	99.15	99.60	99.85	99.95	99.95
chi-squared	30.00	56.00	76.55	89.95	94.95	98.25	99.20	99.65	99.90	99.95	
0.01	parametric	15.30	33.25	53.45	72.65	82.70	92.35	95.15	97.50	99.05	99.30
	Puri & Sen	12.15	30.15	51.20	69.55	80.35	91.05	94.25	97.25	98.80	99.10
	ATS	0.15	17.05	40.25	59.95	73.65	87.80	91.95	96.10	98.15	99.10
	logistic Wald	0.05	3.65	22.20	46.75	67.4	83.05	90.95	95.95	98.45	99.20
	logistic LR	19.70	41.25	63.85	83.10	90.6	96.30	98.30	99.30	99.80	99.95
	logistic W-LR	4.50	22.10	46.95	70.85	84.0	93.60	96.80	98.60	99.55	99.85
	probit Wald	0.05	7.35	29.10	54.85	74.5	87.70	94.10	97.90	99.25	99.75
	probit LR	20.35	42.55	66.45	84.50	92.3	97.60	98.70	99.55	99.85	99.95
	probit W-LR	3.80	23.00	50.00	75.05	86.5	95.10	97.85	99.25	99.65	99.95
chi-squared	12.05	31.55	53.70	75.50	84.30	93.30	96.65	98.35	99.10	99.80	

Graphic for $\alpha=0.05$:



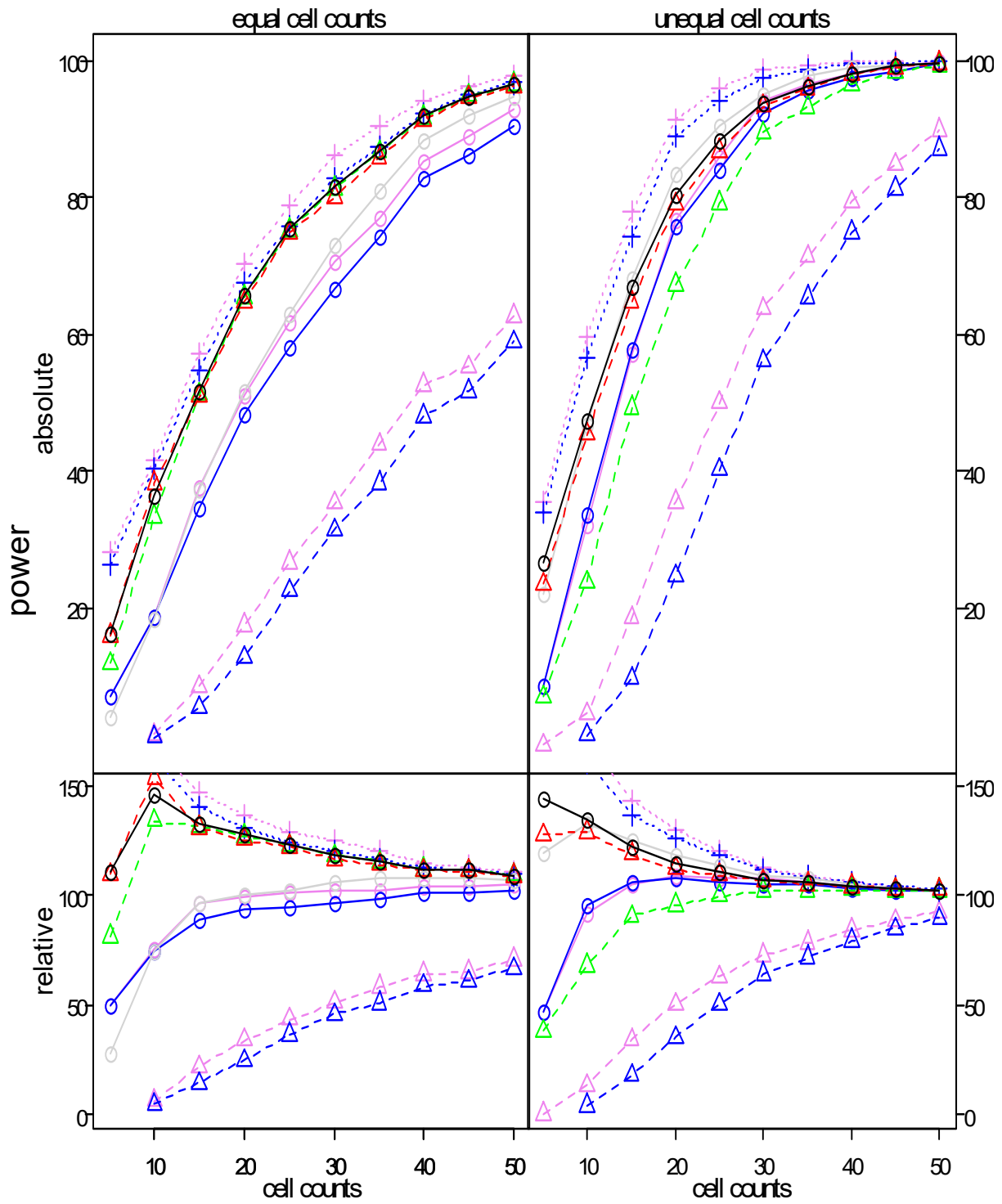
legend

- parametric
- - -△- - - Furi & Sen
- - -△- - - ATS
- chi-squared
- - -△- - - logistic/Wald
- ⋯+⋯ logistic/LR
- logistic/Wald+LR
- - -△- - - probit/Wald
- ⋯+⋯ probit/LR
- probit/Wald+LR

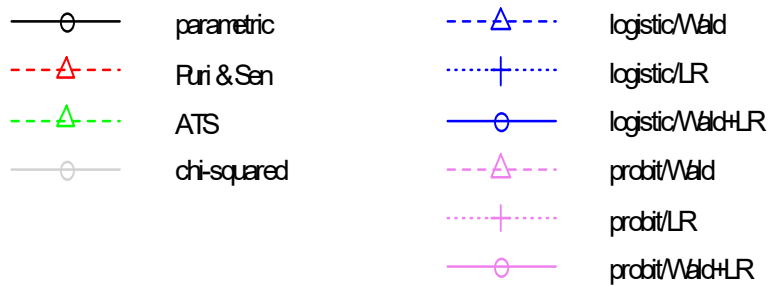
6.2.3 p = 0.9

		equal cell counts (levels = 2*4)									
α	method	5	10	15	20	25	30	35	40	45	50
0.05	parametric	16.25	36.35	51.70	65.80	75.40	81.60	86.85	91.90	94.90	96.70
	Puri & Sen	16.10	38.30	50.95	64.70	74.85	80.10	85.75	91.35	94.55	96.25
	ATS	11.95	33.40	51.25	65.45	75.25	81.35	86.75	91.75	94.90	96.65
	logistic Wald	0.05	1.20	5.55	12.85	22.55	31.50	38.35	48.10	51.75	59.00
	logistic LR	26.35	40.35	54.65	67.55	75.90	82.90	87.40	92.35	95.10	96.75
	logistic W-LR	7.30	18.70	34.50	48.30	58.20	66.75	74.25	82.75	86.20	90.45
	probit Wald	0.05	1.60	8.60	17.60	26.70	35.35	43.95	52.65	55.35	62.70
	probit LR	28.25	41.70	57.30	70.25	78.85	86.25	90.35	94.20	96.15	97.80
	probit W-LR	7.30	18.90	37.55	51.10	61.90	70.50	77.15	85.30	88.85	92.80
chi-squared	4.15	18.50	37.50	51.85	62.90	73.15	80.90	88.35	92.00	94.85	
0.01	parametric	3.20	13.50	25.85	39.60	49.95	59.55	69.10	77.80	83.60	88.45
	Puri & Sen	3.05	10.80	24.70	37.90	48.00	58.05	66.80	76.20	82.45	87.60
	ATS	1.70	11.40	25.30	38.75	49.25	59.00	69.05	77.45	83.50	88.40
	logistic Wald	0.05	0.05	0.55	2.35	5.15	8.65	15.45	21.70	24.75	30.95
	logistic LR	8.45	20.20	32.05	43.20	52.90	61.95	71.25	79.50	84.55	89.45
	logistic W-LR	0.40	3.60	11.15	20.90	29.95	38.45	49.15	58.90	63.85	71.60
	probit Wald	0.05	0.05	1.05	3.90	8.15	13.40	19.90	26.35	29.20	36.80
	probit LR	8.80	20.40	33.15	46.35	56.50	66.55	75.20	84.05	87.85	92.65
	probit W-LR	0.50	4.05	13.25	23.65	33.05	42.50	54.35	63.15	68.50	75.40
chi-squared	0.30	6.55	14.00	26.55	36.80	47.95	61.00	68.80	75.60	82.75	
		unequal cell counts (levels = 4*5)									
0.05	parametric	26.55	47.35	66.85	80.55	88.25	93.80	96.20	98.20	99.20	99.75
	Puri & Sen	23.50	45.45	64.75	79.00	86.85	93.35	95.90	98.00	98.90	99.70
	ATS	7.05	23.90	49.25	67.35	79.25	89.50	93.20	96.55	98.30	99.35
	logistic Wald	0.05	1.50	9.80	24.80	40.25	56.20	65.50	74.95	81.30	87.15
	logistic LR	33.90	56.60	74.20	89.00	94.05	97.60	98.70	99.60	99.75	99.95
	logistic W-LR	8.70	33.75	57.95	75.95	84.10	92.35	95.60	97.35	98.55	99.65
	probit Wald	0.05	4.65	18.70	35.55	50.00	63.80	71.35	79.35	84.95	89.95
	probit LR	35.40	59.70	77.85	91.40	95.85	98.75	99.30	99.90	99.95	99.95
	probit W-LR	8.65	32.15	57.35	76.65	86.00	94.05	96.50	98.15	99.00	99.80
chi-squared	22.05	46.75	68.10	83.55	90.35	95.20	97.95	98.95	99.35	99.70	
0.01	parametric	12.10	25.15	44.60	61.05	72.90	84.50	89.65	93.95	96.10	98.45
	Puri & Sen	9.15	22.70	41.80	58.30	70.70	82.80	88.55	93.35	95.65	98.15
	ATS	2.70	5.65	20.80	36.70	52.35	67.20	79.20	86.55	91.35	95.80
	logistic Wald	0.05	0.15	2.65	6.90	17.15	28.70	38.20	51.5	60.15	70.20
	logistic LR	15.20	31.60	54.05	71.40	82.50	91.85	95.50	97.4	98.55	99.75
	logistic W-LR	1.00	10.00	30.05	49.25	63.00	74.70	83.85	90.5	93.55	97.05
	probit Wald	0.05	0.50	6.10	13.05	24.20	37.30	46.90	58.5	65.10	75.00
	probit LR	15.70	34.60	58.35	75.20	86.40	94.20	97.25	98.7	99.20	99.80
	probit W-LR	0.85	9.75	29.40	51.20	65.10	78.20	86.80	92.1	95.00	98.10
chi-squared	8.30	21.80	43.05	62.05	74.45	86.60	91.35	95.55	97.15	99.10	

Graphic for $\alpha=0.05$:



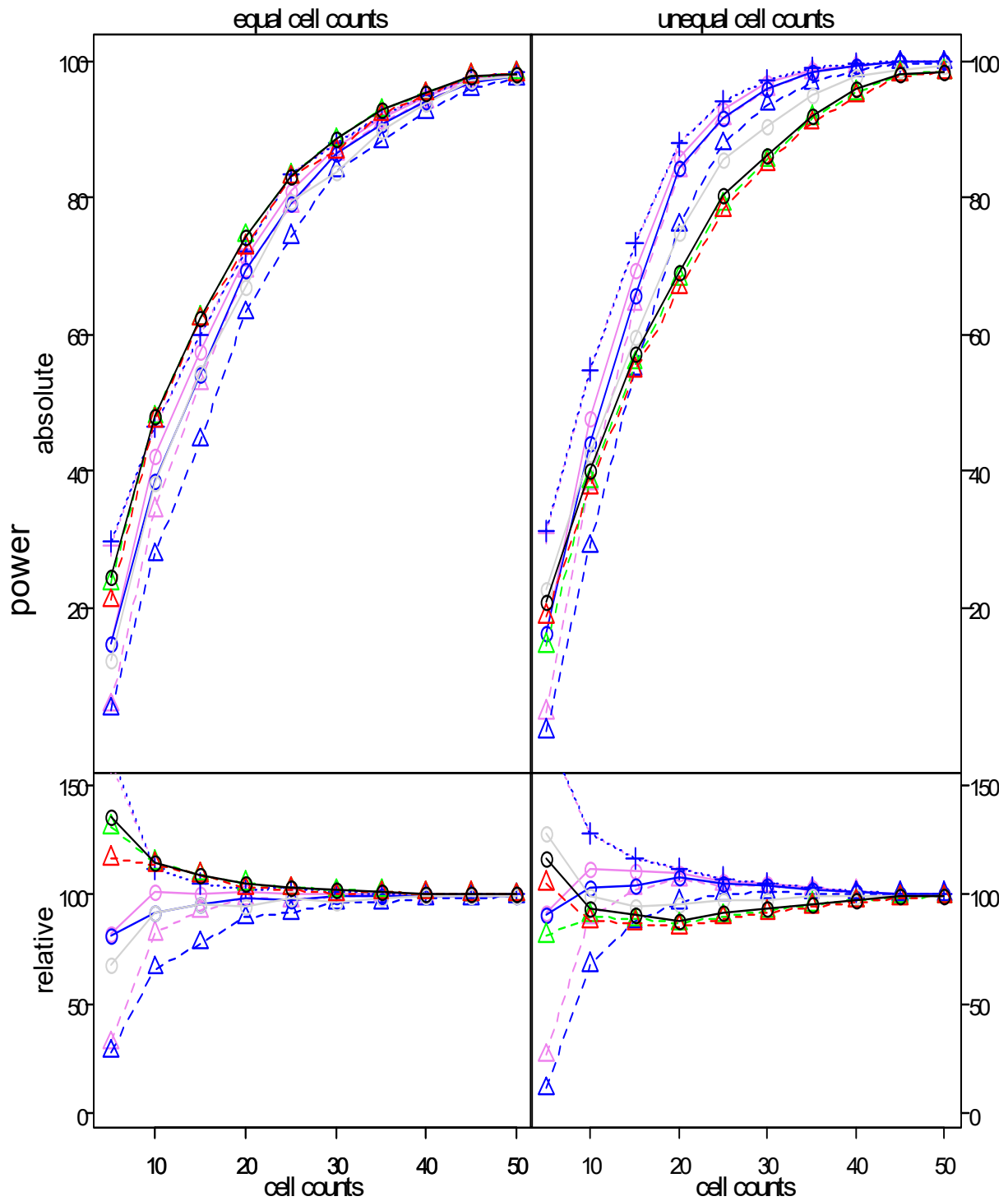
legend



6. 3. Main effect A - AB significant (effects $a_i = 0.4*s$ $ab_{ij} = 0.4*s$)**6. 3. 1 $p = 0.5$**

		equal cell counts (levels = 2*4)									
α	method	5	10	15	20	25	30	35	40	45	50
0.05	parametric	24.50	47.95	62.4	74.40	83.15	88.55	92.85	95.30	97.85	98.25
	Puri & Sen	21.15	47.50	62.2	72.80	83.10	86.85	92.25	95.20	97.80	98.20
	ATS	23.70	47.95	62.4	74.40	83.15	88.55	92.85	95.30	97.85	98.25
	logistic Wald	5.15	27.80	44.5	63.25	74.35	84.05	88.30	92.65	96.00	97.45
	logistic LR	29.85	46.60	60.0	72.30	83.55	87.90	91.90	94.95	97.55	98.35
	logistic W-LR	14.75	38.50	54.3	69.55	79.15	86.55	90.80	94.05	97.00	97.85
	probit Wald	5.85	34.35	53.0	69.35	78.95	86.60	91.05	94.15	97.05	97.95
	probit LR	29.05	46.65	60.0	72.40	83.55	88.15	91.90	94.95	97.55	98.35
	probit W-LR	14.85	42.40	57.4	71.40	80.95	87.55	91.65	94.75	97.35	98.25
	chi-squared	12.40	38.30	54.6	67.10	79.35	83.70	89.75	93.95	97.20	97.70
0.01	parametric	10.60	23.50	39.50	51.35	64.40	72.55	80.10	86.85	91.45	92.95
	Puri & Sen	6.85	21.70	33.85	47.00	60.00	72.05	78.50	84.30	90.45	92.55
	ATS	9.30	23.25	39.50	51.35	64.40	72.55	80.00	86.85	91.45	92.95
	logistic Wald	0.5	9.60	19.30	34.50	48.95	59.05	70.35	78.50	85.10	89.20
	logistic LR	12.6	23.60	37.05	49.70	62.15	72.55	78.05	86.75	90.65	94.15
	logistic W-LR	3.3	16.55	27.65	43.85	56.55	65.95	74.80	82.40	88.50	92.10
	probit Wald	0.6	14.50	26.30	43.50	56.80	66.10	75.20	82.45	88.60	92.30
	probit LR	12.7	23.45	37.05	49.60	62.00	72.55	78.05	86.75	90.65	94.15
	probit W-LR	3.9	19.40	29.95	47.65	59.35	68.90	77.35	84.15	90.10	93.25
	chi-squared	3.50	14.50	26.50	40.70	53.75	68.05	74.55	81.60	88.35	90.85
		unequal cell counts (levels = 4*5)									
0.05	parametric	20.90	40.20	57.15	69.25	80.30	86.35	91.90	95.85	98.20	98.45
	Puri & Sen	18.80	37.65	54.75	66.80	78.25	84.90	91.00	94.90	97.95	98.35
	ATS	14.55	38.60	55.80	68.25	79.05	85.45	91.70	95.40	98.15	98.40
	logistic Wald	2.05	29.05	55.00	76.00	87.95	93.65	96.80	98.60	99.75	99.75
	logistic LR	31.25	54.90	73.25	87.90	94.10	97.10	98.95	99.55	99.90	99.95
	logistic W-LR	16.25	44.10	65.70	84.50	91.80	96.10	98.45	99.20	99.85	99.85
	probit Wald	4.80	38.30	64.50	83.90	91.60	96.05	98.50	99.25	99.85	99.85
	probit LR	30.90	54.70	73.25	87.95	94.05	97.15	98.95	99.55	99.90	99.95
	probit W-LR	16.35	47.85	69.40	86.00	93.05	96.75	98.85	99.45	99.85	99.90
	chi-squared	22.80	42.50	59.75	75.00	85.55	90.50	95.05	97.70	98.85	99.25
0.01	parametric	7.30	19.85	33.30	45.15	59.50	69.65	80.05	86.90	90.60	94.30
	Puri & Sen	5.45	17.30	29.85	42.40	55.60	66.65	77.55	85.00	89.35	93.05
	ATS	3.90	16.55	31.20	43.85	57.05	68.15	78.70	86.30	90.25	93.70
	logistic Wald	0.05	9.40	27.40	50.40	67.85	80.85	89.60	94.00	96.70	98.50
	logistic LR	12.80	32.55	51.60	70.70	82.25	90.75	95.00	97.60	98.90	99.35
	logistic W-LR	4.05	20.50	39.95	61.95	76.50	86.45	93.20	96.10	97.95	98.85
	probit Wald	0.60	17.55	38.35	60.90	76.20	86.65	93.15	96.35	98.00	98.95
	probit LR	12.75	32.55	51.45	70.95	82.20	90.65	94.95	97.60	98.90	99.35
	probit W-LR	4.15	24.00	45.20	66.10	79.35	88.80	94.00	97.10	98.65	99.20
	chi-squared	7.15	21.45	35.95	51.50	64.75	75.35	84.25	90.90	94.60	96.75

Graphic for $\alpha=0.05$:



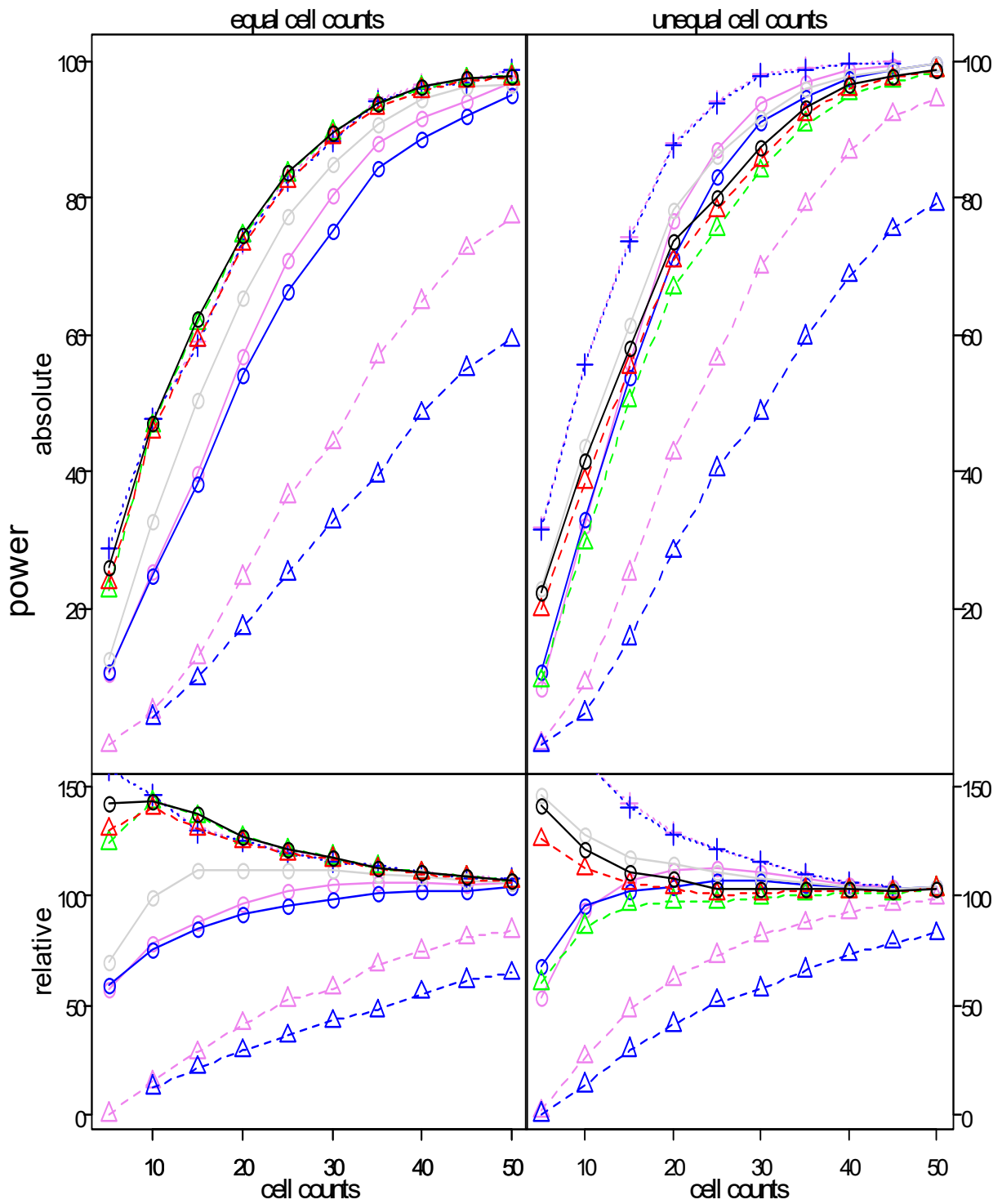
legend

- | | | | |
|-------------|-------------|---------|------------------|
| —○— | parametric | ---△--- | logistic/Wald |
| - - -△- - - | Furi & Sen | ⋯+⋯ | logistic/LR |
| - - -△- - - | ATS | —○— | logistic/Wald+LR |
| —○— | chi-squared | - - -△- | probit/Wald |
| | | ⋯+⋯ | probit/LR |
| | | —○— | probit/Wald+LR |

6.3.2 p = 0.8

		equal cell counts (levels = 2*4)									
α	method	5	10	15	20	25	30	35	40	45	50
0.05	parametric	26.05	47.10	62.30	74.55	83.75	89.65	93.85	96.15	97.35	97.85
	Puri & Sen	23.80	45.95	59.15	73.20	82.35	88.95	93.20	95.70	97.05	97.50
	ATS	22.70	46.80	61.70	74.40	83.55	89.60	93.80	96.10	97.35	97.85
	logistic Wald	0.05	4.20	9.80	17.30	25.20	32.80	39.55	48.55	55.10	59.20
	logistic LR	28.85	47.85	58.55	73.70	82.60	88.40	94.25	96.05	96.90	98.75
	logistic W-LR	10.90	24.75	38.30	54.05	66.25	75.15	84.35	88.50	91.95	95.10
	probit Wald	0.05	5.05	13.00	24.55	36.45	44.20	56.90	64.85	72.65	77.15
	probit LR	28.80	47.80	59.10	73.55	83.05	88.95	94.55	96.45	97.30	98.70
	probit W-LR	10.55	25.60	39.90	57.00	70.85	80.40	88.05	91.70	94.05	96.85
chi-squared	12.70	32.70	50.40	65.60	77.35	85.00	90.80	94.35	96.20	96.70	
0.01	parametric	9.05	22.65	36.20	51.15	63.25	72.75	81.30	87.25	91.30	93.35
	Puri & Sen	8.15	19.30	33.95	48.40	59.00	70.75	80.00	85.60	90.05	92.55
	ATS	6.90	21.40	35.80	50.70	62.95	72.60	81.20	87.15	91.30	93.35
	logistic Wald	0.05	0.40	2.10	5.30	10.55	13.10	19.75	26.00	31.45	35.35
	logistic LR	12.15	24.65	34.65	50.75	62.35	71.40	81.25	85.90	89.90	94.05
	logistic W-LR	1.70	7.30	13.65	23.70	36.30	47.40	59.20	66.50	75.00	81.75
	probit Wald	0.05	1.05	3.35	8.50	17.10	23.45	33.55	43.65	51.80	59.35
	probit LR	11.95	24.55	34.40	50.25	62.65	72.40	81.65	86.00	90.25	94.30
	probit W-LR	1.75	7.50	14.60	26.20	39.75	52.80	64.75	72.75	81.35	87.10
chi-squared	1.90	13.65	25.30	39.75	51.80	64.10	75.30	81.70	87.40	90.95	
		unequal cell counts (levels = 4*5)									
0.05	parametric	22.35	41.60	58.20	73.75	80.25	87.50	93.35	96.45	97.80	98.85
	Puri & Sen	19.85	38.65	55.40	70.90	78.20	85.60	92.25	96.00	97.35	98.60
	ATS	9.55	29.65	50.35	66.90	75.55	83.95	90.80	95.15	97.00	98.55
	logistic Wald	0.05	4.7	15.70	28.40	40.50	48.70	59.70	68.60	75.40	79.10
	logistic LR	31.65	55.6	73.65	87.60	93.85	97.95	98.80	99.50	99.75	99.95
	logistic W-LR	10.75	33.0	53.75	71.25	83.15	91.05	94.75	97.55	98.80	99.65
	probit Wald	0.30	9.1	25.20	42.80	56.55	69.95	79.00	86.90	92.10	94.40
	probit LR	31.90	55.6	74.35	88.10	94.25	98.10	98.95	99.50	99.80	99.95
	probit W-LR	8.40	32.1	56.05	76.85	87.25	93.70	97.00	98.80	99.45	99.95
chi-squared	23.00	43.90	61.50	78.40	86.20	91.80	95.90	97.85	98.80	99.55	
0.01	parametric	9.50	20.65	35.95	49.70	61.30	72.80	81.80	88.90	92.70	95.00
	Puri & Sen	6.60	18.30	32.60	45.85	57.85	69.80	79.50	86.80	91.25	93.60
	ATS	3.35	10.75	24.20	38.70	51.55	64.85	76.20	83.75	89.00	92.30
	logistic Wald	0.05	0.80	4.85	11.00	19.25	25.55	36.80	46.70	52.25	61.15
	logistic LR	12.65	30.20	51.15	69.85	82.60	91.20	94.90	97.55	98.85	99.70
	logistic W-LR	1.65	9.50	25.60	42.50	59.85	72.60	81.60	89.55	94.05	96.60
	probit Wald	0.05	1.75	9.70	22.40	35.15	45.90	60.40	72.45	80.45	84.80
	probit LR	12.85	30.10	52.40	70.90	83.55	91.90	95.55	97.85	99.05	99.80
	probit W-LR	1.25	9.35	28.20	48.40	66.00	78.90	87.60	93.65	97.60	98.70
chi-squared	7.25	21.40	38.90	54.60	68.00	78.50	87.00	92.30	95.55	97.20	

Graphic for $\alpha=0.05$:



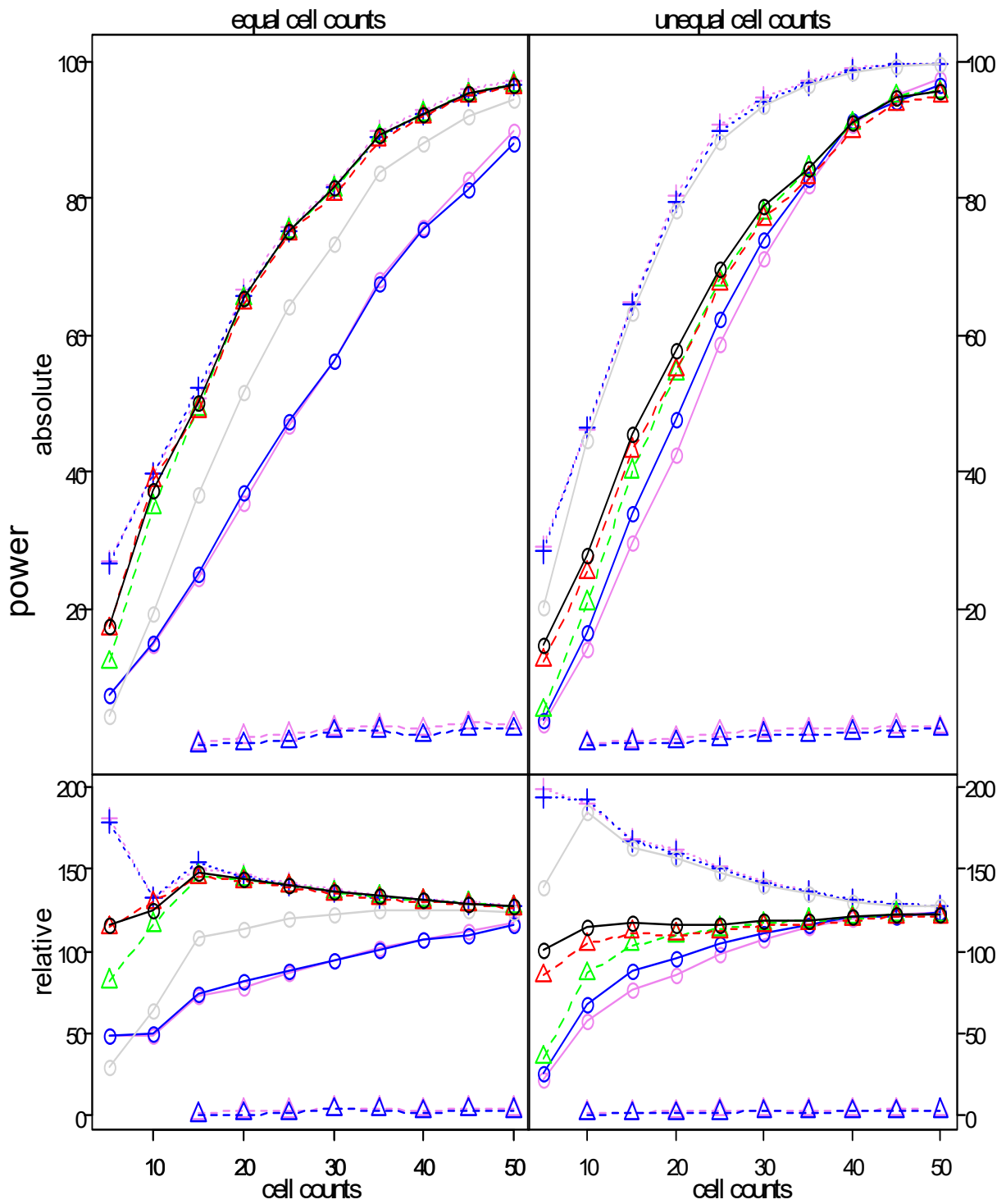
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|-------------|-------------|-------------|------------------|
| —○— | parametric | - - -△- - - | logistic/Wald |
| - - -△- - - | Fur & Sen | ⋯+⋯ | logistic/LR |
| - - -△- - - | ATS | —○— | logistic/Wald+LR |
| —○— | chi-squared | - - -△- - - | probit/Wald |
| | | ⋯+⋯ | probit/LR |
| | | —○— | probit/Wald+LR |

6.3.3 p = 0.9

		equal cell counts (levels = 2*4)									
α	method	5	10	15	20	25	30	35	40	45	50
0.05	parametric	17.45	37.45	50.15	65.45	75.35	81.55	89.35	92.40	95.35	96.65
	Puri & Sen	17.15	38.95	49.00	64.65	74.85	80.55	88.45	91.95	94.95	96.25
	ATS	12.25	34.95	49.30	65.35	75.25	81.40	89.20	92.30	95.25	96.60
	logistic Wald	0.05	0.05	0.15	0.4	0.70	2.25	2.30	1.50	2.65	2.55
	logistic LR	26.75	39.85	52.40	65.8	75.15	81.50	89.10	92.35	95.20	96.60
	logistic W-LR	7.35	15.10	25.25	37.1	47.35	56.40	67.45	75.65	81.25	88.10
	probit Wald	0.05	0.05	0.50	1.4	1.65	2.65	2.95	2.50	3.35	3.30
	probit LR	27.05	39.80	50.95	66.7	75.90	82.05	89.75	92.85	96.05	97.30
	probit W-LR	7.35	14.80	24.50	35.4	46.85	56.35	68.25	75.90	83.00	89.75
chi-squared	4.35	19.30	36.65	51.60	64.35	73.50	83.80	88.00	91.90	94.45	
0.01	parametric	3.60	13.75	25.65	39.65	51.10	60.40	71.45	77.85	83.30	88.10
	Puri & Sen	3.50	11.50	24.30	38.30	49.30	58.95	68.85	76.35	81.95	87.35
	ATS	1.90	12.05	24.80	38.90	50.35	60.00	70.95	77.55	83.10	87.90
	logistic Wald	0.05	0.05	0.05	0.05	0.05	0.10	0.25	0.15	0.35	99.95
	logistic LR	9.00	20.60	29.00	41.40	52.15	61.20	72.05	78.40	83.00	87.80
	logistic W-LR	0.60	2.60	7.15	10.75	18.25	24.30	30.50	38.35	47.75	54.00
	probit Wald	0.05	0.05	0.05	0.05	0.15	0.20	0.60	0.25	0.50	0.10
	probit LR	8.95	19.50	27.40	39.90	51.35	60.90	71.80	78.05	84.20	88.55
	probit W-LR	0.60	2.30	6.95	10.70	17.15	22.45	29.50	37.45	46.55	52.90
chi-squared	0.55	6.90	14.40	26.40	39.75	48.90	62.25	69.70	76.30	83.05	
		unequal cell counts (levels = 4*5)									
0.05	parametric	14.85	27.80	45.55	57.95	69.80	79.00	84.50	91.00	94.65	95.60
	Puri & Sen	12.45	25.35	43.15	54.90	67.40	77.10	83.00	89.90	93.70	95.10
	ATS	5.15	20.95	40.20	54.55	68.05	77.80	84.45	90.90	94.95	95.55
	logistic Wald	0.05	0.25	0.45	0.60	1.10	1.65	1.65	2.05	2.15	2.45
	logistic LR	28.40	46.60	64.60	79.50	89.95	94.15	96.75	98.70	99.50	99.50
	logistic W-LR	3.75	16.50	34.15	47.90	62.45	73.85	82.90	91.40	94.10	96.65
	probit Wald	0.05	0.50	0.80	1.20	2.10	2.30	2.50	2.70	2.95	2.85
	probit LR	29.00	46.20	64.95	80.35	90.90	94.80	97.25	98.95	99.70	99.70
	probit W-LR	3.15	14.05	29.80	42.60	58.85	71.25	81.90	90.80	95.15	97.40
chi-squared	20.40	44.80	63.30	78.15	88.20	93.45	96.55	98.45	99.25	99.55	
0.01	parametric	5.55	12.35	23.65	33.50	46.30	59.30	67.00	74.85	82.45	87.60
	Puri & Sen	4.05	10.05	20.50	30.80	43.10	55.30	64.55	72.40	80.35	85.55
	ATS	1.25	5.30	16.45	28.25	40.75	54.35	65.35	73.00	80.25	86.20
	logistic Wald	0.05	0.05	0.05	0.05	0.05	0.20	0.15	0.25	0.20	0.55
	logistic LR	9.35	23.80	40.70	56.05	71.70	82.65	88.80	94.50	97.15	98.25
	logistic W-LR	0.20	3.10	10.20	17.85	30.25	41.25	52.00	62.70	72.50	81.30
	probit Wald	0.05	0.05	0.10	0.05	0.15	0.25	0.45	0.25	0.25	0.80
	probit LR	9.65	23.15	40.80	56.50	72.35	83.00	90.15	95.55	97.55	98.60
	probit W-LR	0.15	2.35	8.00	15.30	26.80	39.10	48.75	60.70	72.05	81.60
chi-squared	5.90	20.70	39.45	54.60	69.70	81.30	88.10	94.45	97.00	97.55	

Graphic for $\alpha=0.05$:



legend

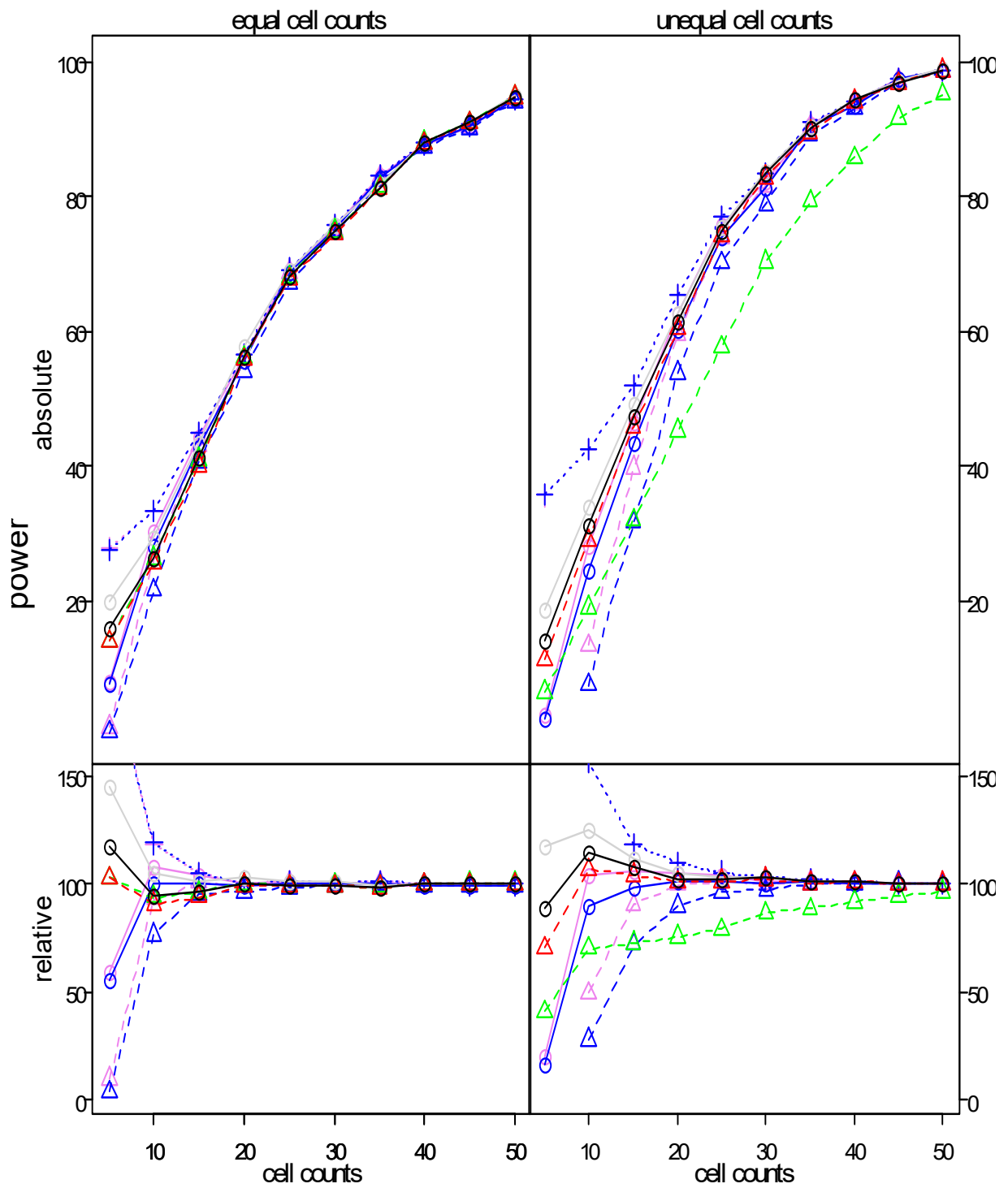
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|-------------|-------------|-------------|------------------|
| —○— | parametric | - - -△- - - | logistic/Wald |
| - - -△- - - | Furi & Sen | ⋯+⋯ | logistic/LR |
| - - -△- - - | ATS | —○— | logistic/Wald+LR |
| —○— | chi-squared | - - -△- - - | probit/Wald |
| | | ⋯+⋯ | probit/LR |
| | | —○— | probit/Wald+LR |

6. 4. Interaction AB (effects $ab_{ij} = 0.4*s$)

6. 4. 1 $p = 0.5$

		equal cell counts (levels = 2*4)									
α	method	5	10	15	20	25	30	35	40	45	50
0.05	parametric	16.15	26.50	41.25	56.25	68.05	74.90	81.45	88.05	90.95	94.80
	Puri & Sen	14.15	25.60	40.15	55.90	67.85	74.45	81.25	88.00	90.90	94.75
	ATS	14.15	26.45	41.05	56.15	68.05	74.90	81.45	88.05	90.95	94.80
	logistic Wald	0.55	21.60	40.80	54.25	67.30	74.50	82.35	87.35	90.25	94.10
	logistic LR	27.60	33.45	45.00	56.60	69.25	75.70	83.25	87.90	90.65	94.50
	logistic W-LR	7.65	28.15	43.00	55.65	68.80	75.20	82.90	87.65	90.40	94.30
	probit Wald	1.35	26.20	43.05	55.80	68.80	75.25	83.00	87.65	90.50	94.30
	probit LR	27.85	33.40	44.95	56.60	69.25	75.75	83.25	87.90	90.65	94.45
	probit W-LR	8.10	30.40	44.35	56.30	69.15	75.65	83.05	87.75	90.55	94.35
chi-squared	19.90	29.45	43.35	57.90	69.20	75.90	81.85	88.15	91.10	95.00	
0.01	parametric	5.25	11.90	20.60	33.95	43.55	51.30	62.00	71.70	75.85	84.00
	Puri & Sen	3.65	10.60	19.45	32.20	42.35	49.85	61.35	70.90	75.60	83.70
	ATS	4.15	11.60	20.35	33.85	43.45	51.30	61.95	71.65	75.80	84.00
	logistic Wald	0.05	5.85	16.15	27.95	42.95	51.20	61.30	68.1	76.05	83.15
	logistic LR	11.65	14.25	22.40	32.90	46.55	53.60	63.50	70.3	77.25	84.25
	logistic W-LR	0.45	9.50	19.65	30.65	44.70	52.50	62.35	69.3	76.55	83.65
	probit Wald	0.05	8.50	19.70	30.75	44.95	52.65	62.40	69.4	76.60	83.80
	probit LR	11.70	14.35	22.55	32.95	46.55	53.60	63.45	70.3	77.20	84.25
	probit W-LR	0.60	11.05	21.05	32.15	45.95	53.10	63.00	69.6	76.95	84.10
chi-squared	6.15	12.50	21.35	34.40	44.45	51.60	62.40	71.95	76.30	84.25	
		unequal cell counts (levels = 4*5)									
0.05	parametric	14.30	31.15	47.45	61.35	74.90	83.35	90.10	94.45	97.00	98.85
	Puri & Sen	11.30	29.00	45.90	60.40	74.15	82.90	89.55	94.20	96.85	98.75
	ATS	6.60	19.10	32.05	45.30	57.70	70.40	79.30	85.75	91.70	95.15
	logistic Wald	0.05	7.60	31.75	53.85	70.25	78.80	89.20	93.05	97.05	98.55
	logistic LR	35.75	42.60	52.05	65.40	77.05	83.35	91.10	94.15	97.45	98.80
	logistic W-LR	2.70	24.50	43.40	60.40	73.90	81.35	90.50	93.55	97.35	98.65
	probit Wald	0.05	13.45	39.85	59.65	73.85	81.50	90.55	93.65	97.35	98.65
	probit LR	35.70	42.55	52.05	65.45	77.05	83.40	91.10	94.15	97.45	98.80
	probit W-LR	3.25	28.25	46.50	62.85	75.85	82.35	90.85	94.00	97.40	98.70
chi-squared	18.80	33.95	49.15	62.65	75.45	83.70	90.45	94.45	97.20	98.90	
0.01	parametric	3.90	13.25	24.20	38.95	50.75	64.15	75.35	83.50	90.05	93.65
	Puri & Sen	2.30	10.75	21.80	37.10	48.95	63.50	74.20	83.00	89.45	93.30
	ATS	2.20	5.60	12.95	22.15	31.90	44.00	55.10	64.95	75.85	80.70
	logistic Wald	0.05	0.80	10.70	27.10	43.15	57.50	71.50	81.35	89.25	93.85
	logistic LR	15.95	20.50	28.40	41.85	54.35	65.15	76.65	83.85	90.85	94.70
	logistic W-LR	0.15	6.25	19.20	34.80	49.25	61.95	74.05	82.75	90.00	94.40
	probit Wald	0.05	3.15	16.55	33.60	49.05	62.05	74.10	82.85	90.10	94.40
	probit LR	15.90	20.65	28.40	41.95	54.35	65.15	76.75	83.95	90.85	94.70
	probit W-LR	0.20	7.70	22.65	38.05	51.95	63.80	75.30	83.35	90.55	94.50
chi-squared	4.70	14.10	24.70	39.55	51.40	64.55	75.45	83.95	90.05	93.80	

Graphic for $\alpha=0.05$:



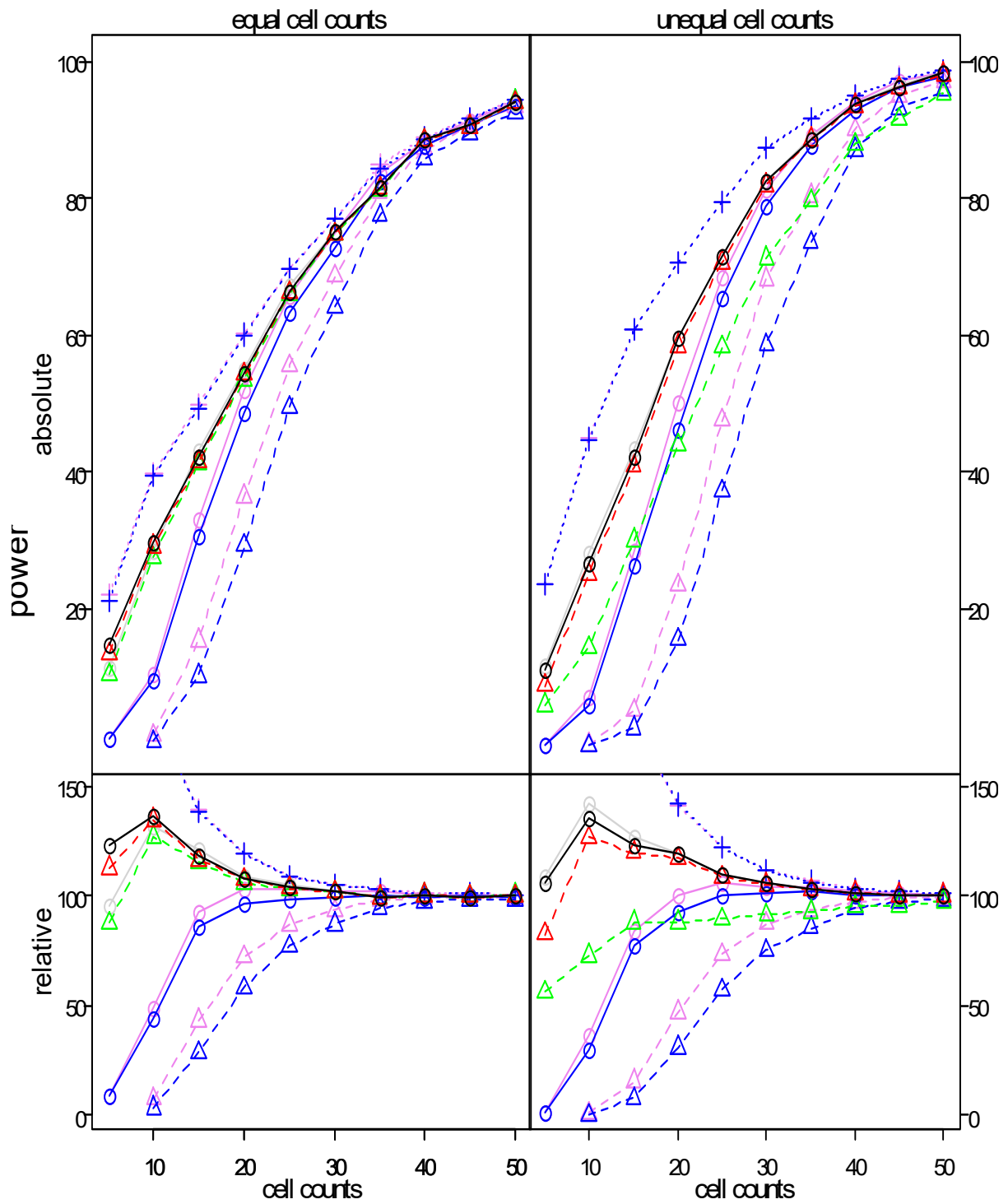
legend

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|---------|-------------|---------|------------------|
| —○— | parametric | - -△- - | logistic/Wald |
| - -△- - | Furi & Sen | ⋯+⋯ | logistic/LR |
| - -△- - | ATS | —○— | logistic/Wald+LR |
| —○— | chi-squared | - -△- - | probit/Wald |
| | | ⋯+⋯ | probit/LR |
| | | —○— | probit/Wald+LR |

6.4.2 p = 0.8

		equal cell counts (levels = 2*4)									
α	method	5	10	15	20	25	30	35	40	45	50
0.05	parametric	14.75	29.60	42.35	54.50	66.35	75.15	81.70	88.65	90.70	94.20
	Puri & Sen	13.45	29.15	41.50	54.30	66.30	74.85	81.50	88.60	90.55	94.05
	ATS	10.45	27.50	41.30	53.60	66.15	74.85	81.40	88.60	90.55	94.15
	logistic Wald	0.05	0.7	10.30	29.25	49.45	64.10	77.60	85.95	89.55	92.60
	logistic LR	21.30	39.6	49.35	60.10	69.65	76.90	84.45	88.80	91.65	94.35
	logistic W-LR	1.05	9.6	30.80	48.75	63.20	72.90	82.65	87.75	90.85	93.60
	probit Wald	0.05	1.6	15.45	36.45	55.65	68.65	80.90	87.25	90.70	93.55
	probit LR	22.00	39.7	49.75	60.25	69.80	77.15	84.85	88.90	91.70	94.35
	probit W-LR	1.05	10.6	33.25	52.15	65.80	75.05	83.65	88.35	91.35	94.10
	chi-squared	11.45	28.45	43.25	55.15	67.35	75.25	81.60	88.50	90.70	93.90
0.01	parametric	4.15	10.95	20.85	29.95	42.95	52.10	61.70	72.20	76.70	82.50
	Puri & Sen	2.35	9.35	19.70	29.15	41.90	51.15	60.90	71.70	76.55	82.30
	ATS	1.60	8.60	19.35	28.95	41.85	51.15	60.90	71.60	76.50	82.20
	logistic Wald	0.05	0.05	1.65	8.00	18.65	35.30	50.10	61.65	72.00	80.05
	logistic LR	5.95	17.25	27.05	37.55	45.10	56.75	64.45	71.85	78.40	84.30
	logistic W-LR	0.05	1.40	8.95	22.00	33.50	49.30	60.00	68.20	75.60	82.80
	probit Wald	0.05	0.15	3.75	14.55	26.40	44.70	57.20	67.70	75.35	82.95
	probit LR	6.00	17.55	27.45	37.85	45.40	56.95	64.55	72.05	78.50	84.40
	probit W-LR	0.05	1.70	11.50	25.20	36.85	52.70	61.95	70.35	77.45	83.65
	chi-squared	2.20	9.10	19.45	29.60	42.70	51.75	61.50	71.50	76.55	82.95
		unequal cell counts (levels = 4*5)									
0.05	parametric	11.25	26.75	42.15	59.80	71.45	82.45	88.80	93.80	96.40	98.40
	Puri & Sen	8.80	25.05	40.85	58.45	70.70	82.00	88.65	93.55	96.20	98.20
	ATS	6.00	14.40	30.05	43.90	58.25	71.25	79.75	87.90	91.65	95.45
	logistic Wald	0.05	0.05	2.60	15.50	37.25	58.70	73.65	87.10	93.25	95.80
	logistic LR	23.60	44.85	61.00	70.75	79.45	87.40	91.65	95.10	97.60	98.75
	logistic W-LR	0.10	5.85	26.30	46.25	65.40	78.90	87.65	92.95	96.35	97.95
	probit Wald	0.05	0.20	5.30	23.60	47.60	68.20	80.50	90.10	95.00	97.10
	probit LR	23.70	45.00	60.95	70.60	79.50	87.35	91.75	95.00	97.65	98.75
	probit W-LR	0.10	7.30	28.60	50.25	68.65	81.40	89.30	94.00	97.20	98.40
	chi-squared	11.65	28.10	43.35	59.80	71.45	82.50	88.90	93.80	96.50	98.30
0.01	parametric	3.60	10.25	21.55	33.05	48.10	62.10	73.90	83.00	88.30	92.90
	Puri & Sen	1.75	8.40	20.05	31.05	46.65	60.25	73.25	82.15	87.80	92.70
	ATS	1.80	2.95	10.20	19.40	31.65	43.20	56.00	67.35	75.60	83.80
	logistic Wald	0.05	0.05	0.35	2.90	13.75	29.45	46.30	66.10	78.70	86.05
	logistic LR	6.45	21.05	35.50	48.10	60.10	71.45	78.90	87.30	91.40	94.10
	logistic W-LR	0.05	0.80	6.80	20.30	38.80	54.85	67.80	80.45	86.85	91.85
	probit Wald	0.05	0.05	0.95	6.90	22.95	41.30	57.70	74.90	84.25	90.05
	probit LR	6.50	21.10	35.40	47.90	60.10	71.35	78.60	87.35	91.45	94.05
	probit W-LR	0.05	1.20	8.70	24.35	43.65	58.60	71.65	83.15	88.70	92.85
	chi-squared	2.90	8.75	21.15	32.55	48.00	61.65	73.30	82.80	87.90	93.15

Graphic for $\alpha=0.05$:



legend

- | | | | |
|-------------|-------------|-------------|------------------|
| —○— | parametric | ---△--- | logistic/Wald |
| - - -△- - - | Fur & Sen | ⋯+⋯ | logistic/LR |
| - - -△- - - | ATS | —○— | logistic/Wald+LR |
| —○— | chi-squared | - - -△- - - | probit/Wald |
| | | ⋯+⋯ | probit/LR |
| | | —○— | probit/Wald+LR |

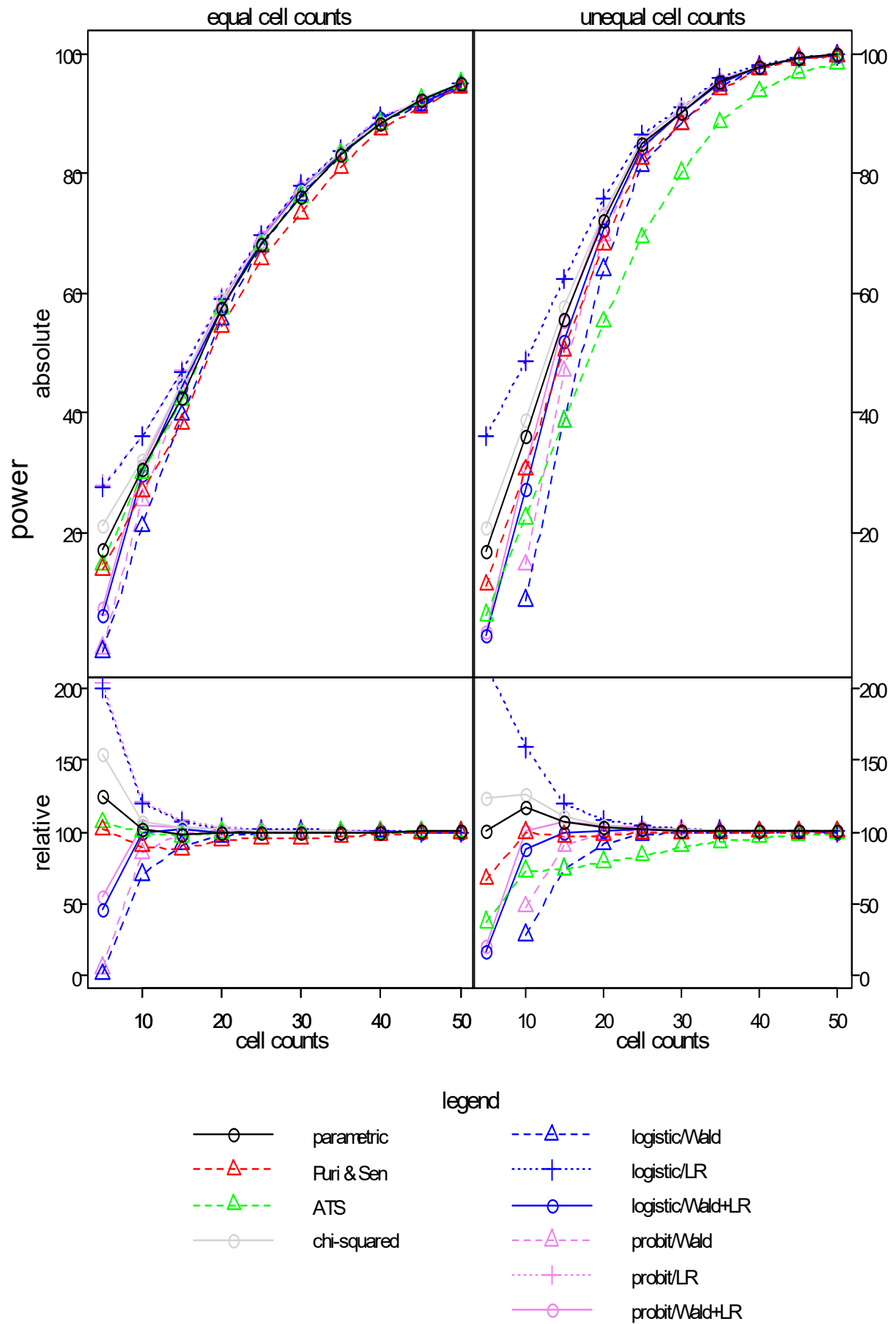
6.4.3 p = 0.9

		equal cell counts (levels = 2*4)									
α	method	5	10	15	20	25	30	35	40	45	50
0.05	parametric	10.40	26.50	43.50	55.15	64.75	77.60	82.95	87.00	91.45	94.60
	Puri & Sen	6.45	25.35	42.05	55.20	64.45	77.25	83.10	86.75	91.35	94.40
	ATS	4.30	21.35	40.45	52.55	63.45	76.40	82.20	86.25	91.00	94.35
	logistic Wald	0.05	0.05	0.05	0.65	3.70	12.05	24.00	41.05	56.95	68.20
	logistic LR	6.70	33.50	54.95	65.10	73.20	81.70	86.60	88.90	92.65	95.35
	logistic W-LR	0.05	1.90	11.85	24.55	41.90	61.30	74.45	82.15	87.95	93.05
	probit Wald	0.05	0.05	0.20	1.45	6.95	18.50	34.05	51.40	65.20	74.70
	probit LR	7.00	33.95	55.75	65.75	73.50	81.95	86.65	89.05	92.85	95.50
	probit W-LR	0.05	1.95	12.75	26.15	45.25	64.05	76.75	83.90	89.35	93.65
chi-squared	1.30	16.45	36.85	51.90	64.05	75.90	82.20	86.30	90.90	94.40	
0.01	parametric	2.80	9.15	21.30	30.35	40.80	54.25	63.45	70.15	77.95	84.25
	Puri & Sen	0.85	7.30	18.70	28.40	39.65	53.35	63.00	69.50	77.55	83.90
	ATS	0.50	4.10	16.00	25.60	37.70	51.60	61.35	68.40	76.65	83.55
	logistic Wald	0.05	0.05	0.05	0.05	0.35	1.50	5.45	12.95	27.65	39.90
	logistic LR	1.05	11.30	28.35	41.95	50.65	63.15	70.50	74.05	81.05	86.75
	logistic W-LR	0.05	0.05	0.90	4.50	12.70	26.35	41.70	54.65	67.35	77.45
	probit Wald	0.05	0.05	0.05	0.10	1.30	4.10	12.05	23.55	40.00	52.80
	probit LR	1.10	11.40	29.00	42.25	51.10	63.75	70.40	74.30	81.15	86.95
	probit W-LR	0.05	0.05	0.95	4.90	14.45	29.70	45.45	58.80	71.60	80.00
chi-squared	0.10	3.50	13.15	25.05	36.40	50.85	61.90	68.90	77.25	83.35	
		unequal cell counts (levels = 4*5)									
0.05	parametric	9.95	22.90	39.25	56.35	70.50	81.90	88.95	94.15	97.45	98.15
	Puri & Sen	7.80	21.50	37.60	55.35	69.80	81.40	88.40	93.95	97.35	98.15
	ATS	3.70	9.95	20.45	38.90	54.30	67.15	78.40	86.45	92.05	95.35
	logistic Wald	0.05	0.05	0.05	0.05	0.70	4.65	14.70	30.70	50.40	68.30
	logistic LR	5.65	35.75	60.05	76.00	85.60	91.80	94.40	96.75	98.50	99.05
	logistic W-LR	0.05	0.35	4.45	18.80	39.60	60.90	77.65	88.00	94.70	97.10
	probit Wald	0.05	0.05	0.05	0.25	2.15	9.35	25.40	43.95	64.80	79.05
	probit LR	5.65	36.05	60.20	76.25	85.80	91.95	94.45	96.80	98.45	99.10
	probit W-LR	0.05	0.35	5.15	20.60	43.20	66.05	81.00	89.65	96.20	97.55
chi-squared	4.80	20.25	36.70	55.00	69.60	80.80	88.50	93.60	97.30	98.10	
0.01	parametric	3.70	8.30	17.30	31.55	45.95	58.60	72.05	82.35	89.50	93.15
	Puri & Sen	2.25	6.85	15.05	29.45	44.15	57.10	70.45	81.80	88.90	92.90
	ATS	1.35	1.85	5.00	12.95	24.85	37.50	50.30	63.40	73.35	82.30
	logistic Wald	0.05	0.05	0.05	0.05	0.10	0.60	2.60	7.85	19.80	36.55
	logistic LR	0.85	12.25	31.75	51.75	66.05	77.85	84.60	91.10	94.70	96.60
	logistic W-LR	0.05	0.05	0.55	3.50	11.45	28.15	47.60	66.80	78.80	88.10
	probit Wald	0.05	0.05	0.05	0.05	0.20	1.65	7.50	18.80	36.95	55.55
	probit LR	0.90	12.25	31.95	51.70	66.10	77.75	84.75	90.90	94.70	96.65
	probit W-LR	0.05	0.05	0.75	4.15	13.60	32.30	52.65	70.95	82.65	90.20
chi-squared	1.35	5.80	13.50	27.25	42.75	55.80	69.55	81.80	88.20	92.60	

6. 5. Interaction AB - A significant (effects $ab_{ij} = 0.4*s$ $a_i = 0.4*s$)**6. 5. 1 $p = 0.5$**

		equal cell counts (levels = 2*4)									
α	method	5	10	15	20	25	30	35	40	45	50
0.05	parametric	17.15	30.60	42.55	57.55	68.05	76.20	83.20	88.35	92.40	95.10
	Puri & Sen	13.95	26.95	38.15	54.45	65.65	73.25	81.00	87.40	91.10	94.35
	ATS	14.70	30.00	42.15	57.40	68.05	76.15	83.20	88.35	92.40	95.10
	logistic Wald	0.20	21.15	39.65	55.65	67.80	76.35	83.00	88.80	91.40	94.50
	logistic LR	27.55	36.05	46.75	59.15	69.65	78.10	83.90	89.40	91.95	95.00
	logistic W-LR	6.35	29.90	44.50	57.60	68.85	77.45	83.25	89.15	91.85	94.75
	probit Wald	0.75	25.55	43.40	57.80	69.00	77.45	83.45	89.10	91.85	94.80
	probit LR	28.05	36.25	47.05	59.20	69.70	78.00	83.90	89.45	92.00	95.00
	probit W-LR	7.55	31.30	45.15	58.55	69.30	77.75	83.60	89.25	91.95	94.85
chi-squared	21.20	32.25	45.15	59.05	68.95	77.05	83.75	88.75	92.55	95.15	
0.01	parametric	4.85	13.45	20.00	33.50	44.95	53.90	65.05	72.85	79.00	85.60
	Puri & Sen	3.35	10.55	16.75	29.55	40.80	50.35	61.75	68.65	75.90	83.45
	ATS	3.65	12.50	19.70	33.40	44.80	53.85	65.05	72.75	79.00	85.60
	logistic Wald	0.05	5.40	15.35	30.15	42.35	53.40	63.25	71.30	77.55	84.05
	logistic LR	10.90	18.55	24.60	36.60	47.15	56.25	65.45	73.15	79.00	84.70
	logistic W-LR	0.70	10.85	20.55	34.05	44.70	54.65	64.45	72.55	78.25	84.40
	probit Wald	0.05	8.55	19.95	33.95	45.10	55.00	64.60	72.70	78.45	84.40
	probit LR	11.10	18.45	24.70	36.75	47.15	56.30	65.50	73.15	78.95	84.75
	probit W-LR	0.90	12.95	22.25	35.60	46.15	56.15	65.05	72.90	78.75	84.45
chi-squared	5.55	14.00	20.60	34.20	45.30	54.45	65.40	73.05	79.20	85.45	
		unequal cell counts (levels = 4*5)									
0.05	parametric	16.80	36.05	55.6	72.10	85.00	90.25	95.50	97.85	99.40	99.80
	Puri & Sen	11.25	30.60	50.5	68.10	82.40	88.30	93.95	97.40	99.00	99.60
	ATS	6.25	22.40	38.6	55.20	69.35	80.15	88.50	93.75	96.95	98.50
	logistic Wald	0.05	8.75	38.65	64.00	81.35	88.40	94.60	97.55	99.30	99.65
	logistic LR	36.25	48.70	62.45	75.80	86.50	91.00	95.95	98.00	99.45	99.80
	logistic W-LR	2.90	27.20	52.00	70.75	84.45	90.20	95.20	97.85	99.40	99.75
	probit Wald	0.05	14.70	47.05	69.70	84.05	90.25	95.30	97.85	99.40	99.80
	probit LR	36.25	48.80	62.35	75.80	86.55	91.05	95.95	98.00	99.45	99.80
	probit W-LR	3.55	30.85	55.50	73.05	85.55	90.70	95.75	97.90	99.40	99.80
chi-squared	20.80	38.90	57.7	73.45	85.15	90.95	95.45	97.95	99.45	99.80	
0.01	parametric	5.20	15.50	32.05	48.20	64.75	75.80	86.05	92.10	96.10	98.00
	Puri & Sen	2.95	11.60	26.40	42.30	59.50	71.45	83.00	89.75	94.70	97.25
	ATS	2.10	7.35	15.55	26.45	41.90	54.70	68.50	78.15	87.10	91.90
	logistic Wald	0.05	1.50	14.60	35.75	55.85	71.15	83.35	90.40	95.05	97.80
	logistic LR	16.60	25.00	37.75	53.35	68.30	78.20	87.10	92.65	96.35	98.15
	logistic W-LR	0.25	7.95	26.65	45.45	63.20	74.75	85.35	91.85	95.80	98.00
	probit Wald	0.05	3.85	22.35	43.70	62.75	74.95	85.55	91.95	95.85	98.00
	probit LR	16.55	24.95	37.70	53.40	68.40	78.30	87.15	92.65	96.35	98.20
	probit W-LR	0.35	10.35	30.30	49.05	66.00	76.40	86.60	92.40	96.30	98.10
chi-squared	6.35	16.70	32.85	49.05	65.55	76.50	86.25	92.45	96.20	98.15	

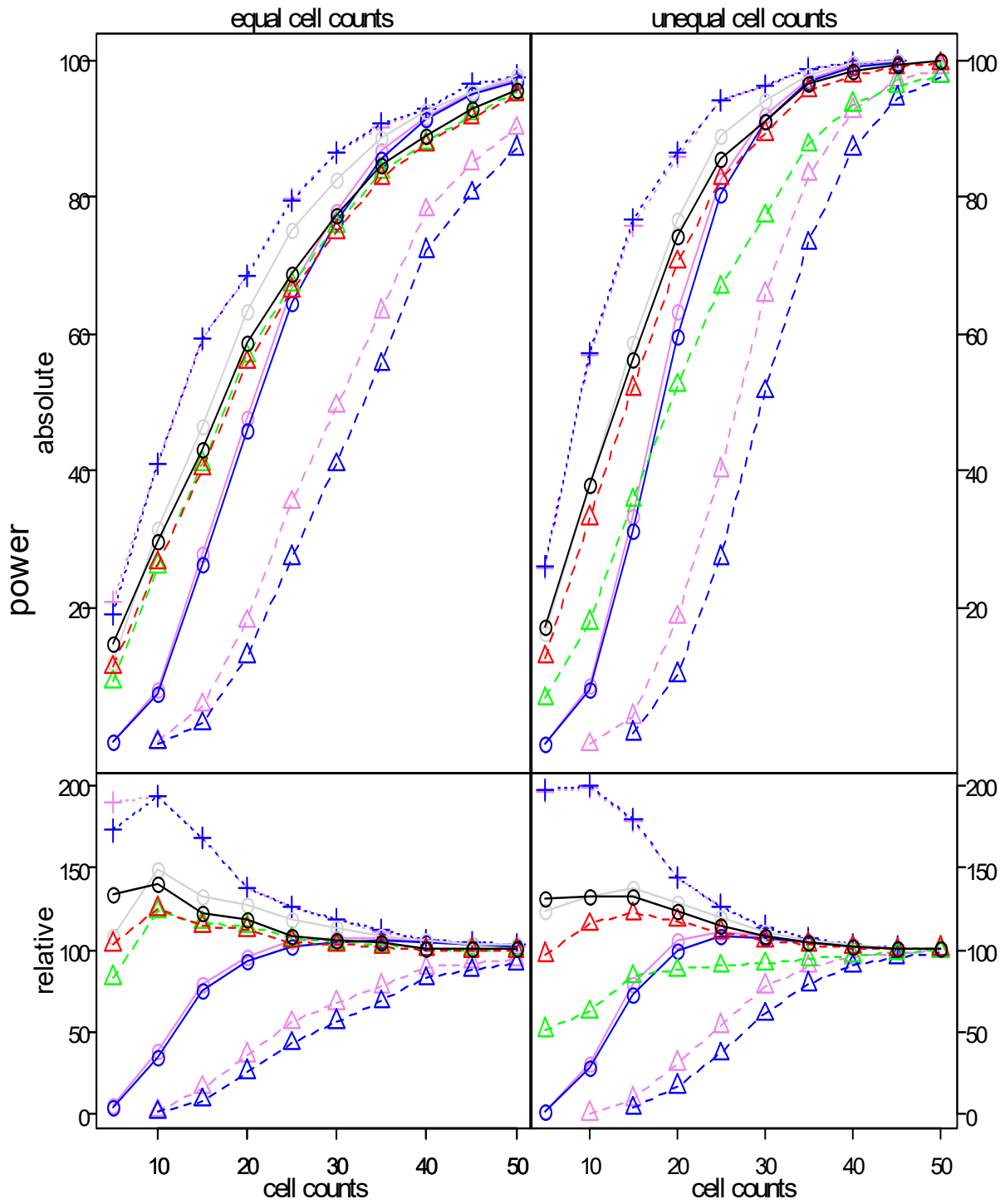
Graphic for $\alpha=0.05$:



6.5.2 p = 0.8

α	method	equal cell counts (levels = 2*4)									
		5	10	15	20	25	30	35	40	45	50
0.05	parametric	14.70	29.75	43.05	58.60	68.75	77.40	84.65	88.85	93.00	95.55
	Puri & Sen	11.40	26.50	40.25	55.80	66.35	75.00	82.90	87.60	91.60	94.90
	ATS	9.15	26.10	41.05	56.80	67.30	75.85	83.70	87.95	92.10	95.25
	logistic Wald	0.05	0.25	3.05	13.00	27.30	41.00	55.60	72.25	80.60	87.20
	logistic LR	19.00	41.00	59.25	68.50	79.45	86.40	90.65	92.95	96.55	97.65
	logistic W-LR	0.50	7.35	26.40	46.05	64.60	76.55	85.70	91.25	95.00	97.00
	probit Wald	0.05	0.45	5.75	18.00	35.45	49.40	63.40	78.10	85.05	90.05
	probit LR	20.85	41.05	59.20	68.45	79.75	86.40	90.30	92.95	96.45	97.55
	probit W-LR	0.55	8.05	28.00	47.70	66.75	78.10	86.75	91.85	95.50	97.20
	chi-squared	11.90	31.65	46.60	63.35	75.20	82.65	88.55	92.70	95.45	97.90
0.01	parametric	3.10	10.95	22.90	32.50	44.75	54.95	65.70	72.75	79.35	85.85
	Puri & Sen	1.80	8.00	18.70	28.35	40.50	50.55	62.00	69.75	77.00	83.45
	ATS	1.50	8.20	19.55	29.15	41.05	51.20	62.35	70.00	77.50	84.00
	logistic Wald	0.05	0.05	0.15	2.50	7.80	16.50	28.65	42.05	55.55	67.75
	logistic LR	5.00	16.50	32.65	47.00	57.95	68.40	76.15	82.65	87.80	91.80
	logistic W-LR	0.05	0.65	5.15	16.45	29.15	46.15	60.55	73.45	81.30	88.30
	probit Wald	0.05	0.05	0.85	5.35	13.80	25.45	38.85	54.20	66.15	76.20
	probit LR	5.35	17.00	33.20	46.65	57.70	68.00	76.15	82.60	87.65	91.75
	probit W-LR	0.05	0.85	6.20	19.40	33.45	49.70	63.85	76.25	82.90	89.35
	chi-squared	2.60	10.30	22.30	36.10	49.45	61.10	72.05	79.05	85.80	90.85
		unequal cell counts (levels = 4*5)									
0.05	parametric	17.30	37.95	56.45	74.30	85.60	91.10	96.45	98.50	99.30	99.80
	Puri & Sen	12.80	33.10	52.05	70.45	82.65	89.30	95.60	97.85	98.95	99.60
	ATS	6.75	17.90	35.75	52.60	66.90	77.25	87.60	93.60	96.35	97.85
	logistic Wald	0.05	0.05	1.75	10.25	27.30	51.60	73.25	87.20	94.45	97.65
	logistic LR	26.00	57.25	76.70	86.45	94.20	96.35	98.80	99.70	99.90	99.95
	logistic W-LR	0.15	8.05	31.15	59.80	80.55	91.00	96.85	99.00	99.70	99.95
	probit Wald	0.05	0.10	4.15	18.60	40.10	65.85	83.25	92.65	97.20	98.85
	probit LR	25.75	57.00	75.95	85.95	94.05	96.25	98.85	99.70	99.85	99.95
	probit W-LR	0.25	8.70	33.55	63.30	82.60	92.10	97.30	99.20	99.80	99.95
	chi-squared	16.35	38.10	58.75	76.80	88.85	94.20	97.80	99.50	99.80	99.95
0.01	parametric	5.80	17.10	33.2	50.9	66.15	77.80	87.75	94.10	97.05	98.45
	Puri & Sen	3.15	12.55	27.7	45.3	60.60	74.25	85.10	92.25	96.00	97.60
	ATS	2.40	4.70	13.3	25.5	39.50	52.95	65.50	77.45	85.30	89.50
	logistic Wald	0.05	0.05	0.20	2.05	8.65	23.30	45.65	66.70	80.55	91.05
	logistic LR	8.30	31.00	50.70	69.05	82.80	89.95	95.20	97.75	99.55	99.85
	logistic W-LR	0.05	0.85	9.30	28.45	51.55	72.00	86.25	93.90	97.85	99.30
	probit Wald	0.05	0.05	0.75	5.05	17.75	38.15	61.90	79.45	89.45	95.95
	probit LR	8.55	30.90	50.40	68.40	82.05	89.65	95.05	97.70	99.45	99.80
	probit W-LR	0.05	1.25	11.00	32.55	56.80	76.05	88.75	94.75	98.45	99.45
	chi-squared	4.85	16.70	32.6	53.8	70.45	83.25	91.90	96.15	98.75	99.55

Graphic for $\alpha=0.05$:



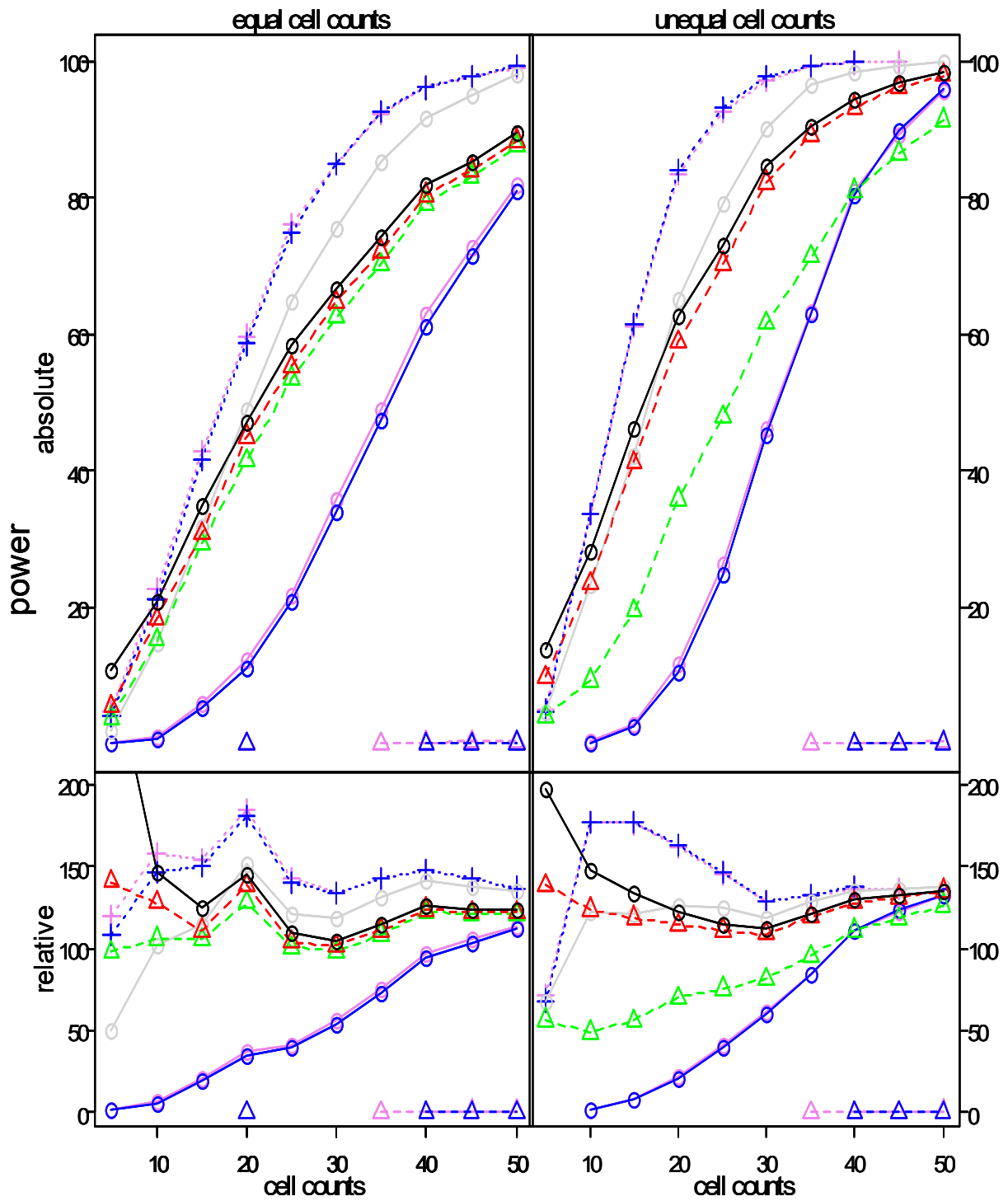
legend

- | | | | |
|-------------|-------------|---------|------------------|
| —○— | parametric | ---△--- | logistic/Wald |
| - - -△- - - | Puri & Sen |+ | logistic/LR |
| - - -△- - - | ATS | —○— | logistic/Wald+LR |
| —○— | chi-squared | - - -△- | probit/Wald |
| | |+ | probit/LR |
| | | —○— | probit/Wald+LR |

6.5.3 p = 0.9

		equal cell counts (levels = 2*4)										
α	method	5	10	15	20	25	30	35	40	45	50	
0.05	parametric	10.85	21.00	34.90	47.20	58.55	66.80	74.40	81.95	85.25	89.60	
	Puri & Sen	5.45	18.40	30.90	45.05	55.35	64.70	72.15	80.50	84.05	88.40	
	ATS	3.80	15.25	29.30	41.55	53.55	62.50	70.20	79.25	83.20	87.55	
	logistic Wald	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.10	0.15
	logistic LR	4.20	21.15	41.70	58.60	74.80	85.10	92.65	96.15	97.75	99.35	
	logistic W-LR	0.05	0.85	5.30	11.10	21.00	34.15	47.45	61.15	71.50	81.05	
	probit Wald	0.05	0.05	0.05	0.05	0.05	0.05	0.10	0.20	0.40	0.30	
	probit LR	4.65	22.70	42.75	59.80	76.10	85.10	92.35	96.20	97.80	99.15	
	probit W-LR	0.05	1.05	5.85	12.25	21.95	35.80	48.95	63.00	72.90	82.00	
chi-squared	1.95	14.70	31.80	49.10	64.70	75.50	85.15	91.60	94.95	98.00		
0.01	parametric	2.60	6.35	14.05	22.85	31.35	41.15	50.15	59.75	66.85	73.80	
	Puri & Sen	0.45	4.25	10.60	19.30	27.80	37.70	47.15	56.70	63.70	71.40	
	ATS	0.40	3.00	9.20	16.55	23.95	34.25	42.75	52.60	60.00	67.80	
	logistic Wald	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	
	logistic LR	0.65	6.60	17.40	30.15	46.25	59.85	73.15	83.65	89.30	95.40	
	logistic W-LR	0.05	0.05	0.45	1.05	2.70	7.45	12.45	20.60	31.45	43.25	
	probit Wald	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.10	0.10	
	probit LR	0.70	6.95	18.55	30.70	47.50	60.20	73.90	84.35	89.55	95.35	
	probit W-LR	0.05	0.05	0.55	1.30	3.05	7.85	13.55	21.85	32.40	44.15	
chi-squared	0.15	3.65	10.00	20.95	32.95	45.50	58.60	70.55	80.35	87.25		
		unequal cell counts (levels = 4*5)										
0.05	parametric	14.00	28.10	46.35	62.80	73.20	84.80	90.60	94.55	96.90	98.30	
	Puri & Sen	9.85	23.55	41.30	58.95	70.40	82.30	89.15	93.30	96.15	97.90	
	ATS	4.00	9.35	19.50	35.90	48.00	61.60	71.35	81.10	86.60	91.40	
	logistic Wald	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.20	
	logistic LR	4.85	33.65	61.60	84.00	93.35	97.75	99.35	99.95	99.95	99.95	
	logistic W-LR	0.05	0.25	2.65	10.40	24.90	45.25	63.15	80.50	90.00	96.00	
	probit Wald	0.05	0.05	0.05	0.05	0.05	0.05	0.10	0.05	0.10	0.35	
	probit LR	5.05	33.70	61.30	83.35	92.60	97.15	99.25	99.80	99.90	99.95	
	probit W-LR	0.05	0.45	3.00	11.60	26.45	46.20	63.30	81.10	89.30	95.70	
chi-squared	4.85	23.30	42.25	65.10	79.20	90.10	96.65	98.55	99.45	99.90		
0.01	parametric	5.70	12.55	22.35	36.75	49.15	63.25	72.90	84.30	89.90	93.65	
	Puri & Sen	2.80	8.70	18.05	31.75	44.30	58.45	69.35	81.90	88.15	92.60	
	ATS	1.40	1.65	4.35	11.10	19.60	29.75	43.05	54.85	64.65	73.30	
	logistic Wald	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	
	logistic LR	0.60	10.85	31.55	58.85	75.15	88.80	96.35	98.85	99.45	99.95	
	logistic W-LR	0.05	0.05	0.20	1.30	4.70	13.80	25.45	42.75	58.90	74.05	
	probit Wald	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	
	probit LR	0.60	11.15	32.30	58.65	74.85	88.55	95.90	98.65	99.35	99.90	
	probit W-LR	0.05	0.05	0.20	1.65	5.75	14.80	26.45	44.20	59.30	73.70	
chi-squared	1.60	8.85	18.65	34.05	51.40	69.80	82.60	92.40	96.75	98.95		

Graphic for $\alpha=0.05$:



legend

- | | | | |
|---------|-------------|---------|------------------|
| —○— | parametric | ---△--- | logistic/Wald |
| ---△--- | Furi & Sen | ⋯+⋯ | logistic/LR |
| ---△--- | ATS | —○— | logistic/Wald+LR |
| —○— | chi-squared | ---△--- | probit/Wald |
| | | ⋯+⋯ | probit/LR |
| | | —○— | probit/Wald+LR |