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"Optimum" FDR Procedures and MCV Values

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21APR2003 09Jan2007 (p. 3, line 33 error corrected)

Summary

Using simulation techniques,the powers of stepdown (SD) and stepup (SU) FDR procedures with different minimum critical values (MCV's) are examined and recommendations made. Test statistics are assumed to have a joint multivariate t distribution with common correlation coefficient of .5, and df = ∞. The cases of m=14 and 100 hypotheses are used with the standardized difference Δ between the common means of the test statistics for the false hypotheses and the true hypotheses having values of 1 and 2. For all possible numbers nF of false hypotheses, per pair, all pairs and any pair powers are calculated. Recommendations, based on power considerations, are: for small numbers of false hypotheses, use SD with a large value for MCV (e.g. 2). (SU with a large value for MCV, e.g. 2 is also acceptable). If approximately half of the hypotheses are false, use SU with an MCV of 1.645. If the proportion of false hypotheses is large and per pair power is most important, use SU with a small MCV (MCV=.5 and 1 for m=14 and 100 respectively). However, if all pairs power is most important, use SU with MCV as small as possible (-.5244 and -1.2 for m=14 and 100 respectively).

0. Introduction

Most multiple comparison procedures have traditionally been set up to control the Type I familywise error rate (FWE). The probability that at least one true hypothesis is rejected is never greater than α. Recently Benjamini and Hochberg (1995) introduced the concept of controlling the "false discovery rate" (FDR). Using this concept, instead of controlling the probability of rejecting a true hypothesis, the expected proportion (say q) of the rejected hypotheses which are true, is controlled. (If no hypotheses are rejected, the proportion is defined to be zero.) The procedure seems to be particularly appropriate in screening situations where the object is, starting from a large set, to identify a smaller set as the object of future studies.

The procedure of Benjamini and Hochberg (1995) was a stepup (SU) procedure. Benjamini and Liu (1999) introduced a stepdown (SD) procedure which controlled the FDR. Both procedures were shown to control the FDR for independent test statistics. Troendle (2000) introduced SU and SD procedures, valid for dependent test statistics, which controlled asymptotically the FDR under normality assumptions. For the SU case, Troendle used an error allocation procedure to obtain critical values. Somerville and Bretz (2003) used least favorable configurations and no distributional assumptions for the test statistics, to obtain equations for sequentially obtaining critical values for the SD procedure. They also introduced the concept of a minimum critical value (MCV). In some cases, a solution is possible only when the MCV is sufficiently large. They conjectured that for any given MCV, no SD procedure is more powerful. The equations turned out to be the same as those obtained by Troendle when the MCV is equal to 0.

Somerville and Bretz (2003) also used least favorable configurations and no distributional assumptions for the test statistics to get equations for sequentially obtaining critical values for the SU procedure. Instead of an allocation procedure, they used the concept of a minimum critical value (MCV). While for many situations, the equations had no solution, they showed that a solution was always possible if the MCV was sufficiently large. They conjectured that for any given MCV, no SU procedure is more powerful.

Other contributions to the literature include Yekutieli and Benjamini (1999), Benjamini and Yekutieli (2001), Kwong, Holland and Cheung (2002) and Horn and Dunnett (2003). Horn and Dunnett conducted a study to compare the powers of several FWE and FDR controlling methods.

In this paper the powers of both SD and SU FDR procedures are compared using several MCV's.

1. Problem

We first describe FDR step-up and step-down procedures. Suppose we have m hypotheses $H_1, H_2, \ldots, H_m$ to be tested. Let the corresponding test statistics be $T_1, T_2, \ldots, T_m$. Denote the hypotheses as $H_{(1)}, H_{(2)}, \ldots, H_{(m)}$ corresponding to the ordered test statistics $T_{(1)} \leq T_{(2)} \leq \ldots \leq T_{(m)}$. Denote the m critical values as $d_1 \leq d_2 \leq \ldots \leq d_m$.

For the step-down procedure, beginning with i = m, then m - 1, etc., compare $T_{(i)}$ with d_i, stopping when $T_{(i)} < d_i$, and rejecting the (m-i) hypotheses $H_{(i+1)}, \ldots, H_{(m)}$. If $T_{(m)} < d_m$, reject no hypotheses. If $T_{(i)} \geq d_i$ for all m test statistics, reject all the m hypotheses.

For the step-up procedure, beginning with i = 1, then 2, etc., compare $T_{(i)}$ with d_i, stopping when $T_{(i)} \geq d_i$, and rejecting the (m-i+1) hypotheses $H_{(i)}, \ldots, H_{(m)}$. If $T_{(i)} < d_i$ for all m test statistics, reject no hypotheses.

Using an FDR procedure, the false discovery rate (FDR), that is, the expected value of the proportion of number of rejected hypotheses which are true, must be $\leq q$. Let Q = V/R where V is the number of true hypotheses which are rejected and R is the number of hypotheses which are rejected. When R = 0, we define Q = 0. E(Q) = E(V/R) is the false discovery rate FDR.

2. Calculation of the Critical Values for SD

To obtain the m critical values, m "least favorable configurations" are used. Define the i^{th} least favorable configuration (lfc_i) as having the means of i of the test statistics equal to zero, while the remaining m - i have a common mean which increases without limit.

Define A_i to be the probability that exactly i hypotheses are rejected.

$$A_0 = P[T_{(m)} < d_m]$$
$$A_i = P[T_{(m)} \geq d_m, \ldots, T_{(m-i+1)} \geq d_{m-i+1}, T_{(m-i)} < d_{m-i}] \qquad 1 \leq i < m$$
$$A_m = P[T_{(m)} \geq d_m, \ldots T_{(1)} \geq d_1].$$

Under the null hypothesis (lfc_m), set A_0 equal to 1 - q and solve for d_m.
To obtain d_1, assume lfc_1. Then $T_{(m)}, T_{(m-1)}, \ldots, T_{(2)}$ are large and $d_m, d_{m-1}, \ldots, d_2$ become irrelevant. More important, $A_0 = A_1 = \ldots = A_{m-2} = 0$. E(Q) becomes

$$E(Q) = A_{m-1} * (0/(m-1)) + A_m * (1/m) \leq q$$

or $$P[T_{(1)} \geq d_1] \leq mq.$$

To maximize power considerations, we choose the smallest value for d_1 which satisfies the equation.

To obtain d_i, given the values for $d_1, \ldots, d_{i-1}$, assume lfc_i. $T_{(m)}, T_{(m-1)}, \ldots, T_{(i+1)}$ are large, $d_m, d_{m-1}, \ldots, d_{i+1}$ become irrelevant, and $A_0 = A_1 = \ldots = A_{m-i-1} = 0$. The equation, $E(Q) \leq q$ can be solved for d_i.

$$E(Q) = A_{m-i} * (0/(m-i)) + A_{m-i+1} * (1/(m-i+1)) + \ldots + A_m * i/m$$

and $$A_{m-i+1} = P[T_{(i)} \geq d_i, \ldots, T_{(i-1)} < d_{i-1}]$$
$$\ldots$$
$$A_{m-1} = P[T_{(i)} \geq d_i, \ldots, T_{(2)} \geq d_2, T_1 < d_1]$$
$$A_m = P[T_{(i)} \geq d_i, \ldots, T_{(2)} \geq d_2, T_1 \geq d_1].$$

Since $A_{m-i+1}, \ldots, A_m$ are each decreasing functions of d_i, we choose d_i as the smallest value such that

$$E(Q) \leq q.$$

It must be noted that if $mq \geq 1$, any value of d_1 will satisfy the equation

$$P[T_{(1)} \geq d_1] \leq mq.$$

It is also true that having obtained a value for d_1, there may be a value of i such that there does not exist a value of d_i sufficiently large so that $E(Q) \leq q$ (examples will be given later). In that case the smallest value or d_1 is selected such that, for all $1 < i \leq m-1$, values of d_i can be chosen which satisfy $E(Q) \leq q$. That such a value of d_1 always exists can be seen from the fact that if all the critical values are equal to d_m, the procedure is that of Dunnett (1955) for one-sided comparisons.

It is worth noting that the equations for solving for the critical values do not depend on the distribution of any T_i or the independence of the T_i values. Only when numerical values for d_i are needed is it necessary to specify the test statistic distributions.

3. Calculation of the Critical Values for SU

Denote the m critical values as $d_1 \leq d_2 \leq \ldots \leq d_m$, noting that the critical values are in general different from those for the step-down case. Define B_i to be the probability that exactly i hypotheses are rejected.

$$B_m = P[T_{(1)} \geq d_1]$$
$$B_i = P[T_{(1)} < d_1, \ldots, T_{(m-i)} < d_{m-i}, T_{(m-i+1)} \geq d_{m-i+1}] \qquad 1 \leq i < m$$

$B_0 \quad = P[T_{(1)} < d_1, \ldots ,T_{(m-1)} < d_{m-1}, T_{(m)} < d_m]$.

To solve for d_1, assume lfc_1. Then $B_0 = B_1 = \ldots B_{m-2} = 0$. E(Q) becomes

$E(Q) \quad = B_{m-1} * (0/(m-1)) + B_m * (1/m) \leq q$

or $\quad P[T_{(1)} \geq d_1] \quad \leq mq$.

To obtain d_i, given the values for $d_1, \ldots , d_{i-1}$, assume lfc_i. Then $B_0 = B_1 = \ldots = B_{m-i-1} = 0$. We write

$E(Q) \quad = B_{m-i} * (0/(m-i)) + B_{m-i+1} * (1/(m-i+1)) + \ldots + B_m * i/m$

where $B_{m-i+1} \quad = P[T_{(1)} < d_1, \ldots , T_{(i-1)} < d_{i-1}, T_{(i)} \geq d_i]$

...

$B_{m-1} \quad = P[T_{(1)} < d_1, T_{(2)} \geq d_2]$

$B_m \quad = P[T_{(1)} \geq d_1]$.

Since B_{m-i+1} is a decreasing functions of d_i, we choose d_i as the smallest value such that

$E(Q) \leq q$.

As in the SD case if $mq \geq 1$, any value of d_1 will satisfy the equation

$P[T_{(1)} \geq d_1] \quad \leq mq$.

Also, having obtained a value for d_1, there may be a value of i such that there does not exist a value of d_i sufficiently large so that $E(Q) \leq q$ (examples will be given later). In that case the smallest value for d_1 is selected such that, for all $1< i \leq m$, values of d_i can be chosen which satisfy $E(Q) \leq q$. That such a value of d_1 always exists can be seen from the fact that if all the critical values are equal to d_m, the procedure is that of Dunnett (1955) for one-sided comparisons.

4. Use of Minimum Critical Values (MCV's)

If the T_i are each N(0,1), then $d_1 \geq \Phi(1 - mq)$ for either SD or SU. Thus, if $mq > .5$, d_1 will be negative. Somerville and Bretz (2003) discuss a larger class of stepdown procedures where d_1 is arbitrarily given larger values. Values for d_2, d_3, … are calculated in the manner described above, with the proviso that whenever the calculated value d_i is less than d_{i-1}, d_i is given the value d_{i-1}. They suggested that arbitrarily selecting a minimum value for d_1 often resulted in a much smaller FDR at the price of a modest decrease in "power". Requiring such a minimum critical value might also mitigate the psychological disadvantage of using a negative critical value, or using a critical value much smaller that the one which would have been used if only a single hypothesis had been under test.

As noted above, if $mq \geq 1$, selection of an MCV is mandated.

5. Calculation of Critical Values

Critical values were calculated using the Fortran 90 programs SEQUP and SEQDN. Define ρ to be the correlation between T_i and T_j for $i \neq j$. The programs can sequentially calculate the critical values from d_2 to d_m for arbitrary values of m, q, ρ and df. The programs make efficient use of simulation. The tables for m=14 and m=100 in Appendix III were calculated using 10,000,000 random vectors of size m. For m = 14, the values should have a standard error of less than .001. For m = 100 the standard errors may be slightly larger, particularly for intermediate critical values.

In calculating critical values and power in this paper, the assumption is made that the test statistics have a joint multivariate t distribution with the test statistics having variance equal to 1, and a common correlation coefficient of ρ.

6. Calculation of Power

An objective in this paper was to determine, if possible, the best FDR procedures to use under various circumstances. For example, if only a small number of false hypotheses were expected, should a stepup or a stepdown procedure be used, and which MCV should be used. What if a large number of false hypotheses were expected? Does the best procedure depend on the value of m? The study was limited to the case of one-sided hypotheses. The study was restricted to q=.05, ρ = .5, Δ=1 and 2 and m=14 and 100. The situation is equivalent to Dunnett's (1955) one-sided "Comparisons with a Control" where n_1 and n_0 are the respective sample sizes for the treatment and control means. In that case, $\rho = n_1/(n_0 + n_1)$ which is equal to .5 when $n_0 = n_1$. The study uses $n_0 = n_1 = 6$.

Three kinds of power were calculated: per-pair power, all-pairs power and any-pairs power (see Horn and Dunnett (2003)). The probability of rejecting at least one of the false hypotheses is called any pairs power (anp). The probability of rejecting all false hypotheses is called all-pairs power (ap). Considering a specific hypotheses, the probability of its rejection is called the per-pair power (pp). Under the conditions of this paper (described below) the per-pair power is identical to the average power.

Two values for m were selected, 14 and 100, with q = .05, ρ = .5 and df = ∞

For stepdown FDR procedures it was determined that the smallest values for d_1 (MCV value) which resulted in finite values for all of the critical values, were (approximately) -.5244 and -1.2 for m = 14 and 100 respectively. For stepup FDR procedures, the corresponding MCV values were (approximately) .5 and 1. Since the procedure of Dunnett (1955) is the limiting case for both the stepdown and the stepup procedures, the largest possible MCV values are 2.546 for m = 14 and 3.045 when m = 100.

The MCV values used in the study for m = 14 were -.5244, 0., .5, 1., 1.645 and 2 for stepdown and .5, .6, 1., 1.645, and 2. for stepup. The MCV values used for m = 100 were -1.2, 0., 1., 1.645 and 2 for stepdown and 1., 1.645 and 2. for stepup.

Power values were calculated for all possible values for nF, the number of false hypotheses. The mean value of the test statistics for the true hypotheses was assumed to be 0, while the common mean value for the false hypotheses was Δ. The powers were computed for Δ = 1 and 2.

Tables of the powers are given in Appendix II. The tables were calculated using Fortran 90 programs FDRPWRUP and FDRPWRDN. The programs use efficient simulation to calculate each power for arbitrary values of m, q, ρ, Δ, MCV and df. The standard error of the values should be less than .001.

Graphs of the three types of powers, per pair, all pairs and any pair are given in APPENDIX I. All graphs were generated using MINITAB Release 13.

7. Comparison with Other Procedures

Per pair and all pairs powers were calculated for m = 100 for the stepup procedure of Benjamini and Hochberg (1995), the stepdown procedure of Benjamini and Liu (1999) and the sequentially rejective procedure of Holm (1979). Graphs comparing the procedures with stepdown FDR procedures using 6 different MCV values are given in APPENDIX V. APPENDIX IV contains comparisons of E(Q) for the procedures.

8. Tables of MCV's (SD or SU) with the Largest Power

Table 1 of APPENDIX VI gives the MCV value for stepdown and stepup FDR which gives the largest power for each of per pair (pp), all pairs (ap) and any pairs (anp) power for values of Δ = 1 and 2 when m = 14. Table 2 of APPENDIX V gives the same values when m = 100.

9. Conclusions and Recommendations

Using the tables in APPENDIX II and the graphs of powers given in APPENDIX I, the following observations are made:

i) For per pair or all pairs power, the ranking of powers with respect to MCV when nF is small is the reverse of the ranking when nF is large. The maximum power occurs for small nF when MCV is largest. As nF increases the maximum shifts to the next largest MCV, with the maximum power when nF is large occurring when MCV is smallest. This is true for both stepup and stepdown FDR and for m=14 and m=100.

ii) For small values of nF, differences in per pair power for different MCVs for stepdown are "minimal" for either m=14 or m=100.

iii) For small values of nF, differences in all pairs power for different MCVs for stepdown are "minimal" for either m=14 or m=100.

iv) For small values of nF, differences in all pairs power for different MCVs for stepup are "minimal" for either m=14 or m=100.

The following are recommendations based on the study results:

<u>Size of nF</u>	<u>Recommendation</u>
Small	SD FDR with large MCV (MCV = 2 for m = 14 or 100) If SU FDR is used, use a large MCV (MCV=2 for m = 14 or 100)
nF=m/2	SU FDR with MCV=1.645 for m = 14 or 100
Large	If per pair power is most important: SU FDR with small MCV (if m=14, MCV=.5; if m=100, MCV=1) If all pairs power is most important: SD FDR with small MCV (if m=14, MCV=-.5244; if m=100, MCV=-1.2)

10. Acknowledgement

The author is grateful for the comments, criticisms and suggestions of Manfred Horn during the course of this study.

11. References:

Bechhofer, R. E. and Dunnett, C. W. (1986). Tables of percentage points of multivariate Student t distributions. Selected Tables in Mathematical Statistics Vol. 11.

Benjamini, Yoav and Hochberg, Yosef (1995). Controlling the false discovery rate: a practical and powerful approach to multiple testing. *J.R. Statist. Soc. B* **57** 289-300.

Benjamini, Yoav and Liu, Wei (1999). A step-down multiple hypotheses procedure that controls the false discovery rate under independence. *Journal of Statistical Planning and Inference* **82**, 163-170.

Benjamini, Y. and Yekutieli, D. (2001). The control of the false discovery rate in multiple testing under dependency. *Ann. of Statist.* 29, 1165-1188.

Dunnett, C. W. (1955). A multiple comparison procedure for comparing several treatments with a control. *J. Amer. Statist. Assoc.* **50**, 1096-1121.

Holm, S. (1979). A simple sequentially rejective multiple testing procedure. Scandinavian Journal of Statistics **6**, 65-70.

Horn, M. and C. W. Dunnett (2002) Power and sample size comparisons of some FWE and FDR controlling stepdown and stepup procedures in the many-one case. Submitted.

Kwong, K. S., Holland B. and Cheung, S. H. (2002) A modified Benjamini–Hochberg multiple comparisons procedure for controlling the false discovery rate. *Journal of Statistical Planning and Inference* 104 (2002) 351–362.

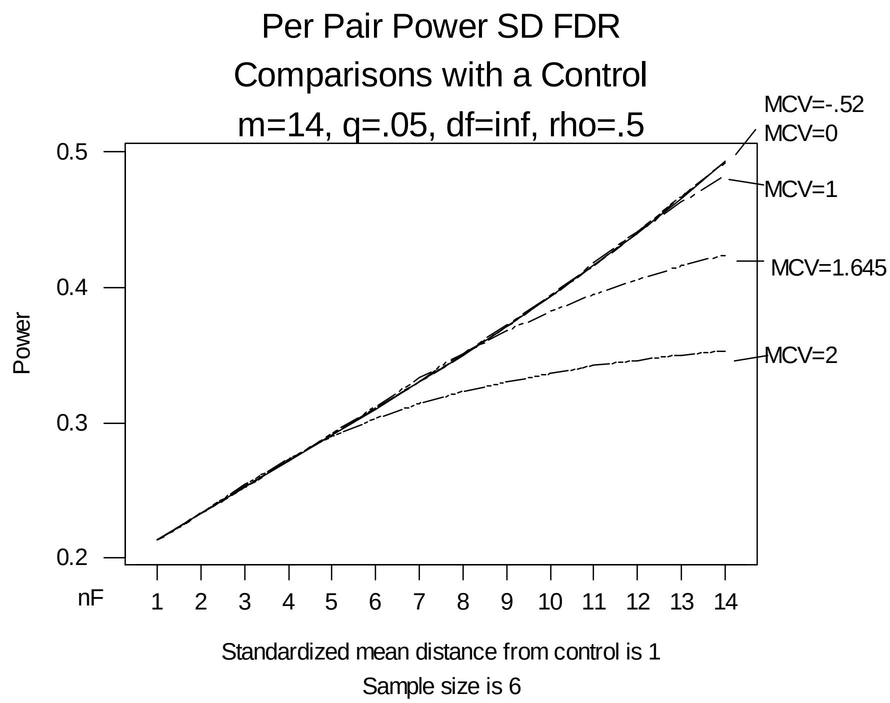
Somerville, Paul N. and Bretz, Frank (2003). On FDR step-down and step-up procedures. Submitted.

Troendle, James F. (2000) Stepwise normal theory multiple test procedures controlling the false discovery rate. *Journal of Statistical Planning and Inference* **84**, 139-158.

Yekutieli, D. and Benjamini, Y., 1999. Resampling based false discovery rate controlling multiple test procedures for correlated test statistics. *Journal of Statistical Planning and Inference* 82, 171–196.

APPENDIX I GRAPHICAL REPRESENTATIONS OF POWER

STEPDOWN PER PAIR POWER m = 14 Δ = 1



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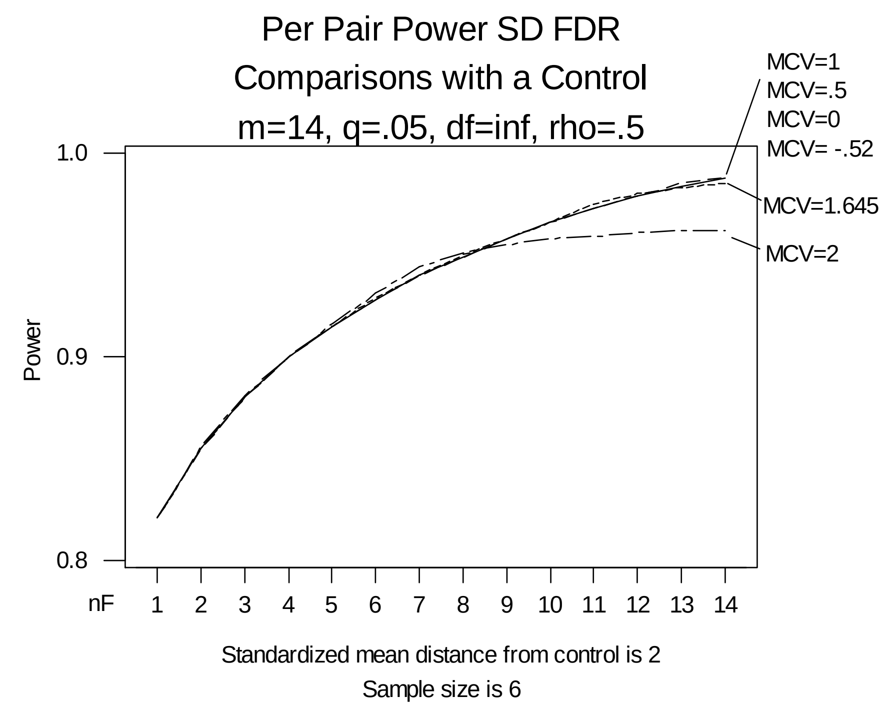
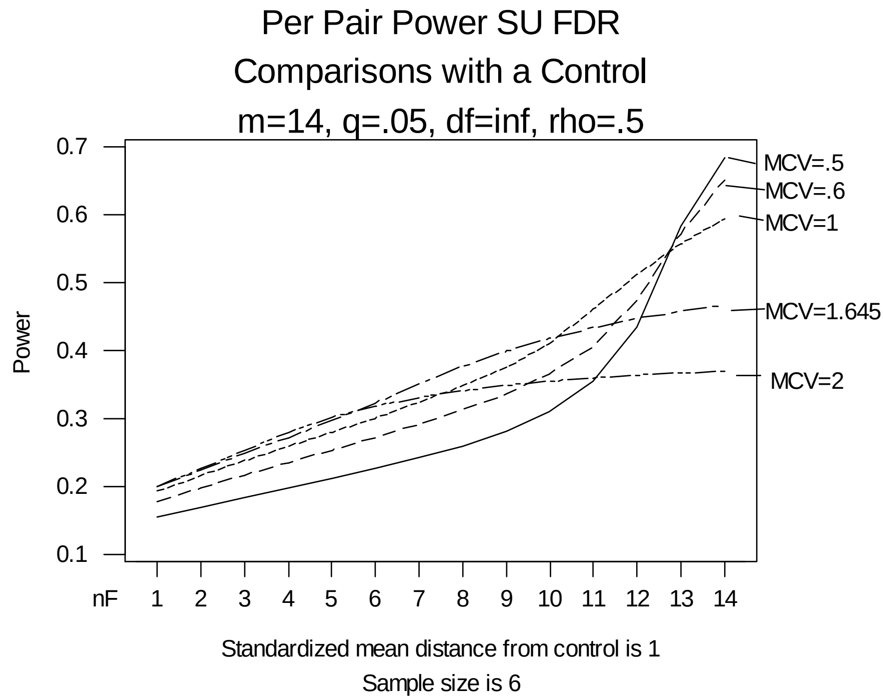


STEPUP PER PAIR POWER m = 14 Δ = 1



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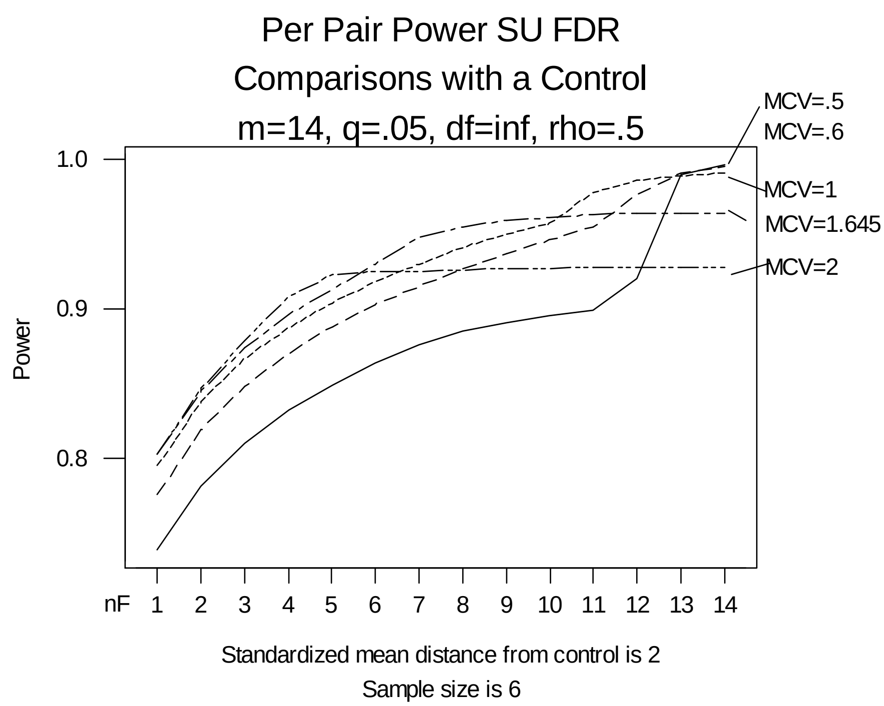
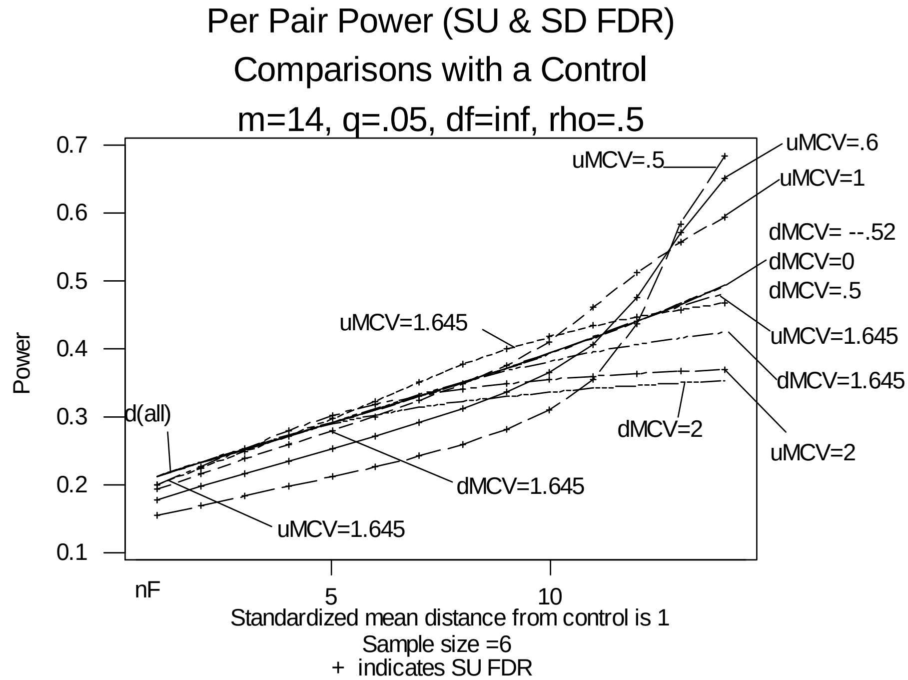


COMBINED STEPDOWN AND STEPUP PER PAIR POWER m = 14 $\Delta = 1$



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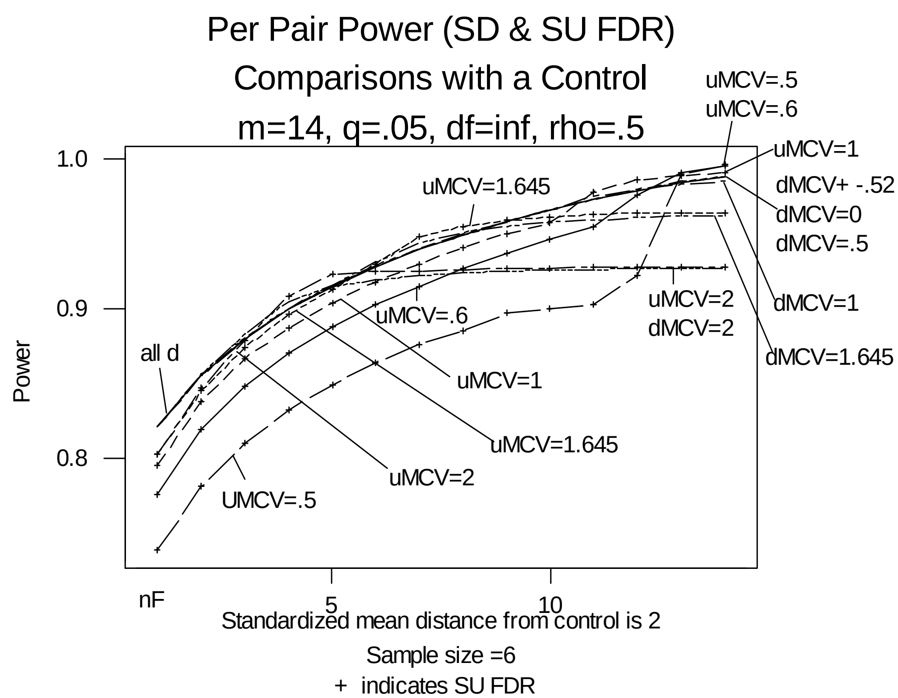
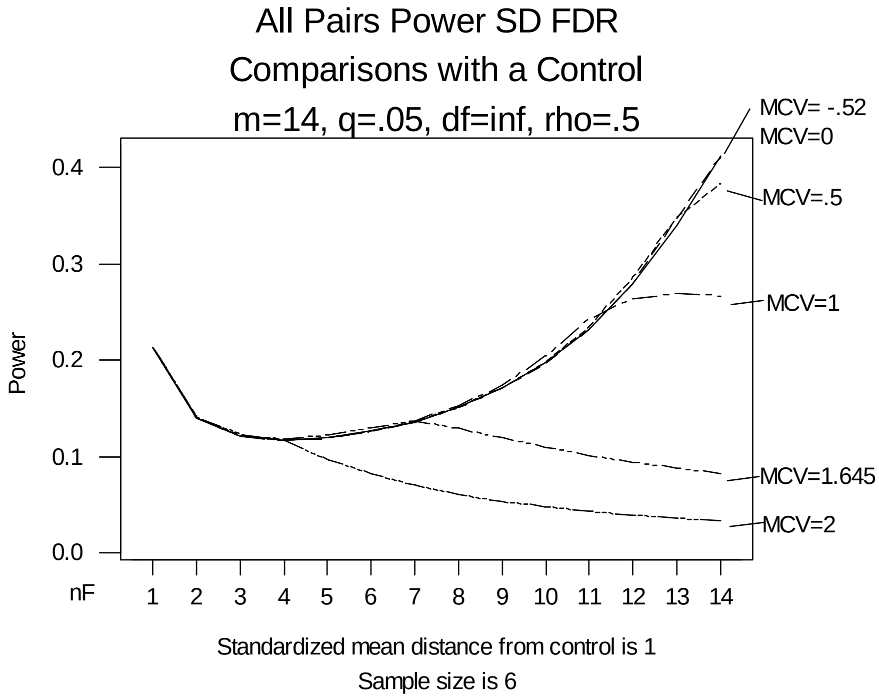


STEPDOWN ALL PAIRS POWER m = 14 $\Delta = 1$



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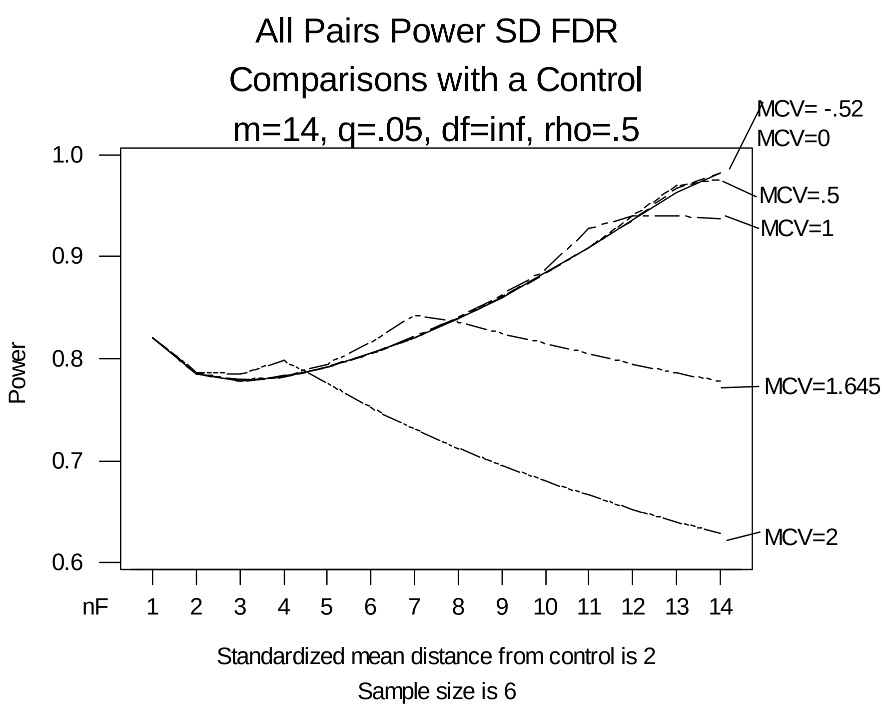
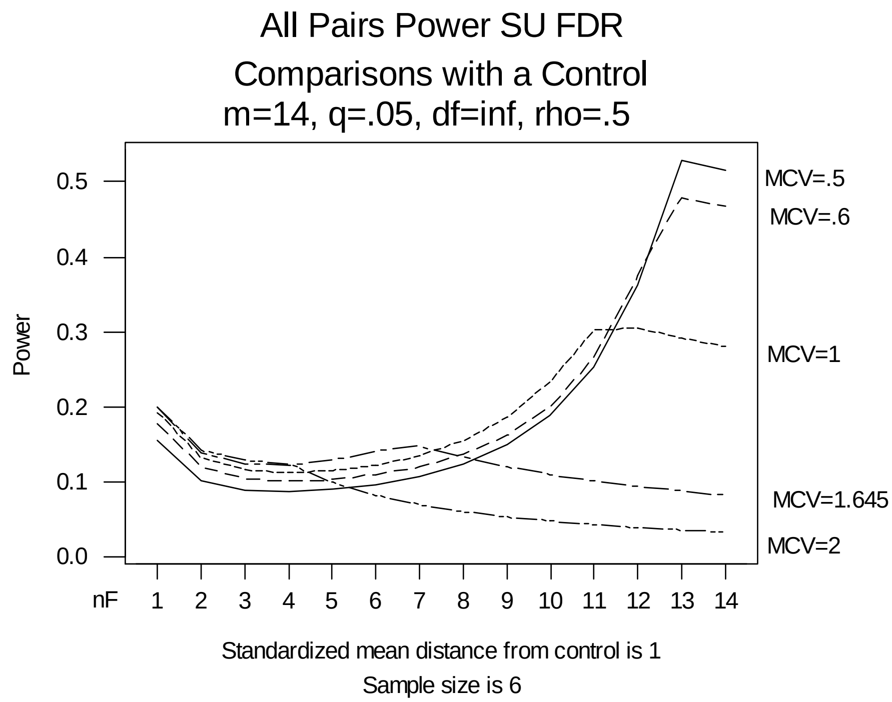


STEPUP ALL PAIRS POWER m = 14 Δ = 1



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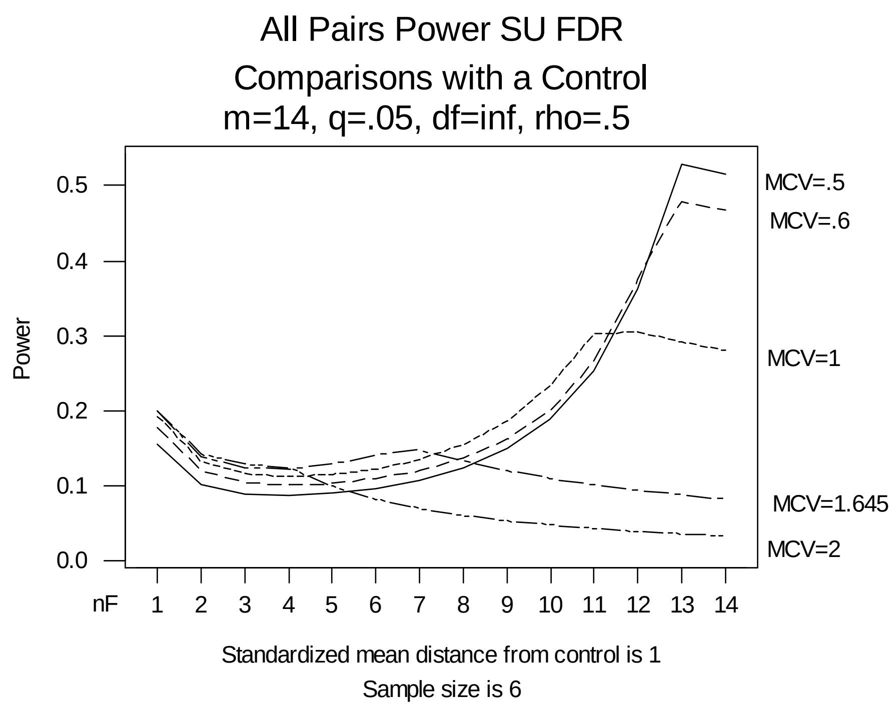

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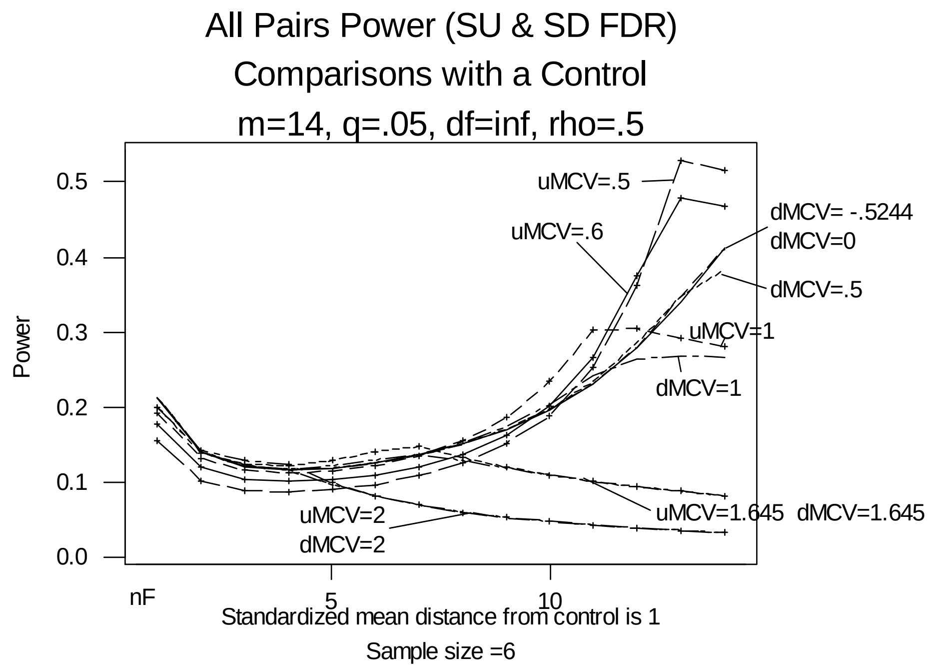

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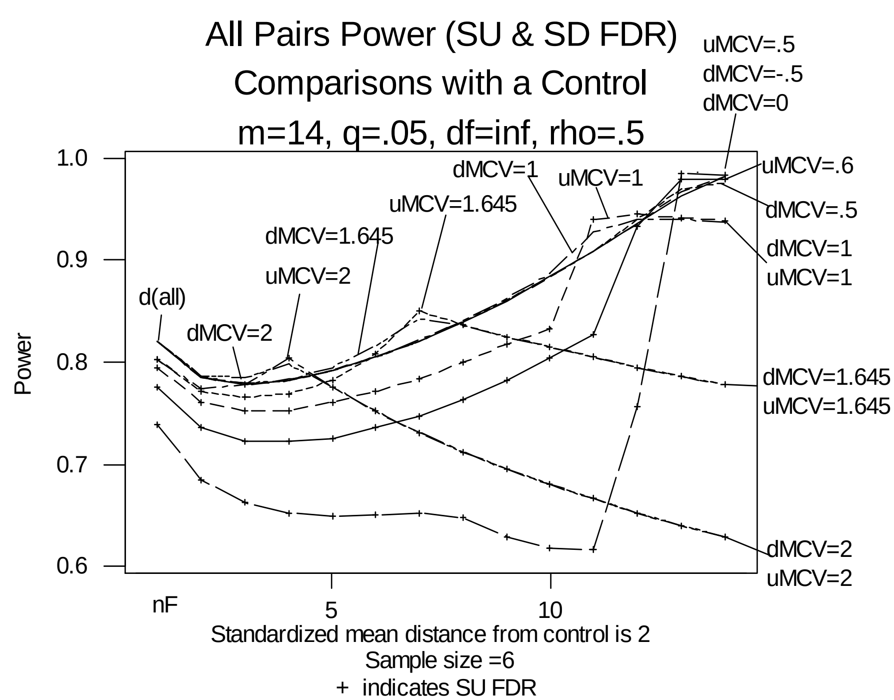

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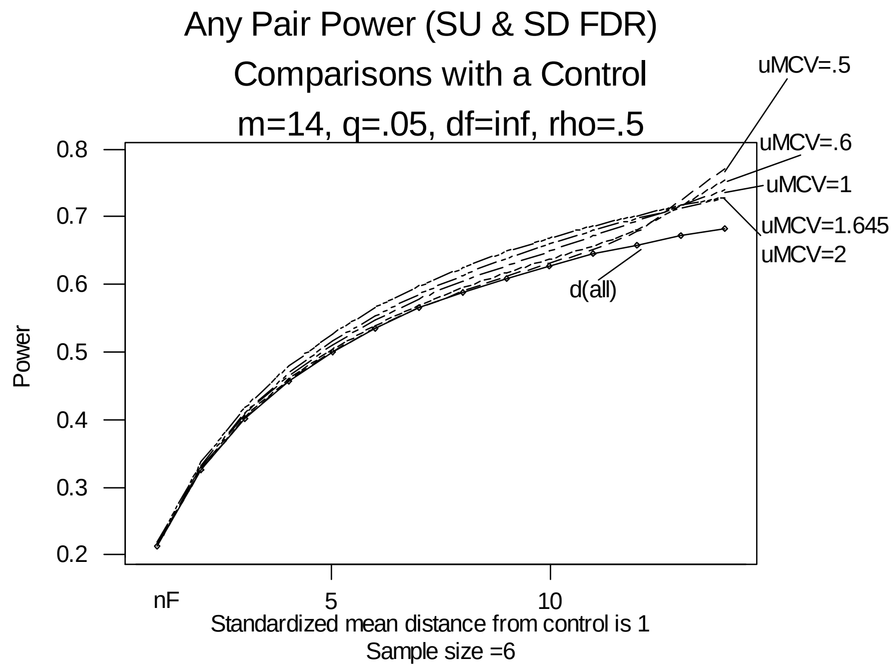

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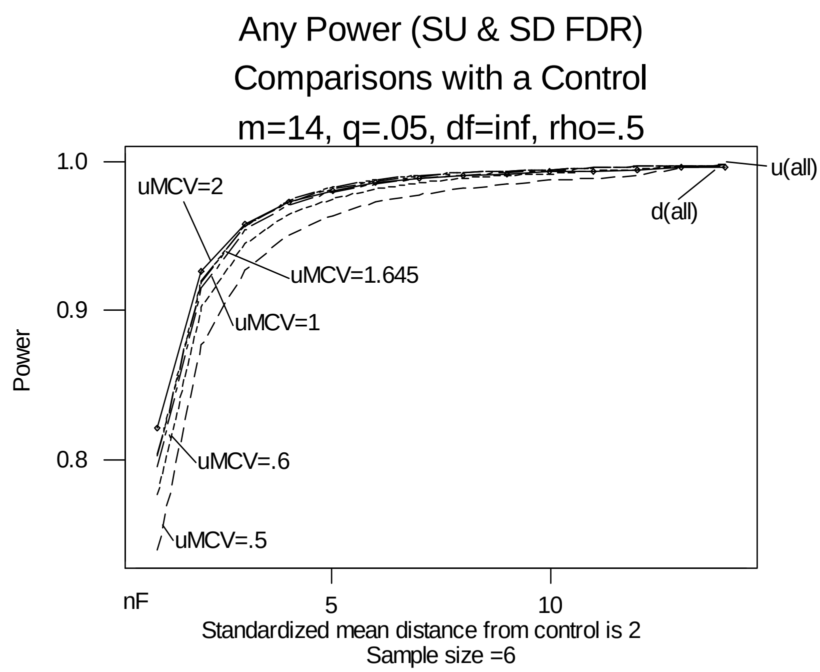
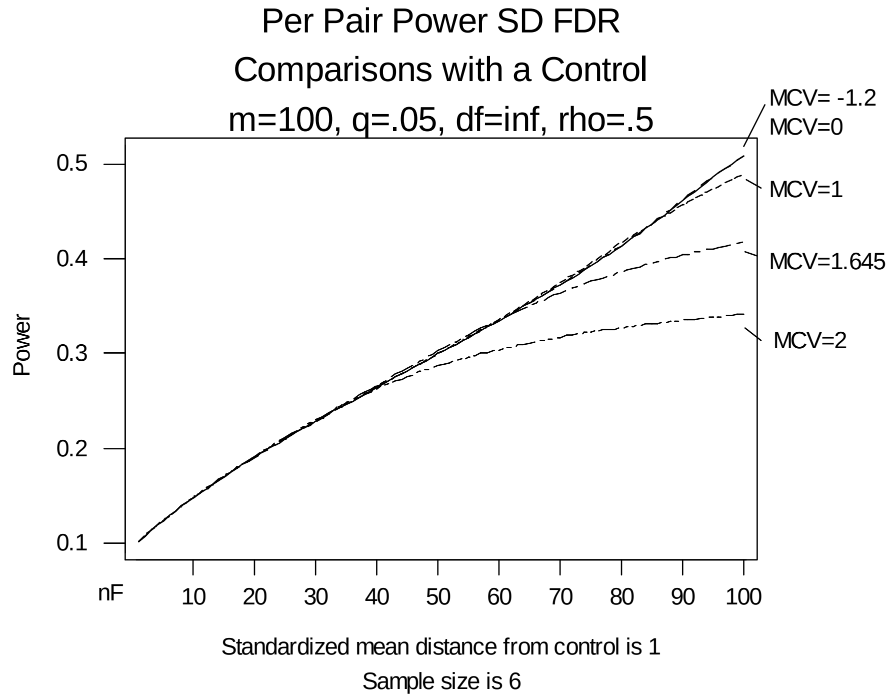
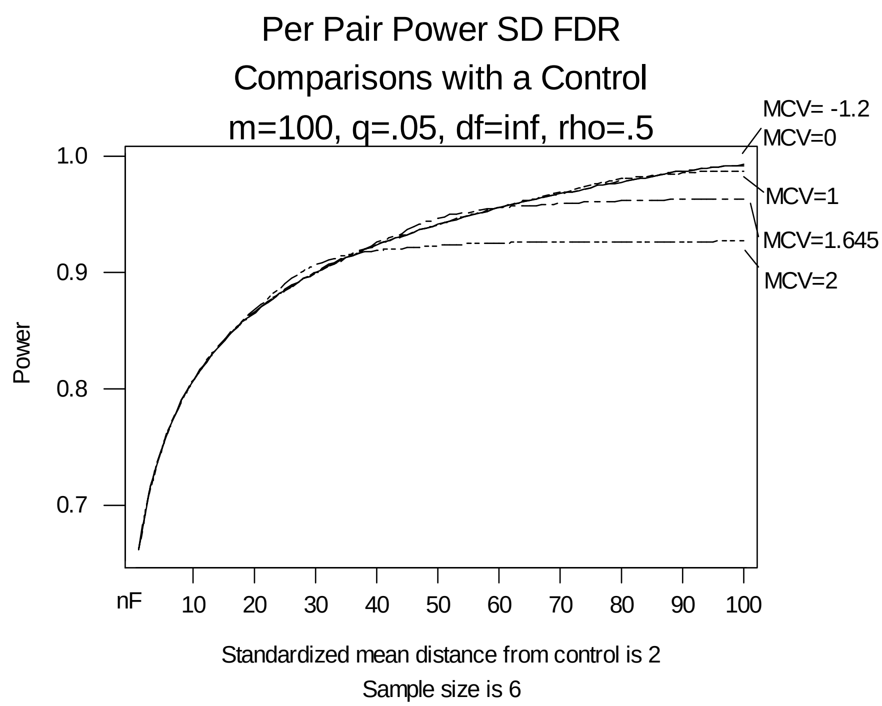


STEPDOWN PER PAIR POWER m = 100 $\Delta = 1$



STEPDOWN PER PAIR POWER m = 100 $\Delta = 2$



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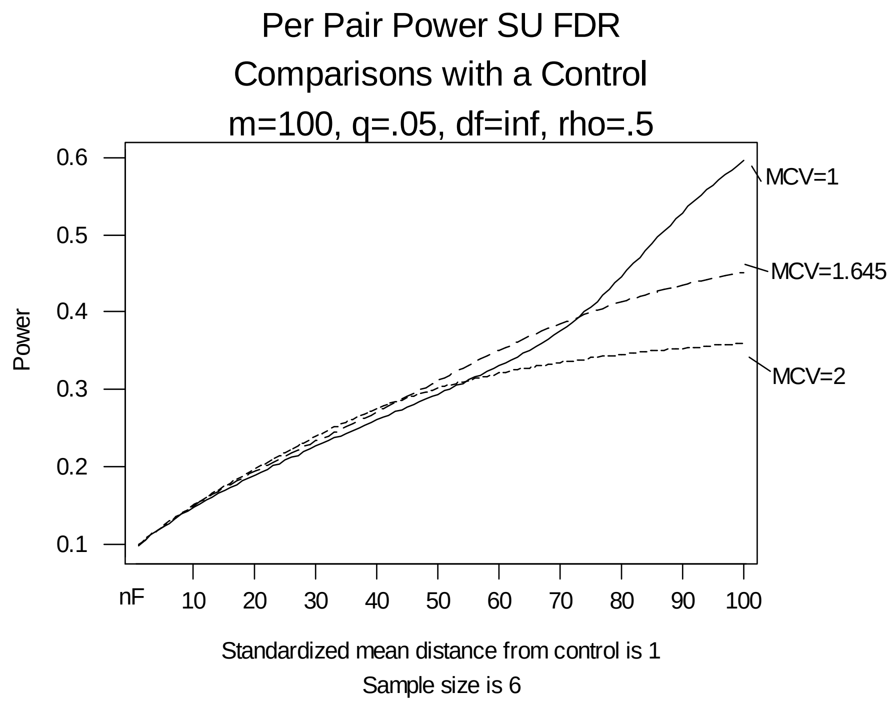
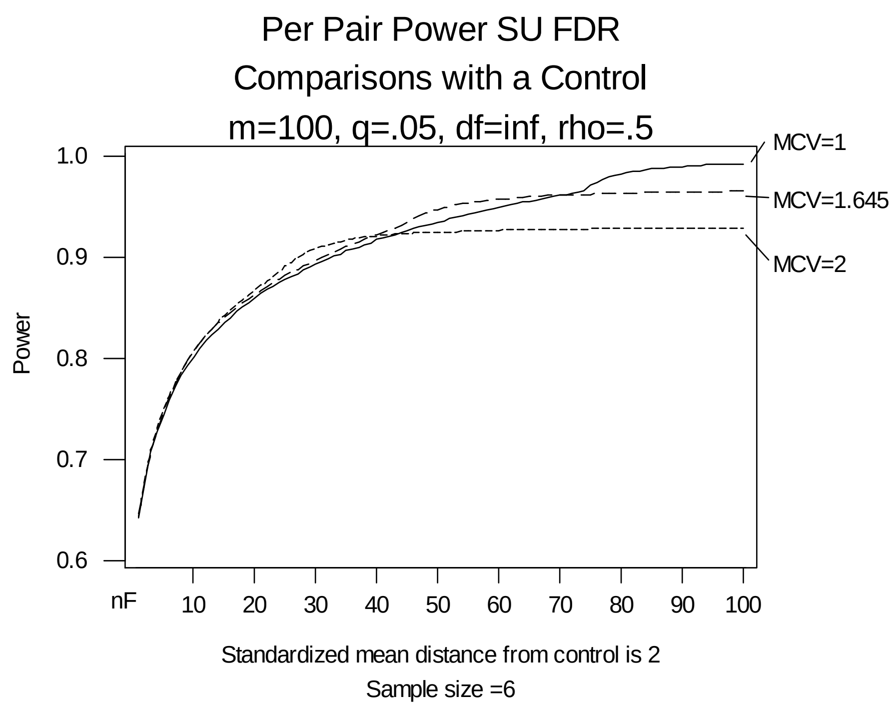


STEPUP PER PAIR POWER m = 100 $\Delta = 2$



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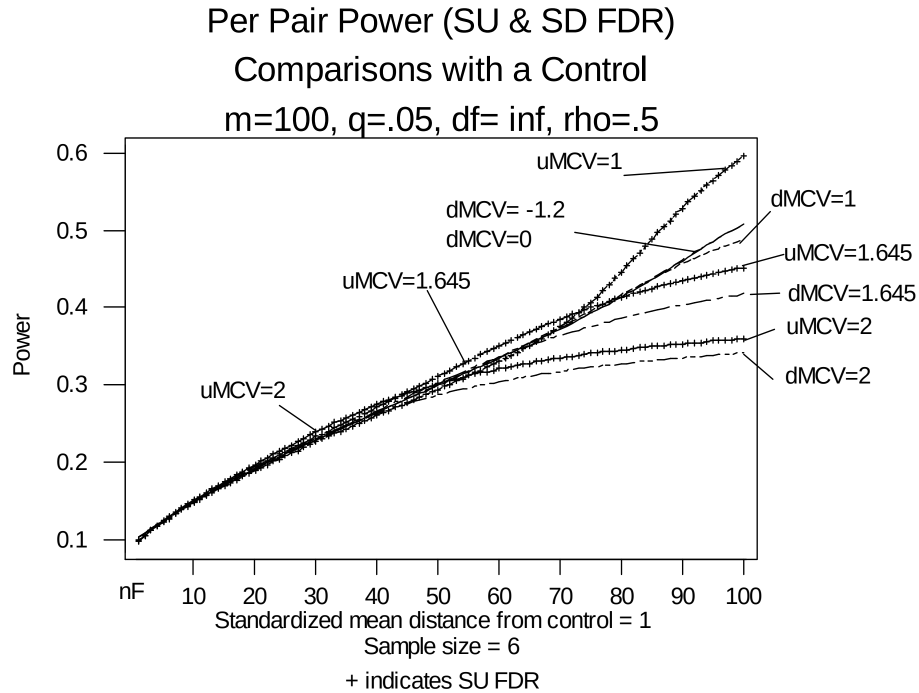

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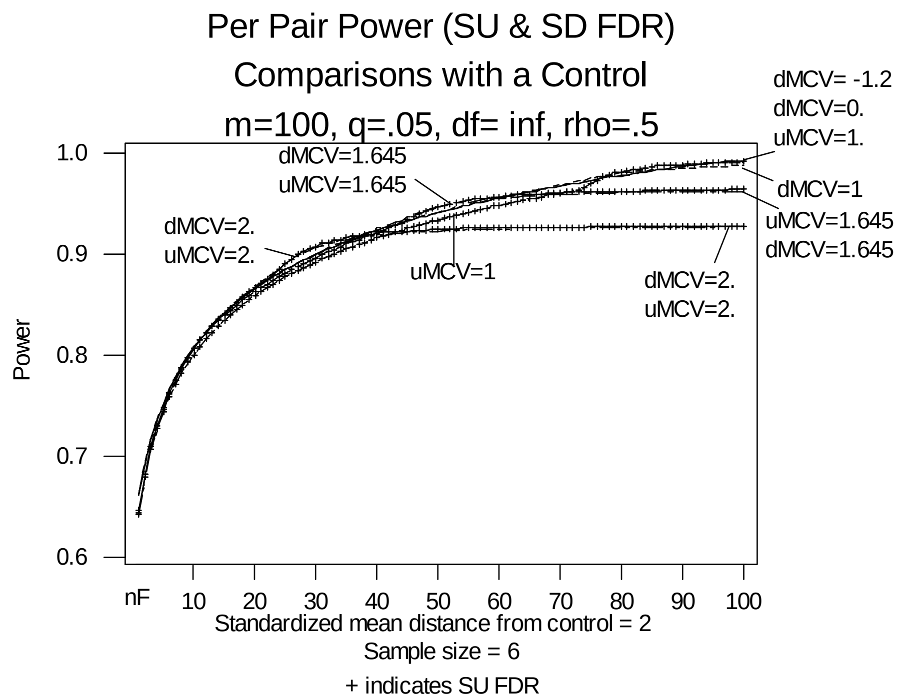
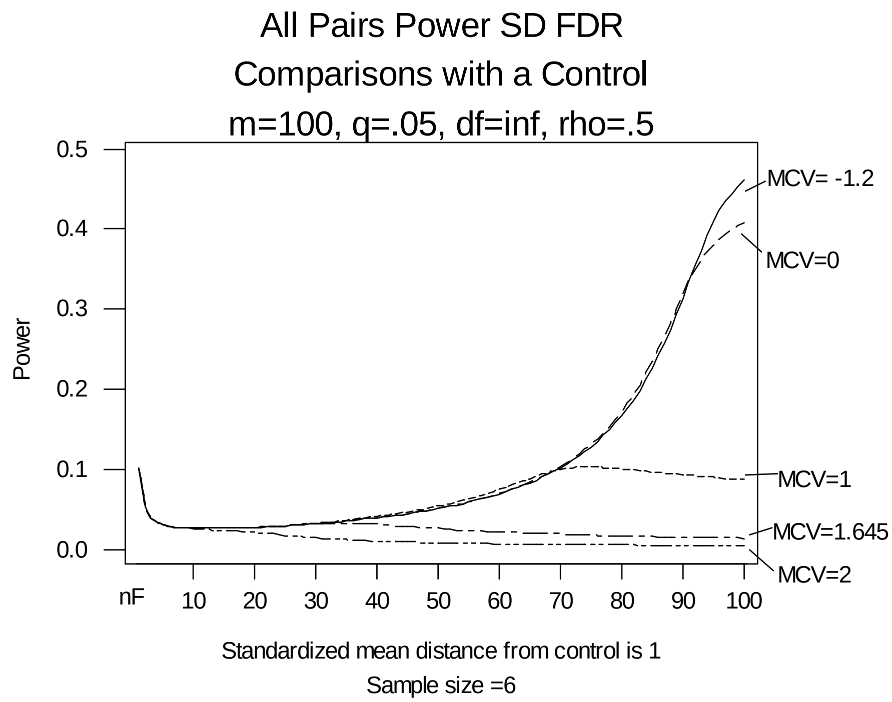
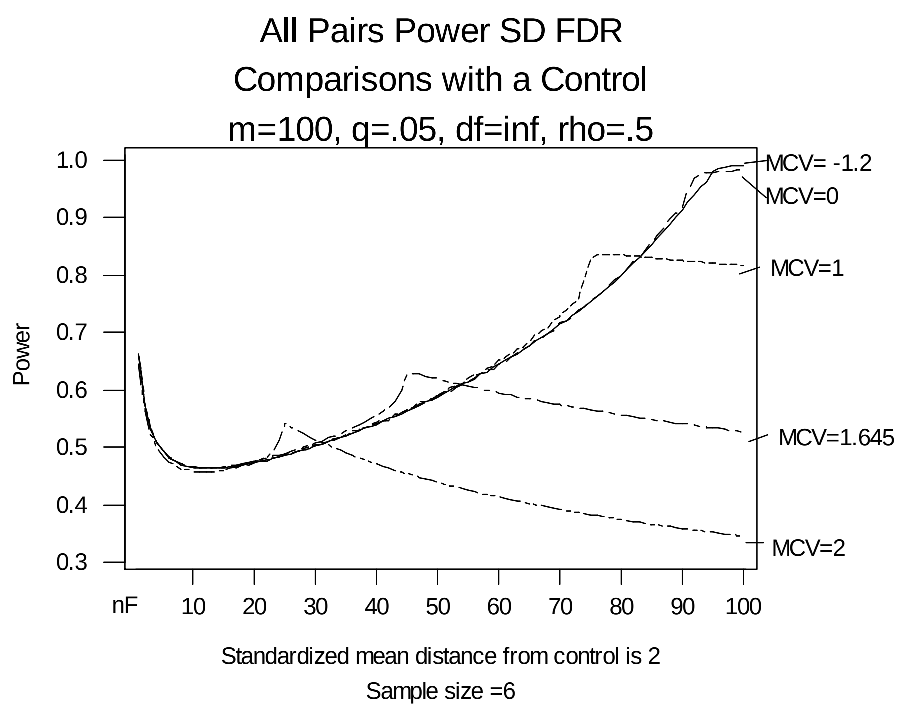


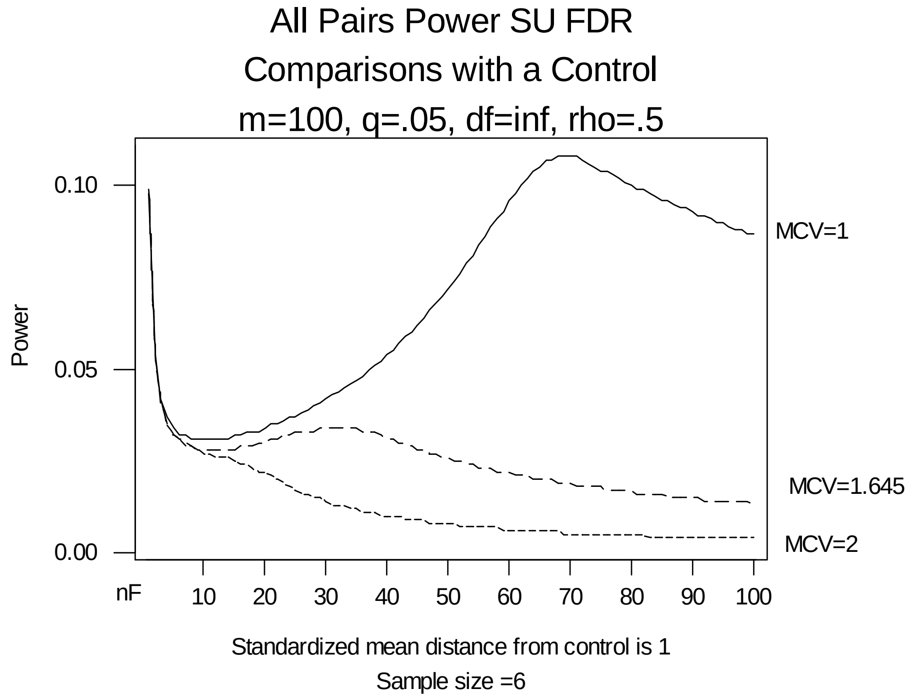
STEPDOWN ALL PAIRS POWER m = 100 Δ = 1



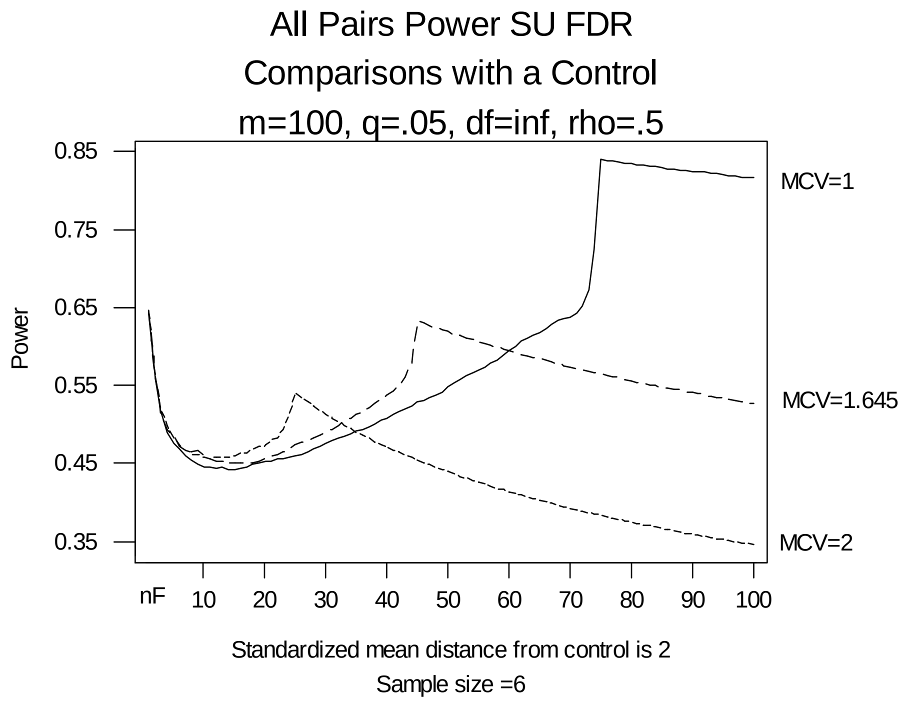
STEPDOWN ALL PAIRS POWER m = 100 Δ = 2



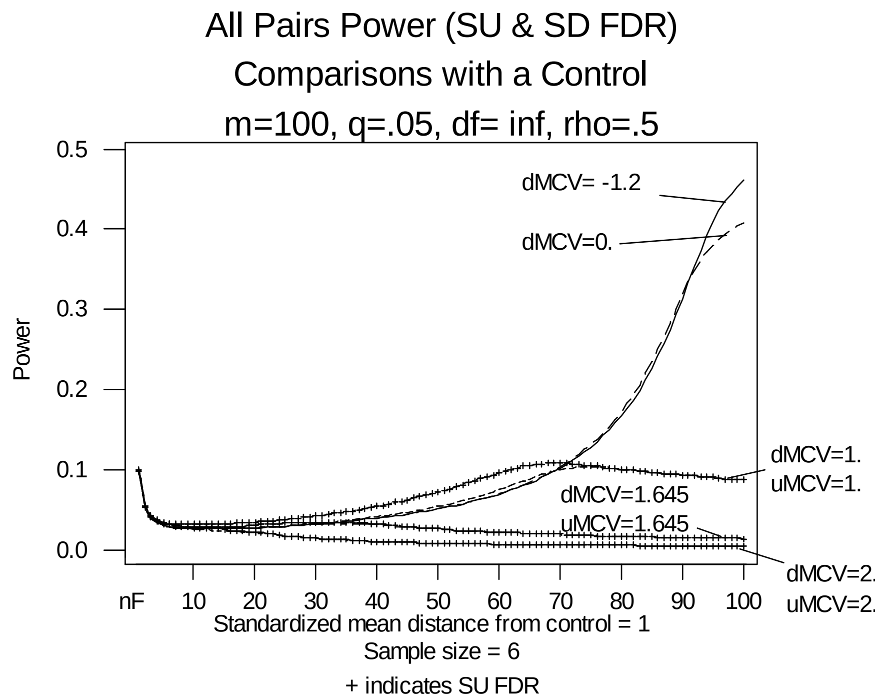
STEPUP ALL PAIRS POWER m = 100 Δ = 1



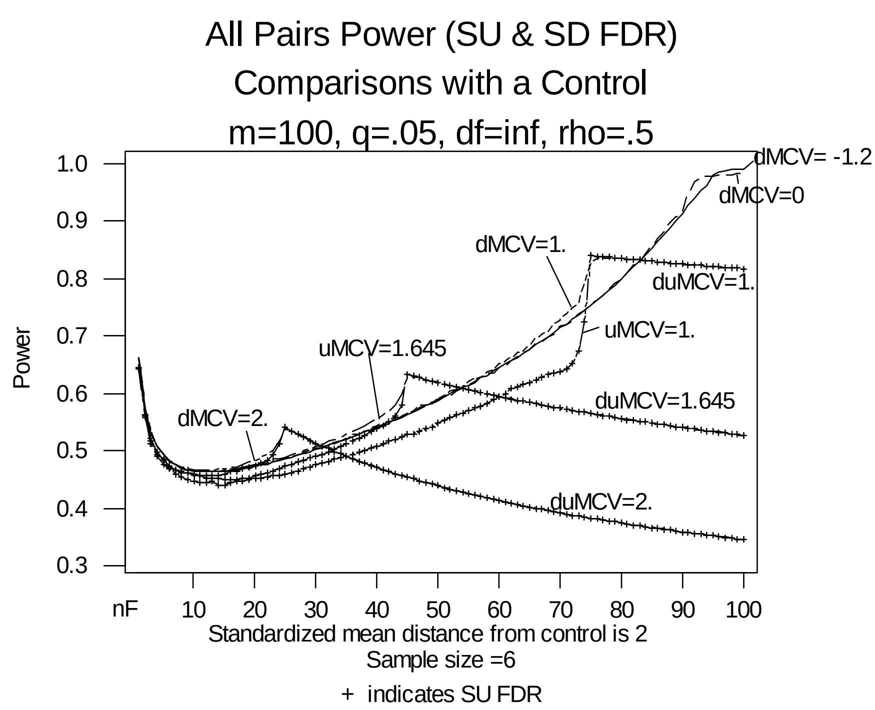
STEPUP ALL PAIRS POWER m = 100 Δ = 2



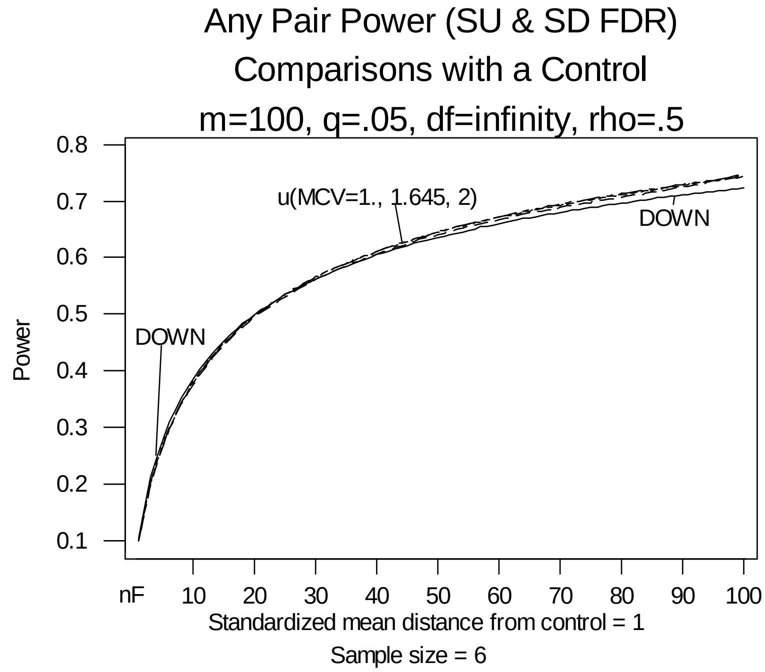
COMBINED STEPDOWN AND STEPUP ALL PAIRS POWER m = 100 Δ = 1



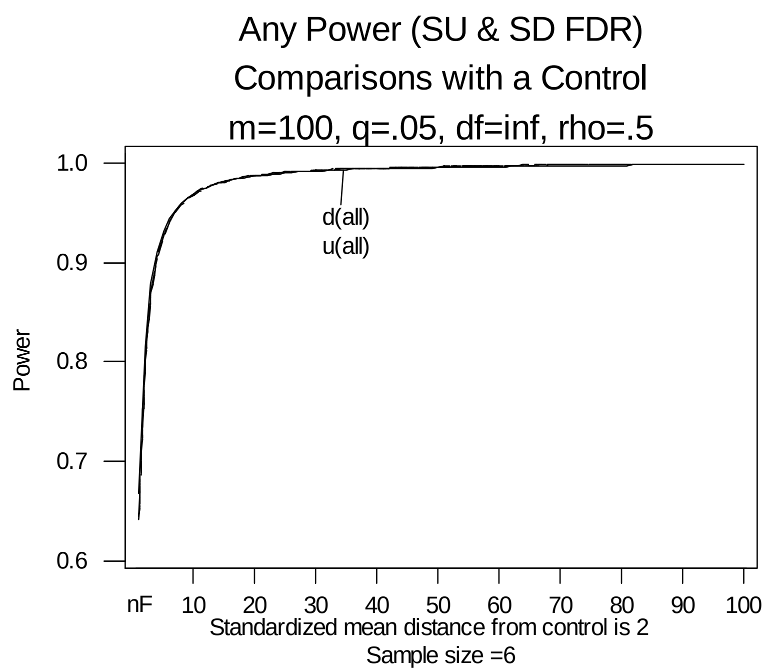
COMBINED STEPDOWN AND STEPUP ALL PAIRS POWER m = 100 Δ = 2



COMBINED STEPDOWN AND STEPUP ANY PAIR POWER m = 100 Δ = 1



COMBINED STEPDOWN AND STEPUP ANY PAIR POWER m = 100 Δ = 2



APPENDIX II POWER TABLES

Per Pair Power (SU & SD) Comparisons with a Control
m=14, q=.05, ρ =.5, df=∞.
Standardized mean distance from control is 1.
Sample size =6
MCV

	-0.52d	0.d	0.5d	1.d	1.645d	2d	0.5u	0.6u	1.u	1.645u	2.u
			DOWN						UP		
1	**0.213**	**0.213**	**0.213**	**0.213**	**0.213**	**0.213**	0.155	0.178	0.193	**0.200**	**0.200**
2	**0.233**	**0.233**	**0.233**	**0.233**	**0.233**	**0.233**	0.169	0.198	0.216	**0.225**	**0.227**
3	0.252	0.252	0.252	0.252	0.253	**0.254**	0.183	0.217	0.238	**0.249**	**0.253**
4	0.272	0.272	0.272	0.272	0.272	**0.273**	0.198	0.235	0.259	**0.272**	**0.280**
5	0.291	0.291	0.291	0.291	**0.292**	0.290	0.212	0.254	0.280	0.297	**0.302**
6	0.310	0.310	0.311	0.311	**0.312**	0.303	0.226	0.272	0.301	0.323	**0.319**
7	0.330	0.330	0.330	0.330	**0.333**	0.314	0.242	0.292	0.324	**0.351**	0.331
8	0.350	0.350	0.350	**0.351**	**0.351**	0.323	0.260	0.313	0.348	**0.377**	0.341
9	0.371	0.371	0.371	**0.372**	0.368	0.330	0.281	0.336	0.375	**0.399**	0.349
10	0.393	0.393	0.393	**0.394**	0.382	0.336	0.310	0.366	0.411	**0.418**	0.355
11	0.416	0.416	0.416	**0.418**	0.395	0.342	0.355	0.407	**0.461**	0.434	0.360
12	0.440	0.440	**0.441**	**0.441**	0.406	0.346	0.435	0.475	**0.512**	0.447	0.364
13	0.466	**0.467**	**0.467**	0.463	0.416	0.350	**0.583**	0.572	0.557	0.458	0.367
14	**0.493**	**0.493**	0.492	0.482	0.424	0.353	**0.683**	0.652	0.594	0.467	0.370

Per Pair Power (SU & SD) Comparisons with a Control
m=14, q=.05, ρ =.5, df=∞.
Standardized mean distance from control is 2
Sample size = 6
MCV

	-0.52d	0.d	0.5	1.d	1.645d	2.d	0.5u	0.6u	1.u	1.645.u	2.u
			DOWN						UP		
1	**0.821**	**0.821**	**0.821**	**0.821**	**0.821**	**0.821**	0.739	0.776	0.795	**0.803**	**0.803**
2	0.855	0.855	**0.856**	0.855	**0.856**	**0.856**	0.781	0.819	0.838	0.845	**0.847**
3	0.880	0.880	0.880	0.880	0.881	**0.883**	0.810	0.848	0.867	0.874	**0.879**
4	0.900	0.900	0.900	0.900	0.900	**0.905**	0.832	0.870	0.887	0.896	**0.908**
5	0.915	0.915	0.915	0.915	**0.916**	0.915	0.849	0.888	0.904	0.913	**0.923**
6	0.928	0.928	0.928	0.929	**0.931**	0.919	0.864	0.903	0.918	**0.930**	0.925
7	0.940	0.940	0.940	0.940	**0.944**	0.922	0.876	0.915	0.930	**0.948**	0.925
8	0.949	0.949	0.949	0.950	**0.951**	0.924	0.885	0.927	0.941	**0.955**	0.926
9	**0.958**	**0.958**	**0.958**	**0.958**	0.955	0.925	0.891	0.937	0.950	**0.959**	0.927
10	**0.966**	**0.966**	**0.966**	**0.966**	0.958	0.926	0.895	0.946	0.957	**0.961**	0.927
11	0.973	0.973	0.973	**0.975**	0.959	0.926	0.899	0.955	0.978	**0.963**	0.928
12	0.979	0.979	0.979	**0.980**	0.961	0.927	0.920	0.976	**0.986**	0.964	0.928
13	0.984	**0.985**	**0.985**	0.983	0.962	0.927	0.990	**0.991**	0.989	0.964	0.928
14	**0.988**	**0.988**	**0.988**	0.985	0.962	0.927	**0.996**	0.995	0.991	0.964	0.928

All Pairs Power (SU & SD) Comparisons with a Control

m=14, q=.05, ρ =.5, df=∞.

Standardized mean distance from control is 1.

Sample size =6

						MCV					
			DOWN						UP		
	-0.52d	0.d	0.5d	1.d	1.645d	2.d	0.5u	0.6u	1.u	1.645u	2.u
1	**0.213**	**0.213**	**0.213**	**0.213**	**0.213**	**0.213**	0.155	0.178	0.193	**0.200**	**0.200**
2	0.140	0.140	0.140	0.140	0.140	**0.141**	0.102	0.120	0.132	0.139	**0.142**
3	0.121	0.121	0.121	0.121	0.122	**0.123**	0.089	0.104	0.116	0.124	**0.129**
4	0.117	0.117	0.117	0.117	**0.118**	0.116	0.087	0.101	0.112	0.122	**0.124**
5	0.119	0.119	0.119	0.119	**0.122**	0.097	0.090	0.103	0.115	**0.129**	0.099
6	0.126	0.126	0.126	0.126	**0.130**	0.082	0.097	0.110	0.122	**0.141**	0.082
7	0.136	0.136	0.136	**0.137**	**0.137**	0.070	0.108	0.120	0.135	**0.148**	0.070
8	0.151	0.151	0.151	**0.153**	0.129	0.060	0.124	0.137	**0.155**	0.133	0.060
9	0.171	0.171	0.171	**0.174**	0.119	0.053	0.149	0.162	**0.186**	0.120	0.053
10	0.197	0.197	0.198	**0.204**	0.110	0.048	0.188	0.201	**0.235**	0.110	0.048
11	0.232	0.232	0.235	**0.243**	0.101	0.043	0.253	0.266	**0.303**	0.101	0.043
12	0.279	0.280	**0.286**	0.264	0.094	0.039	0.363	**0.375**	0.305	0.094	0.039
13	0.340	0.347	**0.348**	0.269	0.088	0.036	**0.529**	0.480	0.292	0.088	0.036
14	**0.412**	0.411	0.383	0.267	0.082	0.033	**0.517**	0.468	0.281	0.082	0.033

All Pairs Power (SU & SD) Comparisons with a Control

m=14, q=.05, ρ =.5, df=∞.

Standardized mean distance from control is 2

Sample size = 6

					MCV						
			DOWN						UP		
	-0.5d	0.d	0.5d	1.d	1.65d	2.d	0.5u	0.6u	1.u	1.65u	2.u
1	**0.821**	**0.821**	**0.821**	**0.821**	**0.821**	**0.821**	0.739	0.776	0.795	**0.803**	**0.803**
2	0.785	0.785	0.785	0.785	0.786	**0.787**	0.685	0.736	0.761	0.771	**0.774**
3	0.778	0.778	0.778	0.779	0.779	**0.785**	0.662	0.722	0.752	0.766	**0.778**
4	0.782	0.782	0.782	0.782	0.783	**0.798**	0.652	0.722	0.752	0.769	**0.804**
5	0.792	0.792	0.792	0.792	**0.795**	0.776	0.649	0.725	0.761	**0.782**	0.776
6	0.805	0.805	0.805	0.805	**0.816**	0.752	0.650	0.736	0.771	**0.808**	0.752
7	0.821	0.821	0.821	0.822	**0.843**	0.731	0.652	0.747	0.784	**0.850**	0.731
8	0.840	0.840	0.840	**0.841**	0.836	0.712	0.647	0.763	0.800	**0.837**	0.712
9	0.860	0.860	0.861	**0.863**	0.825	0.695	0.629	0.782	0.818	**0.825**	0.695
10	0.884	0.884	0.884	**0.887**	0.815	0.680	0.617	0.804	**0.833**	0.815	0.680
11	0.909	0.909	0.909	**0.928**	0.805	0.666	0.616	0.827	**0.940**	0.805	0.666
12	0.936	0.936	**0.940**	**0.940**	0.795	0.652	0.756	0.934	**0.945**	0.795	0.652
13	0.963	0.967	**0.970**	0.940	0.786	0.640	**0.985**	0.980	0.942	0.786	0.640
14	**0.983**	0.982	0.976	0.938	0.778	0.629	**0.984**	0.979	0.939	0.778	0.629

Any Pair Power (SU & SD FDR) Comparisons with a Control
m=14, q=.05, ρ =.5, df=∞.
Standardized mean distance from control is 1
Sample size =6

			MCV			
	down	u.5	u.6	u1.	u1.645	u2.
1	0.213	0.218	0.216	0.216	0.217	**0.219**
2	0.326	0.327	0.327	0.330	0.332	**0.337**
3	0.402	0.402	0.404	0.408	0.410	**0.418**
4	0.458	0.458	0.460	0.465	0.469	**0.479**
5	0.501	0.501	0.504	0.511	0.516	**0.527**
6	0.536	0.536	0.540	0.548	0.554	**0.566**
7	0.565	0.566	0.570	0.579	0.586	**0.598**
8	0.589	0.590	0.595	0.605	0.614	**0.625**
9	0.610	0.612	0.618	0.628	0.639	**0.649**
10	0.628	0.632	0.638	0.650	0.660	**0.669**
11	0.645	0.652	0.657	0.672	0.680	**0.687**
12	0.659	0.678	0.681	0.694	0.698	**0.702**
13	0.672	**0.724**	0.716	0.717	0.713	0.717
14	0.683	**0.771**	0.754	0.740	0.728	0.729

Any Pair Power (SU & SD FDR) Comparisons with a Control
m=14, q=.05, ρ =.5, df=∞.
Standardized mean distance from control is 2
Sample size =6

	d(all)	u.5	u.6	u1.	u1.645	u2.
1	**0.821**	0.739	0.776	0.795	0.802	0.803
2	**0.926**	0.877	0.902	0.915	0.919	0.920
3	**0.958**	0.927	0.945	0.954	0.957	0.957
4	0.973	0.951	0.965	0.971	0.973	**0.974**
5	0.981	0.964	0.975	0.980	0.982	**0.983**
6	0.986	0.973	0.982	0.985	0.987	**0.988**
7	0.989	0.978	0.986	0.989	0.990	**0.991**
8	0.991	0.982	0.989	0.991	0.993	**0.993**
9	0.992	0.985	0.991	0.993	0.994	**0.994**
10	0.994	0.988	0.992	0.994	0.995	**0.995**
11	0.994	0.989	0.994	0.996	0.996	**0.996**
12	0.995	0.991	0.995	0.997	0.997	**0.997**
13	0.996	0.996	0.997	0.997	0.997	**0.997**
14	0.996	0.998	0.998	0.998	0.998	**0.998**

Per Pair Power (Stepup and Stepdown FDR)
Comparisons with a Control
m=100, q=.05, ρ =.5, df=∞.
Standardized mean distance from control is 1
FDRPWRDN used with n=1,000,000

					MCV			
			DOWN				UP	
	-1.2d	0.d	1.d	1.645d	2.d	1.u	1.645u	2.u
1	**0.102**	**0.102**	**0.102**	**0.102**	**0.102**	0.098	**0.099**	0.098
2	**0.108**	**0.108**	**0.108**	**0.108**	**0.108**	**0.105**	**0.105**	**0.105**
3	**0.113**	**0.113**	**0.113**	**0.113**	**0.113**	0.111	0.111	**0.112**
4	**0.119**	**0.119**	**0.119**	**0.119**	**0.119**	0.117	0.117	**0.118**
5	**0.124**	**0.124**	**0.124**	**0.124**	**0.124**	0.122	0.123	**0.124**
6	**0.129**	**0.129**	**0.129**	**0.129**	**0.129**	0.127	0.128	**0.129**
7	**0.134**	**0.134**	**0.134**	**0.134**	**0.134**	0.133	0.134	**0.135**
8	**0.139**	**0.139**	**0.139**	**0.139**	**0.139**	0.138	0.139	**0.140**
9	**0.144**	**0.144**	**0.144**	**0.144**	**0.144**	0.143	0.144	**0.145**
10	0.148	**0.149**	**0.149**	**0.149**	**0.149**	0.147	0.149	**0.151**
11	**0.153**	**0.153**	**0.153**	**0.153**	**0.153**	0.152	0.154	**0.155**
12	0.157	0.157	**0.158**	**0.158**	**0.158**	0.156	0.159	**0.160**
13	**0.162**	**0.162**	**0.162**	**0.162**	**0.162**	0.161	0.164	**0.165**
14	0.166	0.166	0.166	0.166	**0.167**	0.165	0.168	**0.170**
15	0.170	0.170	0.170	**0.171**	**0.171**	0.169	0.173	**0.174**
16	**0.175**	**0.175**	**0.175**	**0.175**	**0.175**	0.173	0.177	**0.179**
17	0.179	0.179	0.179	0.179	**0.180**	0.177	0.181	**0.183**
18	0.183	0.183	0.183	0.183	**0.184**	0.181	0.186	**0.188**
19	0.187	0.187	0.187	0.187	**0.188**	0.185	0.190	**0.192**
20	0.191	0.191	0.191	0.191	**0.192**	0.189	0.194	**0.197**
21	0.195	0.195	0.195	0.195	**0.196**	0.193	0.198	**0.201**
22	0.199	0.199	0.199	0.199	**0.200**	0.197	0.202	**0.205**
23	0.202	0.202	0.203	0.203	**0.204**	0.201	0.206	**0.210**
24	0.206	0.206	0.206	0.207	**0.208**	0.204	0.210	**0.214**
25	0.210	0.210	0.210	0.211	**0.212**	0.208	0.213	**0.218**
26	0.214	0.214	0.214	0.215	**0.216**	0.212	0.217	**0.222**
27	0.218	0.218	0.218	0.218	**0.220**	0.215	0.221	**0.227**
28	0.221	0.221	0.221	0.222	**0.223**	0.219	0.225	**0.231**
29	0.225	0.225	0.225	0.226	**0.227**	0.223	0.229	**0.235**
30	0.229	0.229	0.229	0.230	**0.231**	0.226	0.233	**0.239**
31	0.232	0.232	0.232	0.233	**0.234**	0.230	0.236	**0.243**
32	0.236	0.236	0.236	0.237	**0.238**	0.233	0.240	**0.247**
33	0.240	0.240	0.240	**0.241**	**0.241**	0.237	0.244	**0.251**
34	0.243	0.243	0.243	**0.245**	**0.245**	0.240	0.248	**0.254**
35	0.247	0.247	0.247	**0.248**	**0.248**	0.243	0.251	**0.258**
36	0.250	0.250	0.250	**0.252**	0.251	0.247	0.255	**0.261**
37	0.254	0.254	0.254	**0.256**	0.254	0.250	0.259	**0.265**
38	0.257	0.257	0.258	**0.259**	0.257	0.254	0.263	**0.268**
39	0.261	0.261	0.261	**0.263**	0.260	0.257	0.267	**0.272**
40	0.264	0.265	0.265	**0.267**	0.263	0.260	0.271	**0.275**

41	0.268	0.268	0.268	**0.270**	0.266	0.264	0.275	**0.278**
42	0.272	0.272	0.272	**0.274**	0.268	0.267	0.279	**0.281**
43	0.275	0.275	0.275	**0.278**	0.271	0.271	0.283	**0.284**
44	0.279	0.279	0.279	**0.281**	0.273	0.274	**0.287**	0.286
45	0.282	0.282	0.282	**0.285**	0.276	0.277	**0.291**	0.289
46	0.286	0.286	0.286	**0.289**	0.278	0.281	**0.295**	0.292
47	0.289	0.289	0.289	**0.292**	0.281	0.284	**0.299**	0.294
48	0.292	0.293	0.293	**0.296**	0.283	0.288	**0.303**	0.297
49	0.296	0.296	0.296	**0.299**	0.285	0.291	**0.307**	0.299
50	0.300	0.300	0.300	**0.303**	0.287	0.294	**0.311**	0.302
51	0.303	0.303	0.304	**0.307**	0.289	0.298	**0.315**	0.304
52	0.307	0.307	0.307	**0.310**	0.291	0.301	**0.319**	0.306
53	0.310	0.310	0.311	**0.313**	0.293	0.305	**0.323**	0.308
54	0.314	0.314	0.314	**0.317**	0.295	0.308	**0.327**	0.310
55	0.317	0.317	0.318	**0.320**	0.296	0.312	**0.331**	0.312
56	0.321	0.321	0.321	**0.324**	0.298	0.316	**0.335**	0.314
57	0.324	0.324	0.325	**0.327**	0.300	0.319	**0.339**	0.316
58	0.328	0.328	0.329	**0.330**	0.301	0.323	**0.343**	0.317
59	0.331	0.331	0.332	**0.333**	0.303	0.327	**0.347**	0.319
60	0.335	0.335	**0.336**	**0.336**	0.304	0.330	**0.351**	0.321
61	0.339	0.339	**0.340**	0.339	0.306	0.334	**0.354**	0.322
62	0.342	0.342	**0.344**	0.342	0.307	0.338	**0.358**	0.324
63	0.346	0.346	**0.347**	0.345	0.309	0.342	**0.362**	0.326
64	0.350	0.350	**0.351**	0.348	0.310	0.347	**0.365**	0.327
65	0.354	0.354	**0.355**	0.351	0.311	0.351	**0.369**	0.328
66	0.357	0.357	**0.359**	0.354	0.313	0.356	**0.372**	0.330
67	0.361	0.361	**0.363**	0.356	0.314	0.360	**0.375**	0.331
68	0.365	0.365	**0.367**	0.359	0.315	0.365	**0.379**	0.332
69	0.369	0.369	**0.371**	0.362	0.316	0.370	**0.382**	0.334
70	0.373	0.373	**0.375**	0.364	0.317	0.376	**0.385**	0.335
71	0.376	0.377	**0.379**	0.367	0.319	0.381	**0.388**	0.336
72	0.380	0.381	**0.383**	0.369	0.320	0.387	**0.391**	0.337
73	0.384	0.385	**0.387**	0.371	0.321	**0.394**	**0.394**	0.338
74	0.388	0.389	**0.391**	0.374	0.322	**0.400**	0.397	0.339
75	0.393	0.393	**0.396**	0.376	0.323	**0.407**	0.400	0.341
76	0.397	0.397	**0.400**	0.378	0.324	**0.414**	0.403	0.342
77	0.401	0.401	**0.404**	0.380	0.325	**0.422**	0.405	0.343
78	0.405	0.405	**0.408**	0.382	0.326	**0.430**	0.408	0.344
79	0.409	0.410	**0.413**	0.384	0.326	**0.438**	0.411	0.344
80	0.414	0.414	**0.417**	0.386	0.327	**0.446**	0.413	0.345
81	0.418	0.418	**0.421**	0.388	0.328	**0.454**	0.416	0.346
82	0.423	0.423	**0.425**	0.390	0.329	**0.463**	0.418	0.347
83	0.427	0.428	**0.429**	0.392	0.330	**0.471**	0.420	0.348
84	0.432	0.432	**0.433**	0.394	0.331	**0.480**	0.423	0.349
85	**0.437**	**0.437**	**0.437**	0.395	0.331	**0.488**	0.425	0.350

86	0.441	**0.442**	0.441	0.397	0.332	**0.497**	0.427	0.350
87	0.446	**0.447**	0.445	0.399	0.333	**0.505**	0.429	0.351
88	0.451	**0.452**	0.449	0.401	0.334	**0.513**	0.431	0.352
89	0.456	**0.457**	0.453	0.402	0.334	**0.522**	0.433	0.353
90	0.461	**0.462**	0.457	0.404	0.335	**0.529**	0.435	0.353
91	0.466	**0.467**	0.460	0.405	0.336	**0.537**	0.437	0.354
92	0.471	**0.472**	0.464	0.407	0.336	**0.545**	0.439	0.355
93	0.476	**0.477**	0.467	0.408	0.337	**0.552**	0.441	0.355
94	0.481	**0.482**	0.471	0.410	0.338	**0.559**	0.443	0.356
95	**0.486**	**0.486**	0.474	0.411	0.338	**0.565**	0.444	0.357
96	**0.491**	**0.491**	0.477	0.412	0.339	**0.572**	0.446	0.357
97	**0.496**	0.495	0.480	0.414	0.340	**0.578**	0.448	0.358
98	**0.500**	**0.500**	0.483	0.415	0.340	**0.584**	0.449	0.358
99	**0.504**	**0.504**	0.486	0.416	0.341	**0.590**	0.451	0.359
100	**0.508**	**0.508**	0.489	0.418	0.341	**0.596**	0.452	0.360

Per Pair Stepup and Stepdown FDR
Comparisons with a Control
m=100, q=.05, ρ =.5, df=∞.
Standardized mean distance from control = 2
Sample size = 6
MCV

	DOWN						UP		
	-1.2d	0.d	1.d	1.645d	2.d		1.u	1.645u	2u
1	**0.662**	**0.662**	**0.662**	**0.662**	**0.662**		0.642	0.646	0.644
2	**0.693**	**0.693**	**0.693**	**0.693**	**0.693**		0.680	0.682	**0.683**
3	**0.717**	**0.717**	**0.717**	**0.717**	**0.717**		0.707	0.707	**0.710**
4	0.736	**0.737**	**0.737**	**0.737**	**0.737**		0.727	0.727	**0.731**
5	**0.753**	**0.753**	**0.753**	**0.753**	**0.753**		0.744	0.747	**0.748**
6	**0.767**	**0.767**	**0.767**	**0.767**	**0.767**		0.759	0.762	**0.763**
7	**0.779**	**0.779**	**0.779**	**0.779**	**0.779**		0.772	0.775	**0.776**
8	**0.790**	**0.790**	**0.790**	**0.790**	**0.790**		0.783	0.787	**0.788**
9	**0.800**	**0.800**	**0.800**	**0.800**	**0.800**		0.793	**0.798**	**0.798**
10	0.808	0.808	0.808	0.808	**0.809**		0.801	**0.807**	**0.807**
11	0.816	0.816	0.816	0.816	**0.817**		0.809	**0.815**	**0.815**
12	0.823	0.823	0.823	**0.824**	**0.824**		0.817	**0.822**	**0.822**
13	0.830	0.830	0.830	0.830	**0.831**		0.823	**0.829**	**0.829**
14	0.836	0.836	0.836	**0.837**	**0.837**		0.829	0.835	**0.836**
15	0.842	0.842	0.842	**0.843**	**0.843**		0.835	0.840	**0.842**
16	0.848	0.848	0.848	0.848	**0.849**		0.840	0.845	**0.847**
17	0.853	0.853	0.853	0.853	**0.854**		0.846	0.850	**0.853**
18	0.858	0.858	0.858	0.858	**0.859**		0.850	0.855	**0.858**
19	0.862	0.862	0.862	0.863	**0.864**		0.855	0.859	**0.863**
20	0.866	0.867	0.867	0.867	**0.869**		0.860	0.863	**0.867**
21	0.871	0.871	0.871	0.871	**0.873**		0.864	0.867	**0.872**
22	0.874	0.874	0.875	0.875	**0.877**		0.868	0.871	**0.876**
23	0.878	0.878	0.878	0.879	**0.882**		0.871	0.875	**0.880**
24	0.882	0.882	0.882	0.882	**0.886**		0.875	0.878	**0.885**
25	0.885	0.885	0.885	0.886	**0.891**		0.878	0.882	**0.891**

26	0.888	0.888	0.888	0.889	**<u>0.895</u>**	0.881	0.885	**<u>0.895</u>**
27	0.892	0.892	0.892	0.892	**0.899**	0.884	0.888	**<u>0.900</u>**
28	0.895	0.895	0.895	0.895	**0.902**	0.887	0.891	**<u>0.903</u>**
29	0.897	0.897	0.898	0.898	**0.905**	0.890	0.894	**<u>0.906</u>**
30	0.900	0.900	0.900	0.901	**0.907**	0.893	0.897	**<u>0.908</u>**
31	0.903	0.903	0.903	0.904	**0.909**	0.896	0.900	**<u>0.911</u>**
32	0.906	0.906	0.906	0.907	**0.911**	0.898	0.903	**<u>0.912</u>**
33	0.908	0.908	0.908	0.909	**0.912**	0.901	0.905	**<u>0.914</u>**
34	0.911	0.910	0.911	0.912	**0.914**	0.903	0.908	**<u>0.915</u>**
35	0.913	0.913	0.913	0.914	**0.915**	0.906	0.911	**<u>0.917</u>**
36	0.915	0.915	0.915	**0.917**	0.916	0.908	0.913	**<u>0.918</u>**
37	0.917	0.917	0.918	**<u>0.919</u>**	0.917	0.910	0.915	**<u>0.919</u>**
38	0.920	0.920	0.920	**<u>0.921</u>**	0.918	0.912	0.918	**0.920**
39	0.922	0.922	0.922	**<u>0.923</u>**	0.918	0.914	**0.920**	**0.920**
40	0.924	0.924	0.924	**<u>0.926</u>**	0.919	0.917	**0.922**	0.921
41	0.926	0.926	0.926	**<u>0.928</u>**	0.920	0.919	**0.924**	0.922
42	0.928	0.928	0.928	**<u>0.930</u>**	0.920	0.920	**0.927**	0.922
43	0.930	0.929	0.930	**<u>0.932</u>**	0.921	0.922	**0.929**	0.923
44	0.931	0.931	0.932	**<u>0.934</u>**	0.921	0.924	**0.931**	0.923
45	0.933	0.933	0.933	**<u>0.937</u>**	0.922	0.926	**0.935**	0.923
46	0.935	0.935	0.935	**<u>0.940</u>**	0.922	0.928	**0.938**	0.924
47	0.937	0.937	0.937	**<u>0.942</u>**	0.922	0.930	**0.941**	0.924
48	0.938	0.938	0.939	**<u>0.944</u>**	0.923	0.931	**0.943**	0.924
49	0.940	0.940	0.940	**0.945**	0.923	0.933	**<u>0.946</u>**	0.925
50	0.942	0.942	0.942	**<u>0.947</u>**	0.923	0.934	**<u>0.947</u>**	0.925
51	0.943	0.943	0.943	**0.948**	0.924	0.936	**<u>0.949</u>**	0.925
52	0.945	0.945	0.945	**0.950**	0.924	0.938	**<u>0.950</u>**	0.925
53	0.946	0.946	0.947	**0.951**	0.924	0.939	**<u>0.952</u>**	0.925
54	0.948	0.948	0.948	**0.952**	0.924	0.941	**<u>0.953</u>**	0.926
55	0.949	0.949	0.950	**0.952**	0.925	0.942	**<u>0.954</u>**	0.926
56	0.951	0.951	0.951	**0.953**	0.925	0.943	**<u>0.955</u>**	0.926
57	0.952	0.952	0.952	**0.954**	0.925	0.945	**<u>0.955</u>**	0.926
58	0.953	0.953	0.954	**0.955**	0.925	0.946	**<u>0.956</u>**	0.926
59	**0.955**	**0.955**	**0.955**	**0.955**	0.925	0.948	**<u>0.957</u>**	0.926
60	**0.956**	**0.956**	**0.956**	**0.956**	0.925	0.949	**<u>0.957</u>**	0.926
61	0.957	0.957	**<u>0.958</u>**	0.956	0.925	0.950	**<u>0.958</u>**	0.927
62	**<u>0.959</u>**	**<u>0.959</u>**	**<u>0.959</u>**	0.957	0.926	0.952	**0.958**	0.927
63	**<u>0.960</u>**	**<u>0.960</u>**	**<u>0.960</u>**	0.957	0.926	0.953	**0.959**	0.927
64	0.961	0.961	**<u>0.962</u>**	0.958	0.926	0.954	**0.959**	0.927
65	0.962	0.962	**<u>0.963</u>**	0.958	0.926	0.955	**0.960**	0.927
66	0.963	**<u>0.964</u>**	**<u>0.964</u>**	0.958	0.926	0.956	**0.960**	0.927
67	0.965	**<u>0.965</u>**	**<u>0.965</u>**	0.959	0.926	0.957	**0.960**	0.927
68	0.966	0.966	**<u>0.967</u>**	0.959	0.926	0.959	**0.961**	0.927
69	0.967	0.967	**<u>0.968</u>**	0.959	0.926	0.960	**0.961**	0.927
70	0.968	0.968	**<u>0.969</u>**	0.960	0.926	**0.961**	**0.961**	0.927

71	0.969	0.969	**0.970**	0.960	0.926		**0.962**	**0.962**	0.927
72	0.970	0.970	**0.971**	0.960	0.927		**0.963**	0.962	0.927
73	0.971	0.971	**0.973**	0.960	0.927		**0.964**	0.962	0.927
74	0.972	0.972	**0.974**	0.961	0.927		**0.966**	0.962	0.927
75	0.973	0.973	**0.976**	0.961	0.927		**0.971**	0.962	0.928
76	0.975	0.975	**0.977**	0.961	0.927		**0.974**	0.963	0.928
77	0.976	0.976	**0.978**	0.961	0.927		**0.977**	0.963	0.928
78	0.977	0.977	**0.979**	0.961	0.927		**0.979**	0.963	0.928
79	0.977	0.978	**0.980**	0.961	0.927		**0.981**	0.963	0.928
80	0.978	0.979	**0.981**	0.962	0.927		**0.982**	0.963	0.928
81	0.979	0.979	**0.982**	0.962	0.927		**0.983**	0.963	0.928
82	0.980	0.980	**0.982**	0.962	0.927		**0.985**	0.963	0.928
83	0.981	0.981	**0.983**	0.962	0.927		**0.985**	0.963	0.928
84	0.982	0.982	**0.983**	0.962	0.927		**0.986**	0.964	0.928
85	0.983	0.983	**0.984**	0.962	0.927		**0.987**	0.964	0.928
86	**0.984**	**0.984**	**0.984**	0.962	0.927		**0.988**	0.964	0.928
87	**0.985**	**0.985**	**0.985**	0.962	0.927		**0.988**	0.964	0.928
88	**0.986**	**0.986**	0.985	0.963	0.927		**0.989**	0.964	0.928
89	**0.987**	**0.987**	0.985	0.963	0.927		**0.989**	0.964	0.928
90	**0.987**	**0.987**	0.986	0.963	0.927		**0.989**	0.964	0.928
91	**0.988**	**0.988**	0.986	0.963	0.927		**0.990**	0.964	0.928
92	**0.989**	**0.989**	0.986	0.963	0.927		**0.990**	0.964	0.928
93	**0.990**	**0.990**	0.987	0.963	0.927		**0.990**	0.964	0.928
94	**0.990**	**0.990**	0.987	0.963	0.927		**0.991**	0.964	0.928
95	**0.991**	**0.991**	0.987	0.963	0.927		**0.991**	0.964	0.928
96	**0.991**	**0.991**	0.987	0.963	0.928		**0.991**	0.964	0.928
97	**0.992**	**0.992**	0.987	0.963	0.928		**0.991**	0.964	0.928
98	**0.992**	**0.992**	0.988	0.963	0.928		**0.991**	0.965	0.928
99	**0.992**	**0.992**	0.988	0.963	0.928		**0.991**	0.965	0.928
100	**0.993**	0.992	0.988	0.963	0.928		**0.992**	0.965	0.928

All Pairs Power (Stepup and Stepdown FDR)
Comparisons with a Control
m=100, q=.05, ρ =.5, df=∞.
Standardized mean distance from control is 1
FDRPWRDN used with n=1,000,000

				MCV				
			DOWN				UP	
	-1.2	0	1	1.645	2	1	1.645	2
1	**0.102**	**0.102**	**0.102**	**0.102**	**0.102**	0.098	**0.099**	0.098
2	**0.052**	**0.052**	**0.052**	**0.052**	**0.052**	**0.054**	0.053	0.054
3	**0.038**	**0.038**	**0.038**	**0.038**	**0.038**	**0.042**	0.040	0.041
4	**0.033**	**0.033**	**0.033**	**0.033**	**0.033**	**0.037**	0.035	0.035
5	**0.030**	**0.030**	**0.030**	**0.030**	**0.030**	**0.034**	0.032	0.032
6	**0.028**	**0.028**	**0.028**	**0.028**	**0.028**	**0.032**	0.031	0.031
7	**0.027**	**0.027**	**0.027**	**0.027**	**0.027**	**0.032**	0.030	0.029
8	**0.027**	**0.027**	**0.027**	**0.027**	0.026	**0.031**	0.029	0.029
9	**0.026**	**0.026**	**0.026**	**0.026**	0.026	**0.031**	0.028	0.028
10	**0.026**	**0.026**	**0.026**	**0.026**	0.025	**0.031**	0.028	0.027

11	**0.026**	**0.026**	**0.026**	**0.026**	0.025	**<u>0.031</u>**	0.028	0.027
12	**0.026**	**0.026**	**0.026**	**0.026**	0.025	**<u>0.031</u>**	0.028	0.026
13	**0.026**	**0.026**	**0.026**	**0.026**	0.024	**<u>0.031</u>**	0.028	0.026
14	**0.026**	**0.026**	**0.026**	**0.026**	0.024	**<u>0.031</u>**	0.028	0.026
15	**0.026**	**0.026**	**0.026**	**0.026**	0.024	**<u>0.032</u>**	0.028	0.025
16	**0.026**	**0.026**	**0.026**	**0.026**	0.023	**<u>0.032</u>**	0.029	0.024
17	0.026	0.026	0.026	**0.027**	0.023	**<u>0.033</u>**	0.029	0.024
18	0.026	0.026	**0.027**	**0.027**	0.022	**<u>0.033</u>**	0.029	0.023
19	**0.027**	**0.027**	**0.027**	**0.027**	0.022	**<u>0.033</u>**	0.030	0.022
20	**0.027**	**0.027**	**0.027**	**0.027**	0.021	**<u>0.034</u>**	0.030	0.022
21	0.027	0.027	**0.028**	**0.028**	0.020	**<u>0.035</u>**	0.031	0.021
22	**0.028**	**0.028**	**0.028**	**0.028**	0.020	**<u>0.035</u>**	0.031	0.020
23	0.028	0.028	0.028	**0.029**	0.019	**<u>0.036</u>**	0.032	0.019
24	**0.029**	**0.029**	**0.029**	**0.029**	0.018	**<u>0.037</u>**	0.032	0.018
25	**0.029**	**0.029**	**0.029**	**0.029**	0.017	**<u>0.037</u>**	0.033	0.017
26	**0.030**	**0.030**	**0.030**	**0.030**	0.016	**<u>0.038</u>**	0.033	0.016
27	**0.030**	**0.030**	**0.030**	**0.030**	0.016	**<u>0.039</u>**	0.033	0.016
28	0.030	**0.031**	**0.031**	0.030	0.015	**<u>0.040</u>**	0.033	0.015
29	0.031	0.031	**0.032**	0.031	0.015	**<u>0.041</u>**	0.034	0.015
30	**0.032**	**0.032**	**0.032**	0.031	0.014	**<u>0.042</u>**	0.034	0.014
31	0.032	0.032	**0.033**	0.031	0.013	**<u>0.043</u>**	0.034	0.013
32	0.033	0.033	**0.034**	0.032	0.013	**<u>0.044</u>**	0.034	0.013
33	0.034	0.034	**0.034**	0.032	0.013	**<u>0.045</u>**	0.034	0.013
34	0.034	0.034	**0.035**	0.032	0.012	**<u>0.046</u>**	0.034	0.012
35	0.035	0.035	**0.036**	0.032	0.012	**<u>0.047</u>**	0.034	0.012
36	0.036	0.036	**0.037**	0.032	0.011	**<u>0.048</u>**	0.033	0.011
37	0.037	0.037	**0.038**	0.032	0.011	**<u>0.050</u>**	0.033	0.011
38	**0.038**	**0.038**	**0.038**	0.032	0.011	**<u>0.051</u>**	0.033	0.011
39	0.038	0.038	**0.040**	0.031	0.010	**<u>0.052</u>**	0.032	0.010
40	0.039	0.039	**0.041**	0.031	0.010	**<u>0.054</u>**	0.031	0.010
41	0.040	0.040	**0.042**	0.031	0.010	**<u>0.055</u>**	0.031	0.010
42	0.041	0.041	**0.043**	0.030	0.010	**<u>0.057</u>**	0.030	0.010
43	0.042	0.042	**0.044**	0.029	0.009	**<u>0.059</u>**	0.030	0.009
44	0.043	0.043	**0.045**	0.029	0.009	**<u>0.060</u>**	0.029	0.009
45	0.044	0.044	**0.046**	0.028	0.009	**<u>0.062</u>**	0.028	0.009
46	0.046	0.046	**0.048**	0.028	0.009	**<u>0.064</u>**	0.028	0.009
47	0.047	0.047	**0.049**	0.027	0.008	**<u>0.066</u>**	0.027	0.008
48	0.048	0.048	**0.051**	0.027	0.008	**<u>0.068</u>**	0.027	0.008
49	0.050	0.050	**0.052**	0.026	0.008	**<u>0.070</u>**	0.026	0.008
50	0.051	0.051	**0.054**	0.026	0.008	**<u>0.072</u>**	0.026	0.008
51	0.052	0.052	**0.055**	0.025	0.008	**<u>0.074</u>**	0.025	0.008
52	0.054	0.054	**0.057**	0.025	0.007	**<u>0.076</u>**	0.025	0.007
53	0.055	0.056	**0.059**	0.024	0.007	**<u>0.079</u>**	0.024	0.007
54	0.057	0.057	**0.061**	0.024	0.007	**<u>0.081</u>**	0.024	0.007
55	0.059	0.059	**0.063**	0.023	0.007	**<u>0.084</u>**	0.023	0.007

56	0.061	0.061	**0.065**	0.023	0.007	**0.086**	0.023	0.007
57	0.063	0.063	**0.067**	0.023	0.007	**0.089**	0.023	0.007
58	0.065	0.065	**0.070**	0.022	0.007	**0.091**	0.022	0.007
59	0.067	0.067	**0.072**	0.022	0.006	**0.093**	0.022	0.006
60	0.069	0.070	**0.075**	0.022	0.006	**0.096**	0.022	0.006
61	0.072	0.072	**0.077**	0.021	0.006	**0.098**	0.021	0.006
62	0.075	0.075	**0.080**	0.021	0.006	**0.100**	0.021	0.006
63	0.077	0.078	**0.083**	0.021	0.006	**0.102**	0.021	0.006
64	0.080	0.081	**0.085**	0.020	0.006	**0.104**	0.020	0.006
65	0.083	0.084	**0.088**	0.020	0.006	**0.105**	0.020	0.006
66	0.086	0.087	**0.091**	0.020	0.006	**0.107**	0.020	0.006
67	0.090	0.091	**0.094**	0.020	0.006	**0.107**	0.020	0.006
68	0.094	0.095	**0.096**	0.019	0.006	**0.108**	0.019	0.006
69	0.098	**0.099**	0.098	0.019	0.005	**0.108**	0.019	0.005
70	0.102	**0.103**	0.100	0.019	0.005	**0.108**	0.019	0.005
71	0.106	**0.108**	0.101	0.018	0.005	**0.108**	0.018	0.005
72	0.111	**0.113**	0.102	0.018	0.005	**0.107**	0.018	0.005
73	0.116	**0.119**	0.103	0.018	0.005	**0.106**	0.018	0.005
74	0.122	**0.125**	0.103	0.018	0.005	**0.105**	0.018	0.005
75	0.128	**0.131**	0.103	0.018	0.005	**0.104**	0.018	0.005
76	0.135	**0.138**	0.103	0.017	0.005	**0.104**	0.017	0.005
77	0.142	**0.145**	0.102	0.017	0.005	**0.103**	0.017	0.005
78	0.149	**0.153**	0.101	0.017	0.005	**0.102**	0.017	0.005
79	0.158	**0.162**	0.101	0.017	0.005	**0.101**	0.017	0.005
80	0.167	**0.172**	0.100	0.017	0.005	**0.100**	0.017	0.005
81	0.176	**0.182**	0.099	0.016	0.005	**0.099**	0.016	0.005
82	0.187	**0.194**	0.099	0.016	0.005	**0.099**	0.016	0.005
83	0.199	**0.206**	0.098	0.016	0.004	**0.098**	0.016	0.004
84	0.212	**0.220**	0.097	0.016	0.004	**0.097**	0.016	0.004
85	0.226	**0.234**	0.096	0.016	0.004	**0.096**	0.016	0.004
86	0.241	**0.250**	0.096	0.015	0.004	**0.096**	0.015	0.004
87	0.257	**0.266**	0.095	0.015	0.004	**0.095**	0.015	0.004
88	0.275	**0.283**	0.094	0.015	0.004	**0.094**	0.015	0.004
89	0.294	**0.301**	0.094	0.015	0.004	**0.094**	0.015	0.004
90	0.313	**0.318**	0.093	0.015	0.004	**0.093**	0.015	0.004
91	0.334	**0.335**	0.092	0.015	0.004	**0.092**	0.015	0.004
92	**0.354**	0.349	0.092	0.015	0.004	**0.092**	0.014	0.004
93	**0.374**	0.361	0.091	0.014	0.004	**0.091**	0.014	0.004
94	**0.393**	0.372	0.090	0.014	0.004	**0.090**	0.014	0.004
95	**0.409**	0.380	0.090	0.014	0.004	**0.090**	0.014	0.004
96	**0.423**	0.388	0.089	0.014	0.004	**0.089**	0.014	0.004
97	**0.435**	0.394	0.088	0.014	0.004	**0.088**	0.014	0.004
98	**0.445**	0.399	0.088	0.014	0.004	**0.088**	0.014	0.004
99	**0.454**	0.404	0.087	0.014	0.004	**0.087**	0.014	0.004
100	**0.462**	0.408	0.087	0.013	0.004	**0.087**	0.013	0.004

All Pair Power for Comparisons with a Control
m=100, q=.05, ρ =.5, df=∞.
Standardized mean distance from control is 2
Sample size = 6

				MCV				
			DOWN				UP	
nF	-1.2	0	1	1.645	2	1	1.645	2
1	**0.662**	**0.662**	**0.662**	**0.662**	**0.662**	0.642	**0.646**	0.644
2	**0.573**	**0.573**	**0.573**	**0.573**	**0.573**	0.559	0.561	**0.563**
3	0.531	**0.532**	0.531	**0.532**	**0.532**	0.518	0.513	**0.522**
4	0.507	0.507	**0.508**	**0.508**	**0.508**	0.490	0.493	**0.498**
5	0.492	**0.493**	**0.493**	**0.493**	**0.493**	0.476	**0.485**	0.483
6	0.482	0.482	0.482	**0.483**	**0.483**	0.469	0.472	**0.474**
7	0.476	0.475	0.475	**0.476**	**0.476**	0.459	0.466	**0.467**
8	0.470	0.470	**0.471**	**0.471**	**0.471**	0.454	**0.464**	0.462
9	0.467	0.468	0.467	0.467	**0.469**	0.449	**0.466**	0.461
10	0.465	0.464	0.466	0.466	**0.467**	0.446	**0.460**	0.458
11	0.463	0.463	0.463	0.464	**0.466**	0.445	**0.456**	**0.456**
12	0.463	0.464	0.463	0.463	**0.467**	0.444	0.453	**0.458**
13	0.464	0.463	0.464	0.465	**0.466**	0.446	0.453	**0.457**
14	0.464	0.464	0.464	0.465	**0.468**	0.441	0.451	**0.458**
15	0.465	0.464	0.465	0.466	**0.468**	0.441	0.450	**0.459**
16	0.466	0.465	0.465	0.469	**0.472**	0.444	0.450	**0.463**
17	0.467	0.467	0.469	0.468	**0.472**	0.446	0.450	**0.463**
18	0.471	0.470	0.468	0.471	**0.477**	0.448	0.451	**0.468**
19	0.470	0.471	0.472	0.473	**0.480**	0.450	0.453	**0.471**
20	0.473	0.475	0.475	0.476	**0.483**	0.452	0.456	**0.473**
21	0.477	0.476	0.476	0.478	**0.488**	0.453	0.459	**0.479**
22	0.477	0.476	0.478	0.481	**0.493**	0.455	0.462	**0.483**
23	0.482	0.482	0.480	0.485	**0.501**	0.456	0.465	**0.493**
24	0.483	0.484	0.484	0.485	**0.517**	0.457	0.469	**0.513**
25	0.486	0.487	0.487	0.489	**0.538**	0.459	0.473	**0.541**
26	0.489	0.490	0.489	0.494	**0.535**	0.462	0.477	**0.535**
27	0.493	0.492	0.493	0.496	**0.529**	0.465	0.480	**0.529**
28	0.496	0.496	0.497	0.500	**0.524**	0.469	0.483	**0.524**
29	0.499	0.497	0.500	0.503	**0.519**	0.472	0.487	**0.518**
30	0.504	0.503	0.503	0.508	**0.513**	0.475	0.490	**0.513**
31	0.505	0.506	0.507	**0.511**	0.508	0.479	0.494	**0.508**
32	0.509	0.510	0.511	**0.517**	0.504	0.482	0.499	**0.504**
33	0.514	0.512	0.515	**0.519**	0.499	0.485	**0.503**	0.499
34	0.518	0.517	0.518	**0.524**	0.495	0.488	**0.508**	0.495
35	0.520	0.522	0.520	**0.528**	0.490	0.491	**0.512**	0.490
36	0.525	0.525	0.528	**0.534**	0.486	0.494	**0.517**	0.486
37	0.529	0.529	0.530	**0.539**	0.482	0.497	**0.522**	0.482
38	0.534	0.534	0.534	**0.544**	0.478	0.501	**0.527**	0.478
39	0.536	0.537	0.539	**0.550**	0.475	0.505	**0.533**	0.474
40	0.540	0.541	0.544	**0.556**	0.471	0.508	**0.538**	0.471

41	0.545	0.545	0.547	<u>**0.564**</u>	0.467	0.512	**0.544**	0.467
42	0.552	0.550	0.547	<u>**0.568**</u>	0.464	0.516	**0.551**	0.464
43	0.554	0.554	0.558	<u>**0.579**</u>	0.460	0.520	**0.561**	0.460
44	0.559	0.561	0.561	<u>**0.600**</u>	0.457	0.524	**0.580**	0.457
45	0.562	0.565	0.565	<u>**0.628**</u>	0.454	0.528	<u>**0.633**</u>	0.454
46	0.568	0.569	0.570	<u>**0.629**</u>	0.451	0.530	<u>**0.630**</u>	0.451
47	0.574	0.572	0.579	<u>**0.627**</u>	0.448	0.534	<u>**0.627**</u>	0.448
48	0.579	0.579	0.580	<u>**0.624**</u>	0.445	0.538	<u>**0.624**</u>	0.445
49	0.582	0.584	0.583	<u>**0.622**</u>	0.442	0.542	<u>**0.622**</u>	0.442
50	0.588	0.589	0.591	<u>**0.619**</u>	0.439	0.548	<u>**0.619**</u>	0.439
51	0.595	0.596	0.596	<u>**0.616**</u>	0.436	0.553	<u>**0.616**</u>	0.436
52	0.599	0.597	0.603	<u>**0.614**</u>	0.433	0.558	<u>**0.614**</u>	0.433
53	0.606	0.604	0.607	<u>**0.611**</u>	0.431	0.562	<u>**0.611**</u>	0.431
54	0.611	0.610	<u>**0.611**</u>	0.609	0.428	0.566	**0.609**	0.428
55	0.613	0.614	<u>**0.620**</u>	0.606	0.425	0.570	**0.606**	0.425
56	0.619	0.620	<u>**0.626**</u>	0.604	0.423	0.574	**0.604**	0.423
57	0.628	<u>**0.629**</u>	0.628	0.602	0.420	0.578	**0.602**	0.420
58	0.631	0.634	<u>**0.638**</u>	0.599	0.418	0.583	**0.599**	0.418
59	0.639	0.636	<u>**0.642**</u>	0.597	0.416	0.589	**0.597**	0.416
60	0.645	0.646	<u>**0.652**</u>	0.595	0.413	0.594	**0.595**	0.413
61	0.652	0.649	<u>**0.657**</u>	0.593	0.411	**0.600**	0.593	0.411
62	0.657	0.658	<u>**0.663**</u>	0.591	0.409	**0.608**	0.590	0.409
63	0.662	0.664	<u>**0.671**</u>	0.588	0.407	**0.611**	0.588	0.406
64	0.670	0.670	<u>**0.675**</u>	0.586	0.404	**0.615**	0.586	0.404
65	0.676	0.677	<u>**0.686**</u>	0.584	0.402	**0.618**	0.584	0.402
66	0.685	0.686	<u>**0.695**</u>	0.582	0.400	**0.623**	0.582	0.400
67	0.692	0.691	<u>**0.703**</u>	0.580	0.398	**0.628**	0.580	0.398
68	0.697	0.699	<u>**0.707**</u>	0.578	0.396	**0.634**	0.578	0.396
69	0.706	0.702	<u>**0.721**</u>	0.576	0.394	**0.636**	0.576	0.394
70	0.715	0.717	<u>**0.728**</u>	0.574	0.392	**0.638**	0.574	0.392
71	0.721	0.720	<u>**0.739**</u>	0.572	0.390	**0.642**	0.572	0.390
72	0.729	0.728	<u>**0.749**</u>	0.571	0.388	**0.652**	0.570	0.388
73	0.736	0.738	<u>**0.757**</u>	0.569	0.387	**0.673**	0.568	0.386
74	0.743	0.745	<u>**0.794**</u>	0.567	0.385	**0.725**	0.567	0.385
75	0.754	0.753	**0.828**	0.565	0.383	<u>**0.840**</u>	0.565	0.383
76	0.764	0.764	**0.835**	0.563	0.381	<u>**0.839**</u>	0.563	0.381
77	0.770	0.770	**0.836**	0.562	0.379	<u>**0.838**</u>	0.561	0.379
78	0.781	0.781	**0.836**	0.560	0.378	<u>**0.837**</u>	0.560	0.378
79	0.788	0.791	**0.835**	0.558	0.376	<u>**0.836**</u>	0.558	0.376
80	0.799	0.801	<u>**0.835**</u>	0.556	0.374	<u>**0.835**</u>	0.556	0.374
81	0.810	0.809	<u>**0.834**</u>	0.555	0.373	<u>**0.834**</u>	0.554	0.373
82	0.820	0.823	<u>**0.833**</u>	0.553	0.371	<u>**0.833**</u>	0.553	0.371
83	0.830	0.831	<u>**0.832**</u>	0.552	0.370	<u>**0.832**</u>	0.551	0.370
84	0.840	<u>**0.843**</u>	0.831	0.550	0.368	**0.831**	0.550	0.368
85	0.852	<u>**0.856**</u>	0.830	0.548	0.367	**0.830**	0.548	0.366

86	0.864	**0.869**	0.829	0.547	0.365	**0.829**	0.547	0.365
87	0.876	**0.882**	0.828	0.545	0.364	**0.828**	0.545	0.363
88	0.888	**0.899**	0.827	0.544	0.362	0.827	0.544	0.362
89	0.900	**0.907**	0.826	0.542	0.361	**0.826**	0.542	0.360
90	0.912	**0.913**	0.825	0.541	0.359	**0.825**	0.541	0.359
91	0.927	**0.949**	0.824	0.540	0.358	**0.824**	0.539	0.358
92	0.940	**0.968**	0.824	0.538	0.356	**0.824**	0.538	0.356
93	0.954	**0.975**	0.823	0.537	0.355	**0.823**	0.536	0.355
94	0.962	**0.978**	0.822	0.535	0.354	**0.822**	0.535	0.353
95	**0.980**	0.979	0.821	0.534	0.352	**0.821**	0.533	0.352
96	**0.986**	0.980	0.820	0.533	0.351	**0.820**	0.532	0.351
97	**0.988**	0.981	0.819	0.531	0.350	**0.819**	0.531	0.349
98	**0.989**	0.981	0.818	0.530	0.348	**0.818**	0.529	0.348
99	**0.990**	0.982	0.818	0.528	0.347	**0.818**	0.528	0.347
100	**0.990**	0.982	0.817	0.527	0.346	**0.817**	0.527	0.346

Any Pair Power (SU & SD) Comparisons with a Control
m=100, q=.05, ρ =.5, df=∞.
Standardized mean distance from a control is 1
Sample size =6

	d(all)	MCV u1.	u1.645	u2.
1	0.102	0.098	**0.099**	0.098
2	0.164	0.155	**0.157**	**0.157**
3	0.211	0.200	**0.202**	**0.202**
4	0.249	0.237	**0.240**	0.**240**
5	0.281	0.269	**0.272**	0.271
6	0.308	0.296	**0.299**	0.298
7	0.331	0.320	**0.323**	0.322
8	0.352	0.341	**0.344**	**0.344**
9	0.371	0.360	**0.364**	0.363
10	0.388	0.377	**0.381**	**0.381**
11	0.403	0.393	**0.397**	**0.397**
12	0.417	0.408	**0.412**	0.411
13	0.430	0.422	**0.425**	**0.425**
14	0.442	0.434	**0.438**	**0.438**
15	0.454	0.446	**0.450**	0.449
16	0.464	0.457	**0.460**	**0.460**
17	0.474	0.467	**0.471**	**0.471**
18	0.483	0.477	**0.480**	**0.480**
19	0.491	0.486	**0.489**	**0.489**
20	0.500	0.495	**0.498**	0.**498**
21	0.507	0.503	**0.506**	**0.506**
22	0.514	0.510	**0.514**	**0.514**
23	0.521	0.518	**0.521**	**0.521**
24	0.528	0.525	0.528	**0.529**
25	0.534	0.531	**0.535**	**0.535**
26	0.540	0.538	**0.542**	**0.542**
27	0.546	0.544	**0.548**	**0.548**
28	0.552	0.550	**0.554**	**0.554**
29	0.557	0.556	**0.560**	**0.560**
30	0.562	0.562	**0.566**	**0.566**
31	0.567	0.567	**0.571**	**0.571**
32	0.572	0.572	**0.576**	**0.576**
33	0.577	0.577	**0.581**	**0.581**
34	0.581	0.582	0.585	**0.586**
35	0.585	0.586	**0.590**	**0.590**
36	0.589	0.591	**0.595**	**0.595**
37	0.593	0.595	**0.599**	**0.599**
38	0.597	0.599	**0.603**	**0.603**
39	0.601	0.603	**0.607**	**0.607**
40	0.605	0.607	**0.611**	**0.611**

41	0.608	0.611	**0.615**	**0.615**
42	0.612	0.615	**0.619**	**0.619**
43	0.615	0.618	0.622	**0.623**
44	0.618	0.622	**0.626**	**0.626**
45	0.622	0.625	0.629	**0.630**
46	0.625	0.629	**0.633**	**0.633**
47	0.628	0.632	**0.636**	**0.636**
48	0.630	0.635	**0.639**	**0.639**
49	0.633	0.638	0.642	**0.643**
50	0.636	0.641	0.645	**0.646**
51	0.639	0.644	0.648	**0.649**
52	0.641	0.647	**0.651**	**0.651**
53	0.644	0.650	**0.654**	**0.654**
54	0.646	0.652	0.656	**0.657**
55	0.649	0.655	0.659	**0.660**
56	0.651	0.658	**0.662**	**0.662**
57	0.654	0.660	0.664	**0.665**
58	0.656	0.663	**0.667**	**0.667**
59	0.658	0.665	0.669	**0.670**
60	0.660	0.668	**0.672**	**0.672**
61	0.663	0.670	0.674	**0.675**
62	0.665	0.672	0.676	**0.677**
63	0.667	0.674	0.678	**0.679**
64	0.669	0.677	0.681	**0.682**
65	0.671	0.679	0.683	**0.684**
66	0.673	0.681	0.685	**0.686**
67	0.675	0.683	0.687	**0.688**
68	0.677	0.685	0.689	**0.691**
69	0.678	0.687	0.691	**0.693**
70	0.680	0.689	0.693	**0.695**
71	0.682	0.691	0.695	**0.697**
72	0.684	0.693	0.697	**0.699**
73	0.685	0.695	0.699	**0.700**
74	0.687	0.697	0.701	**0.702**
75	0.689	0.698	0.703	**0.704**
76	0.690	0.700	0.704	**0.706**
77	0.692	0.702	0.706	**0.708**
78	0.694	0.704	0.708	**0.710**
79	0.695	0.705	0.710	**0.712**
80	0.697	0.707	0.712	**0.713**
81	0.698	0.709	0.713	**0.715**
82	0.700	0.711	0.715	**0.717**
83	0.701	0.712	0.717	**0.719**
84	0.703	0.714	0.718	**0.720**
85	0.704	0.716	0.720	**0.722**

86	0.706	0.718	0.722	**0.723**
87	0.707	0.719	0.723	**0.725**
88	0.708	0.721	0.725	**0.727**
89	0.710	0.723	0.726	**0.728**
90	0.711	0.725	0.728	**0.730**
91	0.712	0.727	0.730	**0.731**
92	0.714	0.729	0.731	**0.733**
93	0.715	0.731	0.733	**0.734**
94	0.716	0.733	0.734	**0.736**
95	0.717	0.736	0.736	**0.737**
96	0.719	0.738	0.737	**0.739**
97	0.720	0.740	0.739	**0.740**
98	0.721	0.743	0.740	**0.741**
99	0.722	0.745	0.742	**0.743**
100	0.723	0.748	0.743	**0.744**

Any Pair Power (SU & SD) Comparisons with a Control

m=100, q=.05, ρ =.5, df=∞.

Standardized mean distance from a control is 2

Sample size =6

	d(all)	MCV u1.	u1.645	u2.
1	**0.668**	0.642	**0.646**	0.644
2	**0.816**	0.802	**0.804**	0.803
3	**0.879**	0.869	**0.871**	0.870
4	**0.911**	0.905	0.906	**0.906**
5	**0.931**	0.926	0.927	**0.927**
6	**0.944**	0.940	0.941	**0.942**
7	**0.953**	0.951	0.952	**0.952**
8	**0.960**	0.958	0.959	**0.959**
9	**0.965**	0.964	0.965	**0.965**
10	**0.969**	0.968	0.969	**0.969**
11	**0.973**	0.972	0.973	**0.973**
12	0.975	0.975	0.975	**0.976**
13	0.978	0.978	0.978	**0.978**
14	0.980	0.980	0.980	**0.980**
15	0.981	0.981	0.982	**0.982**
16	0.983	0.983	0.983	**0.983**
17	0.984	0.984	0.984	**0.985**
18	0.985	0.985	0.986	**0.986**
19	0.986	0.986	0.987	**0.987**
20	0.987	0.987	0.987	**0.987**
21	0.987	0.988	0.988	**0.988**
22	0.988	0.989	0.989	**0.989**
23	0.989	0.989	0.990	**0.990**
24	0.989	0.990	0.990	**0.990**
25	0.990	0.990	0.991	**0.991**

26	0.990	0.991	0.991	**0.991**
27	0.991	0.991	0.992	**0.992**
28	0.991	0.992	0.992	**0.992**
29	0.991	0.992	0.992	**0.992**
30	0.992	0.993	0.993	**0.993**
31	0.992	0.993	0.993	**0.993**
32	0.993	0.993	0.993	**0.993**
33	0.993	0.993	0.994	**0.994**
34	0.993	0.994	0.994	**0.994**
35	0.993	0.994	0.994	**0.994**
36	0.994	0.994	0.994	**0.994**
37	0.994	0.994	0.995	**0.995**
38	0.994	0.995	0.995	**0.995**
39	0.994	0.995	0.995	**0.995**
40	0.994	0.995	0.995	0.995
41	0.994	0.995	0.995	0.995
42	0.995	0.995	0.995	0.995
43	0.995	0.995	0.996	0.996
44	0.995	0.996	0.996	0.996
45	0.995	0.996	0.996	0.996
46	0.995	0.996	0.996	0.996
47	0.995	0.996	0.996	0.996
48	0.995	0.996	0.996	0.996
49	0.995	0.996	0.996	0.996
50	0.996	0.996	0.996	0.996
51	0.996	0.996	0.997	0.997
52	0.996	0.996	0.997	0.997
53	0.996	0.997	0.997	0.997
54	0.996	0.997	0.997	0.997
55	0.996	0.997	0.997	0.997
56	0.996	0.997	0.997	0.997
57	0.996	0.997	0.997	0.997
58	0.996	0.997	0.997	0.997
59	0.996	0.997	0.997	0.997
60	0.996	0.997	0.997	0.997
61	0.996	0.997	0.997	0.997
62	0.997	0.997	0.997	0.997
63	0.997	0.997	0.997	0.997
64	0.997	0.997	0.997	0.998
65	0.997	0.997	0.997	0.998
66	0.997	0.997	0.998	0.998
67	0.997	0.997	0.998	0.998
68	0.997	0.998	0.998	0.998
69	0.997	0.998	0.998	0.998
70	0.997	0.998	0.998	0.998

71	0.997	0.998	0.998	0.998
72	0.997	0.998	0.998	0.998
73	0.997	0.998	0.998	0.998
74	0.997	0.998	0.998	0.998
75	0.997	0.998	0.998	0.998
76	0.997	0.998	0.998	0.998
77	0.997	0.998	0.998	0.998
78	0.997	0.998	0.998	0.998
79	0.997	0.998	0.998	0.998
80	0.997	0.998	0.998	0.998
81	0.997	0.998	0.998	0.998
82	0.998	0.998	0.998	0.998
83	0.998	0.998	0.998	0.998
84	0.998	0.998	0.998	0.998
85	0.998	0.998	0.998	0.998
86	0.998	0.998	0.998	0.998
87	0.998	0.998	0.998	0.998
88	0.998	0.998	0.998	0.998
89	0.998	0.998	0.998	0.998
90	0.998	0.998	0.998	0.998
91	0.998	0.998	0.998	0.999
92	0.998	0.998	0.999	0.999
93	0.998	0.999	0.999	0.999
94	0.998	0.999	0.999	0.999
95	0.998	0.999	0.999	0.999
96	0.998	0.999	0.999	0.999
97	0.998	0.999	0.999	0.999
98	0.998	0.999	0.999	0.999
99	0.998	0.999	0.999	0.999
100	0.998	0.999	0.999	0.999

APPENDIX III CRITICAL VALUES

Critical values for Stepdown FDR

$m=14$, $q=.05$, $\rho=.5$, $df=\infty$

			MCV			
	-.5244	0.	.5	1.	1.645	2.
1	-0.524	0.000	0.500	1.000	1.645	2.000
2	0.694	0.592	0.500	1.000	1.645	2.000
3	1.014	1.022	0.972	1.000	1.645	2.000
4	1.223	1.224	1.221	1.060	1.645	2.000
5	1.377	1.378	1.376	1.363	1.645	2.000
6	1.510	1.511	1.510	1.500	1.645	2.000
7	1.626	1.626	1.626	1.622	1.645	2.000
8	1.733	1.733	1.734	1.733	1.645	2.000
9	1.839	1.839	1.839	1.838	1.801	2.000
10	1.946	1.946	1.946	1.945	1.933	2.000
11	2.056	2.056	2.056	2.058	2.053	2.000
12	2.181	2.181	2.182	2.180	2.178	2.159
13	2.331	2.331	2.330	2.331	2.330	2.326
14	2.546	2.546	2.546	2.546	2.546	2.546

Critical values for Stepup FDR

$m=14$, $q=.05$, $\rho=.5$, $df=\infty$

			MCV		
	.5	.6	1.	1.645	2.
1	0.500	0.600	1.000	1.645	1.645
2	0.500	0.600	1.000	1.645	1.645
3	1.846	1.093	1.000	1.645	1.645
4	2.157	1.592	1.064	1.645	1.645
5	2.157	1.683	1.604	1.645	1.645
6	2.057	1.780	1.673	1.645	1.645
7	2.157	1.871	1.765	1.645	1.645
8	2.192	1.960	1.858	1.645	1.645
9	2.255	2.045	1.951	1.843	1.843
10	2.325	2.140	2.046	1.987	1.987
11	2.407	2.236	2.155	2.107	2.107
12	2.504	2.354	2.269	2.232	2.232
13	2.630	2.492	2.419	2.388	2.388
14	2.825	2.706	2.640	2.613	2.613

Critical values for Stepdown FDR

m=100, q=.05, ρ=.5, df=∞

			MCV		
	-1.2	0.	1.	1.645	2.
1	-1.200	0.000	1.000	1.645	2.000
2	-1.200	0.000	1.000	1.645	2.000
3	-1.200	0.000	1.000	1.645	2.000
4	-1.200	0.000	1.000	1.645	2.000
5	-1.200	0.000	1.000	1.645	2.000
6	-0.161	0.000	1.000	1.645	2.000
7	0.335	0.000	1.000	1.645	2.000
8	0.387	0.000	1.000	1.645	2.000
9	0.510	0.000	1.000	1.645	2.000
10	0.602	0.335	1.000	1.645	2.000
11	0.682	0.703	1.000	1.645	2.000
12	0.742	0.703	1.000	1.645	2.000
13	0.796	0.740	1.000	1.645	2.000
14	0.846	0.825	1.000	1.645	2.000
15	0.895	0.876	1.000	1.645	2.000
16	0.938	0.926	1.000	1.645	2.000
17	0.980	0.972	1.000	1.645	2.000
18	1.014	1.012	1.000	1.645	2.000
19	1.047	1.035	1.000	1.645	2.000
20	1.081	1.086	1.000	1.645	2.000
21	1.114	1.109	1.000	1.645	2.000
22	1.148	1.137	1.000	1.645	2.000
23	1.164	1.168	1.000	1.645	2.000
24	1.204	1.203	1.000	1.645	2.000
25	1.217	1.216	1.000	1.645	2.000
26	1.247	1.251	1.000	1.645	2.000
27	1.280	1.271	1.147	1.645	2.000
28	1.295	1.292	1.272	1.645	2.000
29	1.315	1.322	1.272	1.645	2.000
30	1.342	1.342	1.300	1.645	2.000
31	1.356	1.347	1.331	1.645	2.000
32	1.381	1.395	1.345	1.645	2.000
33	1.407	1.397	1.388	1.645	2.000
34	1.419	1.422	1.393	1.645	2.000
35	1.438	1.434	1.417	1.645	2.000
36	1.464	1.462	1.440	1.645	2.000
37	1.478	1.479	1.472	1.645	2.000
38	1.501	1.496	1.478	1.645	2.000
39	1.516	1.513	1.504	1.645	2.000
40	1.528	1.538	1.520	1.645	2.000
41	1.549	1.544	1.531	1.645	2.000
42	1.564	1.574	1.564	1.645	2.000
43	1.590	1.577	1.569	1.645	2.000
44	1.595	1.593	1.600	1.645	2.000
45	1.622	1.620	1.605	1.645	2.000
46	1.637	1.636	1.622	1.645	2.000
47	1.645	1.646	1.648	1.645	2.000
48	1.662	1.665	1.661	1.645	2.000
49	1.682	1.687	1.673	1.645	2.000
50	1.694	1.688	1.694	1.645	2.000
51	1.715	1.713	1.707	1.645	2.000
52	1.733	1.728	1.731	1.645	2.000

53	1.739	1.742	1.740	1.645	2.000
54	1.757	1.764	1.745	1.645	2.000
55	1.777	1.774	1.773	1.645	2.000
56	1.794	1.787	1.790	1.645	2.000
57	1.804	1.802	1.801	1.734	2.000
58	1.822	1.822	1.812	1.784	2.000
59	1.830	1.836	1.847	1.806	2.000
60	1.855	1.854	1.847	1.815	2.000
61	1.869	1.868	1.861	1.841	2.000
62	1.884	1.883	1.879	1.859	2.000
63	1.893	1.895	1.898	1.878	2.000
64	1.914	1.914	1.912	1.893	2.000
65	1.929	1.930	1.919	1.911	2.000
66	1.949	1.943	1.950	1.933	2.000
67	1.958	1.961	1.958	1.947	2.000
68	1.975	1.980	1.975	1.966	2.000
69	1.995	1.992	1.991	1.978	2.000
70	2.013	2.009	2.008	2.001	2.000
71	2.023	2.025	2.025	2.015	2.000
72	2.044	2.048	2.042	2.036	2.000
73	2.059	2.058	2.059	2.052	2.000
74	2.078	2.080	2.077	2.072	2.000
75	2.096	2.094	2.095	2.085	2.000
76	2.114	2.111	2.110	2.109	2.000
77	2.131	2.130	2.131	2.128	2.068
78	2.147	2.146	2.152	2.141	2.114
79	2.171	2.175	2.169	2.162	2.142
80	2.185	2.186	2.187	2.184	2.164
81	2.209	2.204	2.204	2.203	2.190
82	2.233	2.231	2.228	2.226	2.211
83	2.246	2.248	2.252	2.247	2.234
84	2.273	2.273	2.268	2.272	2.263
85	2.294	2.296	2.297	2.288	2.282
86	2.318	2.321	2.318	2.317	2.312
87	2.344	2.342	2.344	2.342	2.336
88	2.368	2.370	2.369	2.367	2.364
89	2.398	2.396	2.398	2.398	2.391
90	2.429	2.428	2.429	2.426	2.423
91	2.457	2.459	2.456	2.457	2.453
92	2.491	2.490	2.493	2.491	2.487
93	2.528	2.529	2.526	2.527	2.526
94	2.567	2.568	2.568	2.566	2.566
95	2.613	2.615	2.614	2.613	2.612
96	2.665	2.663	2.663	2.664	2.664
97	2.724	2.725	2.723	2.724	2.724
98	2.798	2.797	2.799	2.798	2.797
99	2.896	2.895	2.896	2.895	2.895
100	3.045	3.045	3.045	3.045	3.045

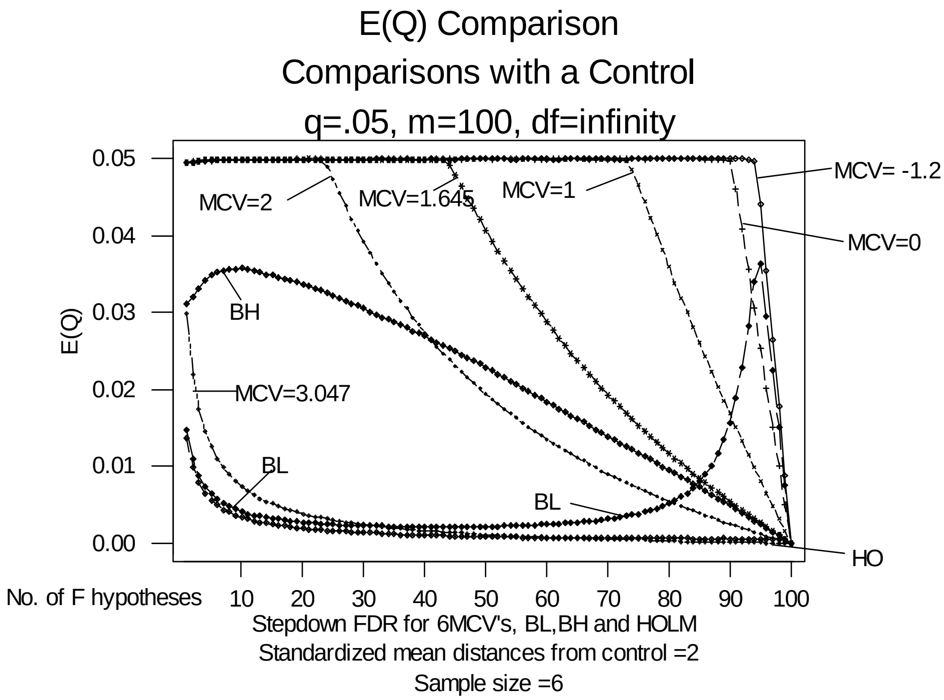
Critical values for Stepup FDR
m=100, q=.05, ρ=.5, df=∞

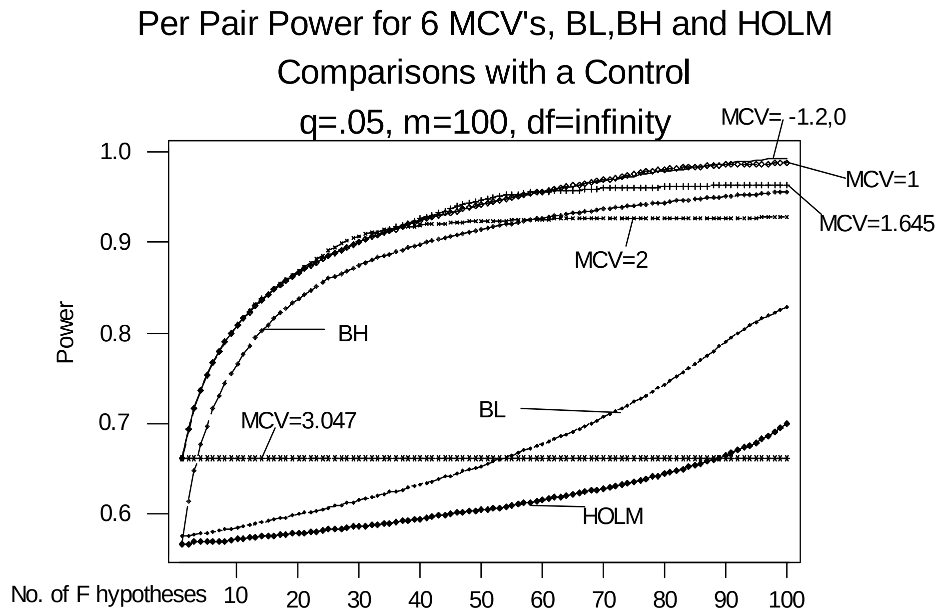
			MCV
	1.0	1.645	2.0
1	1.000	1.645	2.000
2	1.000	1.645	2.000
3	1.000	1.645	2.000
4	1.000	1.645	2.000
5	1.000	1.645	2.000
6	1.000	1.645	2.000
7	1.000	1.645	2.000
8	1.000	1.645	2.000
9	1.000	1.645	2.000
10	1.000	1.645	2.000
11	1.000	1.645	2.000
12	1.000	1.645	2.000
13	1.000	1.645	2.000
14	1.000	1.645	2.000
15	1.000	1.645	2.000
16	1.000	1.645	2.000
17	1.000	1.645	2.000
18	1.000	1.645	2.000
19	1.000	1.645	2.000
20	1.000	1.645	2.000
21	1.000	1.645	2.000
22	1.000	1.645	2.000
23	1.000	1.645	2.000
24	1.000	1.645	2.000
25	1.000	1.645	2.000
26	1.000	1.645	2.000
27	1.532	1.645	2.000
28	1.532	1.645	2.000
29	1.532	1.645	2.000
30	1.532	1.645	2.000
31	1.532	1.645	2.000
32	1.535	1.645	2.000
33	1.541	1.645	2.000
34	1.558	1.645	2.000
35	1.570	1.645	2.000
36	1.585	1.645	2.000
37	1.593	1.645	2.000
38	1.605	1.645	2.000
39	1.614	1.645	2.000
40	1.638	1.645	2.000
41	1.653	1.645	2.000
42	1.668	1.645	2.000
43	1.683	1.645	2.000
44	1.697	1.645	2.000
45	1.710	1.645	2.000
46	1.723	1.645	2.000
47	1.736	1.645	2.000
48	1.749	1.645	2.000
49	1.762	1.645	2.000
50	1.776	1.645	2.000
51	1.793	1.645	2.000
52	1.810	1.645	2.000

53	1.823	1.645	2.000
54	1.836	1.645	2.000
55	1.849	1.645	2.000
56	1.859	1.645	2.000
57	1.873	1.808	2.000
58	1.888	1.825	2.000
59	1.902	1.842	2.000
60	1.917	1.859	2.000
61	1.931	1.877	2.000
62	1.945	1.894	2.000
63	1.960	1.911	2.000
64	1.977	1.928	2.000
65	1.991	1.946	2.000
66	2.003	1.963	2.000
67	2.017	1.980	2.000
68	2.033	1.998	2.000
69	2.048	2.015	2.000
70	2.064	2.033	2.000
71	2.079	2.050	2.000
72	2.095	2.068	2.000
73	2.113	2.085	2.000
74	2.131	2.102	2.000
75	2.148	2.120	2.000
76	2.167	2.140	2.000
77	2.183	2.160	2.084
78	2.198	2.180	2.135
79	2.213	2.201	2.163
80	2.231	2.222	2.184
81	2.249	2.243	2.211
82	2.271	2.264	2.229
83	2.292	2.285	2.253
84	2.315	2.306	2.282
85	2.338	2.327	2.300
86	2.367	2.348	2.331
87	2.391	2.369	2.355
88	2.404	2.390	2.383
89	2.436	2.419	2.410
90	2.466	2.443	2.443
91	2.499	2.468	2.473
92	2.530	2.493	2.506
93	2.564	2.544	2.547
94	2.604	2.590	2.588
95	2.643	2.637	2.634
96	2.703	2.683	2.688
97	2.766	2.761	2.750
98	2.836	2.846	2.827
99	2.938	2.935	2.930
100	3.103	3.092	3.097

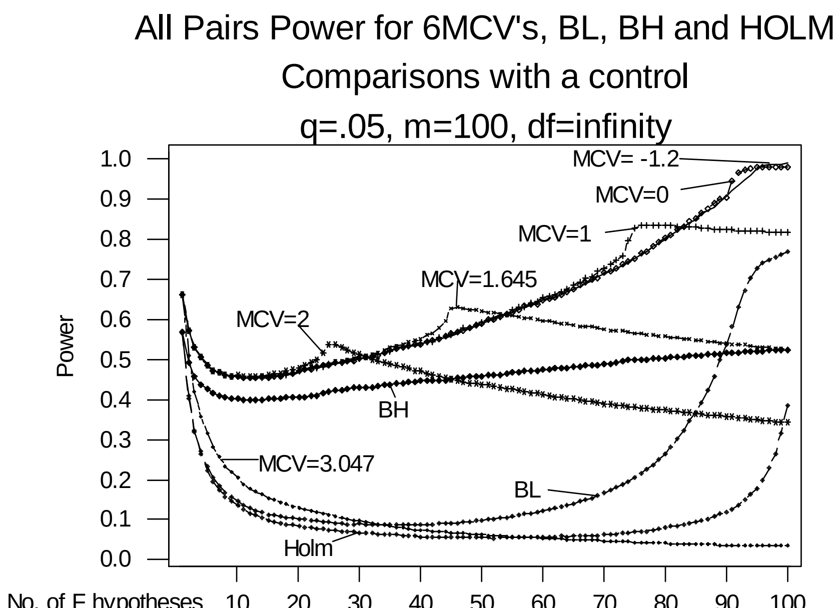
(Note: there are errors in the second decimal place, especially for higher critical values.)

APPENDIX IV AN E(Q) COMPARISON





Stepdown FDR for 6 MCV's, BL, BH and HOLM
Standardized mean distances from control=2
Sample size=6



Stepdown FDR for 6 MCV's, BL, BH and HOLM
Standardized mean distances from control=2
Sample size=6

APPENDIX VI MCV'S WITH LARGEST POWER

Table 1

LARGEST POWER FOR MCV VALUES (SD & SD)

m=14, q=.05, rh0=.5, df = infinity

Comparisons with a Control

nF	pp1	pp2	ap1	ap2	anp1	anp2
1	d(all)	d(all)	d(all)	d(all)	u2	d(all)
2	d(all)	d(all)	d2	d2	u2	d(all)
3	du2	d2	d2	d2	u2	d(all)
4	u2	u2	d2	u2	u2	u2
5	u2	u2	d1.645	d1.645	u2	u2
6	u2	du1.645	d1.645	d1.645	u2	u2
7	u1.645	u1.645	d1.645	u1.645	u2	u2
8	u1.645	u1.645	u1	d1	u2	u2
9	u1.645	u1.645	u1	d1	u2	u2
10	u1.645	d1	u1	d1	u2	u2
11	u1	d1	u1	u1	u2	u2
12	u1	u1	u.6	u1	u2	u2
13	u.5	u.6	u.5	u.5	u.5	u2
14	u.5	u.5	u.5	u.5	u.5	u2

TABLE 1

Values of MCV for which Power is Largest

(d represents stepdown MCV value; u represents stepup MCV value)

Table 2

LARGEST POWER FOR MCV VALUES (SD & SU)

m=100, q=.05, rho=.5, df=infinity

Comparisons with a Control

nF	pp1	pp2	ap1	ap2	anp1	anp2
1	d(all)	d(all)	d(all)	d(all)	d(all)	d(all)
2	d(all)	d(all)	u1	d(all)	d(all)	d(all)
3	d(all)	d(all)	u1	d2	d(all)	d(all)
4	d(all)	d(all)	u1	d2	d(all)	d(all)
5	d(all)	d(all)	u1	d2	d(all)	d(all)
6	d(all)	d(all)	u1	d2	d(all)	d(all)
7	u2	d(all)	u1	d2	d(all)	d(all)
8	u2	d(all)	u1	d2	d(all)	d(all)
9	u2	d(all)	u1	d2	d(all)	d(all)
10	u2	d2	u1	d2	d(all)	d(all)
11	u2	d2	u1	d2	d(all)	d(all)
12	u2	d2	u1	d2	d(all)	u2
13	u2	d2	u1	d2	d(all)	u2
14	u2	d2	u1	d2	d(all)	u2
15	u2	d2	u1	d2	d(all)	u2
16	u2	d2	u1	d2	d(all)	u2
17	u2	d2	u1	d2	d(all)	u2
18	u2	d2	u1	d2	d(all)	u2
19	u2	d2	u1	d2	d(all)	u2
20	u2	d2	u1	d2	d(all)	u2
21	u2	d2	u1	d2	d(all)	u2
22	u2	d2	u1	d2	d(all)	u2
23	u2	d2	u1	d2	d(all)	u2

24	u2	d2	u1	d2	u2	u2
25	u2	d2	u1	d2	u2	u2
26	u2	du2	u1	du2	u2	u2
27	u2	u2	u1	du2	u2	u2
28	u2	u2	u1	du2	u2	u2
29	u2	u2	u1	du2	u2	u2
30	u2	u2	u1	du2	u2	u2
31	u2	u2	u1	d1.645	u2	u2
32	u2	u2	u1	d1.645	u2	u2
33	u2	u2	u1	d1.645	u2	u2
34	u2	u2	u1	d1.645	u2	u2
35	u2	u2	u1	d1.645	u2	u2
36	u2	u2	u1	d1.645	u2	u2
37	u2	du2	u1	d1.645	u2	u2
38	u2	d1.645	u1	d1.645	u2	u2
39	u2	d1.645	u1	d1.645	u2	u2
40	u2	d1.645	u1	d1.645	u2	u2
41	u2	d1.645	u1	d1.645	u2	u2
42	u2	d1.645	u1	d1.645	u2	u2
43	u2	d1.645	u1	d1.645	u2	u2
44	u1.645	d1.645	u1	d1.645	u2	u2
45	u1.645	d1.645	u1	d1.645	u2	u2
46	u1.645	d1.645	u1	d1.645	u2	u2
47	u1.645	d1.645	u1	d1.645	u2	u2
48	u1.645	d1.645	u1	d1.645	u2	u2
49	u1.645	d1.645	u1	d1.645	u2	u2
50	u1.645	du1.645	u1	d1.645	u2	u2
51	u1.645	u1.645	u1	d1.645	u2	u2
52	u1.645	u1.645	u1	d1.645	u2	u2
53	u1.645	u1.645	u1	d1.645	u2	u2
54	u1.645	u1.645	u1	d1	u2	u2
55	u1.645	u1.645	u1	d1	u2	u2
56	u1.645	u1.645	u1	d1	u2	u2
57	u1.645	u1.645	u1	d0	u2	u2
58	u1.645	u1.645	u1	d1	u2	u2
59	u1.645	u1.645	u1	d1	u2	u2
60	u1.645	u1.645	u1	d1	u2	u2
61	u1.645	u1.645	u1	d1	u2	u2
62	u1.645	d1	u1	d1	u2	u2
63	u1.645	d1	u1	d1	u2	u2
64	u1.645	d1	u1	d1	u2	u2
65	u1.645	d1	u1	d1	u2	u2
66	u1.645	d1	u1	d1	u2	u2
67	u1.645	d1	u1	d1	u2	u2
68	u1.645	d1	u1	d1	u2	u2
69	u1.645	d1	u1	d1	u2	u2
70	u1.645	d1	u1	d1	u2	u2

71	u1.645	d1	u1	d1	u2	u2
72	u1,1.645	d1	d0	d1	u2	u2
73	u1	d1	d0	d1	u2	u2
74	u1	d1	d0	d1	u2	u2
75	u1	d1	d0	u1	u2	u2
76	u1	d1	d0	u1	u2	u2
77	u1	d1	d0	u1	u2	u2
78	u1	d1	d0	u1	u2	u2
79	u1	u1	d0	u1	u2	u2
80	u1	u1	d0	u1	u2	u2
81	u1	u1	d0	u1	u2	u2
82	u1	u1	d0	u1	u2	u2
83	u1	u1	d0	u1	u2	u2
84	u1	u1	d0	d0	u2	u2
85	u1	u1	d0	d0	u2	u2
86	u1	u1	d0	d0	u2	u2
87	u1	u1	d0	d0	u2	u2
88	u1	u1	d0	d0	u2	u2
89	u1	u1	d0	d0	u2	u2
90	u1	u1	d0	d0	u2	u2
91	u1	u1	d0	d0	u2	u2
92	u1	u1	d-1.2	d0	u2	u2
93	u1	u1	d-1.2	d0	u2	u2
94	u1	u1	d-1.2	d0	u2	u2
95	u1	u1	d-1.2	d-1.2	u2	u2
96	u1	u1	d-1.2	d-1.2	u2	u2
97	u1	d-1.2,0	d-1.2	d-1.2	u2	u2
98	u1	d-1.2,0	d-1.2	d-1.2	u2	u2
99	u1	d-1.2,0	d-1.2	d-1.2	u2	u2
100	u1	d-1.2	d-1.2	d-1.2	u2	u2

Table 2

Values of MCV for which Power is Largest

(d represents stepdown MCV value; u represents stepup MCV value)