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Cozby & Bates: Methods in Behavioral Research (11th)

Chapter 10: Complex Experimental Designs

Summer 2014

Complex Experimental Designs

- Factorial Design
  - Main Effects
  - Interactions
    - Simple effects
- Within Subject Designs
- Between Subject Designs
- Mixed Designs

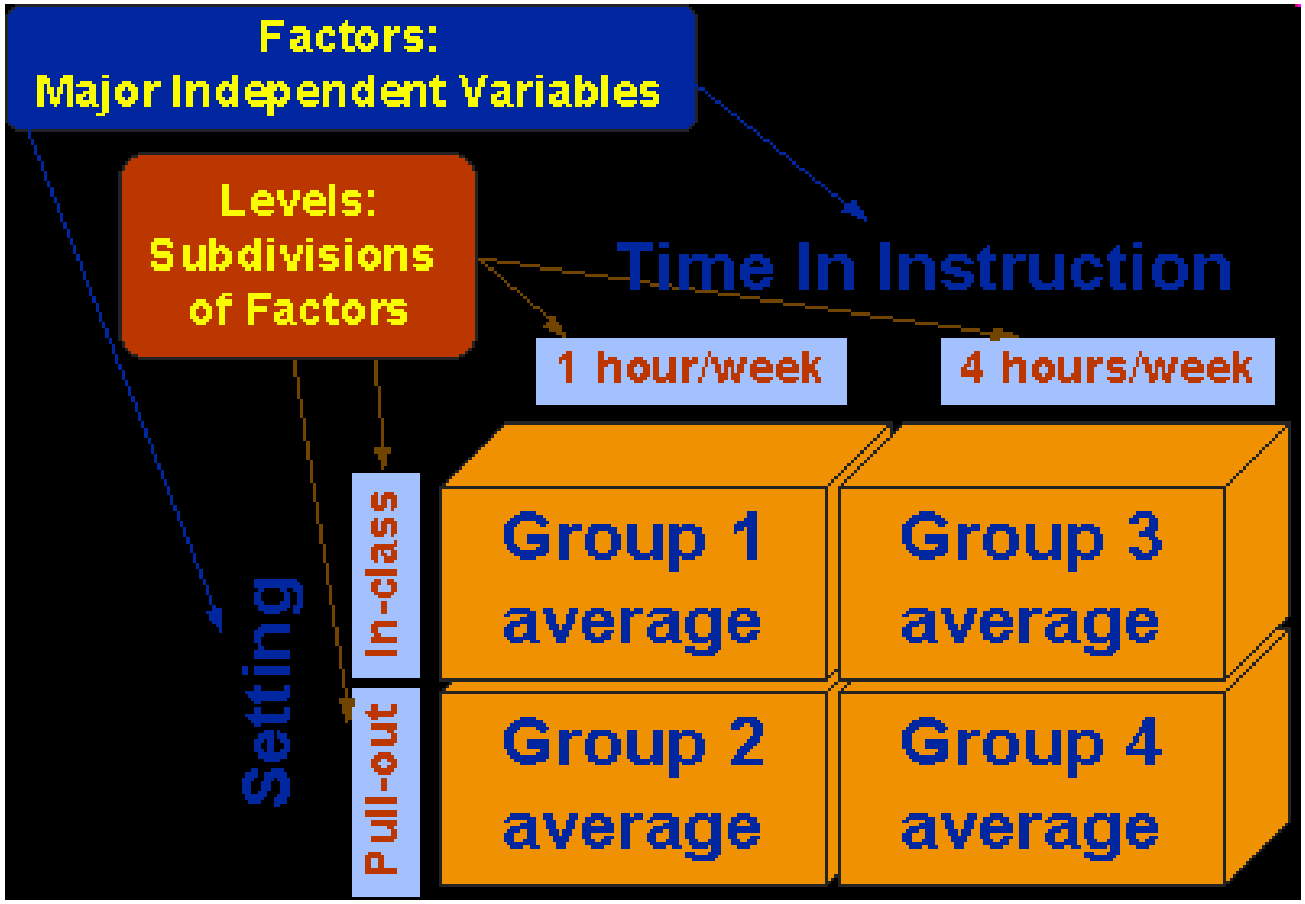
Factorial Design

A factorial design has all levels of every factor combined with every level of every other factor (IVs).

A factorial design allows investigation of the separate main effects and interactions of the two or more independent variables.

	Alcohol (A_1)	Placebo (A_2)
Caffeine (B_1)		
Placebo (B_2)		

A second example (within or between?)



Levels of the IV (Factor Levels)

Multiple levels of the IV can be used to determine the shape of the relationship between the IV and the DV (e.g., curvilinear, ceiling effects, etc.)

Multiple FACTORS can be used to investigate potential dependencies between different IV manipulations (e.g., Alcohol and Caffeine).

2 x 2 factorial design (the simplest factorial design)

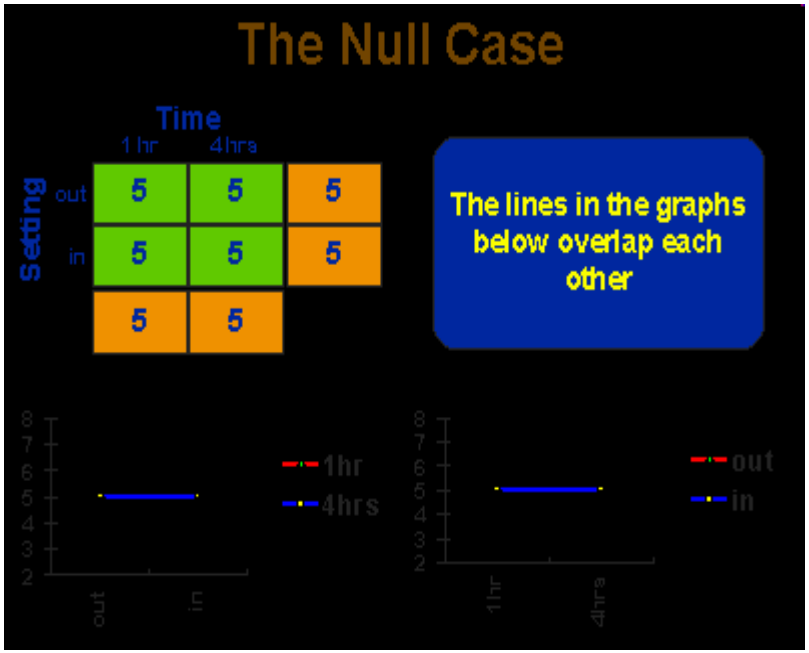
# of factors (A) x # of factors (B) x …

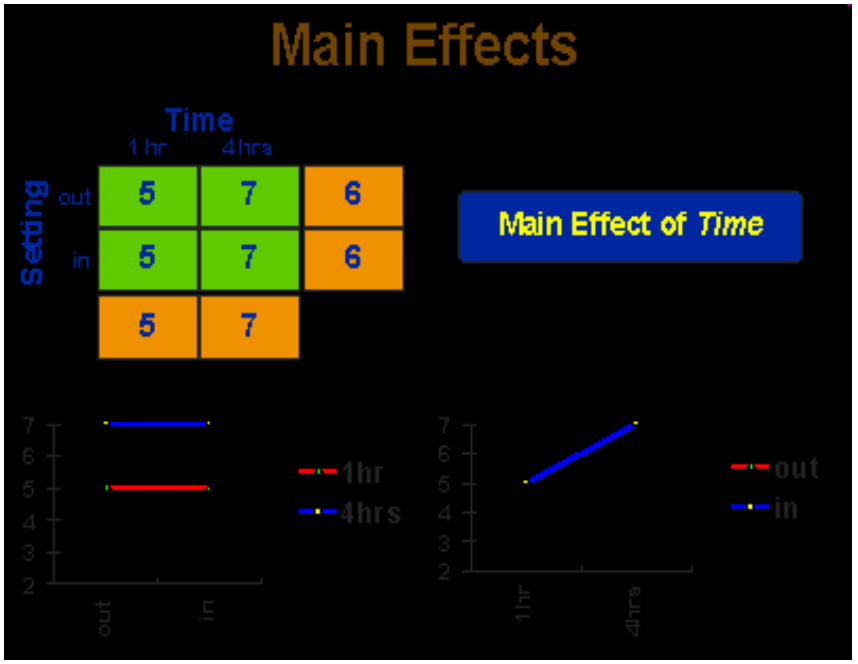
Main Effects

In a design with TWO (or more) independent variables; the main effect of a variable is the OVERALL effect of that variable after collapsing across all other levels of all other factors (e.g., the effect of caffeine averaged across all levels of alcohol gives you the MAIN EFFECT of caffeine).

The effect of each variable by itself

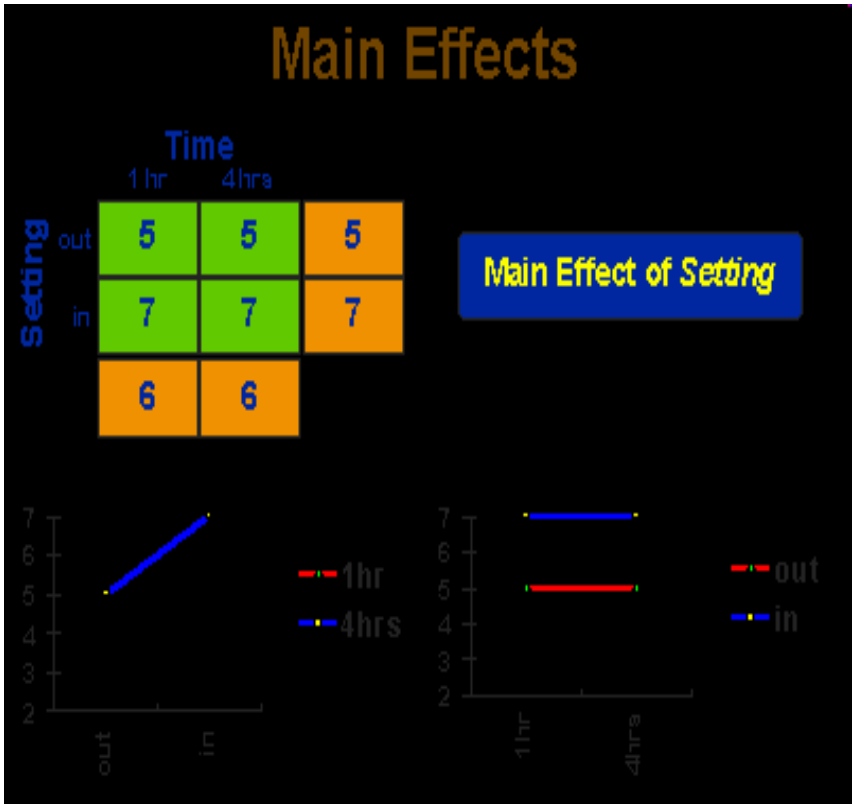
Main Effects

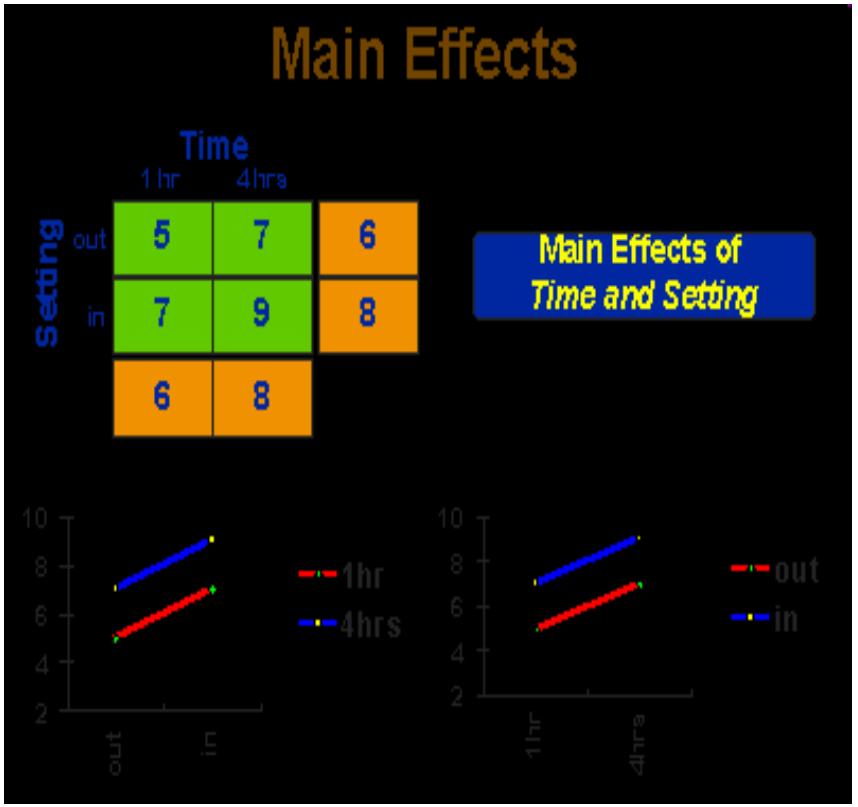




Main Effects

(Main Effect of A, Main effect of A & B [no interaction])

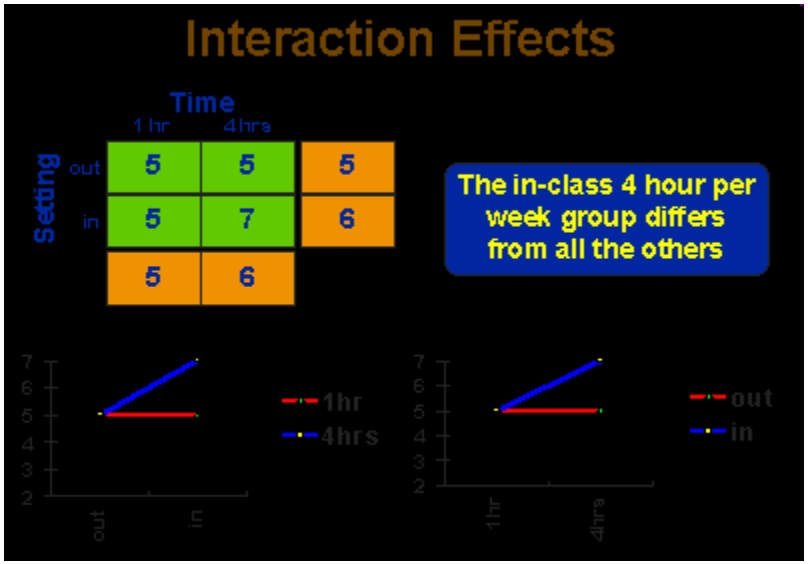




Interactions

The dependency between two or more IVs.

If the effect of one IV depends on the level of another IV there is an interaction.



A *moderator variable* is a variable that influences the relationship between two other variables.

IV x PV designs (factorial designs with Independent variables and participant variables)

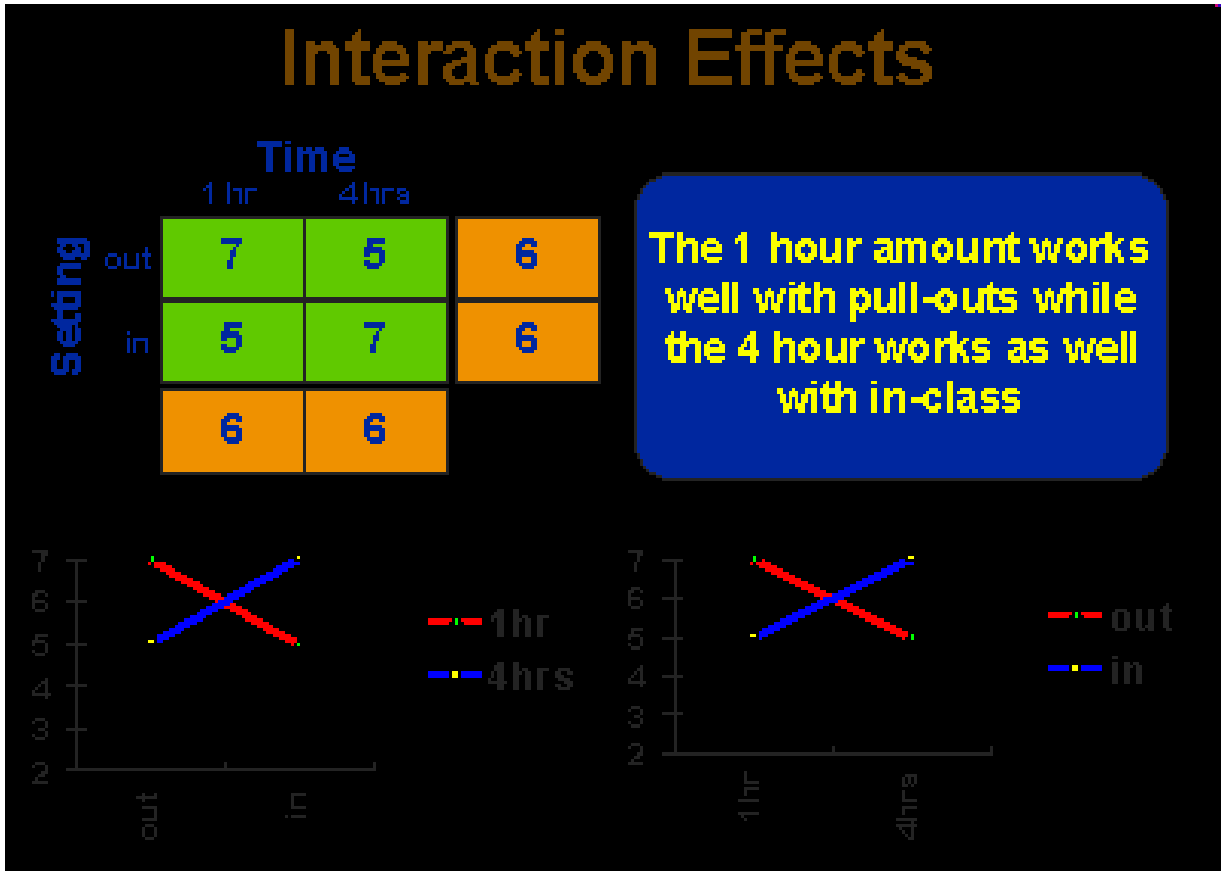
IV: Independent Variable (manipulated)

PV: Participant variable (non-manipulated)

DV: dependent Variable (where effect appears)

	Extravert (A_1)	Introvert (A_2)
Silence (B_1)	8.1	9.2
Television (B_2)	7.9	6.9

Outcomes of 2 x 2 Factorial Designs



Main Effect

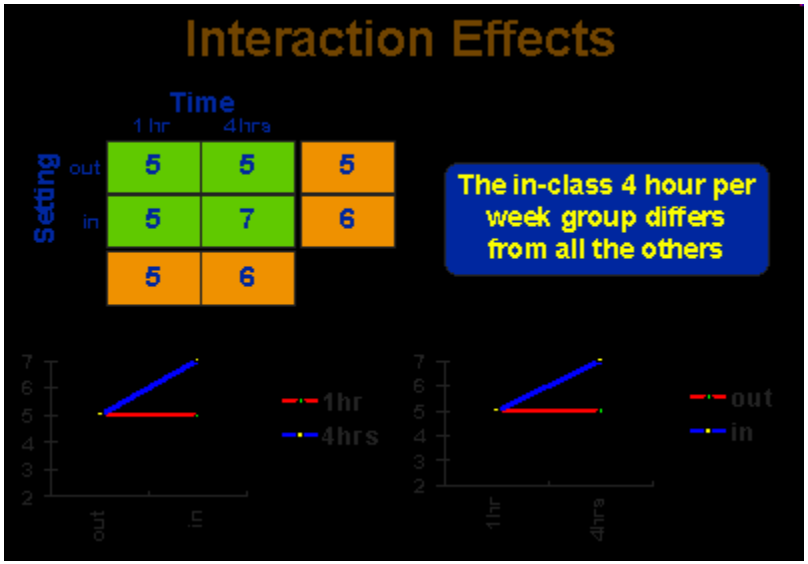
- A: none
- B: none

Interaction

- AxB: yes

Simple Main Effect

Examines the mean difference across one Factor (IV; e.g., Factor A) while holding the level of another factor (IV; e.g., Factor B at B_1) constant.



Learning Objectives

- Define Factorial Design
  - Discuss why a researcher might use this design
- Describe the information provided by main effects and interactions in a factorial design
  - Describe the role of simple main effects in understanding interactions
- Describe a IV x PV design
- Compare the assignment of participants in an ***independent groups*** (between-subjects) design, a ***repeated measures*** (within-subjects) design, and a ***mixed*** (within-between) design.

Chapter 10 Terminology

- Factor
- Factor Levels
- IV
- DV
- PV
- IV x PV design
- Factorial design
- Main Effect
- Interaction
- Simple Main Effect
- Within Subject Design
- Between Subject Design
- Mixed Design
- Moderator Variables

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