

# community project

encouraging academics to share statistics support resources

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stcp-marshall-interactions

The following resources are associated:  
Two-way ANOVA in SPSS and the SPSS datasets 'Diet'

## Interactions in SPSS

**Dependent variable:** Continuous (scale/interval/ratio)

**Independent variables:** Two categorical (Two-way ANOVA),

An interaction is the combined effect of two independent variables on one dependent variable. Possible interactions can be investigated when carrying out ANOVA with at least two independent grouping variables or multiple regression.

### Summarising the effect of two categorical variables on one independent variable

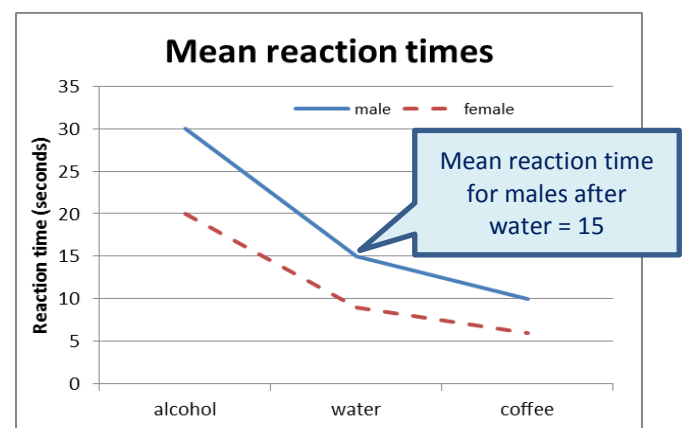
A line chart can be used to compare the means of combinations of two categorical independent variables. It is particularly useful for looking at interaction effects and can also be called an interaction plot or means plot. The lines connect means of each combination.

Example: An experiment was carried out to investigate the effect of drink on reaction times in a driving simulator. Participants were given alcohol, water or coffee. The mean reaction times by group are contained in the table to the right.

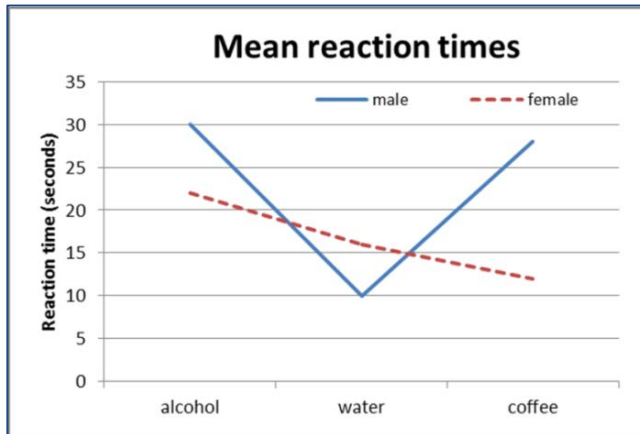
Mean Reaction Times	Male	Female
Alcohol	30	20
Water	15	9
Coffee	10	6

The six means can be displayed in a line/means plot.

For both males and females, the fastest (i.e. lowest) reaction times are after coffee, followed by water then alcohol. Females are faster than males after all three drinks. There is no interaction between gender and drink as the lines are reasonably parallel.



If there was an interaction what would it look like?



An interaction occurs when the lines are not quite so parallel; such that the means of one group do not follow the same pattern as the other group. Here males have their fastest reaction after water, but females have their fastest reaction after coffee. Males are faster than females after water but females are faster after coffee and alcohol.

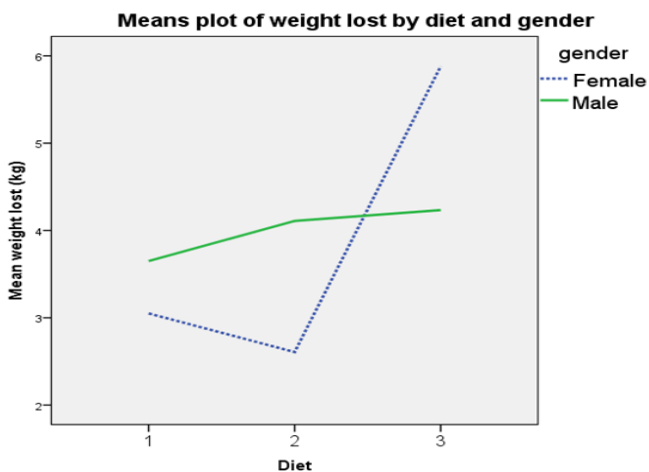
## Producing a line chart in SPSS

**Data:** The data set 'Diet' contains information on 78 people who undertook one of three diets. The dependent variable is weight lost and the independents are the diet and gender.

This example compares weight lost by diet and gender. To produce the plot in SPSS go to: *Graphs* → *Legacy Dialogs* → *Line*

Select the lines represent 'other' category, choose mean and move the dependent variable 'Weight lost' to the Variable box

Move the two categorical independent variables to the 'Category axis' and 'Define lines by' boxes. The x-axis will be the category axis option. Think carefully about which way round to have the two variables



There is a clear interaction between diet and gender as the lines are not parallel. For males, there is very little difference between the means for the diets but for females, Diet 3 led to a much higher mean weight loss.

Note: Positive weight lost means the subject lost weight.