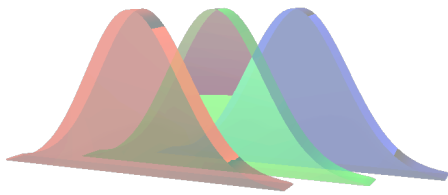


# Quantitative Stats Review

2009 Methodology A - Lecture 12



## Types of ANOVA

Number of Dependent Variables (DV)

- ★ Univariate - 1 DV
  - ★ Repeated-measures - 1 DV measured 2 or more times
- ★ Multivariate - 2 or more different DVs

Groups of Subjects

- ★ Between-subjects - 2 or more groups of subjects, each subject participates in 1 condition
- ★ Within-subjects - 1 group of subjects, each subject participates in all conditions

Number of Independent Variables (IV)

- ★ One-way - 1 factor
- ★ Factorial - 2 or more orthogonal factors

## Types of ANOVA

Number of Independent Variables

|                        |     | One IV                   | More than one IV  |
|------------------------|-----|--------------------------|---|
| Conditions per Subject | One | One-way between-subjects | Factorial between-subjects<br>Mixed-design (split-plot) |
|                        | All | One-way within-subject   | Factorial within-subject                                |

## Sample exam questions

What are the three most common measures of central tendency?

- a) mean, median & mode
- b) standard deviation, variance & variability
- c) mean, standard deviation & effect size
- d) standard deviation, standard error & variance

How are standard deviation and variance related?

- a) standard deviation is half of variance
- b) standard deviation is the square root of variance
- c) standard deviation is equal to variance
- d) standard deviation is unrelated to variance

If the experimental hypothesis is that women have better emotion perception than men, what is the null hypothesis?

- a) men and women have equal emotion perception
- b) men have better emotion perception than women
- c) men and women have different emotion perception, but the better sex is not known
- d) men and women do not have emotion perception

Which of these statements is true?

- a) The null hypothesis is rejected if the p-value is higher than the critical p-value
- b) The alternative hypothesis is accepted if the p-value is higher than the critical p-value
- c) The null hypothesis is rejected if the p-value is lower than the critical p-value
- d) The null hypothesis is accepted if the p-value is lower than the critical p-value

What would be the result if you lowered the critical p-value from .05 to .001?

- a) increase the chance of a false positive
- b) decrease the chance of a false negative
- c) no effect on the chance of a false negative or a false positive
- d) increase the chance of a false negative

Participants in an experiment chose the more symmetric face from 10 different pairs of faces. Which test would you use to determine if their detection of the more symmetric face was different from the chance performance of 5 correct trials?

- a) one-sample t-test
- b) paired samples t-test
- c) independent samples t-test
- d) between-subjects one-way ANOVA

How do you calculate Cohen's d (effect size) for paired-samples t-tests?

- a) difference between the 2 groups divided by the mean of the standard deviations of the 2 groups
- b) difference between the 2 groups divided by standard deviation of the difference scores
- c) the mean of the 2 groups divided by the mean of the standard deviations of the 2 groups
- d) the standard deviation of the difference scores divided by the difference between the 2 groups

What is the difference between one-way and factorial ANOVAs?

- a) the number of dependent variables
- b) the number of levels of the independent variable
- c) the number of independent variables
- d) the number of subjects in each group

For a univariate design, what 2 things do you need to know to determine what type of ANOVA to use?

- a) how many dependent variables and whether they are within- or between-subjects
- b) how many factors and whether they are within- or between-subjects
- c) how many factors and whether they are dependent or independent variables
- d) how many levels and whether they are dependent or independent variables

What type of ANOVA is required if you have both between- and within-subject factors?

- a) between-subjects one-way ANOVA
- b) within-subjects one-way ANOVA
- c) within-subjects factorial ANOVA
- d) mixed-design ANOVA

What are the two tests for homogeneity of variance and when should you use each?

- a) Levene's test for within-subject factors and Fmax for between-subject factors
- b) Levene's test for between-subject factors and Mauchly's test for within-subject factors
- c) Levene's test for between-subject factors and Fmax for within-subject factors
- d) Levene's test for within-subject factors and Mauchly's test for between-subject factors

When do you need to check for sphericity?

- a) for between-subjects factors with 2 or more levels
- b) for within-subjects factors with 2 or more levels
- c) for between-subjects factors with more than 2 levels
- d) for within-subjects factors with more than 2 levels

Which is NOT an advantage of a between-subjects design?

- a) avoids practice effects
- b) can study unchangeable variables
- c) requires fewer participants
- d) avoids effects of tiredness

In a between-subjects experiment with 3 experimental groups, you make sure to assign the same number of men and women to each group. What is this method called?

- a) matching groups
- b) randomisation
- c) pseudo-randomisation
- d) counterbalancing

You run an experiment where male and female participants each report how likely they are to go to different movies. The movies are romantic comedies, crime thrillers, and historical dramas. Each participant views all of the movies. What is the design of this experiment?

- a) sex of participant is a within-subjects variable and type of movie is a between-subjects variable
- b) sex of participant is the independent variable and type of movie is the dependent variable
- c) sex of participant is the dependent variable and type of movie is the independent variable
- d) sex of participant is a between-subjects variable and type of movie is a within-subjects variable

Ben ran an experiment where he asked male and female participants to rate the attractiveness of particularly asymmetric, normal, and symmetric faces. Each participant rated only one type of face. His hypothesis was that men's ratings would not be affected by the symmetry of the face, while women's ratings would increase as symmetry increased.

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What is/are the dependent variable(s)?

- a) symmetry of the face
- b) sex of the participant
- c) both symmetry of the face and sex of the participant
- d) attractiveness ratings

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How would you describe the correct ANOVA to investigate this hypothesis?

- a) 2 x 3 Mixed-design ANOVA
- b) 3 x 2 Within-subjects Factorial ANOVA
- c) 3 x 2 Repeated-measures ANCOVA
- d) 2 x 3 Between-subjects Factorial ANOVA

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What type of effect did Ben predict?

- a) A main effect of sex
- b) A main effect of symmetry
- c) A main effect of attractiveness
- d) An interaction between sex and symmetry

Lisa ran an experiment where she photographed participants before and after they saw a happy or sad movie. The photographs were coded by an expert for how happy they looked on a scale from 0 to 100. Lisa's hypothesis was that the increase in happiness would be greater from before to after the happy movie than from before to after the sad movie.

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What is/are the dependent variable(s)?

- a) Time of the photo (before or after the movie)
- b) Type of movie (happy or sad)
- c) Both time of the photo and type of movie
- d) Happiness ratings of the photographs

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How would you describe the correct ANOVA to investigate this hypothesis?

- a) 2 x 2 Within-subjects Factorial ANOVA
- b) 2 x 2 Between-subjects Factorial ANOVA
- c) 2 x 2 Mixed-design ANOVA
- d) 4-way ANOVA

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What does Lisa's hypothesis predict?

- a) an interaction between time of the photo and type of movie
- b) an interaction between happiness ratings of the photos and type of movie
- c) a main effect of type of movie
- d) a main effect of happiness rating