

# Factorial and Multivariate ANOVAs

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### Types of Effects

- \_\_\_\_\_ = The effect of a single independent variable in a factorial design
- \_\_\_\_\_ = The effect of one independent variable across the levels of other independent variables
- \_\_\_\_\_ = The effect of one independent variable at a single level of another independent variable
  - Only run if you have an interaction effect

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### 2 X 2 Design

Ego Threat?

		Yes	No
Gender	Male		
	Female		

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### Steps in 2 X 2 Factorial Analysis

- STEP ONE: Run a
  - Between-subjects: General Factorial
  - Within-subjects or Mixed: Repeated Measures
  - Look for significant main effects and interactions (report  $F$ -statistics,  $p$ -values and partial eta-squared:  $\eta^2$ )
  - Obtain means from each condition

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### Steps in 2 X 2 Factorial Analysis

- STEP TWO: Obtain
  - If you have a significant interaction effect, select one level of each IV
  - Run t-tests (or ANOVA's) to look for simple main effects
- Remember: More conditions = More tests

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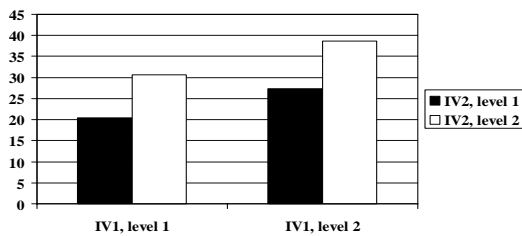
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### Graphing Factorial Results



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- An extension of ANOVA to cover cases where there is more than one dependent variable
- Dependent variables cannot simply be combined into an index
- In addition to IV → DV relationships, can also examine associations among DVs

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**Why Not Use Multiple ANOVAs?**

- Multiple ANOVAs inflates
  - MANOVA analysis adjusts for this and lumps all tests into a single analysis
  - So your alpha level can remain at 0.05 without any extra adjustment
- Provides a preliminary omnibus test of effects to let you know if a difference exists anywhere (similar to ANOVAs)

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**Important Note**

- If your omnibus test is significant, SPSS will provide you with the main effects and interaction effects for each DV
- If this shows significant interaction effects, you will need to examine simple main effects on your own (use same procedure as you do for Factorial ANOVAs)

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- Just like an ANCOVA, a MANCOVA examines effects while controlling for the variance explained by covariates
- Again, highly recommended to control for covariates in quasi-experimental designs

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### What To Look For

- Make sure the \_\_\_\_\_ are significant first
  - May need to provide additional indicators of effect sizes (e.g., Wilks Lambda)
- Check your univariate Main and Interaction Effects for each dependent variable
  - If significant, report F-statistics
  - Check descriptives to make sure they are in the correct direction

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### MANOVA & MANCOVA in SPSS

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### Post hoc Test:

- Correlation of two latent variables, one representing a set of IVs, and the other a set of DVs
- May have several correlations
  - Each one represents a different dimension by which the independent set of variables is related to the dependent set
- Wilks' Lambda used to test the significance

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### Uses of

- Squared value = % of variance in the dependent set explained by the independent set along the given dimension
- Helps to determine the number of dimensions needed to account for the association
- Subsequent dimensions are unrelated to previously noted dimensions

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