

Stating the Hypothesis:

1. Interactions

H_0 : There is no interaction between Plane Design and Paper Weight

H_A : There is an interaction between Plane Design and Paper Weight

$\alpha = 0.05$

2. Factor 1 : Plane Design

H_0 : Means of all levels of Plane Design are identical

H_A : Means are different for levels of Plane Design

$\alpha = 0.05$

3. Factor 2 : Paper Weight

H_0 : Means of all levels of Paper Weight are identical

H_A : Means are different for levels of Paper Weight

$\alpha = 0.05$

Gather Data:

Test	Random	Feet	Inch	Distance
4	052198422	10	51	171
2	107992567	10	92	212
6	575185507	10	81	201
2	347295249	10	58	178
5	639639726	12		144
3	474089394	10	95	215
3	640341538	10	75	195
6	679873730	10	63	183
5	646391167	10	6	126
6	400353877	10	94	214
5	586627449	10	5	125
4	775024168	10	64	184
5	462622957	10	20	140
5	191133605	10	31	151
4	789687228	10	66	186
5	563481964	10	39	159
1	868475074	10	50	170
1	076977515	10	50	170
2	966240200	10	35	155
3	385180853	10	67	187
3	710350930	10	39	159
2	688678028	10	25	145
1	155867578	10	85	205
4	137826776	10	25	145
2	037874694	10	33	153
2	808363984	10	74	194
2	627589390	10	81	201
4	991840882	10	83	203
1	614385005	10	51	171

6	450278830	10	42	162
2	284748546	10	49	169
4	094065305	10	15	135
3	480438315	15		180
4	821209606	10	50	170
1	923945615	12		144
2	316414726	10	103	223
2	297648036	10	50	170
4	031612747	10	15	135
6	267244249	10	68	188
3	770695557	10	41	161
4	529285752	13		156
6	085813711	10	28	148
1	031593686	10	53	173
6	507103720	10	23	143
4	124423768	10	44	164
3	808952160	10	57	177
5	425391412	10	43	163
5	541451142	10	3	123
1	263998472	0	119	119
6	793711272	10	40	160
1	369335920	10	18	138
1	114959995	12		144
5	900026737	0	102	102
3	099283232	10	75	195
5	427195408	11		132
3	880502927	10	76	196
6	273308204	10	33	153
6	615687624	10	18	138
3	901845452	10	23	143
1	530456537	10	35	155

Table 1: All Data Points Collected

Evaluate Evidence:

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ANOVA[data, {design, paper, All}, {design, paper}]
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							All	165.017
							design[dart]	161.9
							design[lift]	174.9
							design[lock]	158.25
							paper[color]	156.8
							paper[print]	173.233
{ ANOVA →	design	2	3063.63	1531.82	2.80839	0.0691323	design[dart] × paper[color]	164.9
	paper	1	4050.82	4050.82	7.42666	0.00864373	design[dart] × paper[print]	158.9
	design paper	2	6286.63	3143.32	5.76287	0.005389	design[lift] × paper[color]	169.
	Error	54	29453.9	545.443			design[lift] × paper[print]	180.8
	Total	59	42855.				design[lock] × paper[color]	136.5
							design[lock] × paper[print]	180.

Figure 1: Two-way ANOVA table data

		Airplane Design			
		Basic Dart	Lock-Bottom	Lift Off	
Paper Weight	Light	158.9	180	180.8	173.233
	Heavy	164.9	136.5	169	156.8
		161.9	158.25	174.9	165.017

Table 2: Two-way ANOVA Table

Make Decision:

$$0.005 < 0.05$$

We reject so there is an interaction between Plane Design and Paper Weight; therefore, main effects cannot be measured.