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TABLES OF REQUIRED SAMPLE SIZE FOR PAIRWISE COMPARISONS.(U)
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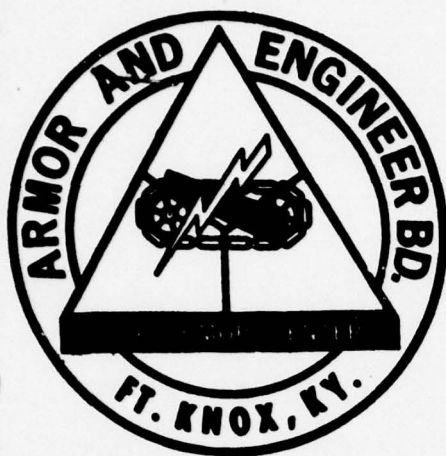
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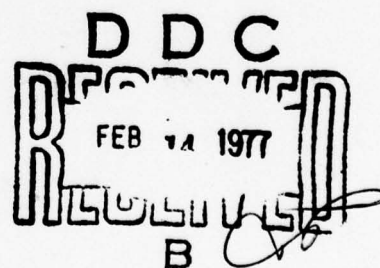
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TECHNICAL MEMORANDUM 2-77

TABLES OF REQUIRED SAMPLE SIZE
FOR PAIRWISE COMPARISONS

BY
HENRY I. JEHAN, JR.
7 FEBRUARY 1977

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20. ABSTRACT (Continue on reverse side if necessary and identify by block number) This memorandum consists of tables of sample sizes required to make pairwise comparisons between populations at specified levels of confidence and discrimination. They assume normally distributed data at a predictable probability of occurrence.		

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TABLES OF REQUIRED SAMPLE SIZE FOR PAIRWISE COMPARISONS

1. The tables at appendixes A and B have been assembled to provide a ready reference to the sample sizes required to make pairwise comparisons between populations at specified levels of confidence (α and β) and discrimination (Δ). They assume normally distributed data at a predicable probability of occurrence.
2. The tables can be used to identify the sample size required to show a given level of discrimination at a given level of confidence when comparing two populations or to identify the levels of confidence and discrimination available from a given sample size.

Example 1. Find the sample size required to test for a ± 0.10 difference between two rifled projectiles at a producer's risk of 0.15 and a user's risk of 0.10. Historically, the probability of hit for such devices is 0.30.

$P(A)$ = Probability of occurrence = 0.30

β = Consumer's risk (probability of a type II error) = 0.10

α = Producer's risk (probability of a type I error) = 0.15

Δ = Difference between systems = ± 0.10

Because the sign of the difference does not matter we look in Table A and find $N = 168$. The comparative sample must be 168 rounds from each system.

Example 2. Given that the cost considerations applied to Example 1 limit the sample size to 50 rounds, determine the levels of α , β , and Δ attainable.

$P(A) = \text{Probability of occurrence} = 0.30$

$N = 50$

Because the problem is the same as in example, Table A is used. Looking in the table for various N 's near 50, we find the following.

N	α	β	Δ
50	0.250	0.150	0.150
47	0.200	0.200	0.150
47	0.150	0.250	0.150
51	0.200	0.050	0.200
51	0.100	0.100	0.200
47	0.050	0.200	0.200
50	0.050	0.050	0.250

This data represents the best mixes of α , β , and Δ available with a sample size of 50 if the probability of occurrence is 0.30. The smallest measurable difference is 0.15. If this is greater than the difference between the current system and the design criteria of the new system (i.e., probability of hit in the ROC is 0.40; therefore, Δ in the ROC equals 0.10). The test at this sample size will involve risks greater than .25.

APPENDIX A

SAMPLE SIZE REQUIRED TO DETECT A DIFFERENCE OF PRESCRIBED MAGNITUDE FROM A STANDARD PROPORTION WHEN THE SIGN OF THE DIFFERENCE IS NOT IMPORTANT

REFERENCE: AMCP 706-111, PARAGRAPH 8-1.4

DATA NOTES

PROBABILITY OF OCCURRENCE IS THE KNOWN PROPORTION OF THE POPULATION OF STANDARD ITEMS WHICH EXHIBIT THE PERTINENT CHARACTERISTIC. THIS MAY BE KNOWN FROM THE PROCESS HISTORY, OR MAY BE GIVEN BY THE REQUIREMENTS OF A SPECIFICATION OR A STANDARD

PROBABILITY OF DEVIATION IS COMPUTED AS:

PROBABILITY OF OCCURRENCE PLUS DELTA, IF PROBABILITY OF OCCURRENCE IS LESS THAN OR EQUAL TO 0.5
PROBABILITY OF OCCURRENCE MINUS DELTA IF PROBABILITY OF OCCURRENCE IS GREATER THAN 0.5

EQUATION

$$N = \frac{\left(\frac{1 + \frac{1 - \alpha}{2}}{1 - \alpha} \right)^2}{\frac{1 - \alpha}{2} - \frac{1 - \beta}{2}}$$

WHERE D = (2 X ARCSINE SQUARE ROOT OF PROBABILITY OF DEVIATION) - (2 X ARCSINE SQUARE ROOT OF PROBABILITY OF OCCURRENCE)

SAMPLE SIZES FOR PAIRED ANALYSIS WHERE THE SIGN OF THE DIFFERENCE IS NOT IMPORTANT
 SAMPLE SIZE (N) FOR A GIVEN VALUE OF MAGNITUDE (DELTA), WITH A SPECIFIC PROBABILITY OF A TYPE I ERROR (ALPHA) FOR

PROBABILITY OF OCCURRENCE = .050 PROBABILITY OF TYPE II ERROR (BETA) = .050

ALPHA = .050	ALPHA = .100	ALPHA = .150	ALPHA = .200	ALPHA = .250
DELTA	DELTA	DELTA	DELTA	DELTA
.050	.050	.050	.050	.050
351	293	257	232	211
.100	.100	.100	.100	.100
110	92	81	73	66
.150	.150	.150	.150	.150
58	48	42	38	35
.200	.200	.200	.200	.200
37	31	27	25	22
.250	.250	.250	.250	.250
26	22	19	18	16

PROBABILITY OF OCCURRENCE = .050 PROBABILITY OF TYPE II ERROR (BETA) = .100

ALPHA = .050	ALPHA = .100	ALPHA = .150	ALPHA = .200	ALPHA = .250
DELTA	DELTA	DELTA	DELTA	DELTA
.050	.050	.050	.050	.050
284	232	201	178	160
.100	.100	.100	.100	.100
89	73	63	56	50
.150	.150	.150	.150	.150
47	38	33	29	27
.200	.200	.200	.200	.200
30	25	21	19	17
.250	.250	.250	.250	.250
21	18	15	14	12

PROBABILITY OF OCCURRENCE = .050 PROBABILITY OF TYPE II ERROR (BETA) = .150

ALPHA = .050	ALPHA = .100	ALPHA = .150	ALPHA = .200	ALPHA = .250
DELTA	DELTA	DELTA	DELTA	DELTA
.050	.050	.050	.050	.050
243	195	166	146	129
.100	.100	.100	.100	.100
76	61	52	46	41
.150	.150	.150	.150	.150
40	32	28	24	22
.200	.200	.200	.200	.200
26	21	18	16	14
.250	.250	.250	.250	.250
18	15	13	11	10

PROBABILITY OF OCCURRENCE = .050 PROBABILITY OF TYPE II ERROR (BETA) = .200

ALPHA = .050	ALPHA = .100	ALPHA = .150	ALPHA = .200	ALPHA = .250
DELTA	DELTA	DELTA	DELTA	DELTA
.050	.050	.050	.050	.050
214	167	141	122	108
.100	.100	.100	.100	.100
67	53	44	39	34
.150	.150	.150	.150	.150
35	28	23	20	18
.200	.200	.200	.200	.200
23	18	15	13	12
.250	.250	.250	.250	.250
16	13	11	9	8

PROBABILITY OF OCCURRENCE = .050 PROBABILITY OF TYPE II ERROR (BETA) = .250

ALPHA = .050	ALPHA = .100	ALPHA = .150	ALPHA = .200	ALPHA = .250
DELTA	DELTA	DELTA	DELTA	DELTA
.050	.050	.050	.050	.050
188	146	121	104	90
.100	.100	.100	.100	.100
59	46	38	33	29
.150	.150	.150	.150	.150
31	24	20	17	15
.200	.200	.200	.200	.200
20	16	13	11	10
.250	.250	.250	.250	.250
14	11	9	8	7

SAMPLE SIZES FOR PAIRED ANALYSIS WHERE THE SIGN OF THE DIFFERENCE IS NOT IMPORTANT
 SAMPLE SIZE (N) FOR A GIVEN VALUE OF MAGNITUDE (DELTA), WITH A SPECIFIC PROBABILITY OF A TYPE I ERROR (ALPHA) FOR

PROBABILITY OF OCCURRENCE = .100 PROBABILITY OF TYPE II ERROR (BETA) = .050

ALPHA = .050	ALPHA = .100	ALPHA = .150	ALPHA = .200	ALPHA = .250
DELTA	DELTA	DELTA	DELTA	DELTA
.050	564	470	372	339
.100	162	135	107	97
.150	80	67	53	48
.200	49	41	33	30
.250	34	28	23	21

PROBABILITY OF OCCURRENCE = .100 PROBABILITY OF TYPE II ERROR (BETA) = .100

ALPHA = .050	ALPHA = .100	ALPHA = .150	ALPHA = .200	ALPHA = .250
DELTA	DELTA	DELTA	DELTA	DELTA
.050	456	372	285	257
.100	131	107	82	74
.150	65	53	41	37
.200	40	33	25	23
.250	28	23	17	16

PROBABILITY OF OCCURRENCE = .100 PROBABILITY OF TYPE II ERROR (BETA) = .150

ALPHA = .050	ALPHA = .100	ALPHA = .150	ALPHA = .200	ALPHA = .250
DELTA	DELTA	DELTA	DELTA	DELTA
.050	390	312	233	208
.100	112	90	67	60
.150	56	45	33	30
.200	34	28	21	18
.250	24	19	14	13

PROBABILITY OF OCCURRENCE = .100 PROBABILITY OF TYPE II ERROR (BETA) = .200

ALPHA = .050	ALPHA = .100	ALPHA = .150	ALPHA = .200	ALPHA = .250
DELTA	DELTA	DELTA	DELTA	DELTA
.050	341	269	196	172
.100	98	77	57	50
.150	49	38	28	25
.200	30	24	17	15
.250	21	16	12	11

PROBABILITY OF OCCURRENCE = .100 PROBABILITY OF TYPE II ERROR (BETA) = .250

ALPHA = .050	ALPHA = .100	ALPHA = .150	ALPHA = .200	ALPHA = .250
DELTA	DELTA	DELTA	DELTA	DELTA
.050	301	234	166	145
.100	87	67	48	42
.150	43	33	24	21
.200	27	21	15	13
.250	18	14	10	9

SAMPLE SIZES FOR PAIRED ANALYSIS WHERE THE SIGN OF THE DIFFERENCE IS NOT IMPORTANT
 SAMPLE SIZE (N) FOR A GIVEN VALUE OF MAGNITUDE (DELTA), WITH A SPECIFIC PROBABILITY OF A TYPE I ERROR (ALPHA) FOR

PROBABILITY OF OCCURANCE = .150 PROBABILITY OF TYPE II ERROR (BETA) = .050

ALPHA = .050			ALPHA = .100			ALPHA = .150			ALPHA = .200			ALPHA = .250		
DELTA	SAMPLE		DELTA	SAMPLE		DELTA	SAMPLE		DELTA	SAMPLE		DELTA	SAMPLE	
.050	748		.050	623		.050	548		.050	493		.050	450	
.100	205		.100	171		.100	151		.100	136		.100	124	
.150	99		.150	82		.150	72		.150	65		.150	59	
.200	59		.200	49		.200	43		.200	39		.200	36	
.250	40		.250	33		.250	29		.250	26		.250	24	

PROBABILITY OF OCCURANCE = .150 PROBABILITY OF TYPE II ERROR (BETA) = .100

ALPHA = .050			ALPHA = .100			ALPHA = .150			ALPHA = .200			ALPHA = .250		
DELTA	SAMPLE		DELTA	SAMPLE		DELTA	SAMPLE		DELTA	SAMPLE		DELTA	SAMPLE	
.050	605		.050	493		.050	426		.050	378		.050	340	
.100	166		.100	136		.100	117		.100	104		.100	94	
.150	80		.150	65		.150	56		.150	50		.150	45	
.200	48		.200	39		.200	34		.200	30		.200	27	
.250	32		.250	26		.250	23		.250	20		.250	18	

PROBABILITY OF OCCURANCE = .150 PROBABILITY OF TYPE II ERROR (BETA) = .150

ALPHA = .050			ALPHA = .100			ALPHA = .150			ALPHA = .200			ALPHA = .250		
DELTA	SAMPLE		DELTA	SAMPLE		DELTA	SAMPLE		DELTA	SAMPLE		DELTA	SAMPLE	
.050	516		.050	414		.050	353		.050	309		.050	278	
.100	142		.100	114		.100	97		.100	85		.100	76	
.150	68		.150	55		.150	47		.150	41		.150	37	
.200	41		.200	33		.200	28		.200	25		.200	22	
.250	28		.250	22		.250	19		.250	17		.250	15	

PROBABILITY OF OCCURANCE = .150 PROBABILITY OF TYPE II ERROR (BETA) = .200

ALPHA = .050			ALPHA = .100			ALPHA = .150			ALPHA = .200			ALPHA = .250		
DELTA	SAMPLE		DELTA	SAMPLE		DELTA	SAMPLE		DELTA	SAMPLE		DELTA	SAMPLE	
.050	452		.050	356		.050	300		.050	260		.050	229	
.100	124		.100	98		.100	83		.100	72		.100	63	
.150	60		.150	47		.150	40		.150	35		.150	30	
.200	36		.200	28		.200	24		.200	21		.200	18	
.250	24		.250	19		.250	16		.250	14		.250	13	

PROBABILITY OF OCCURANCE = .150 PROBABILITY OF TYPE II ERROR (BETA) = .250

ALPHA = .050			ALPHA = .100			ALPHA = .150			ALPHA = .200			ALPHA = .250		
DELTA	SAMPLE		DELTA	SAMPLE		DELTA	SAMPLE		DELTA	SAMPLE		DELTA	SAMPLE	
.050	399		.050	310		.050	257		.050	220		.050	192	
.100	110		.100	85		.100	71		.100	61		.100	53	
.150	53		.150	41		.150	34		.150	29		.150	26	
.200	32		.200	25		.200	21		.200	18		.200	16	
.250	22		.250	17		.250	14		.250	12		.250	11	

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SAMPLE SIZES FOR PAIRED ANALYSIS WHERE THE SIGN OF THE DIFFERENCE IS NOT IMPORTANT
 SAMPLE SIZE (N) FOR A GIVEN VALUE OF MAGNITUDE OF DELTA, WITH A SPECIFIC PROBABILITY OF A TYPE I ERROR (ALPHA) FOR

PROBABILITY OF OCCURRENCE = .200 PROBABILITY OF TYPE II ERROR (BETA) = .050

ALPHA = .050			ALPHA = .100			ALPHA = .150			ALPHA = .200			ALPHA = .250		
DELTA	SAMPLE		DELTA	SAMPLE		DELTA	SAMPLE		DELTA	SAMPLE		DELTA	SAMPLE	
.050	404		.050	753		.050	662		.050	596		.050	544	
.100	242		.100	202		.100	177		.100	160		.100	146	
.150	114		.150	95		.150	83		.150	75		.150	69	
.200	67		.200	56		.200	49		.200	44		.200	40	
.250	45		.250	37		.250	33		.250	30		.250	27	

PROBABILITY OF OCCURRENCE = .200 PROBABILITY OF TYPE II ERROR (BETA) = .100

ALPHA = .050			ALPHA = .100			ALPHA = .150			ALPHA = .200			ALPHA = .250		
DELTA	SAMPLE		DELTA	SAMPLE		DELTA	SAMPLE		DELTA	SAMPLE		DELTA	SAMPLE	
.050	732		.050	596		.050	516		.050	458		.050	412	
.100	196		.100	160		.100	138		.100	123		.100	110	
.150	92		.150	75		.150	65		.150	58		.150	52	
.200	54		.200	44		.200	38		.200	34		.200	31	
.250	36		.250	30		.250	26		.250	23		.250	21	

PROBABILITY OF OCCURRENCE = .200 PROBABILITY OF TYPE II ERROR (BETA) = .150

ALPHA = .050			ALPHA = .100			ALPHA = .150			ALPHA = .200			ALPHA = .250		
DELTA	SAMPLE		DELTA	SAMPLE		DELTA	SAMPLE		DELTA	SAMPLE		DELTA	SAMPLE	
.050	625		.050	500		.050	427		.050	374		.050	333	
.100	167		.100	134		.100	114		.100	100		.100	89	
.150	79		.150	63		.150	54		.150	47		.150	42	
.200	46		.200	37		.200	32		.200	28		.200	25	
.250	31		.250	25		.250	21		.250	19		.250	17	

PROBABILITY OF OCCURRENCE = .200 PROBABILITY OF TYPE II ERROR (BETA) = .200

ALPHA = .050			ALPHA = .100			ALPHA = .150			ALPHA = .200			ALPHA = .250		
DELTA	SAMPLE		DELTA	SAMPLE		DELTA	SAMPLE		DELTA	SAMPLE		DELTA	SAMPLE	
.050	547		.050	431		.050	363		.050	314		.050	277	
.100	146		.100	115		.100	97		.100	84		.100	74	
.150	69		.150	54		.150	46		.150	40		.150	35	
.200	41		.200	32		.200	27		.200	24		.200	21	
.250	27		.250	21		.250	18		.250	16		.250	14	

PROBABILITY OF OCCURRENCE = .200 PROBABILITY OF TYPE II ERROR (BETA) = .250

ALPHA = .050			ALPHA = .100			ALPHA = .150			ALPHA = .200			ALPHA = .250		
DELTA	SAMPLE		DELTA	SAMPLE		DELTA	SAMPLE		DELTA	SAMPLE		DELTA	SAMPLE	
.050	483		.050	375		.050	311		.050	267		.050	232	
.100	129		.100	100		.100	84		.100	72		.100	62	
.150	61		.150	47		.150	39		.150	34		.150	29	
.200	36		.200	28		.200	23		.200	20		.200	18	
.250	24		.250	19		.250	15		.250	13		.250	12	

SAMPLE SIZES FOR PAIRED ANALYSIS WHERE THE SIGN OF THE DIFFERENCE IS NOT IMPORTANT
 SAMPLE SIZE (N) FOR A GIVEN VALUE OF MAGNITUDE (DELTA), WITH A SPECIFIC PROBABILITY OF A TYPE I ERROR (ALPHA) FOR

PROBABILITY OF OCCURRENCE = .250 PROBABILITY OF TYPE II ERROR (BETA) = .050

ALPHA = .050			ALPHA = .100			ALPHA = .150			ALPHA = .200			ALPHA = .250		
DELTA	SAMPLE	DELTA	DELTA	SAMPLE	DELTA	DELTA	SAMPLE	DELTA	DELTA	SAMPLE	DELTA	DELTA	SAMPLE	DELTA
.050	1035	.050	.050	862	.050	.050	758	.050	.050	682	.050	.050	622	.050
.100	272	.100	.100	226	.100	.100	199	.100	.100	179	.100	.100	164	.100
.150	126	.150	.150	105	.150	.150	92	.150	.150	83	.150	.150	76	.150
.200	73	.200	.200	61	.200	.200	54	.200	.200	48	.200	.200	44	.200
.250	43	.250	.250	40	.250	.250	35	.250	.250	32	.250	.250	29	.250

PROBABILITY OF OCCURRENCE = .250 PROBABILITY OF TYPE II ERROR (BETA) = .100

ALPHA = .050			ALPHA = .100			ALPHA = .150			ALPHA = .200			ALPHA = .250		
DELTA	SAMPLE	DELTA	DELTA	SAMPLE	DELTA	DELTA	SAMPLE	DELTA	DELTA	SAMPLE	DELTA	DELTA	SAMPLE	DELTA
.050	837	.050	.050	682	.050	.050	590	.050	.050	524	.050	.050	471	.050
.100	220	.100	.100	179	.100	.100	155	.100	.100	138	.100	.100	124	.100
.150	102	.150	.150	83	.150	.150	72	.150	.150	64	.150	.150	57	.150
.200	59	.200	.200	48	.200	.200	42	.200	.200	37	.200	.200	33	.200
.250	38	.250	.250	32	.250	.250	28	.250	.250	24	.250	.250	22	.250

PROBABILITY OF OCCURRENCE = .250 PROBABILITY OF TYPE II ERROR (BETA) = .150

ALPHA = .050			ALPHA = .100			ALPHA = .150			ALPHA = .200			ALPHA = .250		
DELTA	SAMPLE	DELTA	DELTA	SAMPLE	DELTA	DELTA	SAMPLE	DELTA	DELTA	SAMPLE	DELTA	DELTA	SAMPLE	DELTA
.050	715	.050	.050	573	.050	.050	489	.050	.050	428	.050	.050	381	.050
.100	188	.100	.100	150	.100	.100	128	.100	.100	113	.100	.100	100	.100
.150	87	.150	.150	70	.150	.150	60	.150	.150	52	.150	.150	47	.150
.200	51	.200	.200	41	.200	.200	35	.200	.200	30	.200	.200	27	.200
.250	33	.250	.250	27	.250	.250	23	.250	.250	20	.250	.250	18	.250

PROBABILITY OF OCCURRENCE = .250 PROBABILITY OF TYPE II ERROR (BETA) = .200

ALPHA = .050			ALPHA = .100			ALPHA = .150			ALPHA = .200			ALPHA = .250		
DELTA	SAMPLE	DELTA	DELTA	SAMPLE	DELTA	DELTA	SAMPLE	DELTA	DELTA	SAMPLE	DELTA	DELTA	SAMPLE	DELTA
.050	625	.050	.050	493	.050	.050	415	.050	.050	360	.050	.050	316	.050
.100	164	.100	.100	130	.100	.100	109	.100	.100	95	.100	.100	83	.100
.150	76	.150	.150	60	.150	.150	51	.150	.150	44	.150	.150	39	.150
.200	44	.200	.200	35	.200	.200	30	.200	.200	26	.200	.200	23	.200
.250	29	.250	.250	23	.250	.250	19	.250	.250	17	.250	.250	15	.250

PROBABILITY OF OCCURRENCE = .250 PROBABILITY OF TYPE II ERROR (BETA) = .250

ALPHA = .050			ALPHA = .100			ALPHA = .150			ALPHA = .200			ALPHA = .250		
DELTA	SAMPLE	DELTA	DELTA	SAMPLE	DELTA	DELTA	SAMPLE	DELTA	DELTA	SAMPLE	DELTA	DELTA	SAMPLE	DELTA
.050	553	.050	.050	429	.050	.050	356	.050	.050	305	.050	.050	265	.050
.100	145	.100	.100	113	.100	.100	94	.100	.100	80	.100	.100	70	.100
.150	67	.150	.150	52	.150	.150	44	.150	.150	37	.150	.150	33	.150
.200	39	.200	.200	30	.200	.200	25	.200	.200	22	.200	.200	19	.200
.250	26	.250	.250	20	.250	.250	17	.250	.250	14	.250	.250	13	.250

SAMPLE SIZES FOR PAIRED ANALYSIS WHERE THE SIGN OF THE DIFFERENCE IS NOT IMPORTANT
 SAMPLE SIZE (N) FOR A GIVEN VALUE OF MAGNITUDE (DELTA), WITH A SPECIFIC PROBABILITY OF A TYPE I ERROR (ALPHA) FOR

PROBABILITY OF OCCURRENCE = .300 PROBABILITY OF TYPE II ERROR (BETA) = .050

ALPHA = .050	ALPHA = .100	ALPHA = .150	ALPHA = .200	ALPHA = .250
DELTA	DELTA	DELTA	DELTA	DELTA
.050	113	85	751	685
.100	205	246	194	177
.150	135	112	99	89
.200	77	64	57	51
.250	50	42	37	33

PROBABILITY OF OCCURRENCE = .300 PROBABILITY OF TYPE II ERROR (BETA) = .100

ALPHA = .050	ALPHA = .100	ALPHA = .150	ALPHA = .200	ALPHA = .250
DELTA	DELTA	DELTA	DELTA	DELTA
.050	922	751	650	577
.100	238	194	168	149
.150	109	89	77	68
.200	63	51	44	39
.250	41	33	29	26

PROBABILITY OF OCCURRENCE = .300 PROBABILITY OF TYPE II ERROR (BETA) = .150

ALPHA = .050	ALPHA = .100	ALPHA = .150	ALPHA = .200	ALPHA = .250
DELTA	DELTA	DELTA	DELTA	DELTA
.050	787	630	538	471
.100	204	163	139	122
.150	93	75	64	56
.200	54	43	37	32
.250	35	28	24	21

PROBABILITY OF OCCURRENCE = .300 PROBABILITY OF TYPE II ERROR (BETA) = .200

ALPHA = .050	ALPHA = .100	ALPHA = .150	ALPHA = .200	ALPHA = .250
DELTA	DELTA	DELTA	DELTA	DELTA
.050	689	543	457	396
.100	172	141	118	103
.150	81	64	54	47
.200	47	37	31	27
.250	30	24	20	18

PROBABILITY OF OCCURRENCE = .300 PROBABILITY OF TYPE II ERROR (BETA) = .250

ALPHA = .050	ALPHA = .100	ALPHA = .150	ALPHA = .200	ALPHA = .250
DELTA	DELTA	DELTA	DELTA	DELTA
.050	608	472	392	336
.100	158	122	102	87
.150	72	56	47	40
.200	41	32	27	23
.250	27	21	18	15

SAMPLE SIZE (N) FOR A GIVEN VALUE OF MAGNITUDE (Δ), WITH A SPECIFIC PROBABILITY OF A TYPE I ERROR (α) FOR SAMPLE SIZES FOR PAIRED ANALYSIS WHERE THE SIGN OF THE DIFFERENCE IS NOT IMPORTANT

PROBABILITY OF OCCURANCE = .350 PROBABILITY OF TYPE II ERROR (BETA) = .050

ALPHA = -.050		ALPHA = -.100		ALPHA = -.150		ALPHA = .200		ALPHA = .250	
DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE
.050	1718	.050	1014	.050	692	.050	803	.050	732
.100	311	.100	259	.100	229	.100	205	.100	187
.150	140	.150	117	.150	103	.150	93	.150	85
.200	80	.200	67	.200	59	.200	53	.200	48
.250	51	.250	43	.250	38	.250	34	.250	31

PROBABILITY OF OCCURRENCE = .350 PROBABILITY OF TYPE II ERROR (BETA) = .100

ALPHA = .050		ALPHA = .100		ALPHA = .150		ALPHA = .200		ALPHA = .250	
DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE
.050	965	.050	803	.050	694	.050	616	.050	554
.100	252	.100	205	.100	173	.100	158	.100	142
.150	114	.150	93	.150	80	.150	71	.150	64
.200	69	.200	53	.200	46	.200	41	.200	37
.250	42	.250	34	.250	29	.250	26	.250	24

PROBABILITY OF OCCURANCE = .350 PROBABILITY OF TYPE II ERROR (BETA) = .150

ALPHA = .050		ALPHA = .100		ALPHA = .150		ALPHA = .200		ALPHA = .250	
DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE
-.050	841	-.050	674	-.050	575	-.050	504	-.050	448
-.100	215	-.100	172	-.100	147	-.100	129	-.100	115
-.150	97	-.150	78	-.150	67	-.150	58	-.150	52
-.200	55	-.200	44	-.200	38	-.200	33	-.200	30
-.250	36	-.250	29	-.250	24	-.250	21	-.250	19

PROBABILITY OF OCCURRENCE = .350 PROBABILITY OF TYPE II ERROR (BETA) = .200

ALPHA = .050		ALPHA = .100		ALPHA = .150		ALPHA = .200		ALPHA = .250	
DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE
.050	736	.050	580	.050	488	.050	423	.050	372
.100	188	.100	148	.100	125	.100	108	.100	95
.150	85	.150	67	.150	57	.150	49	.150	43
.200	48	.200	38	.200	32	.200	25	.200	25
.250	31	.250	25	.250	21	.250	18	.250	16

PROBABILITY OF OCCURRENCE = .350 PROBABILITY OF TYPE II ERROR (BETA) = .250

ALPHA = .050.		ALPHA = .100.		ALPHA = .150.		ALPHA = .200.		ALPHA = .250.	
DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE
.050	650	.050	504	.050	419	.050	359	.050	312
.100	166	.100	129	.100	107	.100	92	.100	80
.150	75	.150	55	.150	49	.150	42	.150	36
.200	34	.200	23	.200	28	.200	24	.200	21
.250	24	.250	21	.250	18	.250	15	.250	13

SAMPLE SIZES FOR PAIRED ANALYSIS WHERE THE SIGN OF THE DIFFERENCE IS NOT IMPORTANT
 SAMPLE SIZE (N) FOR A GIVEN VALUE OF MAGNITUDE (DELTA), WITH A SPECIFIC PROBABILITY OF A TYPE I ERROR (ALPHA) FOR

PROBABILITY OF OCCURRENCE = .400 PROBABILITY OF TYPE II ERROR (BETA) = .050

ALPHA =	.050	.100	.150	.200	.250
DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE
.050	127	.050	133	.050	137
.100	321	.100	267	.100	212
.150	143	.150	120	.150	95
.200	81	.200	67	.200	53
.250	51	.250	43	.250	34

PROBABILITY OF OCCURRENCE = .400 PROBABILITY OF TYPE II ERROR (BETA) = .100

ALPHA =	.050	.100	.150	.200	.250
DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE
.050	1027	.050	837	.050	643
.100	263	.100	212	.100	163
.150	116	.150	95	.150	73
.200	65	.200	53	.200	41
.250	42	.250	34	.250	26

PROBABILITY OF OCCURRENCE = .400 PROBABILITY OF TYPE II ERROR (BETA) = .150

ALPHA =	.050	.100	.150	.200	.250
DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE
.050	877	.050	702	.050	525
.100	222	.100	178	.100	133
.150	93	.150	80	.150	60
.200	56	.200	45	.200	34
.250	36	.250	29	.250	21

PROBABILITY OF OCCURRENCE = .400 PROBABILITY OF TYPE II ERROR (BETA) = .200

ALPHA =	.050	.100	.150	.200	.250
DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE
.050	767	.050	605	.050	441
.100	194	.100	153	.100	112
.150	87	.150	69	.150	50
.200	49	.200	39	.200	28
.250	31	.250	25	.250	18

PROBABILITY OF OCCURRENCE = .400 PROBABILITY OF TYPE II ERROR (BETA) = .250

ALPHA =	.050	.100	.150	.200	.250
DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE
.050	678	.050	526	.050	374
.100	172	.100	133	.100	95
.150	77	.150	60	.150	43
.200	43	.200	34	.200	24
.250	24	.250	21	.250	15

SAMPLE SIZES FOR PAIRED ANALYSIS WHERE THE SIGN OF THE DIFFERENCE IS NOT IMPORTANT
 SAMPLE SIZE (N) FOR A GIVEN VALUE OF MAGNITUDE (DELTA), WITH A SPECIFIC PROBABILITY OF A TYPE I ERROR (ALPHA) FOR

PROBABILITY OF OCCURRENCE = .450 PROBABILITY OF TYPE II ERROR (BETA) = .050

ALPHA =	.050	.100	.150	.200	.250
DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE
.050	1296	.050	1074	.050	854
.100	324	.100	270	.100	214
.150	143	.150	120	.150	95
.200	80	.200	67	.200	53
.250	50	.250	42	.250	33

PROBABILITY OF OCCURRENCE = .450 PROBABILITY OF TYPE II ERROR (BETA) = .100

ALPHA =	.050	.100	.150	.200	.250
DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE
.050	1048	.050	854	.050	656
.100	262	.100	214	.100	164
.150	116	.150	95	.150	73
.200	65	.200	53	.200	41
.250	41	.250	33	.250	26

PROBABILITY OF OCCURRENCE = .450 PROBABILITY OF TYPE II ERROR (BETA) = .150

ALPHA =	.050	.100	.150	.200	.250
DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE
.050	895	.050	717	.050	536
.100	224	.100	180	.100	134
.150	99	.150	80	.150	60
.200	55	.200	44	.200	33
.250	35	.250	28	.250	21

PROBABILITY OF OCCURRENCE = .450 PROBABILITY OF TYPE II ERROR (BETA) = .200

ALPHA =	.050	.100	.150	.200	.250
DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE
.050	783	.050	617	.050	450
.100	196	.100	155	.100	113
.150	87	.150	69	.150	50
.200	48	.200	38	.200	28
.250	30	.250	24	.250	18

PROBABILITY OF OCCURRENCE = .450 PROBABILITY OF TYPE II ERROR (BETA) = .250

ALPHA =	.050	.100	.150	.200	.250
DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE
.050	692	.050	536	.050	382
.100	173	.100	134	.100	96
.150	77	.150	60	.150	43
.200	43	.200	33	.200	24
.250	27	.250	21	.250	15

SAMPLE SIZES FOR PAIRED ANALYSIS WHERE THE SIGN OF THE DIFFERENCE IS NOT IMPORTANT
 SAMPLE SIZE (N) FOR A GIVEN VALUE OF MAGNITUDE (DELTA), WITH A SPECIFIC PROBABILITY OF A TYPE I ERROR (ALPHA) FOR

PROBABILITY OF OCCURRENCE = .500 PROBABILITY OF TYPE II ERROR (BETA) = .050

ALPHA = .050			ALPHA = .100			ALPHA = .150			ALPHA = .200			ALPHA = .250		
DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE	DELTA
.050	129	.050	1079	.050	854	.050	739	.050	656	.050	590	.050	534	.050
.100	221	.100	267	.100	235	.100	212	.100	183	.100	163	.100	146	.100
.150	140	.150	117	.150	103	.150	93	.150	80	.150	71	.150	64	.150
.200	77	.200	64	.200	57	.200	44	.200	39	.200	35	.200	32	.200
.250	48	.250	40	.250	35	.250	28	.250	24	.250	22	.250	20	.250

PROBABILITY OF OCCURRENCE = .500 PROBABILITY OF TYPE II ERROR (BETA) = .100

ALPHA = .050			ALPHA = .100			ALPHA = .150			ALPHA = .200			ALPHA = .250		
DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE	DELTA
.050	1048	.050	854	.050	739	.050	656	.050	590	.050	534	.050	477	.050
.100	260	.100	212	.100	183	.100	163	.100	146	.100	133	.100	118	.100
.150	114	.150	93	.150	80	.150	71	.150	64	.150	58	.150	52	.150
.200	63	.200	51	.200	44	.200	39	.200	35	.200	32	.200	29	.200
.250	37	.250	32	.250	28	.250	24	.250	22	.250	20	.250	18	.250

PROBABILITY OF OCCURRENCE = .500 PROBABILITY OF TYPE II ERROR (BETA) = .150

ALPHA = .050			ALPHA = .100			ALPHA = .150			ALPHA = .200			ALPHA = .250		
DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE	DELTA
.050	895	.050	717	.050	612	.050	534	.050	477	.050	420	.050	363	.050
.100	222	.100	178	.100	152	.100	133	.100	118	.100	103	.100	98	.100
.150	97	.150	78	.150	67	.150	58	.150	52	.150	46	.150	43	.150
.200	54	.200	43	.200	37	.200	32	.200	29	.200	26	.200	24	.200
.250	33	.250	27	.250	23	.250	20	.250	18	.250	16	.250	15	.250

PROBABILITY OF OCCURRENCE = .500 PROBABILITY OF TYPE II ERROR (BETA) = .200

ALPHA = .050			ALPHA = .100			ALPHA = .150			ALPHA = .200			ALPHA = .250		
DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE	DELTA
.050	783	.050	617	.050	520	.050	450	.050	396	.050	349	.050	302	.050
.100	194	.100	153	.100	129	.100	112	.100	98	.100	88	.100	80	.100
.150	85	.150	67	.150	57	.150	49	.150	43	.150	38	.150	34	.150
.200	47	.200	37	.200	31	.200	27	.200	24	.200	21	.200	19	.200
.250	29	.250	23	.250	19	.250	17	.250	15	.250	14	.250	13	.250

PROBABILITY OF OCCURRENCE = .500 PROBABILITY OF TYPE II ERROR (BETA) = .250

ALPHA = .050			ALPHA = .100			ALPHA = .150			ALPHA = .200			ALPHA = .250		
DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE	DELTA
.050	692	.050	536	.050	446	.050	382	.050	332	.050	295	.050	268	.050
.100	172	.100	133	.100	111	.100	95	.100	83	.100	75	.100	68	.100
.150	75	.150	58	.150	49	.150	42	.150	36	.150	32	.150	29	.150
.200	41	.200	32	.200	27	.200	23	.200	20	.200	18	.200	16	.200
.250	26	.250	20	.250	17	.250	14	.250	13	.250	12	.250	11	.250

SAMPLE SIZES FOR PAIRED ANALYSIS WHERE THE SIGN OF THE DIFFERENCE IS NOT IMPORTANT
 SAMPLE SIZE (N) FOR A GIVEN VALUE OF MAGNITUDE (DELTA), WITH A SPECIFIC PROBABILITY OF A TYPE I ERROR (ALPHA) FOR

PROBABILITY OF OCCURRENCE = .550 PROBABILITY OF TYPE II ERROR (BETA) = .050

ALPHA =	.050	.100	.150	.200	.250
DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE
.050	1276	.050	1079	.050	854
.100	324	.100	270	.100	214
.150	143	.150	120	.150	95
.200	80	.200	67	.200	53
.250	50	.250	42	.250	33

PROBABILITY OF OCCURRENCE = .550 PROBABILITY OF TYPE II ERROR (BETA) = .100

ALPHA =	.050	.100	.150	.200	.250
DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE
.050	1048	.050	854	.050	656
.100	262	.100	214	.100	164
.150	116	.150	95	.150	73
.200	65	.200	53	.200	41
.250	41	.250	33	.250	26

PROBABILITY OF OCCURRENCE = .550 PROBABILITY OF TYPE II ERROR (BETA) = .150

ALPHA =	.050	.100	.150	.200	.250
DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE
.050	895	.050	717	.050	536
.100	224	.100	180	.100	134
.150	99	.150	80	.150	60
.200	55	.200	44	.200	33
.250	35	.250	28	.250	21

PROBABILITY OF OCCURRENCE = .550 PROBABILITY OF TYPE II ERROR (BETA) = .200

ALPHA =	.050	.100	.150	.200	.250
DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE
.050	783	.050	617	.050	450
.100	196	.100	155	.100	113
.150	87	.150	68	.150	50
.200	48	.200	38	.200	28
.250	30	.250	24	.250	18

PROBABILITY OF OCCURRENCE = .550 PROBABILITY OF TYPE II ERROR (BETA) = .250

ALPHA =	.050	.100	.150	.200	.250
DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE
.050	692	.050	536	.050	382
.100	173	.100	134	.100	96
.150	77	.150	60	.150	43
.200	44	.200	33	.200	24
.250	27	.250	21	.250	15

SAMPLE SIZES FOR PAIRED ANALYSIS WHERE THE SIGN OF THE DIFFERENCE IS NOT IMPORTANT
 SAMPLE SIZE (N) FOR A GIVEN VALUE OF MAGNITUDE (DELTA), WITH A SPECIFIC PROBABILITY OF A TYPE I ERROR (ALPHA) FOR

PROBABILITY OF OCCURRENCE = .600 PROBABILITY OF TYPE II ERROR (BETA) = .050

ALPHA = .050	ALPHA = .100	ALPHA = .150	ALPHA = .200	ALPHA = .250
DELTA	DELTA	DELTA	DELTA	DELTA
.050	1270	1056	837	763
.100	321	267	212	193
.150	143	120	95	86
.200	81	67	53	49
.250	51	43	34	31

PROBABILITY OF OCCURRENCE = .600 PROBABILITY OF TYPE II ERROR (BETA) = .100

ALPHA = .050	ALPHA = .100	ALPHA = .150	ALPHA = .200	ALPHA = .250
DELTA	DELTA	DELTA	DELTA	DELTA
.050	1027	837	643	578
.100	260	212	163	146
.150	116	95	73	66
.200	65	53	41	37
.250	42	34	26	24

PROBABILITY OF OCCURRENCE = .600 PROBABILITY OF TYPE II ERROR (BETA) = .150

ALPHA = .050	ALPHA = .100	ALPHA = .150	ALPHA = .200	ALPHA = .250
DELTA	DELTA	DELTA	DELTA	DELTA
.050	877	702	525	467
.100	222	178	133	118
.150	99	80	60	53
.200	56	45	34	30
.250	36	29	21	19

PROBABILITY OF OCCURRENCE = .600 PROBABILITY OF TYPE II ERROR (BETA) = .200

ALPHA = .050	ALPHA = .100	ALPHA = .150	ALPHA = .200	ALPHA = .250
DELTA	DELTA	DELTA	DELTA	DELTA
.050	767	605	441	388
.100	194	153	112	98
.150	87	69	50	44
.200	49	39	28	25
.250	31	25	18	16

PROBABILITY OF OCCURRENCE = .600 PROBABILITY OF TYPE II ERROR (BETA) = .250

ALPHA = .050	ALPHA = .100	ALPHA = .150	ALPHA = .200	ALPHA = .250
DELTA	DELTA	DELTA	DELTA	DELTA
.050	678	526	374	325
.100	172	133	95	83
.150	77	60	43	37
.200	43	34	24	21
.250	28	21	15	13

SAMPLE SIZES FOR PAIRED ANALYSIS WHERE THE SIGN OF THE DIFFERENCE IS NOT IMPORTANT
 SAMPLE SIZE 100 FOR A GIVEN VALUE OF MAGNITUDE (DELTA), WITH A SPECIFIC PROBABILITY OF A TYPE I ERROR (ALPHA) FOR

PROBABILITY OF OCCURRENCE = .650 PROBABILITY OF TYPE II ERROR (BETA) = .050

ALPHA = .050	ALPHA = .100	ALPHA = .150	ALPHA = .200	ALPHA = .250
DELTA	DELTA	DELTA	DELTA	DELTA
.050	.050	.050	.050	.050
1216	1014	692	803	732
.100	.100	.100	.100	.100
311	259	103	205	187
.150	.150	.150	.150	.150
140	117	103	93	85
.200	.200	.200	.200	.200
80	67	59	53	48
.250	.250	.250	.250	.250
51	43	38	34	31

PROBABILITY OF OCCURRENCE = .650 PROBABILITY OF TYPE II ERROR (BETA) = .100

ALPHA = .050	ALPHA = .100	ALPHA = .150	ALPHA = .200	ALPHA = .250
DELTA	DELTA	DELTA	DELTA	DELTA
.050	.050	.050	.050	.050
985	803	694	616	554
.100	.100	.100	.100	.100
252	205	178	158	142
.150	.150	.150	.150	.150
114	93	80	71	64
.200	.200	.200	.200	.200
65	53	46	41	37
.250	.250	.250	.250	.250
42	34	29	26	24

PROBABILITY OF OCCURRENCE = .650 PROBABILITY OF TYPE II ERROR (BETA) = .150

ALPHA = .050	ALPHA = .100	ALPHA = .150	ALPHA = .200	ALPHA = .250
DELTA	DELTA	DELTA	DELTA	DELTA
.050	.050	.050	.050	.050
841	674	575	504	448
.100	.100	.100	.100	.100
215	172	147	129	115
.150	.150	.150	.150	.150
97	78	67	58	52
.200	.200	.200	.200	.200
55	44	38	33	30
.250	.250	.250	.250	.250
36	29	24	21	19

PROBABILITY OF OCCURRENCE = .650 PROBABILITY OF TYPE II ERROR (BETA) = .200

ALPHA = .050	ALPHA = .100	ALPHA = .150	ALPHA = .200	ALPHA = .250
DELTA	DELTA	DELTA	DELTA	DELTA
.050	.050	.050	.050	.050
736	580	488	423	372
.100	.100	.100	.100	.100
186	148	125	108	95
.150	.150	.150	.150	.150
85	67	57	49	43
.200	.200	.200	.200	.200
48	38	32	28	25
.250	.250	.250	.250	.250
31	25	21	18	16

PROBABILITY OF OCCURRENCE = .650 PROBABILITY OF TYPE II ERROR (BETA) = .250

ALPHA = .050	ALPHA = .100	ALPHA = .150	ALPHA = .200	ALPHA = .250
DELTA	DELTA	DELTA	DELTA	DELTA
.050	.050	.050	.050	.050
650	504	419	359	312
.100	.100	.100	.100	.100
166	129	107	92	80
.150	.150	.150	.150	.150
75	58	49	42	36
.200	.200	.200	.200	.200
43	33	28	24	21
.250	.250	.250	.250	.250
26	21	18	15	13

SAMPLE SIZES FOR PAIRED ANALYSIS WHERE THE SIGN OF THE DIFFERENCE IS NOT IMPORTANT
 SAMPLE SIZE (N) FOR A GIVEN VALUE OF MAGNITUDE (DELTA), WITH A SPECIFIC PROBABILITY OF A TYPE I ERROR (ALPHA) FOR

PROBABILITY OF OCCURRENCE = .700 PROBABILITY OF TYPE II ERROR (BETA) = .050									
ALPHA = .050		ALPHA = .100		ALPHA = .150		ALPHA = .200		ALPHA = .250	
DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE
.050	1130	.050	249	.050	335	.050	351	.050	385
.100	295	.100	246	.100	216	.100	194	.100	177
.150	135	.150	112	.150	99	.150	89	.150	81
.200	77	.200	64	.200	57	.200	51	.200	47
.250	50	.250	42	.250	37	.250	33	.250	30
PROBABILITY OF OCCURRENCE = .700 PROBABILITY OF TYPE II ERROR (BETA) = .100									
ALPHA = .050		ALPHA = .100		ALPHA = .150		ALPHA = .200		ALPHA = .250	
DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE
.050	922	.050	751	.050	650	.050	577	.050	519
.100	238	.100	194	.100	168	.100	149	.100	134
.150	109	.150	89	.150	77	.150	68	.150	62
.200	63	.200	51	.200	44	.200	39	.200	35
.250	41	.250	33	.250	29	.250	26	.250	23
PROBABILITY OF OCCURRENCE = .700 PROBABILITY OF TYPE II ERROR (BETA) = .150									
ALPHA = .050		ALPHA = .100		ALPHA = .150		ALPHA = .200		ALPHA = .250	
DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE
.050	787	.050	630	.050	538	.050	471	.050	419
.100	204	.100	163	.100	139	.100	122	.100	109
.150	93	.150	75	.150	64	.150	56	.150	50
.200	54	.200	43	.200	37	.200	32	.200	29
.250	35	.250	28	.250	24	.250	21	.250	19
PROBABILITY OF OCCURRENCE = .700 PROBABILITY OF TYPE II ERROR (BETA) = .200									
ALPHA = .050		ALPHA = .100		ALPHA = .150		ALPHA = .200		ALPHA = .250	
DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE
.050	689	.050	543	.050	457	.050	396	.050	348
.100	170	.100	141	.100	118	.100	103	.100	90
.150	81	.150	64	.150	54	.150	47	.150	41
.200	47	.200	37	.200	31	.200	27	.200	24
.250	30	.250	24	.250	20	.250	18	.250	16
PROBABILITY OF OCCURRENCE = .700 PROBABILITY OF TYPE II ERROR (BETA) = .250									
ALPHA = .050		ALPHA = .100		ALPHA = .150		ALPHA = .200		ALPHA = .250	
DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE
.050	608	.050	472	.050	392	.050	336	.050	292
.100	158	.100	122	.100	102	.100	87	.100	76
.150	72	.150	56	.150	47	.150	40	.150	35
.200	41	.200	32	.200	27	.200	23	.200	20
.250	27	.250	21	.250	18	.250	15	.250	13

TABLE 1. SAMPLE SIZES FOR PAIRED ANALYSIS WHERE THE SIGN OF THE DIFFERENCE IS NOT IMPORTANT
 SAMPLE SIZE (N) FOR A GIVEN VALUE OF MAGNITUDE (DELTA), WITH A SPECIFIC PROBABILITY OF A TYPE I ERROR (ALPHA) FOR

PROBABILITY OF OCCURRENCE = .750 PROBABILITY OF TYPE II ERROR (BETA) = .050											
ALPHA = .050			ALPHA = .100			ALPHA = .150			ALPHA = .200		
DELTA	SAMPLE	DELTA	DELTA	SAMPLE	DELTA	DELTA	SAMPLE	DELTA	DELTA	SAMPLE	DELTA
.050	1035	.050	.050	562	.050	.050	758	.050	.050	662	.050
.100	272	.100	.100	226	.100	.100	199	.100	.100	179	.100
.150	126	.150	.150	105	.150	.150	92	.150	.150	83	.150
.200	73	.200	.200	61	.200	.200	54	.200	.200	48	.200
.250	48	.250	.250	40	.250	.250	35	.250	.250	32	.250
PROBABILITY OF OCCURRENCE = .750 PROBABILITY OF TYPE II ERROR (BETA) = .100											
ALPHA = .050			ALPHA = .100			ALPHA = .150			ALPHA = .200		
DELTA	SAMPLE	DELTA	DELTA	SAMPLE	DELTA	DELTA	SAMPLE	DELTA	DELTA	SAMPLE	DELTA
.050	837	.050	.050	682	.050	.050	590	.050	.050	524	.050
.100	220	.100	.100	179	.100	.100	155	.100	.100	138	.100
.150	102	.150	.150	83	.150	.150	72	.150	.150	64	.150
.200	59	.200	.200	48	.200	.200	42	.200	.200	37	.200
.250	30	.250	.250	32	.250	.250	28	.250	.250	24	.250
PROBABILITY OF OCCURRENCE = .750 PROBABILITY OF TYPE II ERROR (BETA) = .150											
ALPHA = .050			ALPHA = .100			ALPHA = .150			ALPHA = .200		
DELTA	SAMPLE	DELTA	DELTA	SAMPLE	DELTA	DELTA	SAMPLE	DELTA	DELTA	SAMPLE	DELTA
.050	715	.050	.050	573	.050	.050	489	.050	.050	428	.050
.100	183	.100	.100	150	.100	.100	128	.100	.100	113	.100
.150	87	.150	.150	70	.150	.150	60	.150	.150	52	.150
.200	51	.200	.200	41	.200	.200	35	.200	.200	30	.200
.250	33	.250	.250	27	.250	.250	23	.250	.250	20	.250
PROBABILITY OF OCCURRENCE = .750 PROBABILITY OF TYPE II ERROR (BETA) = .200											
ALPHA = .050			ALPHA = .100			ALPHA = .150			ALPHA = .200		
DELTA	SAMPLE	DELTA	DELTA	SAMPLE	DELTA	DELTA	SAMPLE	DELTA	DELTA	SAMPLE	DELTA
.050	623	.050	.050	493	.050	.050	415	.050	.050	360	.050
.100	164	.100	.100	130	.100	.100	109	.100	.100	95	.100
.150	76	.150	.150	60	.150	.150	51	.150	.150	44	.150
.200	44	.200	.200	35	.200	.200	30	.200	.200	26	.200
.250	29	.250	.250	23	.250	.250	19	.250	.250	17	.250
PROBABILITY OF OCCURRENCE = .750 PROBABILITY OF TYPE II ERROR (BETA) = .250											
ALPHA = .050			ALPHA = .100			ALPHA = .150			ALPHA = .200		
DELTA	SAMPLE	DELTA	DELTA	SAMPLE	DELTA	DELTA	SAMPLE	DELTA	DELTA	SAMPLE	DELTA
.050	553	.050	.050	429	.050	.050	356	.050	.050	305	.050
.100	145	.100	.100	113	.100	.100	94	.100	.100	80	.100
.150	67	.150	.150	52	.150	.150	44	.150	.150	37	.150
.200	39	.200	.200	30	.200	.200	25	.200	.200	22	.200
.250	26	.250	.250	20	.250	.250	17	.250	.250	14	.250

TABLE 1
SAMPLE SIZES FOR PAIRED ANALYSIS WHERE THE SIGN OF THE DIFFERENCE IS NOT IMPORTANT
SAMPLE SIZE (N) FOR A GIVEN VALUE OF MAGNITUDE (DELTA), WITH A SPECIFIC PROBABILITY OF A TYPE I ERROR (ALPHA) FOR

PROBABILITY OF OCCURRENCE = .800 PROBABILITY OF TYPE II ERROR (BETA) = .050

ALPHA = .050			ALPHA = .100			ALPHA = .150			ALPHA = .200			ALPHA = .250		
DELTA	SAMPLE		DELTA	SAMPLE		DELTA	SAMPLE		DELTA	SAMPLE		DELTA	SAMPLE	
.050	904		.050	753		.050	662		.050	596		.050	544	
.100	242		.100	202		.100	177		.100	160		.100	146	
.150	114		.150	95		.150	83		.150	75		.150	69	
.200	67		.200	56		.200	49		.200	44		.200	40	
.250	45		.250	37		.250	33		.250	30		.250	27	

PROBABILITY OF OCCURRENCE = .800 PROBABILITY OF TYPE II ERROR (BETA) = .100

ALPHA = .050			ALPHA = .100			ALPHA = .150			ALPHA = .200			ALPHA = .250		
DELTA	SAMPLE		DELTA	SAMPLE		DELTA	SAMPLE		DELTA	SAMPLE		DELTA	SAMPLE	
.050	732		.050	596		.050	516		.050	458		.050	412	
.100	196		.100	160		.100	138		.100	123		.100	110	
.150	92		.150	75		.150	65		.150	58		.150	52	
.200	54		.200	44		.200	38		.200	34		.200	31	
.250	36		.250	30		.250	26		.250	23		.250	21	

PROBABILITY OF OCCURRENCE = .800 PROBABILITY OF TYPE II ERROR (BETA) = .150

ALPHA = .050			ALPHA = .100			ALPHA = .150			ALPHA = .200			ALPHA = .250		
DELTA	SAMPLE		DELTA	SAMPLE		DELTA	SAMPLE		DELTA	SAMPLE		DELTA	SAMPLE	
.050	625		.050	500		.050	427		.050	374		.050	333	
.100	167		.100	134		.100	114		.100	100		.100	89	
.150	79		.150	63		.150	54		.150	47		.150	42	
.200	46		.200	37		.200	32		.200	28		.200	25	
.250	31		.250	25		.250	21		.250	19		.250	17	

PROBABILITY OF OCCURRENCE = .800 PROBABILITY OF TYPE II ERROR (BETA) = .200

ALPHA = .050			ALPHA = .100			ALPHA = .150			ALPHA = .200			ALPHA = .250		
DELTA	SAMPLE		DELTA	SAMPLE		DELTA	SAMPLE		DELTA	SAMPLE		DELTA	SAMPLE	
.050	547		.050	431		.050	363		.050	314		.050	277	
.100	146		.100	115		.100	97		.100	84		.100	74	
.150	69		.150	54		.150	46		.150	40		.150	35	
.200	41		.200	32		.200	27		.200	24		.200	21	
.250	27		.250	21		.250	18		.250	16		.250	14	

PROBABILITY OF OCCURRENCE = .800 PROBABILITY OF TYPE II ERROR (BETA) = .250

ALPHA = .050			ALPHA = .100			ALPHA = .150			ALPHA = .200			ALPHA = .250		
DELTA	SAMPLE		DELTA	SAMPLE		DELTA	SAMPLE		DELTA	SAMPLE		DELTA	SAMPLE	
.050	483		.050	375		.050	311		.050	267		.050	232	
.100	129		.100	100		.100	84		.100	72		.100	62	
.150	61		.150	47		.150	39		.150	34		.150	29	
.200	36		.200	28		.200	23		.200	20		.200	18	
.250	24		.250	19		.250	16		.250	13		.250	12	

SAMPLE SIZES FOR PAIRED ANALYSIS WHERE THE SIGN OF THE DIFFERENCE IS NOT IMPORTANT
 SAMPLE SIZE (N) FOR A GIVEN VALUE OF MAGNITUDE OF DELTA, WITH A SPECIFIC PROBABILITY OF A TYPE I ERROR (ALPHA) FOR

PROBABILITY OF OCCURRENCE = .850 PROBABILITY OF TYPE II ERROR (BETA) = .050

ALPHA = .050	ALPHA = .100	ALPHA = .150	ALPHA = .200	ALPHA = .250
DELTA	DELTA	DELTA	DELTA	DELTA
.050	.050	.050	.050	.050
74	623	548	493	450
.100	171	151	136	124
.150	99	82	72	65
.200	59	49	43	39
.250	40	33	26	24

PROBABILITY OF OCCURRENCE = .850 PROBABILITY OF TYPE II ERROR (BETA) = .100

ALPHA = .050	ALPHA = .100	ALPHA = .150	ALPHA = .200	ALPHA = .250
DELTA	DELTA	DELTA	DELTA	DELTA
.050	.050	.050	.050	.050
166	493	426	378	340
.100	136	117	104	94
.150	80	65	56	50
.200	40	39	30	27
.250	32	26	20	18

PROBABILITY OF OCCURRENCE = .850 PROBABILITY OF TYPE II ERROR (BETA) = .150

ALPHA = .050	ALPHA = .100	ALPHA = .150	ALPHA = .200	ALPHA = .250
DELTA	DELTA	DELTA	DELTA	DELTA
.050	.050	.050	.050	.050
142	414	353	309	275
.100	114	97	85	76
.150	68	55	47	41
.200	41	33	25	22
.250	28	22	17	15

PROBABILITY OF OCCURRENCE = .850 PROBABILITY OF TYPE II ERROR (BETA) = .200

ALPHA = .050	ALPHA = .100	ALPHA = .150	ALPHA = .200	ALPHA = .250
DELTA	DELTA	DELTA	DELTA	DELTA
.050	.050	.050	.050	.050
124	356	300	260	229
.100	98	83	72	63
.150	60	47	35	30
.200	36	28	21	18
.250	24	19	14	13

PROBABILITY OF OCCURRENCE = .850 PROBABILITY OF TYPE II ERROR (BETA) = .250

ALPHA = .050	ALPHA = .100	ALPHA = .150	ALPHA = .200	ALPHA = .250
DELTA	DELTA	DELTA	DELTA	DELTA
.050	.050	.050	.050	.050
110	310	257	220	192
.100	85	71	61	53
.150	52	41	29	26
.200	32	25	18	16
.250	22	17	12	11

SAMPLE SIZES FOR PAIRED ANALYSIS WHERE THE SIGN OF THE DIFFERENCE IS NOT IMPORTANT
 SAMPLE SIZE (N) FOR A GIVEN VALUE OF MAGNITUDE (DELTA), WITH A SPECIFIC PROBABILITY OF A TYPE I ERROR (ALPHA) FOR

PROBABILITY OF OCCURRENCE = .900 PROBABILITY OF TYPE II ERROR (BETA) = .050

ALPHA = .050			ALPHA = .100			ALPHA = .150			ALPHA = .200			ALPHA = .250		
DELTA	SAMPLE		DELTA	SAMPLE		DELTA	SAMPLE		DELTA	SAMPLE		DELTA	SAMPLE	
.050	564		.050	470		.050	413		.050	372		.050	339	
.100	162		.100	135		.100	119		.100	107		.100	97	
.150	80		.150	67		.150	59		.150	53		.150	48	
.200	49		.200	41		.200	36		.200	33		.200	30	
.250	34		.250	28		.250	25		.250	23		.250	21	

PROBABILITY OF OCCURRENCE = .900 PROBABILITY OF TYPE II ERROR (BETA) = .100

ALPHA = .050			ALPHA = .100			ALPHA = .150			ALPHA = .200			ALPHA = .250		
DELTA	SAMPLE		DELTA	SAMPLE		DELTA	SAMPLE		DELTA	SAMPLE		DELTA	SAMPLE	
.050	456		.050	372		.050	322		.050	285		.050	257	
.100	131		.100	107		.100	92		.100	82		.100	74	
.150	65		.150	53		.150	46		.150	41		.150	37	
.200	40		.200	33		.200	28		.200	25		.200	23	
.250	28		.250	23		.250	20		.250	17		.250	16	

PROBABILITY OF OCCURRENCE = .900 PROBABILITY OF TYPE II ERROR (BETA) = .150

ALPHA = .050			ALPHA = .100			ALPHA = .150			ALPHA = .200			ALPHA = .250		
DELTA	SAMPLE		DELTA	SAMPLE		DELTA	SAMPLE		DELTA	SAMPLE		DELTA	SAMPLE	
.050	290		.050	312		.050	266		.050	233		.050	208	
.100	112		.100	90		.100	77		.100	67		.100	60	
.150	56		.150	45		.150	38		.150	33		.150	30	
.200	34		.200	28		.200	24		.200	21		.200	18	
.250	24		.250	19		.250	16		.250	14		.250	13	

PROBABILITY OF OCCURRENCE = .900 PROBABILITY OF TYPE II ERROR (BETA) = .200

ALPHA = .050			ALPHA = .100			ALPHA = .150			ALPHA = .200			ALPHA = .250		
DELTA	SAMPLE		DELTA	SAMPLE		DELTA	SAMPLE		DELTA	SAMPLE		DELTA	SAMPLE	
.050	341		.050	269		.050	225		.050	196		.050	172	
.100	98		.100	77		.100	65		.100	57		.100	50	
.150	49		.150	38		.150	32		.150	28		.150	25	
.200	30		.200	24		.200	20		.200	17		.200	15	
.250	21		.250	16		.250	14		.250	12		.250	11	

PROBABILITY OF OCCURRENCE = .900 PROBABILITY OF TYPE II ERROR (BETA) = .250

ALPHA = .050			ALPHA = .100			ALPHA = .150			ALPHA = .200			ALPHA = .250		
DELTA	SAMPLE		DELTA	SAMPLE		DELTA	SAMPLE		DELTA	SAMPLE		DELTA	SAMPLE	
.050	301		.050	234		.050	194		.050	166		.050	145	
.100	87		.100	67		.100	56		.100	48		.100	42	
.150	43		.150	33		.150	28		.150	24		.150	21	
.200	27		.200	21		.200	17		.200	15		.200	13	
.250	18		.250	14		.250	12		.250	10		.250	9	

9 2 1

SAMPLE SIZES FOR PAIRED ANALYSIS WHERE THE SIGN OF THE DIFFERENCE IS NOT IMPORTANT
 SAMPLE SIZE (N) FOR A GIVEN VALUE OF MAGNITUDE (DELTA), WITH A SPECIFIC PROBABILITY OF A TYPE I ERROR (ALPHA) FOR

PROBABILITY OF OCCURRENCE = .950 PROBABILITY OF TYPE II ERROR (BETA) = .050

ALPHA = .050			ALPHA = .100			ALPHA = .150			ALPHA = .200			ALPHA = .250		
DELTA	SAMPLE		DELTA	SAMPLE		DELTA	SAMPLE		DELTA	SAMPLE		DELTA	SAMPLE	
.050	351		.050	293		.050	257		.050	232		.050	211	
.100	110		.100	92		.100	81		.100	73		.100	66	
.150	58		.150	48		.150	42		.150	38		.150	35	
.200	37		.200	31		.200	27		.200	25		.200	22	
.250	26		.250	22		.250	19		.250	18		.250	16	

PROBABILITY OF OCCURRENCE = .950 PROBABILITY OF TYPE II ERROR (BETA) = .100

ALPHA = .050			ALPHA = .100			ALPHA = .150			ALPHA = .200			ALPHA = .250		
DELTA	SAMPLE		DELTA	SAMPLE		DELTA	SAMPLE		DELTA	SAMPLE		DELTA	SAMPLE	
.050	284		.050	232		.050	201		.050	178		.050	160	
.100	89		.100	73		.100	63		.100	56		.100	50	
.150	47		.150	38		.150	33		.150	29		.150	27	
.200	30		.200	25		.200	21		.200	19		.200	17	
.250	21		.250	18		.250	15		.250	14		.250	12	

PROBABILITY OF OCCURRENCE = .950 PROBABILITY OF TYPE II ERROR (BETA) = .150

ALPHA = .050			ALPHA = .100			ALPHA = .150			ALPHA = .200			ALPHA = .250		
DELTA	SAMPLE		DELTA	SAMPLE		DELTA	SAMPLE		DELTA	SAMPLE		DELTA	SAMPLE	
.050	243		.050	195		.050	166		.050	146		.050	129	
.100	76		.100	61		.100	52		.100	46		.100	41	
.150	40		.150	32		.150	28		.150	24		.150	22	
.200	26		.200	21		.200	18		.200	16		.200	14	
.250	18		.250	15		.250	13		.250	11		.250	10	

PROBABILITY OF OCCURRENCE = .950 PROBABILITY OF TYPE II ERROR (BETA) = .200

ALPHA = .050			ALPHA = .100			ALPHA = .150			ALPHA = .200			ALPHA = .250		
DELTA	SAMPLE		DELTA	SAMPLE		DELTA	SAMPLE		DELTA	SAMPLE		DELTA	SAMPLE	
.050	212		.050	167		.050	141		.050	122		.050	108	
.100	67		.100	53		.100	44		.100	39		.100	34	
.150	35		.150	28		.150	23		.150	20		.150	18	
.200	23		.200	18		.200	15		.200	13		.200	12	
.250	16		.250	13		.250	11		.250	9		.250	8	

PROBABILITY OF OCCURRENCE = .950 PROBABILITY OF TYPE II ERROR (BETA) = .250

ALPHA = .050			ALPHA = .100			ALPHA = .150			ALPHA = .200			ALPHA = .250		
DELTA	SAMPLE		DELTA	SAMPLE		DELTA	SAMPLE		DELTA	SAMPLE		DELTA	SAMPLE	
.050	180		.050	146		.050	121		.050	104		.050	90	
.100	59		.100	46		.100	38		.100	33		.100	29	
.150	31		.150	24		.150	20		.150	17		.150	15	
.200	20		.200	16		.200	13		.200	11		.200	10	
.250	14		.250	11		.250	9		.250	8		.250	7	

APPENDIX B

SAMPLE SIZE REQUIRED TO DETECT A DIFFERENCE OF PRESCRIBED MAGNITUDE FROM A STANDARD PROPORTION WHEN THE SIGN OF THE DIFFERENCE IS IMPORTANT

REFERENCE: AMCP 706-111, PARAGRAPH 8-1.5

DATA NOTES

PROBABILITY OF OCCURRENCE IS THE KNOWN PROPORTION OF THE POPULATION OF STANDARD ITEMS WHICH EXHIBIT THE PERTINENT CHARACTERISTIC. THIS MAY BE KNOWN FROM THE PROCESS HISTORY, OR MAY BE GIVEN BY THE REQUIREMENTS OF A SPECIFICATION OR A STANDARD

PROBABILITY OF DEVIATION IS COMPUTED AS:

PROBABILITY OF OCCURRENCE PLUS DELTA, IF PROBABILITY OF OCCURRENCE IS LESS THAN OR EQUAL TO 0.5
PROBABILITY OF OCCURRENCE MINUS DELTA IF PROBABILITY OF OCCURRENCE IS GREATER THAN 0.5

B-1

EQUATION

$$N = \frac{((Z_{1-\alpha}) + (Z_{1-\beta}))^2}{1-\alpha - 1-\beta}$$

WHERE D = (2 X ARCSINE SQUARE ROOT OF PROBABILITY OF DEVIATION) - (2 X ARCSINE SQUARE ROOT OF PROBABILITY OF OCCURRENCE)

SAMPLE SIZES FOR PAIRED ANALYSIS WHERE THE SIGN OF THE DIFFERENCE IS IMPORTANT
 SAMPLE SIZE (N) FOR A GIVEN VALUE OF MAGNITUDE (DELTA), WITH A SPECIFIC PROBABILITY OF A TYPE I ERROR (ALPHA) FOR

PROBABILITY OF OCCURRENCE = .050 PROBABILITY OF TYPE II ERROR (BETA) = .050

ALPHA =	.050	ALPHA =	.100	ALPHA =	.150	ALPHA =	.200	ALPHA =	.250
DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE
.050	293	.050	232	.050	195	.050	167	.050	146
.100	92	.100	73	.100	61	.100	53	.100	46
.150	48	.150	38	.150	32	.150	28	.150	24
.200	31	.200	25	.200	21	.200	18	.200	16
.250	22	.250	18	.250	15	.250	13	.250	11

PROBABILITY OF OCCURRENCE = .050 PROBABILITY OF TYPE II ERROR (BETA) = .100

ALPHA =	.050	ALPHA =	.100	ALPHA =	.150	ALPHA =	.200	ALPHA =	.250
DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE
.050	232	.050	178	.050	145	.050	122	.050	104
.100	73	.100	56	.100	46	.100	39	.100	33
.150	38	.150	29	.150	24	.150	20	.150	17
.200	25	.200	19	.200	16	.200	13	.200	11
.250	18	.250	14	.250	11	.250	9	.250	8

PROBABILITY OF OCCURRENCE = .050 PROBABILITY OF TYPE II ERROR (BETA) = .150

ALPHA =	.050	ALPHA =	.100	ALPHA =	.150	ALPHA =	.200	ALPHA =	.250
DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE
.050	195	.050	146	.050	116	.050	96	.050	79
.100	61	.100	46	.100	37	.100	30	.100	25
.150	32	.150	24	.150	19	.150	16	.150	13
.200	21	.200	16	.200	13	.200	10	.200	9
.250	15	.250	11	.250	9	.250	8	.250	6

PROBABILITY OF OCCURRENCE = .050 PROBABILITY OF TYPE II ERROR (BETA) = .200

ALPHA =	.050	ALPHA =	.100	ALPHA =	.150	ALPHA =	.200	ALPHA =	.250
DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE
.050	167	.050	122	.050	95	.050	77	.050	63
.100	53	.100	39	.100	30	.100	24	.100	20
.150	28	.150	20	.150	16	.150	13	.150	11
.200	18	.200	13	.200	10	.200	8	.200	7
.250	13	.250	9	.250	8	.250	6	.250	5

PROBABILITY OF OCCURRENCE = .050 PROBABILITY OF TYPE II ERROR (BETA) = .250

ALPHA =	.050	ALPHA =	.100	ALPHA =	.150	ALPHA =	.200	ALPHA =	.250
DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE
.050	146	.050	104	.050	79	.050	63	.050	50
.100	46	.100	33	.100	25	.100	20	.100	16
.150	24	.150	17	.150	13	.150	11	.150	9
.200	16	.200	11	.200	9	.200	7	.200	6
.250	11	.250	8	.250	6	.250	5	.250	4

SAMPLE SIZES FOR PAIRED ANALYSIS WHERE THE SIGN OF THE DIFFERENCE IS IMPORTANT
 SAMPLE SIZE (N) FOR A GIVEN VALUE OF MAGNITUDE (DELTA), WITH A SPECIFIC PROBABILITY OF A TYPE I ERROR (ALPHA) FOR

PROBABILITY OF OCCURANCE = .100 PROBABILITY OF TYPE II ERROR (BETA) = .050

ALPHA =	.050	ALPHA =	.100	ALPHA =	.150	ALPHA =	.200	ALPHA =	.250
DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE
.050	470	.050	372	.050	312	.050	269	.050	234
.100	135	.100	107	.100	90	.100	77	.100	67
.150	67	.150	53	.150	45	.150	38	.150	33
.200	41	.200	33	.200	28	.200	24	.200	21
.250	28	.250	23	.250	19	.250	16	.250	14

PROBABILITY OF OCCURANCE = .100 PROBABILITY OF TYPE II ERROR (BETA) = .100

ALPHA =	.050	ALPHA =	.100	ALPHA =	.150	ALPHA =	.200	ALPHA =	.250
DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE
.050	372	.050	285	.050	233	.050	196	.050	166
.100	107	.100	82	.100	67	.100	57	.100	48
.150	53	.150	41	.150	33	.150	28	.150	24
.200	33	.200	25	.200	21	.200	17	.200	15
.250	23	.250	17	.250	14	.250	12	.250	10

PROBABILITY OF OCCURANCE = .100 PROBABILITY OF TYPE II ERROR (BETA) = .150

ALPHA =	.050	ALPHA =	.100	ALPHA =	.150	ALPHA =	.200	ALPHA =	.250
DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE
.050	312	.050	233	.050	187	.050	153	.050	127
.100	90	.100	67	.100	54	.100	44	.100	37
.150	45	.150	33	.150	27	.150	22	.150	18
.200	28	.200	21	.200	17	.200	14	.200	11
.250	19	.250	14	.250	12	.250	10	.250	8

PROBABILITY OF OCCURANCE = .100 PROBABILITY OF TYPE II ERROR (BETA) = .200

ALPHA =	.050	ALPHA =	.100	ALPHA =	.150	ALPHA =	.200	ALPHA =	.250
DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE
.050	269	.050	196	.050	153	.050	123	.050	100
.100	77	.100	57	.100	44	.100	36	.100	29
.150	38	.150	28	.150	22	.150	18	.150	15
.200	24	.200	17	.200	14	.200	11	.200	9
.250	16	.250	12	.250	10	.250	8	.250	6

PROBABILITY OF OCCURANCE = .100 PROBABILITY OF TYPE II ERROR (BETA) = .250

ALPHA =	.050	ALPHA =	.100	ALPHA =	.150	ALPHA =	.200	ALPHA =	.250
DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE
.050	234	.050	166	.050	127	.050	100	.050	79
.100	67	.100	48	.100	37	.100	29	.100	23
.150	33	.150	24	.150	18	.150	15	.150	12
.200	21	.200	15	.200	11	.200	9	.200	7
.250	14	.250	10	.250	8	.250	6	.250	5

SAMPLE SIZES FOR PAIRED ANALYSIS WHERE THE SIGN OF THE DIFFERENCE IS IMPORTANT
 SAMPLE SIZE (N) FOR A GIVEN VALUE OF MAGNITUDE (DELTA), WITH A SPECIFIC PROBABILITY OF A TYPE I ERROR (ALPHA) FOR

PROBABILITY OF OCCURRENCE = .150 PROBABILITY OF TYPE II ERROR (BETA) = .050

ALPHA =	.050	ALPHA =	.100	ALPHA =	.150	ALPHA =	.200	ALPHA =	.250
DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE
.050	623	.050	493	.050	414	.050	356	.050	310
.100	171	.100	136	.100	114	.100	98	.100	85
.150	82	.150	65	.150	55	.150	47	.150	41
.200	49	.200	39	.200	33	.200	28	.200	25
.250	33	.250	26	.250	22	.250	19	.250	17

PROBABILITY OF OCCURRENCE = .150 PROBABILITY OF TYPE II ERROR (BETA) = .100

ALPHA =	.050	ALPHA =	.100	ALPHA =	.150	ALPHA =	.200	ALPHA =	.250
DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE
.050	493	.050	378	.050	309	.050	260	.050	220
.100	136	.100	104	.100	85	.100	72	.100	61
.150	65	.150	50	.150	41	.150	35	.150	29
.200	39	.200	30	.200	25	.200	21	.200	18
.250	26	.250	20	.250	17	.250	14	.250	12

PROBABILITY OF OCCURRENCE = .150 PROBABILITY OF TYPE II ERROR (BETA) = .150

ALPHA =	.050	ALPHA =	.100	ALPHA =	.150	ALPHA =	.200	ALPHA =	.250
DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE
.050	414	.050	309	.050	247	.050	203	.050	169
.100	114	.100	85	.100	68	.100	56	.100	47
.150	55	.150	41	.150	33	.150	27	.150	23
.200	33	.200	25	.200	20	.200	16	.200	14
.250	22	.250	17	.250	14	.250	11	.250	9

PROBABILITY OF OCCURRENCE = .150 PROBABILITY OF TYPE II ERROR (BETA) = .200

ALPHA =	.050	ALPHA =	.100	ALPHA =	.150	ALPHA =	.200	ALPHA =	.250
DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE
.050	356	.050	260	.050	203	.050	164	.050	133
.100	99	.100	72	.100	56	.100	45	.100	37
.150	47	.150	35	.150	27	.150	22	.150	18
.200	28	.200	21	.200	15	.200	13	.200	11
.250	19	.250	14	.250	11	.250	9	.250	7

PROBABILITY OF OCCURRENCE = .150 PROBABILITY OF TYPE II ERROR (BETA) = .250

ALPHA =	.050	ALPHA =	.100	ALPHA =	.150	ALPHA =	.200	ALPHA =	.250
DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE
.050	310	.050	220	.050	169	.050	133	.050	105
.100	85	.100	61	.100	47	.100	37	.100	29
.150	41	.150	29	.150	23	.150	18	.150	14
.200	25	.200	18	.200	14	.200	11	.200	9
.250	17	.250	12	.250	9	.250	7	.250	6

SAMPLE SIZES FOR PAIRED ANALYSIS WHERE THE SIGN OF THE DIFFERENCE IS IMPORTANT
SAMPLE SIZE (N) FOR A GIVEN VALUE OF MAGNITUDE (DELTA), WITH A SPECIFIC PROBABILITY OF A TYPE I ERROR (ALPHA) FOR

PROBABILITY OF OCCURRENCE = .200 PROBABILITY OF TYPE II ERROR (BETA) = .050

ALPHA =	.050	ALPHA =	.100	ALPHA =	.150	ALPHA =	.200	ALPHA =	.250
DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE
.050	753	.050	596	.050	500	.050	431	.050	375
.100	202	.100	160	.100	134	.100	115	.100	100
.150	95	.150	75	.150	63	.150	54	.150	47
.200	56	.200	44	.200	37	.200	32	.200	28
.250	37	.250	30	.250	25	.250	21	.250	19

PROBABILITY OF OCCURRENCE = .200 PROBABILITY OF TYPE II ERROR (BETA) = .100

ALPHA =	.050	ALPHA =	.100	ALPHA =	.150	ALPHA =	.200	ALPHA =	.250
DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE
.050	596	.050	458	.050	374	.050	314	.050	267
.100	160	.100	123	.100	100	.100	84	.100	72
.150	75	.150	58	.150	47	.150	40	.150	34
.200	44	.200	34	.200	28	.200	24	.200	20
.250	30	.250	23	.250	19	.250	16	.250	13

PROBABILITY OF OCCURRENCE = .200 PROBABILITY OF TYPE II ERROR (BETA) = .150

ALPHA =	.050	ALPHA =	.100	ALPHA =	.150	ALPHA =	.200	ALPHA =	.250
DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE
.050	500	.050	374	.050	299	.050	246	.050	204
.100	134	.100	100	.100	80	.100	66	.100	55
.150	63	.150	47	.150	39	.150	31	.150	26
.200	37	.200	28	.200	22	.200	19	.200	15
.250	25	.250	19	.250	15	.250	12	.250	10

PROBABILITY OF OCCURRENCE = .200 PROBABILITY OF TYPE II ERROR (BETA) = .200

ALPHA =	.050	ALPHA =	.100	ALPHA =	.150	ALPHA =	.200	ALPHA =	.250
DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE
.050	431	.050	314	.050	245	.050	198	.050	160
.100	115	.100	84	.100	65	.100	53	.100	43
.150	54	.150	40	.150	31	.150	25	.150	21
.200	32	.200	24	.200	19	.200	15	.200	12
.250	21	.250	16	.250	12	.250	10	.250	8

PROBABILITY OF OCCURRENCE = .200 PROBABILITY OF TYPE II ERROR (BETA) = .250

ALPHA =	.050	ALPHA =	.100	ALPHA =	.150	ALPHA =	.200	ALPHA =	.250
DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE
.050	375	.050	267	.050	204	.050	160	.050	127
.100	100	.100	72	.100	55	.100	43	.100	34
.150	47	.150	34	.150	26	.150	21	.150	16
.200	28	.200	20	.200	15	.200	12	.200	10
.250	19	.250	13	.250	10	.250	8	.250	7

SAMPLE SIZES FOR PAIRED ANALYSIS WHERE THE SIGN OF THE DIFFERENCE IS IMPORTANT
SAMPLE SIZE (N) FOR A GIVEN VALUE OF MAGNITUDE (DELTA), WITH A SPECIFIC PROBABILITY OF A TYPE I ERROR (ALPHA) FOR

PROBABILITY OF OCCURRENCE = .250			PROBABILITY OF TYPE II ERROR (BETA) = .050		
ALPHA = .050	ALPHA = .100	ALPHA = .150	ALPHA = .200	ALPHA = .250	
DELTA	DELTA	DELTA	DELTA	DELTA	SAMPLE
.050	862	.050	573	.050	429
.100	226	.100	150	.100	113
.150	105	.150	73	.150	52
.200	61	.200	41	.200	30
.250	40	.250	27	.250	20

PROBABILITY OF OCCURRENCE = .250			PROBABILITY OF TYPE II ERROR (BETA) = .100		
ALPHA = .050	ALPHA = .100	ALPHA = .150	ALPHA = .200	ALPHA = .250	
DELTA	DELTA	DELTA	DELTA	DELTA	SAMPLE
.050	682	.050	428	.050	305
.100	179	.100	113	.100	80
.150	83	.150	52	.150	37
.200	48	.200	30	.200	22
.250	32	.250	20	.250	14

PROBABILITY OF OCCURRENCE = .250			PROBABILITY OF TYPE II ERROR (BETA) = .150		
ALPHA = .050	ALPHA = .100	ALPHA = .150	ALPHA = .200	ALPHA = .250	
DELTA	DELTA	DELTA	DELTA	DELTA	SAMPLE
.050	573	.050	342	.050	233
.100	150	.100	90	.100	62
.150	70	.150	42	.150	29
.200	41	.200	24	.200	17
.250	27	.250	15	.250	11

PROBABILITY OF OCCURRENCE = .250			PROBABILITY OF TYPE II ERROR (BETA) = .200		
ALPHA = .050	ALPHA = .100	ALPHA = .150	ALPHA = .200	ALPHA = .250	
DELTA	DELTA	DELTA	DELTA	DELTA	SAMPLE
.050	493	.050	281	.050	183
.100	130	.100	74	.100	48
.150	60	.150	34	.150	23
.200	35	.200	20	.200	13
.250	23	.250	13	.250	9

PROBABILITY OF OCCURRENCE = .250			PROBABILITY OF TYPE II ERROR (BETA) = .250		
ALPHA = .050	ALPHA = .100	ALPHA = .150	ALPHA = .200	ALPHA = .250	
DELTA	DELTA	DELTA	DELTA	DELTA	SAMPLE
.050	429	.050	233	.050	145
.100	113	.100	62	.100	38
.150	52	.150	29	.150	18
.200	30	.200	17	.200	11
.250	20	.250	11	.250	7

SAMPLE SIZE (N) FOR A GIVEN VALUE OF MAGNITUDE (DELTA), WITH A SPECIFIC PROBABILITY OF A TYPE I ERROR (ALPHA) FOR SAMPLE SIZES FOR PAIRED ANALYSIS WHERE THE SIGN OF THE DIFFERENCE IS IMPORTANT

PROBABILITY OF OCCURRENCE = .300 PROBABILITY OF TYPE II ERROR (BETA) = .050

ALPHA =	.050	ALPHA =	.100	ALPHA =	.150	ALPHA =	.200	ALPHA =	.250
DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE
.050	949	.050	751	.050	630	.050	543	.050	472
.100	246	.100	194	.100	163	.100	141	.100	122
.150	112	.150	89	.150	75	.150	64	.150	56
.200	64	.200	51	.200	43	.200	37	.200	32
.250	42	.250	33	.250	28	.250	24	.250	21

PROBABILITY OF OCCURRENCE = .300 PROBABILITY OF TYPE II ERROR (BETA) = .100

ALPHA =	.050	ALPHA =	.100	ALPHA =	.150	ALPHA =	.200	ALPHA =	.250
DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE
.050	751	.050	577	.050	471	.050	396	.050	336
.100	194	.100	149	.100	122	.100	103	.100	87
.150	89	.150	69	.150	56	.150	47	.150	40
.200	51	.200	39	.200	32	.200	27	.200	23
.250	33	.250	26	.250	21	.250	18	.250	15

PROBABILITY OF OCCURRENCE = .300 PROBABILITY OF TYPE II ERROR (BETA) = .150

ALPHA =	.050	ALPHA =	.100	ALPHA =	.150	ALPHA =	.200	ALPHA =	.250
DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE
.050	630	.050	471	.050	377	.050	310	.050	257
.100	163	.100	122	.100	99	.100	80	.100	67
.150	75	.150	56	.150	45	.150	37	.150	31
.200	43	.200	32	.200	25	.200	21	.200	18
.250	28	.250	21	.250	17	.250	14	.250	12

PROBABILITY OF OCCURRENCE = .300 PROBABILITY OF TYPE II ERROR (BETA) = .200

ALPHA =	.050	ALPHA =	.100	ALPHA =	.150	ALPHA =	.200	ALPHA =	.250
DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE
.050	543	.050	396	.050	310	.050	249	.050	202
.100	141	.100	103	.100	80	.100	65	.100	53
.150	64	.150	47	.150	37	.150	30	.150	24
.200	37	.200	27	.200	21	.200	17	.200	14
.250	24	.250	18	.250	14	.250	11	.250	9

PROBABILITY OF OCCURRENCE = .300 PROBABILITY OF TYPE II ERROR (BETA) = .250

ALPHA =	.050	ALPHA =	.100	ALPHA =	.150	ALPHA =	.200	ALPHA =	.250
DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE
.050	472	.050	336	.050	257	.050	202	.050	160
.100	122	.100	87	.100	67	.100	53	.100	42
.150	56	.150	40	.150	31	.150	24	.150	19
.200	32	.200	23	.200	19	.200	14	.200	11
.250	21	.250	15	.250	12	.250	9	.250	7

TABLE 1. SAMPLE SIZES FOR PAIRED ANALYSIS WHERE THE SIGN OF THE DIFFERENCE IS IMPORTANT
 SAMPLE SIZE (N) FOR A GIVEN VALUE OF MAGNITUDE (DELTA), WITH A SPECIFIC PROBABILITY OF A TYPE I ERROR (ALPHA) FOR

PROBABILITY OF OCCURRENCE = .350			PROBABILITY OF TYPE II ERROR (BETA) = .050		
ALPHA =	DELTA	SAMPLE	ALPHA =	DELTA	SAMPLE
.050	.050	1014	.050	.050	504
.100	.100	254	.100	.100	129
.150	.150	117	.150	.150	58
.200	.200	67	.200	.200	33
.250	.250	43	.250	.250	21
PROBABILITY OF OCCURRENCE = .100			PROBABILITY OF TYPE II ERROR (BETA) = .100		
ALPHA =	DELTA	SAMPLE	ALPHA =	DELTA	SAMPLE
.050	.050	803	.050	.050	359
.100	.100	205	.100	.100	92
.150	.150	93	.150	.150	42
.200	.200	53	.200	.200	24
.250	.250	34	.250	.250	15
PROBABILITY OF OCCURRENCE = .350			PROBABILITY OF TYPE II ERROR (BETA) = .150		
ALPHA =	DELTA	SAMPLE	ALPHA =	DELTA	SAMPLE
.050	.050	674	.050	.050	274
.100	.100	172	.100	.100	70
.150	.150	78	.150	.150	32
.200	.200	44	.200	.200	18
.250	.250	29	.250	.250	12
PROBABILITY OF OCCURRENCE = .100			PROBABILITY OF TYPE II ERROR (BETA) = .200		
ALPHA =	DELTA	SAMPLE	ALPHA =	DELTA	SAMPLE
.050	.050	580	.050	.050	216
.100	.100	148	.100	.100	55
.150	.150	67	.150	.150	25
.200	.200	34	.200	.200	15
.250	.250	25	.250	.250	9
PROBABILITY OF OCCURRENCE = .350			PROBABILITY OF TYPE II ERROR (BETA) = .250		
ALPHA =	DELTA	SAMPLE	ALPHA =	DELTA	SAMPLE
.050	.050	504	.050	.050	171
.100	.100	129	.100	.100	44
.150	.150	58	.150	.150	20
.200	.200	33	.200	.200	12
.250	.250	21	.250	.250	8

SAMPLE SIZE (N) FOR A GIVEN VALUE OF MAGNITUDE (DELTA), WITH A SPECIFIC PROBABILITY OF A TYPE I ERROR (ALPHA) FOR SAMPLE SIZES FOR PAIRED ANALYSIS WHERE THE SIGN OF THE DIFFERENCE IS IMPORTANT

PROBABILITY OF OCCURRENCE = .400				PROBABILITY OF TYPE II ERROR (BETA) = .350			
ALPHA = .050		ALPHA = .100		ALPHA = .150		ALPHA = .200	
DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE
.050	1058	.050	837	.050	702	.050	605
.100	267	.100	212	.100	173	.100	153
.150	120	.150	95	.150	80	.150	69
.200	67	.200	53	.200	45	.200	39
.250	43	.250	34	.250	29	.250	25
PROBABILITY OF OCCURRENCE = .400				PROBABILITY OF TYPE II ERROR (BETA) = .100			
ALPHA = .050		ALPHA = .100		ALPHA = .150		ALPHA = .200	
DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE
.050	837	.050	643	.050	525	.050	441
.100	212	.100	163	.100	133	.100	112
.150	95	.150	73	.150	60	.150	50
.200	53	.200	41	.200	34	.200	28
.250	34	.250	26	.250	21	.250	18
PROBABILITY OF OCCURRENCE = .400				PROBABILITY OF TYPE II ERROR (BETA) = .150			
ALPHA = .050		ALPHA = .100		ALPHA = .150		ALPHA = .200	
DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE
.050	702	.050	525	.050	420	.050	345
.100	178	.100	133	.100	106	.100	87
.150	80	.150	60	.150	48	.150	39
.200	45	.200	34	.200	27	.200	22
.250	29	.250	21	.250	17	.250	14
PROBABILITY OF OCCURRENCE = .400				PROBABILITY OF TYPE II ERROR (BETA) = .200			
ALPHA = .050		ALPHA = .100		ALPHA = .150		ALPHA = .200	
DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE
.050	605	.050	441	.050	345	.050	277
.100	153	.100	112	.100	87	.100	70
.150	69	.150	50	.150	39	.150	32
.200	39	.200	29	.200	22	.200	18
.250	25	.250	18	.250	14	.250	12
PROBABILITY OF OCCURRENCE = .400				PROBABILITY OF TYPE II ERROR (BETA) = .250			
ALPHA = .050		ALPHA = .100		ALPHA = .150		ALPHA = .200	
DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE
.050	526	.050	374	.050	285	.050	225
.100	133	.100	95	.100	73	.100	57
.150	60	.150	43	.150	33	.150	26
.200	34	.200	24	.200	19	.200	15
.250	21	.250	15	.250	12	.250	9
PROBABILITY OF OCCURRENCE = .400				PROBABILITY OF TYPE II ERROR (BETA) = .300			
ALPHA = .050		ALPHA = .100		ALPHA = .150		ALPHA = .200	
DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE
.050	441	.050	312	.050	245	.050	195
.100	112	.100	80	.100	60	.100	45
.150	50	.150	39	.150	32	.150	25
.200	28	.200	21	.200	16	.200	12
.250	18	.250	14	.250	10	.250	8

SAMPLE SIZES FOR PAIRED ANALYSIS WHERE THE SIGN OF THE DIFFERENCE IS IMPORTANT
 SAMPLE SIZE (N) FOR A GIVEN VALUE OF MAGNITUDE (DELTA), WITH A SPECIFIC PROBABILITY OF A TYPE I ERROR (ALPHA) FOR

PROBABILITY OF OCCURRENCE = .450			PROBABILITY OF TYPE II ERROR (BETA) = .050		
ALPHA =	DELTA	SAMPLE	ALPHA =	DELTA	SAMPLE
.050	.050	1079	.050	.050	617
.100	.100	270	.100	.100	155
.150	.150	120	.150	.150	69
.200	.200	67	.200	.200	38
.250	.250	42	.250	.250	24
PROBABILITY OF OCCURRENCE = .450			PROBABILITY OF TYPE II ERROR (BETA) = .100		
ALPHA =	DELTA	SAMPLE	ALPHA =	DELTA	SAMPLE
.050	.050	854	.050	.050	450
.100	.100	214	.100	.100	113
.150	.150	95	.150	.150	50
.200	.200	53	.200	.200	28
.250	.250	33	.250	.250	18
PROBABILITY OF OCCURRENCE = .450			PROBABILITY OF TYPE II ERROR (BETA) = .150		
ALPHA =	DELTA	SAMPLE	ALPHA =	DELTA	SAMPLE
.050	.050	854	.050	.050	352
.100	.100	214	.100	.100	88
.150	.150	95	.150	.150	39
.200	.200	53	.200	.200	22
.250	.250	33	.250	.250	14
PROBABILITY OF OCCURRENCE = .450			PROBABILITY OF TYPE II ERROR (BETA) = .200		
ALPHA =	DELTA	SAMPLE	ALPHA =	DELTA	SAMPLE
.050	.050	854	.050	.050	283
.100	.100	214	.100	.100	71
.150	.150	95	.150	.150	32
.200	.200	53	.200	.200	18
.250	.250	33	.250	.250	9
PROBABILITY OF OCCURRENCE = .450			PROBABILITY OF TYPE II ERROR (BETA) = .250		
ALPHA =	DELTA	SAMPLE	ALPHA =	DELTA	SAMPLE
.050	.050	854	.050	.050	230
.100	.100	214	.100	.100	58
.150	.150	95	.150	.150	26
.200	.200	53	.200	.200	15
.250	.250	33	.250	.250	7

SAMPLE SIZES FOR PAIRED ANALYSIS WHERE THE SIGN OF THE DIFFERENCE IS IMPORTANT
 SAMPLE SIZE (N) FOR A GIVEN VALUE OF MAGNITUDE (DELTA), WITH A SPECIFIC PROBABILITY OF A TYPE I ERROR (ALPHA) FOR

PROBABILITY OF OCCURRENCE = .500			PROBABILITY OF TYPE II ERROR (BETA) = .050		
ALPHA =	.050	.100	ALPHA =	.150	.200
DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE
.050	1079	.050	854	.050	617
.100	267	.100	212	.100	153
.150	117	.150	93	.150	78
.200	64	.200	51	.200	37
.250	40	.250	32	.250	23

PROBABILITY OF OCCURRENCE = .500			PROBABILITY OF TYPE II ERROR (BETA) = .100		
ALPHA =	.050	.100	ALPHA =	.150	.200
DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE
.050	854	.050	656	.050	450
.100	212	.100	163	.100	112
.150	93	.150	71	.150	49
.200	51	.200	39	.200	27
.250	32	.250	24	.250	17

PROBABILITY OF OCCURRENCE = .500			PROBABILITY OF TYPE II ERROR (BETA) = .150		
ALPHA =	.050	.100	ALPHA =	.150	.200
DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE
.050	717	.050	536	.050	352
.100	178	.100	133	.100	87
.150	78	.150	58	.150	38
.200	43	.200	32	.200	21
.250	27	.250	20	.250	13

PROBABILITY OF OCCURRENCE = .500			PROBABILITY OF TYPE II ERROR (BETA) = .200		
ALPHA =	.050	.100	ALPHA =	.150	.200
DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE
.050	617	.050	450	.050	283
.100	153	.100	112	.100	70
.150	67	.150	49	.150	31
.200	37	.200	27	.200	17
.250	23	.250	17	.250	11

PROBABILITY OF OCCURRENCE = .500			PROBABILITY OF TYPE II ERROR (BETA) = .250		
ALPHA =	.050	.100	ALPHA =	.150	.200
DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE
.050	536	.050	382	.050	230
.100	133	.100	95	.100	57
.150	58	.150	42	.150	25
.200	32	.200	23	.200	14
.250	20	.250	14	.250	9

SAMPLE SIZE (N) FOR A GIVEN VALUE OF MAGNITUDE (DELTA), WITH A SPECIFIC PROBABILITY OF A TYPE I ERROR (ALPHA) FOR SAMPLE SIZES FOR PAIRED ANALYSIS WHERE THE SIGN OF THE DIFFERENCE IS IMPORTANT

PROBABILITY OF OCCURRENCE = .550 PROBABILITY OF TYPE II ERROR (BETA) = .250

ALPHA =	.050	.100	.150	.200	.250
DELTA	DELTA	DELTA	DELTA	DELTA	DELTA
.050	1079	654	717	617	536
.100	270	214	180	155	134
.150	120	95	80	69	60
.200	67	53	44	38	33
.250	42	33	28	24	21

PROBABILITY OF OCCURRENCE = .550 PROBABILITY OF TYPE II ERROR (BETA) = .100

ALPHA =	.050	.100	.150	.200	.250
DELTA	DELTA	DELTA	DELTA	DELTA	DELTA
.050	854	656	536	450	382
.100	214	164	134	113	96
.150	95	73	60	50	43
.200	53	41	33	28	24
.250	33	26	21	18	15

PROBABILITY OF OCCURRENCE = .550 PROBABILITY OF TYPE II ERROR (BETA) = .150

ALPHA =	.050	.100	.150	.200	.250
DELTA	DELTA	DELTA	DELTA	DELTA	DELTA
.050	717	536	428	352	292
.100	180	134	107	88	73
.150	80	60	48	39	33
.200	44	33	27	22	18
.250	28	21	17	14	12

PROBABILITY OF OCCURRENCE = .550 PROBABILITY OF TYPE II ERROR (BETA) = .200

ALPHA =	.050	.100	.150	.200	.250
DELTA	DELTA	DELTA	DELTA	DELTA	DELTA
.050	617	450	352	283	230
.100	155	113	88	71	58
.150	69	50	39	32	26
.200	38	28	22	18	15
.250	24	18	14	11	9

PROBABILITY OF OCCURRENCE = .550 PROBABILITY OF TYPE II ERROR (BETA) = .250

ALPHA =	.050	.100	.150	.200	.250
DELTA	DELTA	DELTA	DELTA	DELTA	DELTA
.050	536	382	292	230	182
.100	134	96	73	58	46
.150	60	43	33	26	20
.200	33	24	18	15	12
.250	21	15	12	9	7

SAMPLE SIZES FOR PAIRED ANALYSIS WHERE THE SIGN OF THE DIFFERENCE IS IMPORTANT
 SAMPLE SIZE (N) FOR A GIVEN VALUE OF MAGNITUDE (DELTA), WITH A SPECIFIC PROBABILITY OF A TYPE I ERROR (ALPHA) FOR

PROBABILITY OF OCCURRENCE = .600 PROBABILITY OF TYPE II ERROR (BETA) = .350

ALPHA = .050	ALPHA = .100	ALPHA = .150	ALPHA = .200	ALPHA = .250
DELTA	DELTA	DELTA	DELTA	DELTA
.050	.050	.050	.050	.050
.100	.100	.100	.100	.100
.150	.150	.150	.150	.150
.200	.200	.200	.200	.200
.250	.250	.250	.250	.250
SAMPLE	SAMPLE	SAMPLE	SAMPLE	SAMPLE
1056	837	702	605	526
267	212	173	153	133
120	95	80	69	60
67	53	45	39	34
43	34	29	25	21

PROBABILITY OF OCCURRENCE = .600 PROBABILITY OF TYPE II ERROR (BETA) = .100

ALPHA = .050	ALPHA = .100	ALPHA = .150	ALPHA = .200	ALPHA = .250
DELTA	DELTA	DELTA	DELTA	DELTA
.050	.050	.050	.050	.050
.100	.100	.100	.100	.100
.150	.150	.150	.150	.150
.200	.200	.200	.200	.200
.250	.250	.250	.250	.250
SAMPLE	SAMPLE	SAMPLE	SAMPLE	SAMPLE
837	643	525	441	374
212	163	133	112	95
95	73	60	50	43
53	41	34	28	24
34	26	21	18	15

PROBABILITY OF OCCURRENCE = .600 PROBABILITY OF TYPE II ERROR (BETA) = .150

ALPHA = .050	ALPHA = .100	ALPHA = .150	ALPHA = .200	ALPHA = .250
DELTA	DELTA	DELTA	DELTA	DELTA
.050	.050	.050	.050	.050
.100	.100	.100	.100	.100
.150	.150	.150	.150	.150
.200	.200	.200	.200	.200
.250	.250	.250	.250	.250
SAMPLE	SAMPLE	SAMPLE	SAMPLE	SAMPLE
702	525	420	345	286
178	133	105	87	73
80	60	43	39	33
45	34	27	22	19
29	21	17	14	12

PROBABILITY OF OCCURRENCE = .600 PROBABILITY OF TYPE II ERROR (BETA) = .200

ALPHA = .050	ALPHA = .100	ALPHA = .150	ALPHA = .200	ALPHA = .250
DELTA	DELTA	DELTA	DELTA	DELTA
.050	.050	.050	.050	.050
.100	.100	.100	.100	.100
.150	.150	.150	.150	.150
.200	.200	.200	.200	.200
.250	.250	.250	.250	.250
SAMPLE	SAMPLE	SAMPLE	SAMPLE	SAMPLE
605	441	345	277	225
153	112	87	70	57
69	50	39	32	26
39	28	22	18	15
25	18	14	12	9

PROBABILITY OF OCCURRENCE = .600 PROBABILITY OF TYPE II ERROR (BETA) = .250

ALPHA = .050	ALPHA = .100	ALPHA = .150	ALPHA = .200	ALPHA = .250
DELTA	DELTA	DELTA	DELTA	DELTA
.050	.050	.050	.050	.050
.100	.100	.100	.100	.100
.150	.150	.150	.150	.150
.200	.200	.200	.200	.200
.250	.250	.250	.250	.250
SAMPLE	SAMPLE	SAMPLE	SAMPLE	SAMPLE
526	374	286	225	178
133	95	73	57	45
60	43	33	26	20
34	24	19	15	12
21	15	12	9	8

SAMPLE SIZES FOR PAIRED ANALYSIS WHERE THE SIGN OF THE DIFFERENCE IS IMPORTANT
 SAMPLE SIZE (N) FOR A GIVEN VALUE OF MAGNITUDE (DELTA), WITH A SPECIFIC PROBABILITY OF A TYPE I ERROR (ALPHA) FOR

PROBABILITY OF OCCURRENCE = .650 PROBABILITY OF TYPE II ERROR (BETA) = .050

ALPHA = .050	ALPHA = .100	ALPHA = .150	ALPHA = .200	ALPHA = .250
DELTA	DELTA	DELTA	DELTA	DELTA
1014	803	674	580	504
259	205	172	148	129
117	93	78	67	58
67	53	44	38	33
43	34	29	25	21

PROBABILITY OF OCCURRENCE = .650 PROBABILITY OF TYPE II ERROR (BETA) = .100

ALPHA = .050	ALPHA = .100	ALPHA = .150	ALPHA = .200	ALPHA = .250
DELTA	DELTA	DELTA	DELTA	DELTA
803	616	504	423	359
205	158	129	108	92
93	71	58	49	42
53	41	33	28	24
34	26	21	18	15

PROBABILITY OF OCCURRENCE = .650 PROBABILITY OF TYPE II ERROR (BETA) = .150

ALPHA = .050	ALPHA = .100	ALPHA = .150	ALPHA = .200	ALPHA = .250
DELTA	DELTA	DELTA	DELTA	DELTA
674	504	403	331	274
172	129	103	85	70
78	58	47	38	32
44	33	27	22	18
29	21	17	14	12

PROBABILITY OF OCCURRENCE = .650 PROBABILITY OF TYPE II ERROR (BETA) = .200

ALPHA = .050	ALPHA = .100	ALPHA = .150	ALPHA = .200	ALPHA = .250
DELTA	DELTA	DELTA	DELTA	DELTA
580	423	331	266	216
148	108	85	68	55
67	49	38	31	25
38	28	22	18	15
25	18	14	12	9

PROBABILITY OF OCCURRENCE = .650 PROBABILITY OF TYPE II ERROR (BETA) = .250

ALPHA = .050	ALPHA = .100	ALPHA = .150	ALPHA = .200	ALPHA = .250
DELTA	DELTA	DELTA	DELTA	DELTA
504	359	274	216	171
129	92	70	55	44
58	42	32	25	20
33	24	18	15	12
21	15	12	9	8

SAMPLE SIZES FOR PAIRED ANALYSIS WHERE THE SIGN OF THE DIFFERENCE IS IMPORTANT
 SAMPLE SIZE (N) FOR A GIVEN VALUE OF MAGNITUDE (DELTA), WITH A SPECIFIC PROBABILITY OF A TYPE I ERROR (ALPHA) FOR

PROBABILITY OF OCCURRENCE = .700 PROBABILITY OF TYPE II ERROR (BETA) = .050

ALPHA = .050	ALPHA = .100	ALPHA = .150	ALPHA = .200	ALPHA = .250
DELTA	DELTA	DELTA	DELTA	DELTA
SAMPLE	SAMPLE	SAMPLE	SAMPLE	SAMPLE
.050	.050	.050	.050	.050
.100	.100	.100	.100	.100
.150	.150	.150	.150	.150
.200	.200	.200	.200	.200
.250	.250	.250	.250	.250
949	751	630	543	472
246	194	163	141	122
112	89	75	64	56
64	51	43	37	32
42	33	28	24	21

PROBABILITY OF OCCURRENCE = .700 PROBABILITY OF TYPE II ERROR (BETA) = .100

ALPHA = .050	ALPHA = .100	ALPHA = .150	ALPHA = .200	ALPHA = .250
DELTA	DELTA	DELTA	DELTA	DELTA
SAMPLE	SAMPLE	SAMPLE	SAMPLE	SAMPLE
.050	.050	.050	.050	.050
.100	.100	.100	.100	.100
.150	.150	.150	.150	.150
.200	.200	.200	.200	.200
.250	.250	.250	.250	.250
751	577	471	396	336
194	149	122	103	87
89	68	56	47	40
51	39	32	27	23
33	26	21	18	15

PROBABILITY OF OCCURRENCE = .700 PROBABILITY OF TYPE II ERROR (BETA) = .150

ALPHA = .050	ALPHA = .100	ALPHA = .150	ALPHA = .200	ALPHA = .250
DELTA	DELTA	DELTA	DELTA	DELTA
SAMPLE	SAMPLE	SAMPLE	SAMPLE	SAMPLE
.050	.050	.050	.050	.050
.100	.100	.100	.100	.100
.150	.150	.150	.150	.150
.200	.200	.200	.200	.200
.250	.250	.250	.250	.250
630	471	377	310	257
163	122	98	80	67
75	56	45	37	31
43	32	26	21	18
28	21	17	14	12

PROBABILITY OF OCCURRENCE = .700 PROBABILITY OF TYPE II ERROR (BETA) = .200

ALPHA = .050	ALPHA = .100	ALPHA = .150	ALPHA = .200	ALPHA = .250
DELTA	DELTA	DELTA	DELTA	DELTA
SAMPLE	SAMPLE	SAMPLE	SAMPLE	SAMPLE
.050	.050	.050	.050	.050
.100	.100	.100	.100	.100
.150	.150	.150	.150	.150
.200	.200	.200	.200	.200
.250	.250	.250	.250	.250
543	396	310	249	202
141	103	83	65	53
64	47	37	30	24
37	27	21	17	14
24	18	14	11	9

PROBABILITY OF OCCURRENCE = .700 PROBABILITY OF TYPE II ERROR (BETA) = .250

ALPHA = .050	ALPHA = .100	ALPHA = .150	ALPHA = .200	ALPHA = .250
DELTA	DELTA	DELTA	DELTA	DELTA
SAMPLE	SAMPLE	SAMPLE	SAMPLE	SAMPLE
.050	.050	.050	.050	.050
.100	.100	.100	.100	.100
.150	.150	.150	.150	.150
.200	.200	.200	.200	.200
.250	.250	.250	.250	.250
472	336	257	202	160
122	87	67	53	42
56	40	31	24	19
32	23	18	14	11
21	15	12	9	7

SAMPLE SIZES FOR PAIRED ANALYSIS WHERE THE SIGN OF THE DIFFERENCE IS IMPORTANT
 SAMPLE SIZE (N) FOR A GIVEN VALUE OF MAGNITUDE (DELTA), WITH A SPECIFIC PROBABILITY OF A TYPE I ERROR (ALPHA) FOR

PROBABILITY OF OCCURRENCE = .750 PROBABILITY OF TYPE II ERROR (BETA) = .350

ALPHA =	.050	ALPHA =	.100	ALPHA =	.150	ALPHA =	.200	ALPHA =	.250
DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE
.050	662	.050	682	.050	573	.050	493	.050	429
.100	226	.100	179	.100	150	.100	130	.100	113
.150	105	.150	83	.150	70	.150	60	.150	52
.200	61	.200	48	.200	41	.200	35	.200	30
.250	40	.250	32	.250	27	.250	23	.250	20

PROBABILITY OF OCCURRENCE = .750 PROBABILITY OF TYPE II ERROR (BETA) = .100

ALPHA =	.050	ALPHA =	.100	ALPHA =	.150	ALPHA =	.200	ALPHA =	.250
DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE
.050	682	.050	524	.050	428	.050	360	.050	305
.100	179	.100	138	.100	113	.100	95	.100	80
.150	83	.150	64	.150	52	.150	44	.150	37
.200	48	.200	37	.200	30	.200	26	.200	22
.250	32	.250	24	.250	20	.250	17	.250	14

PROBABILITY OF OCCURRENCE = .750 PROBABILITY OF TYPE II ERROR (BETA) = .150

ALPHA =	.050	ALPHA =	.100	ALPHA =	.150	ALPHA =	.200	ALPHA =	.250
DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE
.050	573	.050	428	.050	342	.050	281	.050	233
.100	150	.100	113	.100	90	.100	74	.100	62
.150	70	.150	52	.150	42	.150	34	.150	29
.200	41	.200	30	.200	24	.200	20	.200	17
.250	27	.250	20	.250	16	.250	13	.250	11

PROBABILITY OF OCCURRENCE = .750 PROBABILITY OF TYPE II ERROR (BETA) = .200

ALPHA =	.050	ALPHA =	.100	ALPHA =	.150	ALPHA =	.200	ALPHA =	.250
DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE
.050	493	.050	360	.050	281	.050	226	.050	183
.100	130	.100	95	.100	74	.100	60	.100	48
.150	60	.150	44	.150	34	.150	28	.150	23
.200	35	.200	26	.200	20	.200	16	.200	13
.250	23	.250	17	.250	13	.250	11	.250	9

PROBABILITY OF OCCURRENCE = .750 PROBABILITY OF TYPE II ERROR (BETA) = .250

ALPHA =	.050	ALPHA =	.100	ALPHA =	.150	ALPHA =	.200	ALPHA =	.250
DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE
.050	429	.050	305	.050	233	.050	183	.050	145
.100	113	.100	80	.100	62	.100	48	.100	38
.150	52	.150	37	.150	29	.150	23	.150	18
.200	30	.200	22	.200	17	.200	13	.200	11
.250	20	.250	14	.250	11	.250	9	.250	7

SAMPLE SIZES FOR PAIRED ANALYSIS WHERE THE SIGN OF THE DIFFERENCE IS IMPORTANT
 SAMPLE SIZE (N) FOR A GIVEN VALUE OF MAGNITUDE (DELTA), WITH A SPECIFIC PROBABILITY OF A TYPE I ERROR (ALPHA) FOR

PROBABILITY OF OCCURANCE = .800 PROBABILITY OF TYPE II ERROR (BETA) = .050

ALPHA =	.050	ALPHA =	.100	ALPHA =	.150	ALPHA =	.200	ALPHA =	.250
DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE
.050	753	.050	595	.050	500	.050	431	.050	375
.100	202	.100	160	.100	134	.100	115	.100	100
.150	95	.150	75	.150	63	.150	54	.150	47
.200	56	.200	44	.200	37	.200	32	.200	28
.250	37	.250	30	.250	25	.250	21	.250	19

PROBABILITY OF OCCURANCE = .800 PROBABILITY OF TYPE II ERROR (BETA) = .100

ALPHA =	.050	ALPHA =	.100	ALPHA =	.150	ALPHA =	.200	ALPHA =	.250
DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE
.050	596	.050	459	.050	374	.050	314	.050	267
.100	160	.100	123	.100	100	.100	84	.100	72
.150	75	.150	58	.150	47	.150	40	.150	34
.200	44	.200	34	.200	28	.200	24	.200	20
.250	30	.250	23	.250	19	.250	16	.250	13

PROBABILITY OF OCCURANCE = .800 PROBABILITY OF TYPE II ERROR (BETA) = .150

ALPHA =	.050	ALPHA =	.100	ALPHA =	.150	ALPHA =	.200	ALPHA =	.250
DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE
.050	500	.050	374	.050	299	.050	246	.050	204
.100	134	.100	100	.100	80	.100	66	.100	55
.150	63	.150	47	.150	38	.150	31	.150	26
.200	37	.200	28	.200	22	.200	19	.200	15
.250	25	.250	19	.250	15	.250	12	.250	10

PROBABILITY OF OCCURANCE = .800 PROBABILITY OF TYPE II ERROR (BETA) = .200

ALPHA =	.050	ALPHA =	.100	ALPHA =	.150	ALPHA =	.200	ALPHA =	.250
DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE
.050	431	.050	314	.050	245	.050	198	.050	160
.100	115	.100	84	.100	65	.100	53	.100	43
.150	54	.150	40	.150	31	.150	25	.150	21
.200	32	.200	24	.200	19	.200	15	.200	12
.250	21	.250	15	.250	12	.250	10	.250	8

PROBABILITY OF OCCURANCE = .800 PROBABILITY OF TYPE II ERROR (BETA) = .250

ALPHA =	.050	ALPHA =	.100	ALPHA =	.150	ALPHA =	.200	ALPHA =	.250
DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE
.050	375	.050	267	.050	204	.050	160	.050	127
.100	100	.100	72	.100	55	.100	43	.100	34
.150	47	.150	34	.150	26	.150	21	.150	16
.200	28	.200	20	.200	15	.200	12	.200	10
.250	19	.250	13	.250	10	.250	8	.250	7

SAMPLE SIZES FOR PAIRED ANALYSIS WHERE THE SIGN OF THE DIFFERENCE IS IMPORTANT
 SAMPLE SIZE (N) FOR A GIVEN VALUE OF MAGNITUDE (DELTA), WITH A SPECIFIC PROBABILITY OF A TYPE I ERROR (ALPHA) FOR

PROBABILITY OF OCCURANCE = .850 PROBABILITY OF TYPE II ERROR (BETA) = .350

ALPHA =	.050	ALPHA =	.100	ALPHA =	.150	ALPHA =	.200	ALPHA =	.250
DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE
.050	623	.050	493	.050	414	.050	356	.050	310
.100	171	.100	136	.100	114	.100	98	.100	85
.150	82	.150	65	.150	55	.150	47	.150	41
.200	49	.200	39	.200	33	.200	28	.200	25
.250	33	.250	26	.250	22	.250	19	.250	17

PROBABILITY OF OCCURANCE = .850 PROBABILITY OF TYPE II ERROR (BETA) = .100

ALPHA =	.050	ALPHA =	.100	ALPHA =	.150	ALPHA =	.200	ALPHA =	.250
DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE
.050	493	.050	378	.050	309	.050	260	.050	220
.100	136	.100	104	.100	85	.100	72	.100	61
.150	65	.150	50	.150	41	.150	35	.150	29
.200	39	.200	30	.200	25	.200	21	.200	18
.250	26	.250	20	.250	17	.250	14	.250	12

PROBABILITY OF OCCURANCE = .850 PROBABILITY OF TYPE II ERROR (BETA) = .150

ALPHA =	.050	ALPHA =	.100	ALPHA =	.150	ALPHA =	.200	ALPHA =	.250
DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE
.050	414	.050	309	.050	247	.050	203	.050	169
.100	114	.100	85	.100	69	.100	56	.100	47
.150	55	.150	41	.150	33	.150	27	.150	23
.200	33	.200	25	.200	20	.200	16	.200	14
.250	22	.250	17	.250	14	.250	11	.250	9

PROBABILITY OF OCCURANCE = .850 PROBABILITY OF TYPE II ERROR (BETA) = .200

ALPHA =	.050	ALPHA =	.100	ALPHA =	.150	ALPHA =	.200	ALPHA =	.250
DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE
.050	356	.050	260	.050	203	.050	164	.050	133
.100	98	.100	72	.100	56	.100	45	.100	37
.150	47	.150	35	.150	27	.150	22	.150	18
.200	28	.200	21	.200	16	.200	13	.200	11
.250	19	.250	14	.250	11	.250	9	.250	7

PROBABILITY OF OCCURANCE = .850 PROBABILITY OF TYPE II ERROR (BETA) = .250

ALPHA =	.050	ALPHA =	.100	ALPHA =	.150	ALPHA =	.200	ALPHA =	.250
DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE
.050	310	.050	220	.050	169	.050	133	.050	105
.100	85	.100	61	.100	47	.100	37	.100	29
.150	41	.150	29	.150	23	.150	18	.150	14
.200	25	.200	18	.200	14	.200	11	.200	9
.250	17	.250	12	.250	9	.250	7	.250	6

SAMPLE SIZES FOR PAIRED ANALYSIS WHERE THE SIGN OF THE DIFFERENCE IS IMPORTANT
 SAMPLE SIZE (N) FOR A GIVEN VALUE OF MAGNITUDE (DELTA), WITH A SPECIFIC PROBABILITY OF A TYPE I ERROR (ALPHA) FOR

PROBABILITY OF OCCURRENCE = .900 PROBABILITY OF TYPE II ERROR (BETA) = .050

ALPHA = .050		ALPHA = .100		ALPHA = .150		ALPHA = .200		ALPHA = .250	
DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE
.050	470	.050	372	.050	312	.050	269	.050	234
.100	135	.100	107	.100	90	.100	77	.100	67
.150	67	.150	53	.150	45	.150	38	.150	33
.200	41	.200	33	.200	28	.200	24	.200	21
.250	28	.250	23	.250	19	.250	16	.250	14

PROBABILITY OF OCCURRENCE = .900 PROBABILITY OF TYPE II ERROR (BETA) = .100

ALPHA = .050		ALPHA = .100		ALPHA = .150		ALPHA = .200		ALPHA = .250	
DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE
.050	372	.050	285	.050	233	.050	196	.050	166
.100	107	.100	82	.100	67	.100	57	.100	48
.150	53	.150	41	.150	33	.150	28	.150	24
.200	33	.200	25	.200	21	.200	17	.200	15
.250	23	.250	17	.250	14	.250	12	.250	10

PROBABILITY OF OCCURRENCE = .900 PROBABILITY OF TYPE II ERROR (BETA) = .150

ALPHA = .050		ALPHA = .100		ALPHA = .150		ALPHA = .200		ALPHA = .250	
DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE
.050	312	.050	233	.050	187	.050	153	.050	127
.100	90	.100	67	.100	54	.100	44	.100	37
.150	45	.150	33	.150	27	.150	22	.150	18
.200	28	.200	21	.200	17	.200	14	.200	11
.250	19	.250	14	.250	12	.250	10	.250	8

PROBABILITY OF OCCURRENCE = .900 PROBABILITY OF TYPE II ERROR (BETA) = .200

ALPHA = .050		ALPHA = .100		ALPHA = .150		ALPHA = .200		ALPHA = .250	
DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE
.050	269	.050	196	.050	153	.050	123	.050	100
.100	77	.100	57	.100	44	.100	36	.100	29
.150	38	.150	28	.150	22	.150	18	.150	15
.200	24	.200	17	.200	14	.200	11	.200	9
.250	16	.250	12	.250	10	.250	8	.250	6

PROBABILITY OF OCCURRENCE = .900 PROBABILITY OF TYPE II ERROR (BETA) = .250

ALPHA = .050		ALPHA = .100		ALPHA = .150		ALPHA = .200		ALPHA = .250	
DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE
.050	234	.050	166	.050	127	.050	100	.050	79
.100	67	.100	48	.100	37	.100	29	.100	23
.150	33	.150	24	.150	19	.150	15	.150	12
.200	21	.200	15	.200	11	.200	9	.200	7
.250	14	.250	10	.250	8	.250	6	.250	5

SAMPLE SIZES FOR PAIRED ANALYSIS WHERE THE SIGN OF THE DIFFERENCE IS IMPORTANT
 SAMPLE SIZE (N) FOR A GIVEN VALUE OF MAGNITUDE (DELTA), WITH A SPECIFIC PROBABILITY OF A TYPE I ERROR (ALPHA) FOR

PROBABILITY OF OCCURRENCE = .950 PROBABILITY OF TYPE II ERROR (BETA) = .050

ALPHA =	.050	ALPHA =	.100	ALPHA =	.150	ALPHA =	.200	ALPHA =	.250
DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE
.050	293	.050	232	.050	195	.050	167	.050	146
.100	92	.100	73	.100	61	.100	53	.100	46
.150	48	.150	39	.150	32	.150	28	.150	24
.200	31	.200	25	.200	21	.200	18	.200	16
.250	22	.250	18	.250	15	.250	13	.250	11

PROBABILITY OF OCCURRENCE = .950 PROBABILITY OF TYPE II ERROR (BETA) = .100

ALPHA =	.050	ALPHA =	.100	ALPHA =	.150	ALPHA =	.200	ALPHA =	.250
DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE
.050	232	.050	178	.050	145	.050	122	.050	104
.100	73	.100	56	.100	46	.100	39	.100	33
.150	38	.150	29	.150	24	.150	20	.150	17
.200	25	.200	19	.200	16	.200	13	.200	11
.250	18	.250	14	.250	11	.250	9	.250	8

PROBABILITY OF OCCURRENCE = .950 PROBABILITY OF TYPE II ERROR (BETA) = .150

ALPHA =	.050	ALPHA =	.100	ALPHA =	.150	ALPHA =	.200	ALPHA =	.250
DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE
.050	195	.050	146	.050	116	.050	96	.050	79
.100	61	.100	46	.100	37	.100	30	.100	25
.150	32	.150	24	.150	19	.150	16	.150	13
.200	21	.200	16	.200	13	.200	10	.200	9
.250	15	.250	11	.250	9	.250	8	.250	6

PROBABILITY OF OCCURRENCE = .950 PROBABILITY OF TYPE II ERROR (BETA) = .200

ALPHA =	.050	ALPHA =	.100	ALPHA =	.150	ALPHA =	.200	ALPHA =	.250
DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE
.050	167	.050	122	.050	96	.050	77	.050	63
.100	53	.100	39	.100	32	.100	24	.100	20
.150	28	.150	20	.150	16	.150	13	.150	11
.200	18	.200	13	.200	10	.200	8	.200	7
.250	13	.250	9	.250	8	.250	6	.250	5

PROBABILITY OF OCCURRENCE = .950 PROBABILITY OF TYPE II ERROR (BETA) = .250

ALPHA =	.050	ALPHA =	.100	ALPHA =	.150	ALPHA =	.200	ALPHA =	.250
DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE	DELTA	SAMPLE
.050	146	.050	104	.050	79	.050	63	.050	50
.100	46	.100	33	.100	25	.100	20	.100	16
.150	24	.150	17	.150	13	.150	11	.150	9
.200	16	.200	11	.200	9	.200	7	.200	6
.250	11	.250	9	.250	5	.250	5	.250	4