

## 5.5: Chapter 5 Summary

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In this lesson, we discussed important elements of the "Treatment Design," one of the two components of an "Experimental Design." We are now familiar with the main effects and interaction effects of a factorial design.

In a full factorial design, the experiment is carried out at every factor level combination. Most factorial studies do not go beyond a two-way interaction, and if a two-way interaction is significant, the mean response values should be compared among different combinations of the two factors rather than among the single factor levels. In other words, the focus should be on response vs. interaction effect rather than response vs. main effects. An Interaction plot is a useful graphical tool to understand the extent of interactions among factors (or treatments) with parallel lines indicating no interaction.

In a nested design, the experiment need not be conducted at every combination of levels in all factors. Given two factors in a nested design, there is a distinction between the nested and the nesting factor. The levels of the nested factor may be unique to each level of the nesting factor. Therefore, the comparison of the nested factor levels should be made within each level of the nesting factor—a fact that should be kept in mind when stating null and alternative hypotheses for the nested factor(s), and also when writing programming code.

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