

QUESTION: In a 2x2x2 factorial design with two levels of each factor, how many independent comparisons are possible? How many comparisons are possible if the design is unbalanced? How many comparisons are possible if the design is balanced? How many comparisons are possible if the design is unbalanced and the design is balanced?

ANSWER: In a 2x2x2 factorial design with two levels of each factor, there are 7 independent comparisons possible. In an unbalanced design, there are 7 independent comparisons possible. In a balanced design, there are 7 independent comparisons possible. In an unbalanced and balanced design, there are 7 independent comparisons possible.

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Table 1. Factorial Design (2x2x2)

| Factor | Level 1 | Level 2 |
|----------|---------|---------|
| Factor 1 | 1 | 2 |
| Factor 2 | 1 | 2 |
| Factor 3 | 1 | 2 |

Table 2. Factorial Design (2x2x2)

| Factor | Level 1 | Level 2 | Level 3 |
|----------|---------|---------|---------|
| Factor 1 | 1 | 2 | 3 |
| Factor 2 | 1 | 2 | 3 |
| Factor 3 | 1 | 2 | 3 |

Table 3. Factorial Design (2x2x2)

| Factor | Level 1 | Level 2 |
|----------|---------|---------|
| Factor 1 | 1 | 2 |
| Factor 2 | 1 | 2 |
| Factor 3 | 1 | 2 |