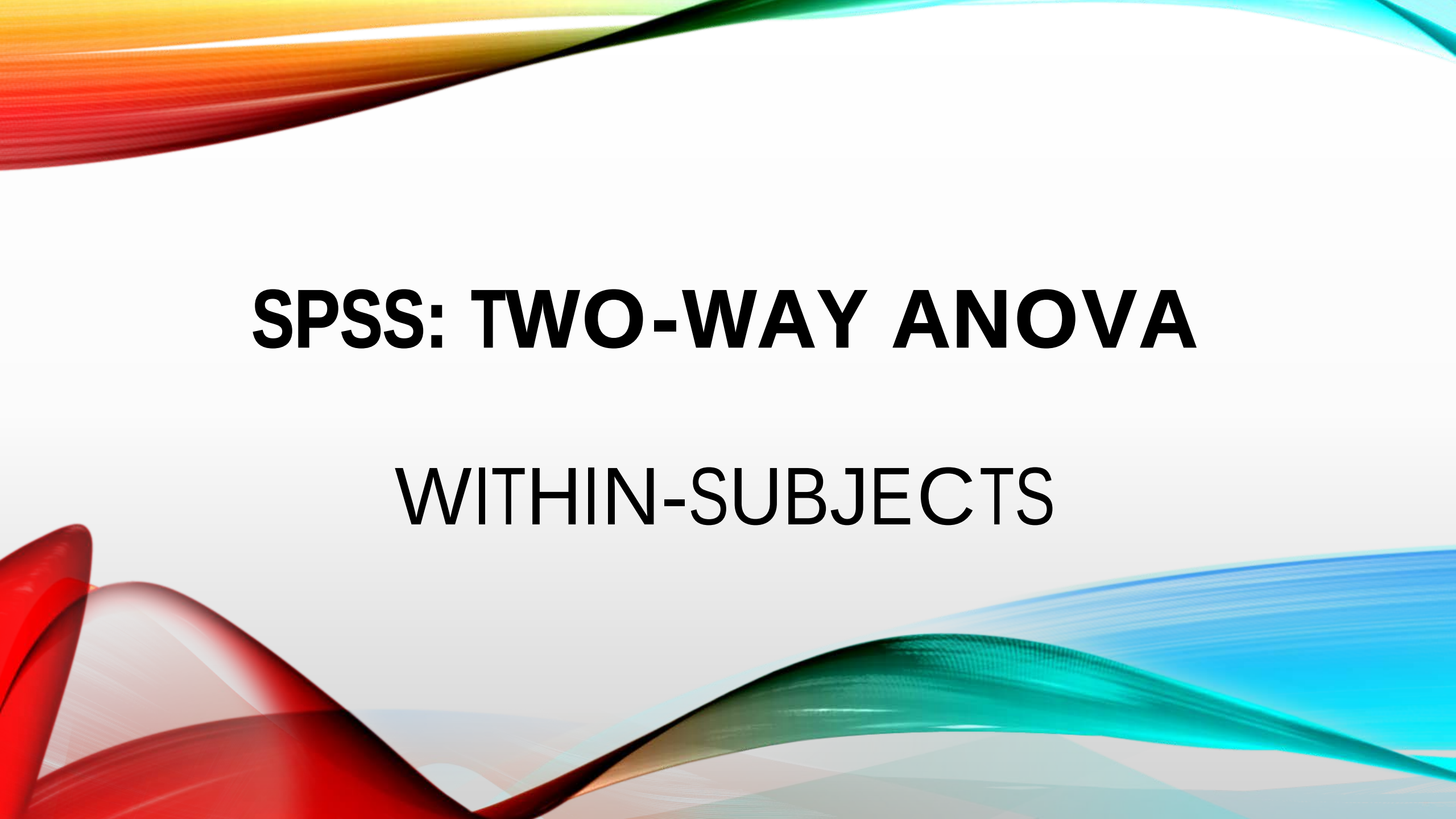




SPSS: TWO-WAY ANOVA

WITHIN-SUBJECTS



TWO-WAY ANOVA

- Within-subjects design = within-subjects ANOVA
- Compares the mean differences between two or more within-subjects independent variables, each with two or more levels

THINGS TO REMEMBER

- Two-way ANOVA is used when you have **two IV's**, and each IV will contain two or more levels.
- Parametric test – relies on a number of assumptions relating to data
- A two-way ANOVA tests whether there is an **interaction** between the two IV's on the DV, as well as the **main effect** of each IV in isolation.
 - A significant interaction ($p < .05$) informs us whether the effect of one of our IVs on the DV is the same for all levels of your other IV – and vice versa
 - Significant interaction = simple main effects!!

ASSUMPTIONS AND REQUIREMENTS FOR DATA

1. The DV should be measured on a continuous scale – interval or ratio
2. The two IV's should each have two or more categorical, independent levels
3. Independence of observations:
 - a) Each measurement should be a distinct and independent entity
4. No significant outliers!
5. Normality: approximately normal distribution for each combination of the groups of the two IV's
6. Sphericity (if applicable)
 - a) Assumption that the variances of the differences between all combinations are equal
 - b) Mauchly's Test of Sphericity!** ($p > .05$)

STUDY EXAMPLE

- Exploring the effects of candidate gender and facial expression on ratings of attractiveness in an occupational setting
- NOTE: we need...
 - Two within-subjects **categorical** IV's:
 1. Gender of candidate (Male AND female)
 2. Facial expression (Smiling AND Neutral)
 - One **continuous** DV: attractiveness ratings



RESULTS

$F(df1, df2) = F\text{-value}, p < / > .05$

Remember that you will have THREE of these!
One for the interaction effect, and two for each of the main effects.

Interaction: $F(1, 19) = 133.64, p < .001, np^2 = .88$

M.E of Gender: $F(1, 19) = .06, p > .05 (= .82), np^2 = .003$

M.E of expression: $F(1, 19) = .12, p > .05 (= .73) np^2 = .006$

INTERPRETING RESULTS

- A two-way within-subjects ANOVA was conducted to assess the effect of candidate gender (male/female) and facial expression exhibited by candidate (smiling/neutral) on attractiveness ratings in an occupational settings. Results show that there was a highly significant interaction effect between gender and facial expression of candidate; $F(1, 19) = 133.64$, $p < .001$, $\eta^2 = .88$. The main effect of candidate gender did not reach statistical significance [$F(1, 19) = .06$, $p > .05$, $\eta^2 = .003$], nor did the main effect of facial expression [$F(1, 19) = .12$, $p > .05$, $\eta^2 = .006$].

RESULTS

Interaction: $F(1, 19) = 133.64, p < .001, \eta^2 = .88$

Because this is significant, we need to
assess simple main effects!

CAUTION!! SIMPLE MAIN EFFECTS

If the interaction effects significant, reporting the main effects within the **Tests of within-subjects effects** table can be misleading. You would need to determine the difference between your groups at each level of each factors, and to do this you need to analyse the data again to determine **simple main effects**.