Exercise

One institute tested 2 methods (Diet and Running) on 2 groups of subjects (North and South), to see which method works best in weight control. Data were recorded in 'Exercise1_data.csv'. Numbers in the data sheet indicates the weight gain (+) and weight lose (-).

Use the data provided in 'Exercise1_data.csv', perform the proper analysis to tell:

1. If there is a difference in the weight loss between Northern subjects and Southern subjects
2. If there is a difference in the weight loss of Northern subjects between 2 methods. Which method is better for Northern subjects to lose weight?
3. If there is an interaction between factor 'North/South' and 'Methods'

1. If there is a difference in the weight loss between Northern subjects and Southern subjects

-> Two Sample independent t-test

North_Diet	North_Running	North_Control	South_Diet	South_Control	South_Running
-1.052355528	-0.256079197	0.619002223	0.006506491	-0.299312413	0.618268609
0.179907218	-0.344592512	1.021046281	1.901115417	0.528722644	1.226651669
1.471291184	0.930824935	-1.312048554	-0.996584058	-0.469303459	0.629361033
1.349365473	-1.95367837	2.973054171	-0.001566043	2.42652297	-2.833973408
-0.202732101	1.622202873	1.794328332	0.149491534	-1.29763329	-2.007760763
-0.422819763	-1.895219088	-2.647455454	5.062272072	4.243414402	0.58513552
1.445790052	-0.760294557	3.616038561	-1.289481521	0.33749643	-1.730197549
-3.019842386	-2.061503887	3.292828798	4.851300716	1.399221182	-1.046795845
-1.628295183	-2.579385519	1.740424752	3.91008234	1.257521868	0.809743106
0.32393077	-4.176150799	6.342946529	0.838475466	2.770722389	-4.681154728
-5.093111515	0.729600489	0.731075227	4.292113781	0.390777022	2.048867702
1.706676722	-3.78638792	-0.579897344	2.878074169	5.306730747	-2.822025299
-1.395995617	-1.472449541	2.485128164	0.44824934	0.12193241	-1.630966544
-0.517477691	-1.884464622	0.240124658	-2.294116259	2.41214323	0.170949668

All different subjects

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North	-1.47245
North	-1.88446
North	0.619002
North	1.021046
North	-1.31205
North	2.973054
North	1.794328
North	-2.64746
North	3.616039
North	3.292829
North	1.740425
North	6.342947
North	0.731075
North	-0.5799
North	2.485128
North	0.240125
South	0.006506
South	1.901115
South	-0.99658
South	-0.00157
South	0.149492
South	5.062272
South	-1.28948
South	4.851301

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T-Test

Independent Samples T-Test

	t	df	p
Weight loss	−1.575	82.00	0.119

Note. Student's T-Test.

2. If there is a difference in the weight loss of **Northern subjects** between 2 **methods**. Which method is better for Northern subjects to lose weight?

ANOVA ▾

ANOVA - Weight loss

Cases	Sum of Squares	df	Mean Square	F	p
Method	55.23	2	27.614	7.095	0.002
Residual	151.79	39	3.892		

Note. Type III Sum of Squares

Post Hoc Tests

Post Hoc Comparisons - Method

		Mean Difference	SE	t	p_{tukey}
Control	Diet	1.941	0.746	2.603	0.034
	Running	2.729	0.746	3.660	0.002
Diet	Running	0.788	0.746	1.057	0.546

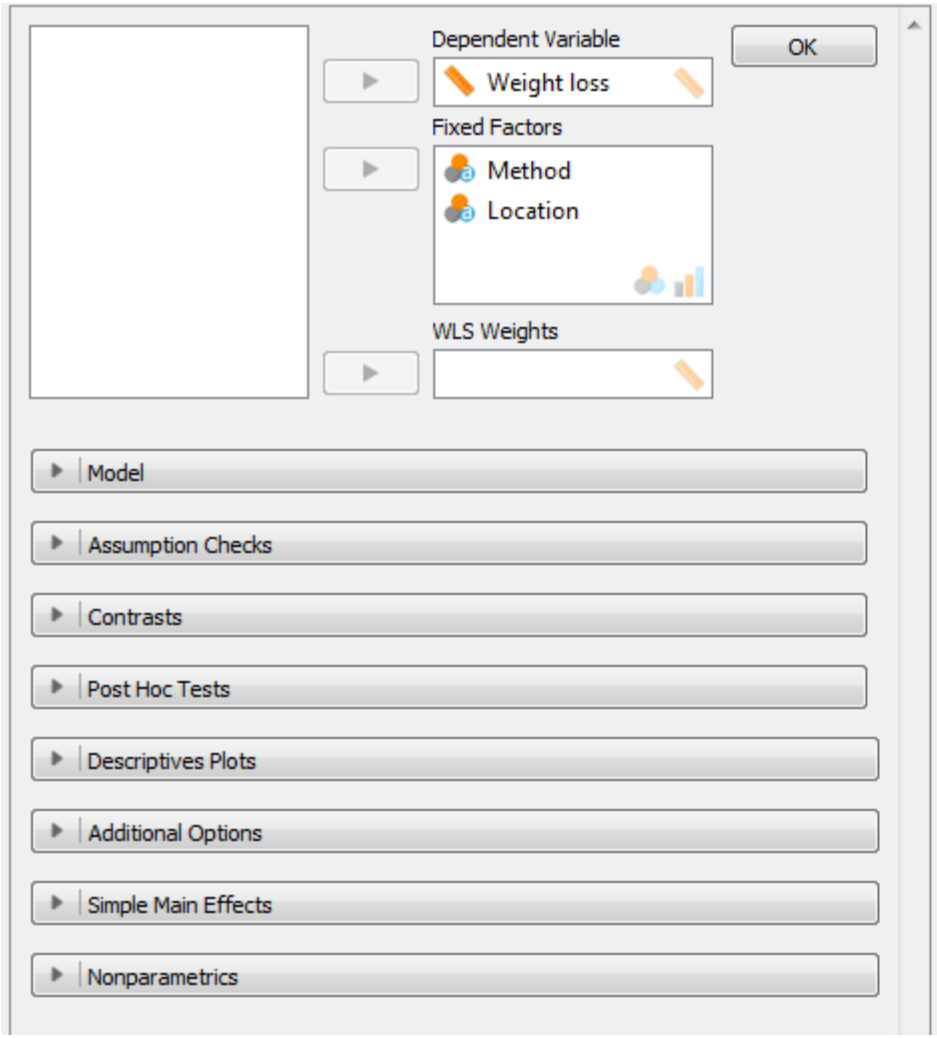
3. If there is an **interaction** between factor ‘North/South’ and ‘Methods’

ANOVA

ANOVA - Weight loss

Cases	Sum of Squares	df	Mean Square	F	p
Method	83.89	2	41.943	10.189	< .001
Location	12.69	1	12.689	3.082	0.083
Method ✻ Location	14.52	2	7.259	1.763	0.178
Residual	321.11	78	4.117		

Note. Type III Sum of Squares



Results

T-Test

Independent Samples T-Test

	t	df	p
Weight loss	−1.575	82.00	0.119

Note. Student's T-Test.

ANOVA

ANOVA - Weight loss

Cases	Sum of Squares	df	Mean Square	F	p
Method	83.89	2	41.943	10.189	< .001
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