Factorial Designs

Outline

- Overview of complex/factorial designs
  - Main effect
  - Interaction effect

Introduction to Factorial Designs

- Researchers often investigate the effects of two or more IVs simultaneously
- All levels of each IV are combined with all levels of the other IVs

Factorial Designs

2 x 2 design

Factor A

Type of Question

Level 1 = Misleading

Level 2 = Unbiased

Factor B

Knowledge of the Crime

Level 1 = Naïve Questioner

Level 2 = Knowledgeable questioner

How to Determine the Number of Conditions?

- 2 x 2 = 4 conditions

	IV A	
IV B	A = 1	A = 2
B = 1	A1,B1	A1,B2
B = 2	A2,B1	A2,B2

Why Should We Use a Factorial Design?

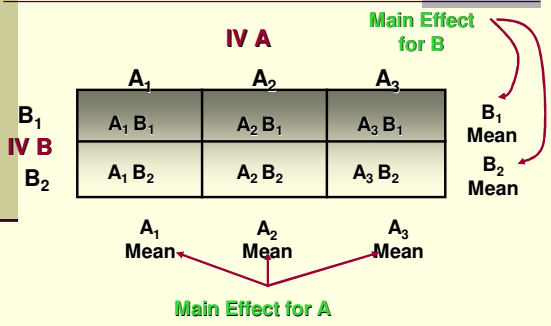
- We can examine the influence that each factor by itself has on a behaviour, as well as the influence that combining these factors has on the behaviour
- Can be efficient and cost-effective

Interpretation of Factorial Designs

Two Kinds of Information:

- **Main effect of an IV**
  - **the effect that one IV has independently of the effect of the other IV**

Main Effect



Interpretation of Factorial Designs

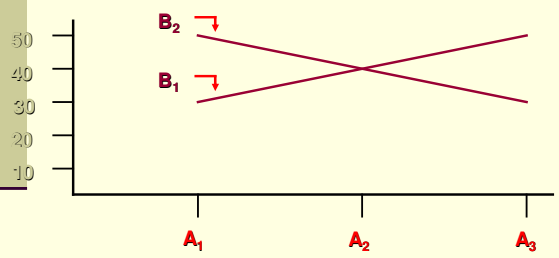
Two Kinds of Information:

- **Main effect of an IV**
- **Interaction**
  - **Represent how independent variables work together to influence behavior**
  - **Occurs when the effect of one IV differs depending on the level of the second IV**

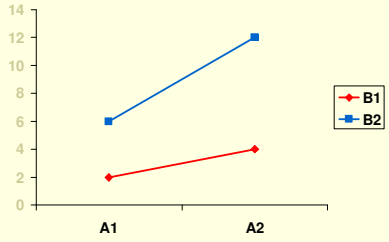
Interactions

- In a graph, if the lines representing different levels of an IV are *not parallel*, an interaction *may* be present (verify with statistics)
- Parallel lines means no interaction.

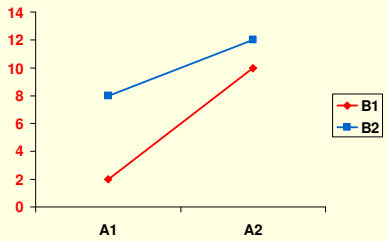
Type of Interactions: Crossover Interaction



Type of Interactions: Synergistic Interaction



Type of Interactions: Ceiling-Effect Interaction



Guidelines for the Analysis of a Factorial Design

- First determine whether the interaction between the independent variables is statistically significant.
  - If the interaction is statistically significant, identify the source of the interaction by examining the simple main effects
  - Main effects should be interpreted cautiously whenever an interaction is present in an experiment
- Then examine whether the main effects of each independent variable are statistically significant.

Varieties of Factorial Designs: Mixed Designs

- 1 factor is between subject & 1 factor is within subject
- e.g.: pre-post-control design
  - All subjects are given a pre-test and a post-test
  - Participants divided into two groups
  - Experimental group vs. control group

2 x 2 Mixed Factorial

Within Subject Factor

Between Subject Factor	Pre-Test	Post Test
Cognitive Therapy	Cognitive Pre	Cognitive Post
Traditional Therapy	Traditional Pre	Traditional Post