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WIENER NEUSTADT
Austrian Network for Higher Education

University of Applied Sciences

Academic Skills II – Lecture 5

Quantitative Research
Summersemester 2022

Group 1: Melanie Hense, BA → hense@fhwn.ac.at
Group 2: Mag. Severin Maurer, BA → severin.maurer@fhwn.ac.at
Group 3: Dr. Karin Wegenstein → karin.wegenstein@fhwn.ac.at

Course Leader: Melanie Hense, BA - hense@fhwn.ac.at
Institute for Market Research & Methodology

Submission Deadlines

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GROUP ASSIGNMENTS (=Group Research Topic)	
1.1. Qualitative Survey Instrument - Version 1 (binary)	Thursday, 17.03.2022 Submission in PDF on Edunet + E-Mail to Peer-Group (with lecturer in cc)
1.2. Peer Review: Qualitative Survey Instrument (binary)	Thursday, 24.03.2022 Submission in PDF on Edunet + E-Mail to Peer-Group (with lecturer in cc)
1.3. Final Qualitative Survey Instrument (15%)	Thursday, 28.03.2022 Submission in PDF on Edunet
2. Quantitative Questionnaire (10%)	Thursday, 31.03.2022 Submission in PDF + Qualtrics Link on Edunet
3. Presentation of empirical results (20%)	Wednesday, 04.05.2022 Presentation – attendance of every group member required

In order to positively complete the course, each assignment must be submitted by the due date and be passed.
Non-submission results in a negative course grade

Learning Outcomes

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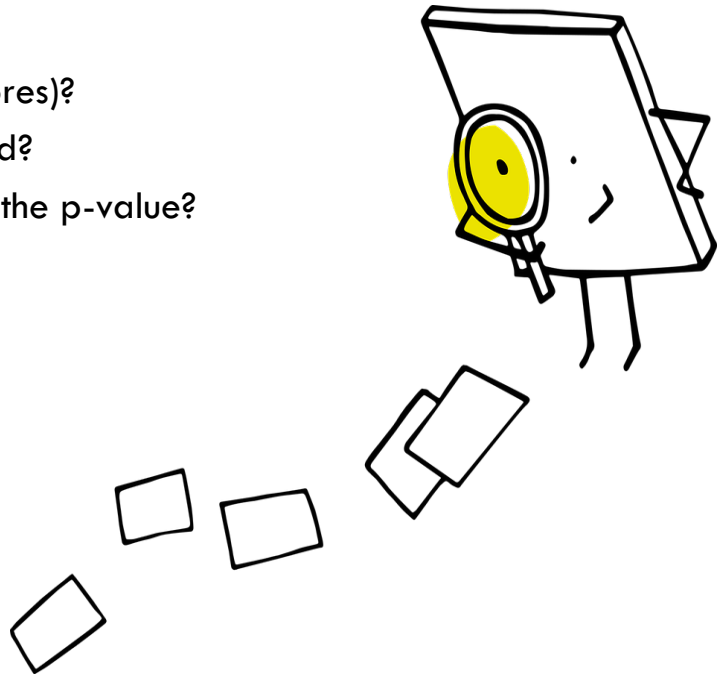
This lecture provides knowledge specific for your group task 2, that is:

1. What do I need to do right after data collection (scale scores)?
2. What are descriptive statistics and which of them do I need?
3. How do I perform a hypothesis test and what do I do with the p-value?
4. What is a correlational analysis and how do I conduct it?
5. What happens next?



Survey

Kindly Participate

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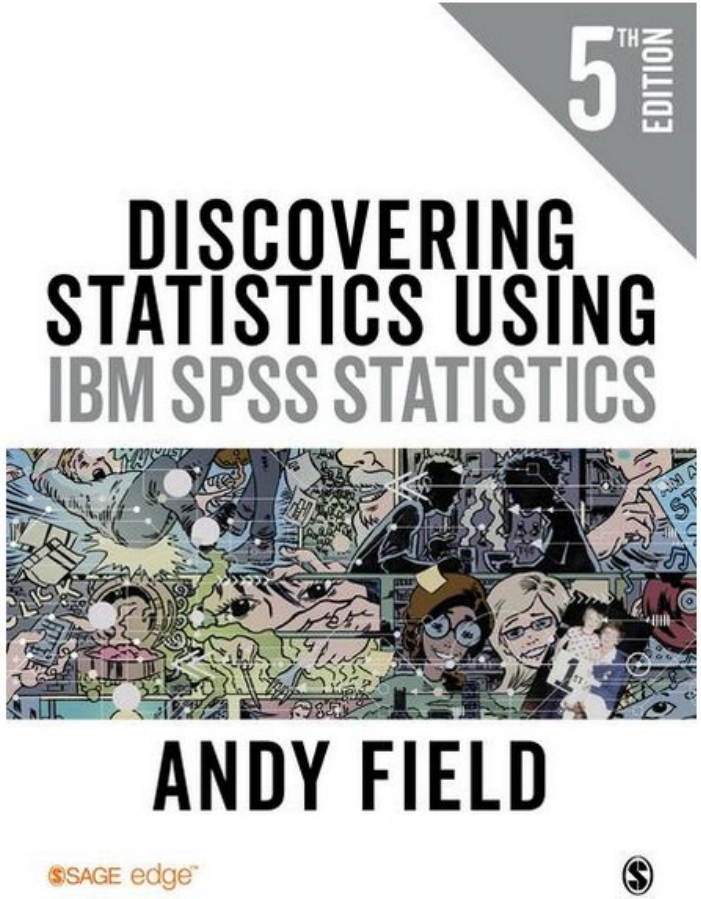

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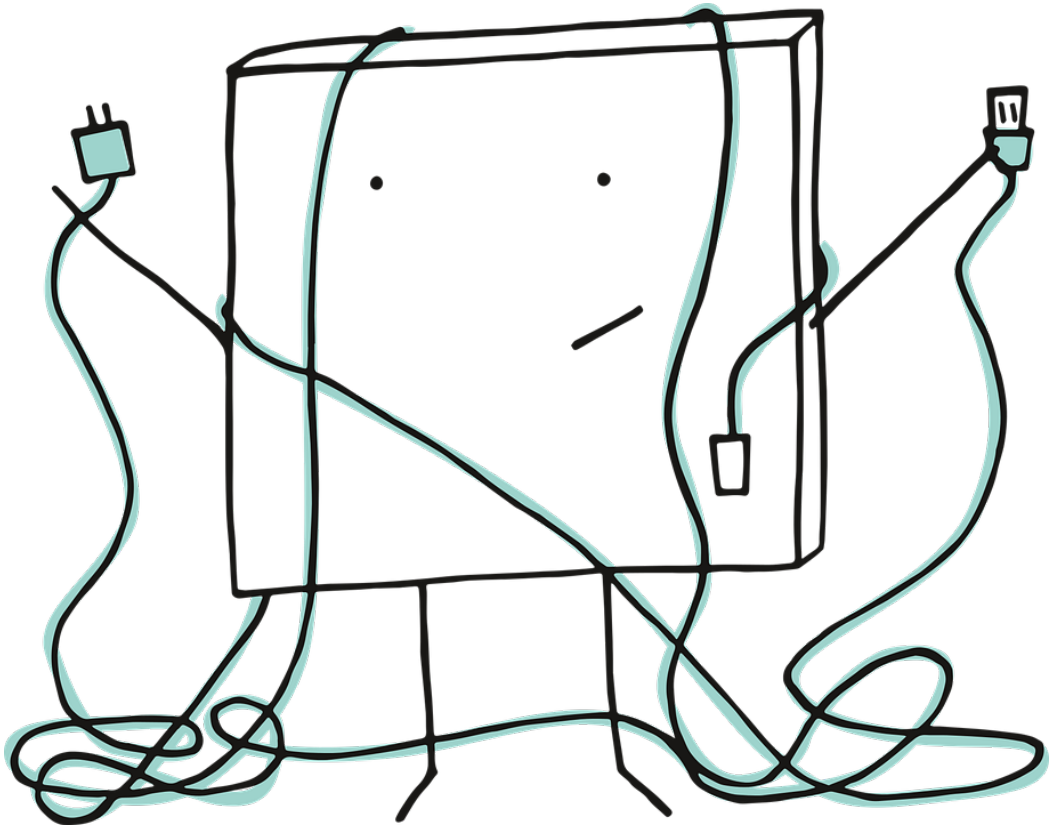
Source: Field, Andy. 2018. *Discovering statistics using IBM SPSS Statistics* (5th ed). London, u.a.: SAGE

Questions?



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1. What do I need to do right after data collection (scale scores)?

Step 1:
Prepare your data

1. What do I need to do right after data collection (scale scores)?

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Introduction

- With respect to your last group session, we provided you with various scales which you will use in your survey
- These scales consist of various items and intend to measure constructs, which in most cases consist of some dimensions
- For each item, you will get a score from the participants of your own survey – but how do you get from your Qualtrics survey to your SPSS dataset?
- And how do you get from these single item scores to the dimension scores, which you are interested in actually?

1. What do I need to do right after data collection (scale scores)?

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Introduction

- The first question is: how do I get a SPSS file from the survey tool Qualtrics?

- → in Qualtrics you will find a “Export”-function, and there you can export the survey data as a SPSS-file

1. What do I need to do right after data collection (scale scores)?

Introduction

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1. What do I need to do right after data collection (scale scores)?

Introduction

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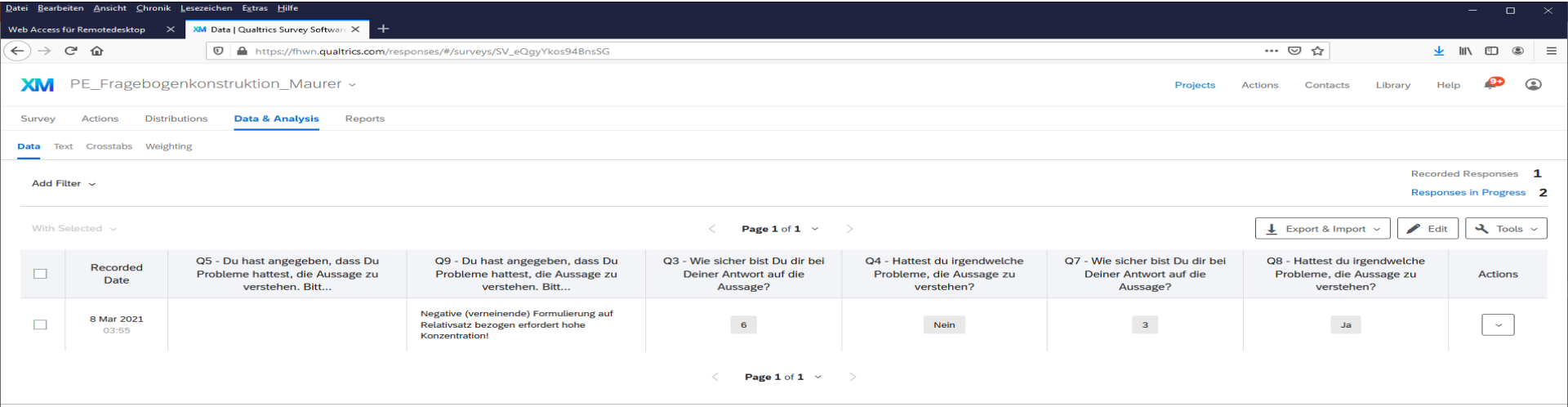

1. What do I need to do right after data collection (scale scores)?

Introduction

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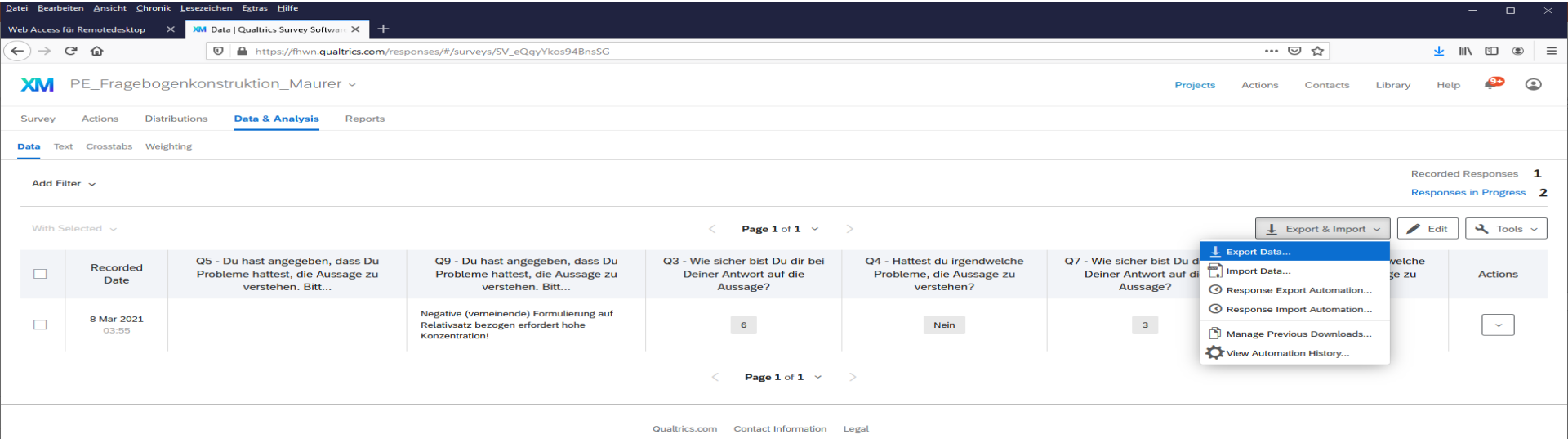

1. What do I need to do right after data collection (scale scores)?

Introduction

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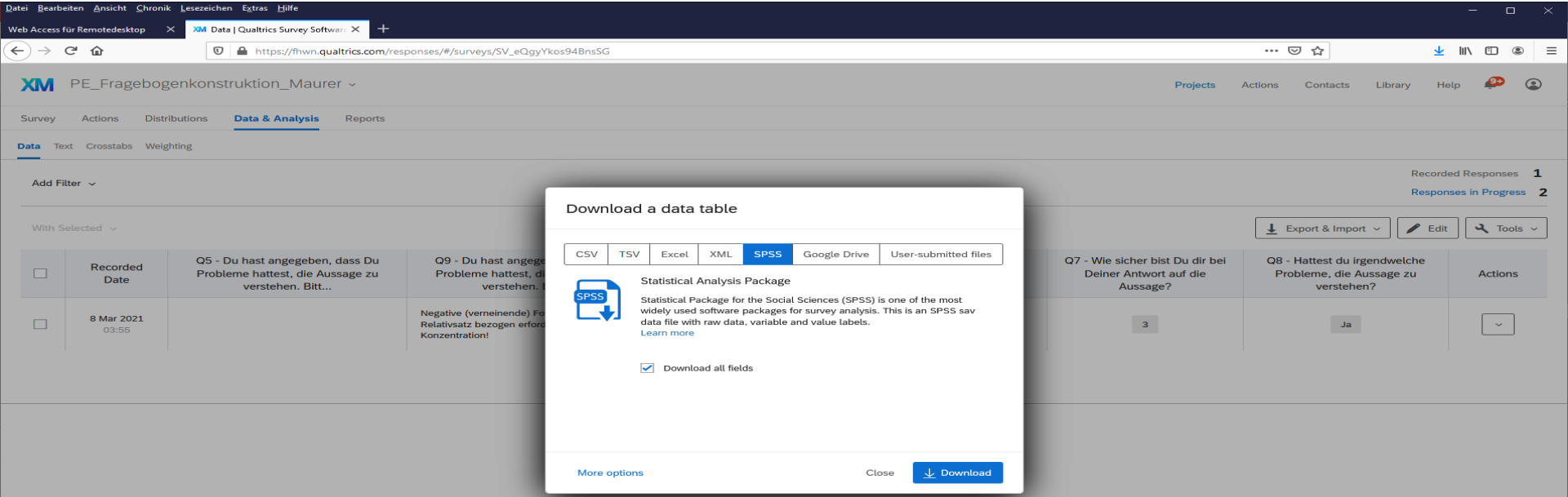

1. What do I need to do right after data collection (scale scores)?

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SPSS: BFI-2-S example

- From now on, all further steps are taken in the software IBM SPSS
- Let's have a look at some data in IBM SPSS for the scale BFI-2-S, which all of you will use for your own survey (assume we have collected data from 50 participants)
- IBM SPSS is a statistical software package very often used in the social sciences, and basically, it consists of two separate windows – a dataset window (which contains a data view mode and a variable view mode) and an output window (which shows all the statistical results you conduct as well as a source code of your taken actions)

1. What do I need to do right after data collection (scale scores)?

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SPSS: BFI-2-S example/ dataset window – variable view mode

Dataset_bfi_2_s.sav [DataSet0] - IBM SPSS Statistics Data Editor

File Edit View Data Transform Analyze Graphs Utilities Extensions Window Help

	Name	Type	Width	Decimals	Label	Values	Missing	Columns	Align	Measure	Role
1	BFI_2_S_1	Numeric	8	0	I am someone who tends to be quiet.	{1, Disagree...	9999	8	Right	Ordinal	Input
2	BFI_2_S_2	Numeric	8	0	I am someone who is compassionate, has a soft heart.	{1, Disagree...	9999	8	Right	Ordinal	Input
3	BFI_2_S_3	Numeric	8	0	I am someone who tends to be disorganized.	{1, Disagree...	9999	8	Right	Ordinal	Input
4	BFI_2_S_4	Numeric	8	0	I am someone who worries a lot.	{1, Disagree...	9999	8	Right	Ordinal	Input
5	BFI_2_S_5	Numeric	8	0	I am someone who is fascinated by art, music, or literature.	{1, Disagree...	9999	8	Right	Ordinal	Input
6	BFI_2_S_6	Numeric	8	0	I am someone who is dominant, acts as a leader.	{1, Disagree...	9999	8	Right	Ordinal	Input
7	BFI_2_S_7	Numeric	8	0	I am someone who is sometimes rude to others.	{1, Disagree...	9999	8	Right	Ordinal	Input
8	BFI_2_S_8	Numeric	8	0	I am someone who has difficulty getting started on tasks.	{1, Disagree...	9999	8	Right	Ordinal	Input
9	BFI_2_S_9	Numeric	8	0	I am someone who tends to feel depressed, blue.	{1, Disagree...	9999	8	Right	Ordinal	Input
10	BFI_2_S_10	Numeric	8	0	I am someone who has little interest in abstract ideas.	{1, Disagree...	9999	8	Right	Ordinal	Input
11	BFI_2_S_11	Numeric	8	0	I am someone who is full of energy.	{1, Disagree...	9999	8	Right	Ordinal	Input
12	BFI_2_S_12	Numeric	8	0	I am someone who assumes the best about people.	{1, Disagree...	9999	8	Right	Ordinal	Input
13	BFI_2_S_13	Numeric	8	0	I am someone who is reliable, can always be counted on.	{1, Disagree...	9999	8	Right	Ordinal	Input
14	BFI_2_S_14	Numeric	8	0	I am someone who is emotionally stable, not easily upset.	{1, Disagree...	9999	8	Right	Ordinal	Input
15	BFI_2_S_15	Numeric	8	0	I am someone who is original, comes up with new ideas.	{1, Disagree...	9999	8	Right	Ordinal	Input
16	BFI_2_S_16	Numeric	8	0	I am someone who is outgoing, sociable.	{1, Disagree...	9999	8	Right	Ordinal	Input
17	BFI_2_S_17	Numeric	8	0	I am someone who can be cold and uncaring.	{1, Disagree...	9999	8	Right	Ordinal	Input
18	BFI_2_S_18	Numeric	8	0	I am someone who keeps things neat and tidy.	{1, Disagree...	9999	8	Right	Ordinal	Input
19	BFI_2_S_19	Numeric	8	0	I am someone who is relaxed, handles stress well.	{1, Disagree...	9999	8	Right	Ordinal	Input
20	BFI_2_S_20	Numeric	8	0	I am someone who has few artistic interests.	{1, Disagree...	9999	8	Right	Ordinal	Input
21	BFI_2_S_21	Numeric	8	0	I am someone who prefers to have others take charge.	{1, Disagree...	9999	8	Right	Ordinal	Input
22	BFI_2_S_22	Numeric	8	0	I am someone who is respectful, treats others with respect.	{1, Disagree...	9999	8	Right	Ordinal	Input
23	BFI_2_S_23	Numeric	8	0	I am someone who is persistent, works until the task is fi...	{1, Disagree...	9999	8	Right	Ordinal	Input
24	BFI_2_S_24	Numeric	8	0	I am someone who feels secure, comfortable with self.	{1, Disagree...	9999	8	Right	Ordinal	Input
25	BFI_2_S_25	Numeric	8	0	I am someone who is complex, a deep thinker.	{1, Disagree...	9999	8	Right	Ordinal	Input
26	BFI_2_S_26	Numeric	8	0	I am someone who is less active than other people.	{1, Disagree...	9999	8	Right	Ordinal	Input
27	BFI_2_S_27	Numeric	8	0	I am someone who tends to find fault with others.	{1, Disagree...	9999	8	Right	Ordinal	Input
28	BFI_2_S_28	Numeric	8	0	I am someone who can be somewhat careless.	{1, Disagree...	9999	8	Right	Ordinal	Input
29	BFI_2_S_29	Numeric	8	0	I am someone who is temperamental, gets emotional easi...	{1, Disagree...	9999	8	Right	Ordinal	Input
30	BFI_2_S_30	Numeric	8	0	I am someone who has little creativity.	{1, Disagree...	9999	8	Right	Ordinal	Input
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Data View | Variable View

IBM SPSS Statistics Processor is ready | Unicode:ON

1. What do I need to do right after data collection (scale scores)?

SPSS: BFI-2-S example/ dataset window – data view mode

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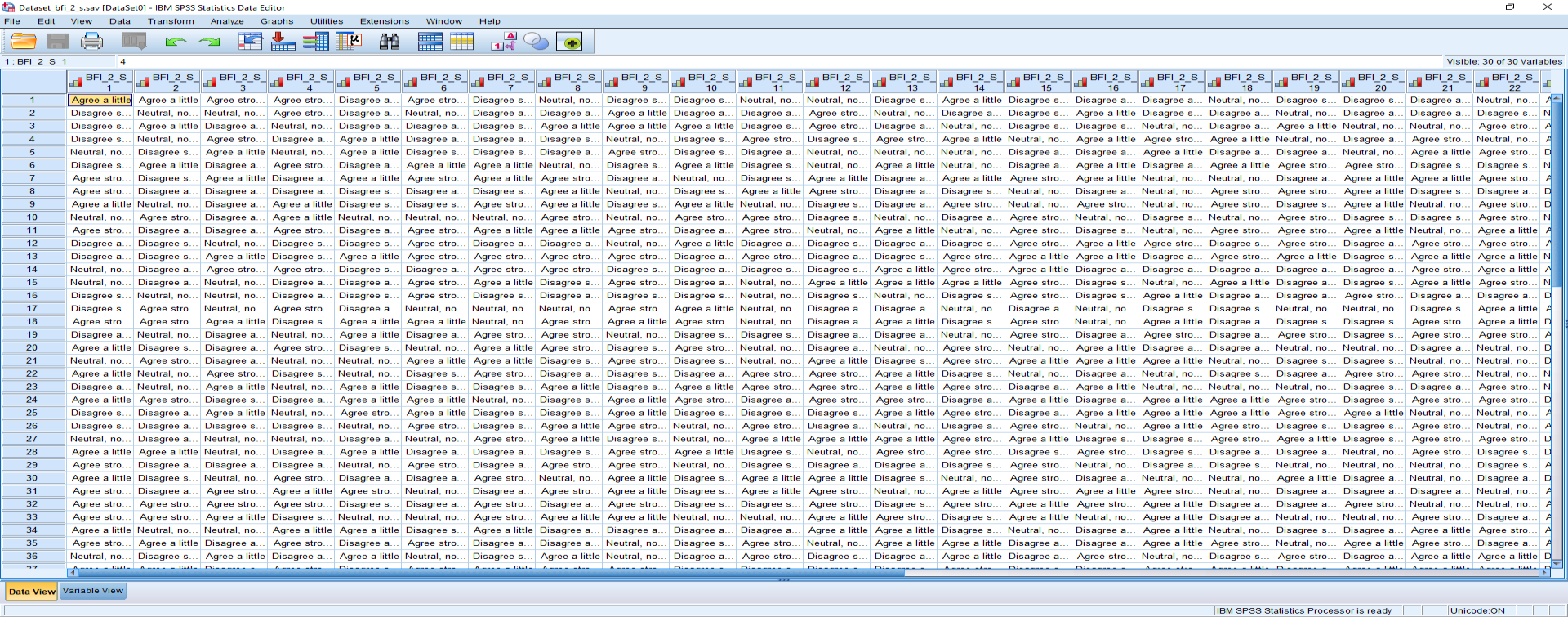

1. What do I need to do right after data collection (scale scores)?

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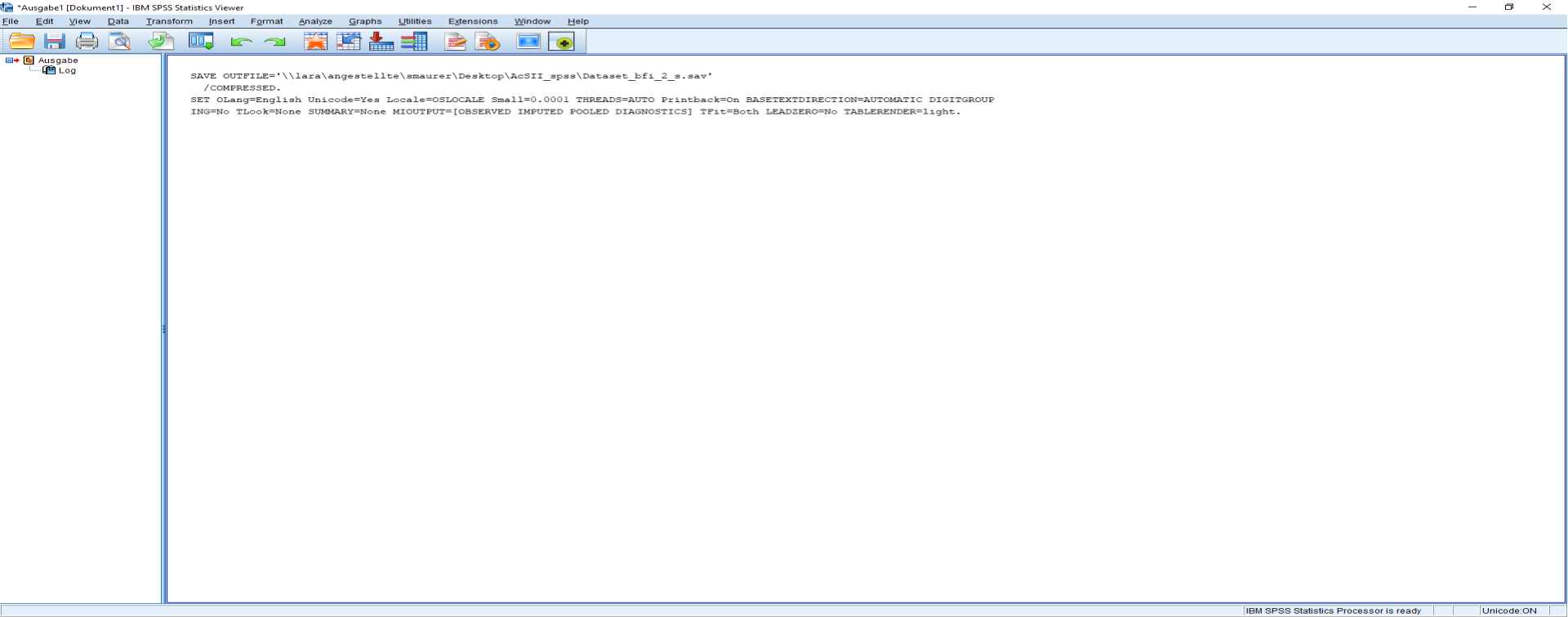
SPSS: BFI-2-S example/ dataset window – output window



1. What do I need to do right after data collection (scale scores)?

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SPSS: BFI-2-S example/ variable view mode

- In the variable view mode, you can set all of the relevant characteristics of your variables (e.g. the level of measurement, remember lecture 4!)

- Let's go through the most important setting options (with reference to the scale file that you received).

1. What do I need to do right after data collection (scale scores)?

SPSS: BFI-2-S example/ variable view mode – variable name

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BFI-2-S¶

Here are a number of characteristics that may or may not apply to you. For example, do you agree that you are someone who likes to spend time with others? Please choose a number next to each statement to indicate the extent to which you agree or disagree with that statement.¶

		1=Disagree strongly	2=Disagree a little	3=Neutral; no opinion	4=Agree a little	5=Agree strongly
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2	I am someone who is compassionate, has a soft heart.	◯	◯	◯	◯	◯
3	I am someone who tends to be disorganized.	◯	◯	◯	◯	◯
4	I am someone who worries a lot.	◯	◯	◯	◯	◯
5	I am someone who is fascinated by art, music, or literature.	◯	◯	◯	◯	◯
6	I am someone who is dominant, acts as a leader.	◯	◯	◯	◯	◯
7	I am someone who is sometimes rude to others.	◯	◯	◯	◯	◯
8	I am someone who has difficulty getting started on tasks.	◯	◯	◯	◯	◯
9	I am someone who tends to feel depressed, blue.	◯	◯	◯	◯	◯
10	I am someone who has little interest in abstract ideas.	◯	◯	◯	◯	◯
11	I am someone who is full of energy.	◯	◯	◯	◯	◯
12	I am someone who assumes the best about people.	◯	◯	◯	◯	◯
13	I am someone who is reliable, can always be counted on.	◯	◯	◯	◯	◯
14	I am someone who is emotionally stable, not easily upset.	◯	◯	◯	◯	◯
15	I am someone who is original, comes up with new ideas.	◯	◯	◯	◯	◯
16	I am someone who is outgoing, sociable.	◯	◯	◯	◯	◯
17	I am someone who can be cold and uncaring.	◯	◯	◯	◯	◯
18	I am someone who keeps things neat and tidy.	◯	◯	◯	◯	◯

Dataset_bfi_2_s.sav [DataSet0] - IBM SPSS Statistics Data Editor

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Data View | Variable View

1. What do I need to do right after data collection (scale scores)?

SPSS: BFI-2-S example/ variable view mode – label (item text)

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BFI-2-S

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2	I am someone who is compassionate, has a soft heart.	○	○	○	○	○
3	I am someone who tends to be disorganized.	○	○	○	○	○
4	I am someone who worries a lot.	○	○	○	○	○
5	I am someone who is fascinated by art, music, or literature.	○	○	○	○	○
6	I am someone who is dominant, acts as a leader.	○	○	○	○	○
7	I am someone who is sometimes rude to others.	○	○	○	○	○
8	I am someone who has difficulty getting started on tasks.	○	○	○	○	○
9	I am someone who tends to feel depressed, blue.	○	○	○	○	○
10	I am someone who has little interest in abstract ideas.	○	○	○	○	○
11	I am someone who is full of energy.	○	○	○	○	○
12	I am someone who assumes the best about people.	○	○	○	○	○
13	I am someone who is reliable, can always be counted on.	○	○	○	○	○
14	I am someone who is emotionally stable, not easily upset.	○	○	○	○	○
15	I am someone who is original, comes up with new ideas.	○	○	○	○	○
16	I am someone who is outgoing, sociable.	○	○	○	○	○
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18	I am someone who keeps things neat and tidy.	○	○	○	○	○

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File Edit View Data Transform Analyze Graphs Utilities Extensions Window Help

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14	BFI_2_S_14	Numeric	8	0	I am someone who is emotionally stable, not easily upset.	{1, Disagree...	9999	8	Right	Ordinal	Input
15	BFI_2_S_15	Numeric	8	0	I am someone who is original, comes up with new ideas.	{1, Disagree...	9999	8	Right	Ordinal	Input
16	BFI_2_S_16	Numeric	8	0	I am someone who is outgoing, sociable.	{1, Disagree...	9999	8	Right	Ordinal	Input
17	BFI_2_S_17	Numeric	8	0	I am someone who can be cold and uncaring.	{1, Disagree...	9999	8	Right	Ordinal	Input
18	BFI_2_S_18	Numeric	8	0	I am someone who keeps things neat and tidy.	{1, Disagree...	9999	8	Right	Ordinal	Input
19	BFI_2_S_19	Numeric	8	0	I am someone who is relaxed, handles stress well.	{1, Disagree...	9999	8	Right	Ordinal	Input
20	BFI_2_S_20	Numeric	8	0	I am someone who has few artistic interests.	{1, Disagree...	9999	8	Right	Ordinal	Input
21	BFI_2_S_21	Numeric	8	0	I am someone who prefers to have others take charge.	{1, Disagree...	9999	8	Right	Ordinal	Input
22	BFI_2_S_22	Numeric	8	0	I am someone who is respectful, treats others with respect.	{1, Disagree...	9999	8	Right	Ordinal	Input
23	BFI_2_S_23	Numeric	8	0	I am someone who is persistent, works until the task is fi...	{1, Disagree...	9999	8	Right	Ordinal	Input
24	BFI_2_S_24	Numeric	8	0	I am someone who feels secure, comfortable with self.	{1, Disagree...	9999	8	Right	Ordinal	Input
25	BFI_2_S_25	Numeric	8	0	I am someone who is complex, a deep thinker.	{1, Disagree...	9999	8	Right	Ordinal	Input
26	BFI_2_S_26	Numeric	8	0	I am someone who is less active than other people.	{1, Disagree...	9999	8	Right	Ordinal	Input
27	BFI_2_S_27	Numeric	8	0	I am someone who tends to find fault with others.	{1, Disagree...	9999	8	Right	Ordinal	Input
28	BFI_2_S_28	Numeric	8	0	I am someone who can be somewhat careless.	{1, Disagree...	9999	8	Right	Ordinal	Input
29	BFI_2_S_29	Numeric	8	0	I am someone who is temperamental, gets emotional easi...	{1, Disagree...	9999	8	Right	Ordinal	Input
30	BFI_2_S_30	Numeric	8	0	I am someone who has little creativity.	{1, Disagree...	9999	8	Right	Ordinal	Input
31											
32											
33											
34											
35											
36											
37											
38											
39											

Data View | Variable View

1. What do I need to do right after data collection (scale scores)?

SPSS: BFI-2-S example/ variable view mode – coding scheme

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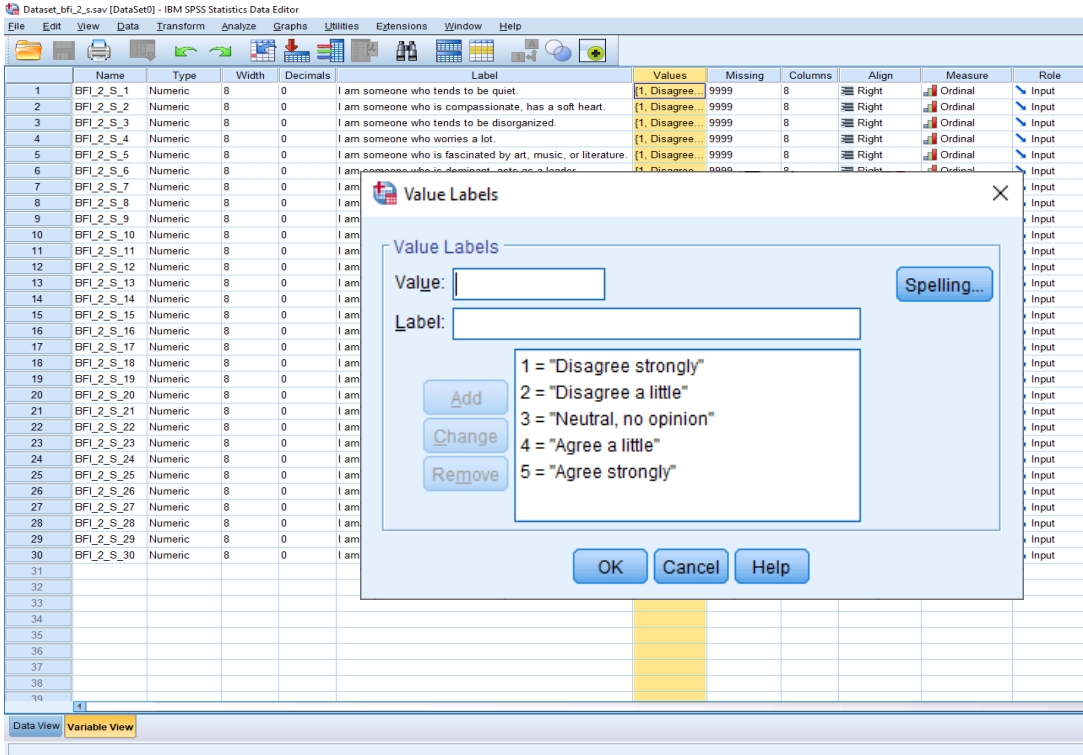
BFI-2-S¶

Here are a number of characteristics that may or may not apply to you. For example, do you agree that you are someone who likes to spend time with others? Please choose a number next to each statement to indicate the extent to which you agree or disagree with that statement.¶

		1=Disagree strongly	2=Disagree a little	3=Neutral; no opinion	4=Agree a little	5=Agree strongly
1	I am someone who tends to be quiet.	○	○	○	○	○
2	I am someone who is compassionate, has a soft heart.	○	○	○	○	○
3	I am someone who tends to be disorganized.	○	○	○	○	○
4	I am someone who worries a lot.	○	○	○	○	○
5	I am someone who is fascinated by art, music, or literature.	○	○	○	○	○
6	I am someone who is dominant, acts as a leader.	○	○	○	○	○
7	I am someone who is sometimes rude to others.	○	○	○	○	○
8	I am someone who has difficulty getting started on tasks.	○	○	○	○	○
9	I am someone who tends to feel depressed, blue.	○	○	○	○	○
10	I am someone who has little interest in abstract ideas.	○	○	○	○	○
11	I am someone who is full of energy.	○	○	○	○	○
12	I am someone who assumes the best about people.	○	○	○	○	○
13	I am someone who is reliable, can always be counted on.	○	○	○	○	○
14	I am someone who is emotionally stable, not easily upset.	○	○	○	○	○
15	I am someone who is original, comes up with new ideas.	○	○	○	○	○
16	I am someone who is outgoing, sociable.	○	○	○	○	○
17	I am someone who can be cold and uncaring.	○	○	○	○	○
18	I am someone who keeps things neat and tidy.	○	○	○	○	○



1. What do I need to do right after data collection (scale scores)?

SPSS: BFI-2-S example/ variable view mode – level of measurement

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BFI-2-S¶

Here are a number of characteristics that may or may not apply to you. For example, do you agree that you are someone who likes to spend time with others? Please choose a number next to each statement to indicate the extent to which you agree or disagree with that statement.¶

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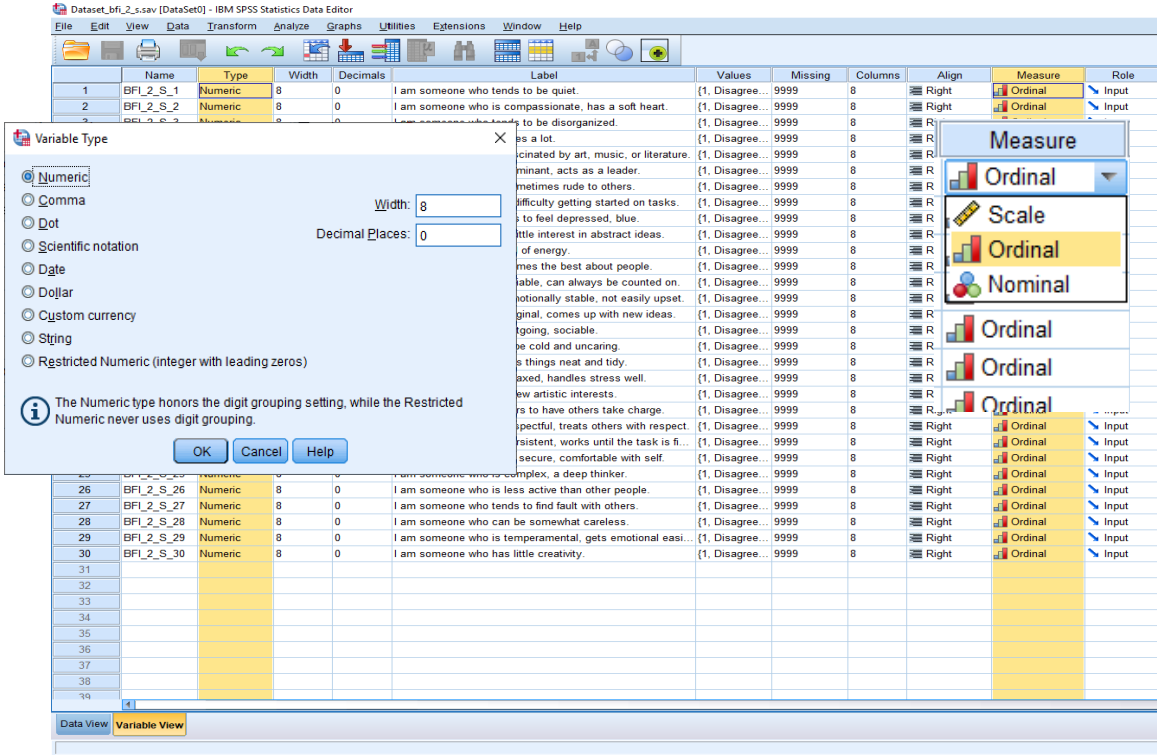
3	I am someone who tends to be disorganized.	○	○	○	○	○
4	I am someone who worries a lot.	○	○	○	○	○
5	I am someone who is fascinated by art, music, or literature.	○	○	○	○	○
6	I am someone who is dominant, acts as a leader.	○	○	○	○	○
7	I am someone who is sometimes rude to others.	○	○	○	○	○
8	I am someone who has difficulty getting started on tasks.	○	○	○	○	○
9	I am someone who tends to feel depressed, blue.	○	○	○	○	○
10	I am someone who has little interest in abstract ideas.	○	○	○	○	○
11	I am someone who is full of energy.	○	○	○	○	○
12	I am someone who assumes the best about people.	○	○	○	○	○
13	I am someone who is reliable, can always be counted on.	○	○	○	○	○
14	I am someone who is emotionally stable, not easily upset.	○	○	○	○	○
15	I am someone who is original, comes up with new ideas.	○	○	○	○	○
16	I am someone who is outgoing, sociable.	○	○	○	○	○
17	I am someone who can be cold and uncaring.	○	○	○	○	○
18	I am someone who keeps things neat and tidy.	○	○	○	○	○



1. What do I need to do right after data collection (scale scores)?

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SPSS: BFI-2-S example/ data view mode

- Usually, the data view mode contains the participants in rows and the variables in columns

1. What do I need to do right after data collection (scale scores)?

SPSS: BFI-2-S example/ data view mode – one row = one specific participant

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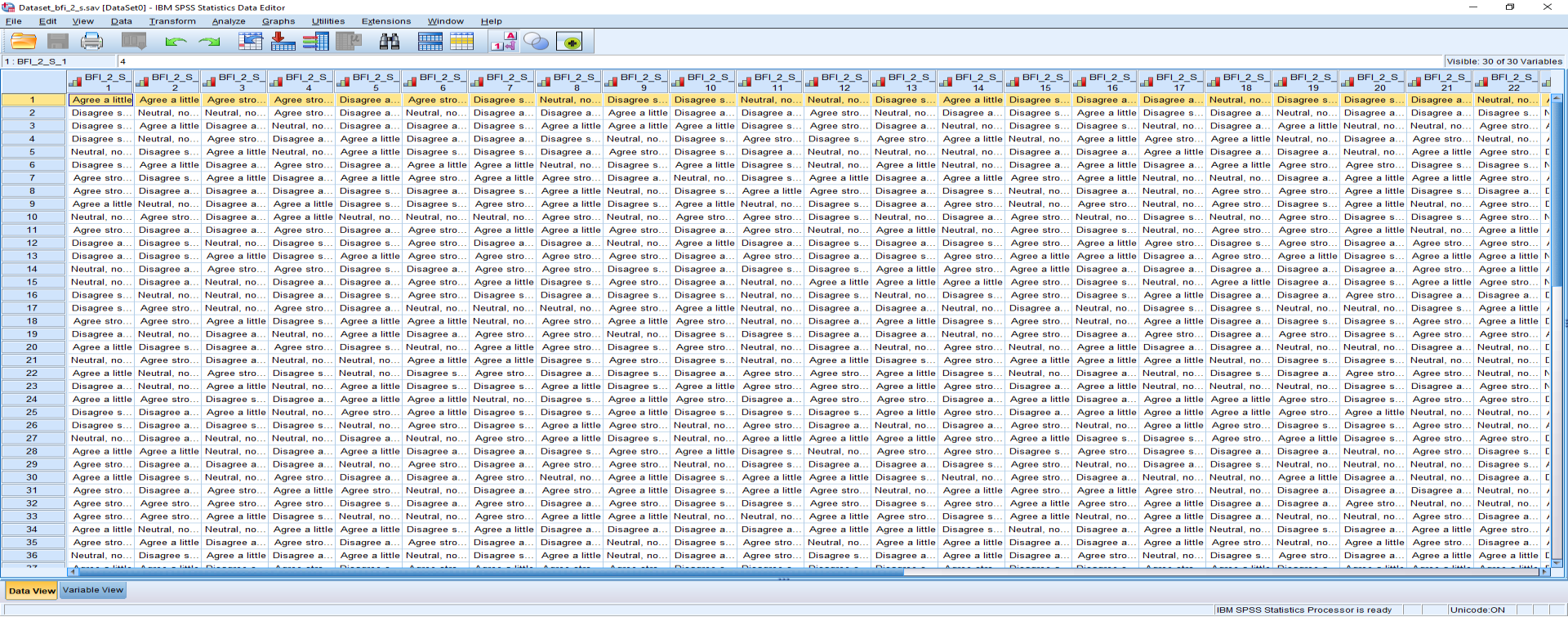

1. What do I need to do right after data collection (scale scores)?

SPSS: BFI-2-S example/ data view mode – one column = one specific variable

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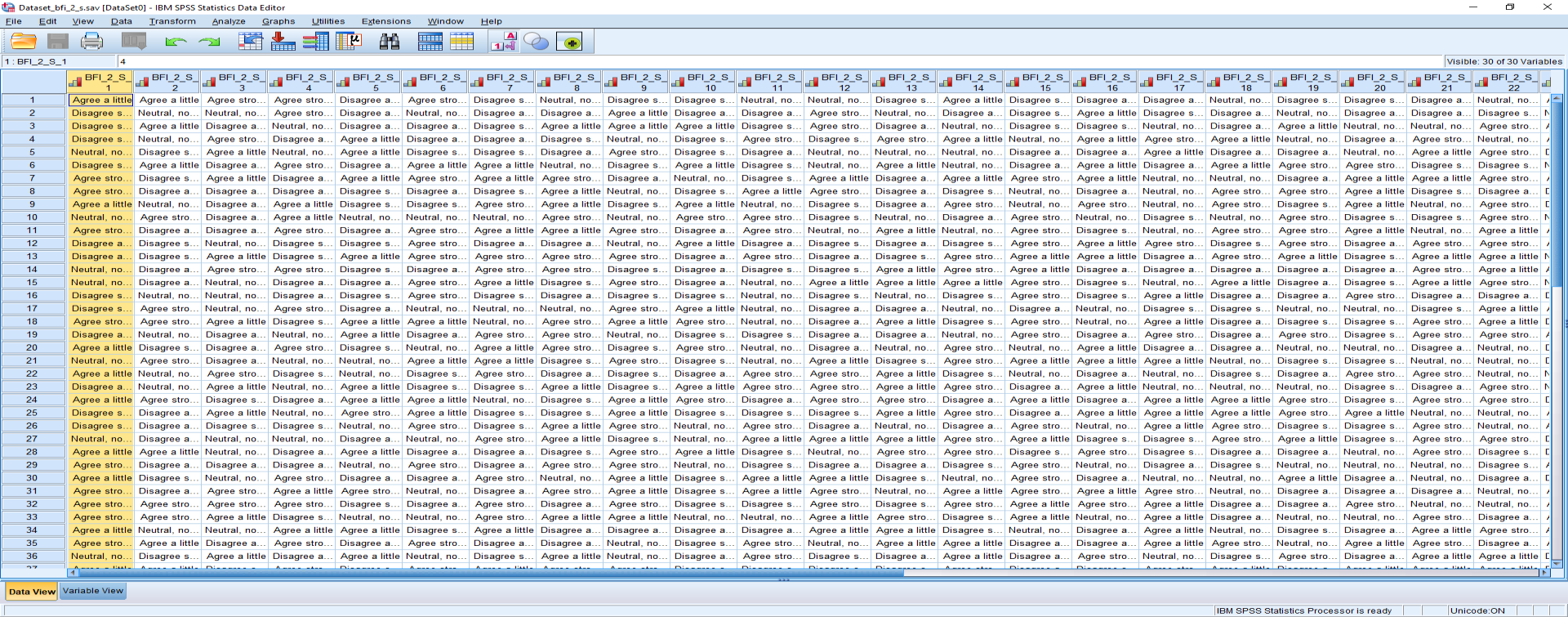

1. What do I need to do right after data collection (scale scores)?

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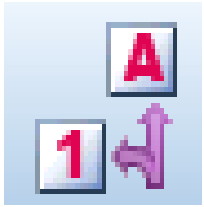
SPSS: BFI-2-S example/ data view mode

- Also in the data view mode, for variables with a coding scheme you can switch between the numbers and the label of a given answer



1. What do I need to do right after data collection (scale scores)?

SPSS: BFI-2-S example/ data view mode – numbers

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BFI-2-S

Here are a number of characteristics that may or may not apply to you. For example, do you agree that you are someone who likes to spend time with others? Please choose a number next to each statement to indicate the extent to which you agree or disagree with that statement.

		1=Disagree strongly	2=Disagree a little	3=Neutral; no opinion	4=Agree a little	5=Agree strongly
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2	I am someone who is compassionate, has a soft heart.	○	○	○	○	○
3	I am someone who tends to be disorganized.	○	○	○	○	○
4	I am someone who worries a lot.	○	○	○	○	○
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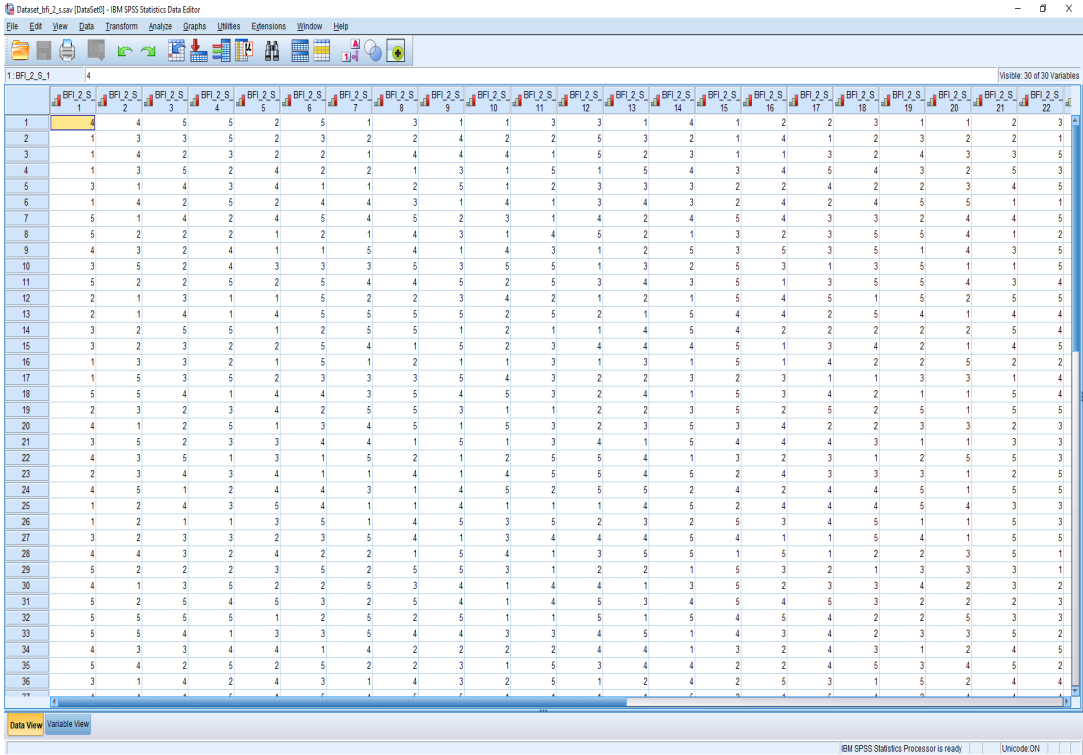
7	I am someone who is sometimes rude to others.	○	○	○	○	○
8	I am someone who has difficulty getting started on tasks.	○	○	○	○	○
9	I am someone who tends to feel depressed, blue.	○	○	○	○	○
10	I am someone who has little interest in abstract ideas.	○	○	○	○	○
11	I am someone who is full of energy.	○	○	○	○	○
12	I am someone who assumes the best about people.	○	○	○	○	○
13	I am someone who is reliable, can always be counted on.	○	○	○	○	○
14	I am someone who is emotionally stable, not easily upset.	○	○	○	○	○
15	I am someone who is original, comes up with new ideas.	○	○	○	○	○
16	I am someone who is outgoing, sociable.	○	○	○	○	○
17	I am someone who can be cold and uncaring.	○	○	○	○	○
18	I am someone who keeps things neat and tidy.	○	○	○	○	○



1. What do I need to do right after data collection (scale scores)?

SPSS: BFI-2-S example/ data view mode – labels

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BFI-2-S¶

Here are a number of characteristics that may or may not apply to you. For example, do you agree that you are someone who likes to spend time with others? Please choose a number next to each statement to indicate the extent to which you agree or disagree with that statement.¶

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9	I am someone who tends to feel depressed, blue.	○	○	○	○	○
10	I am someone who has little interest in abstract ideas.	○	○	○	○	○
11	I am someone who is full of energy.	○	○	○	○	○
12	I am someone who assumes the best about people.	○	○	○	○	○
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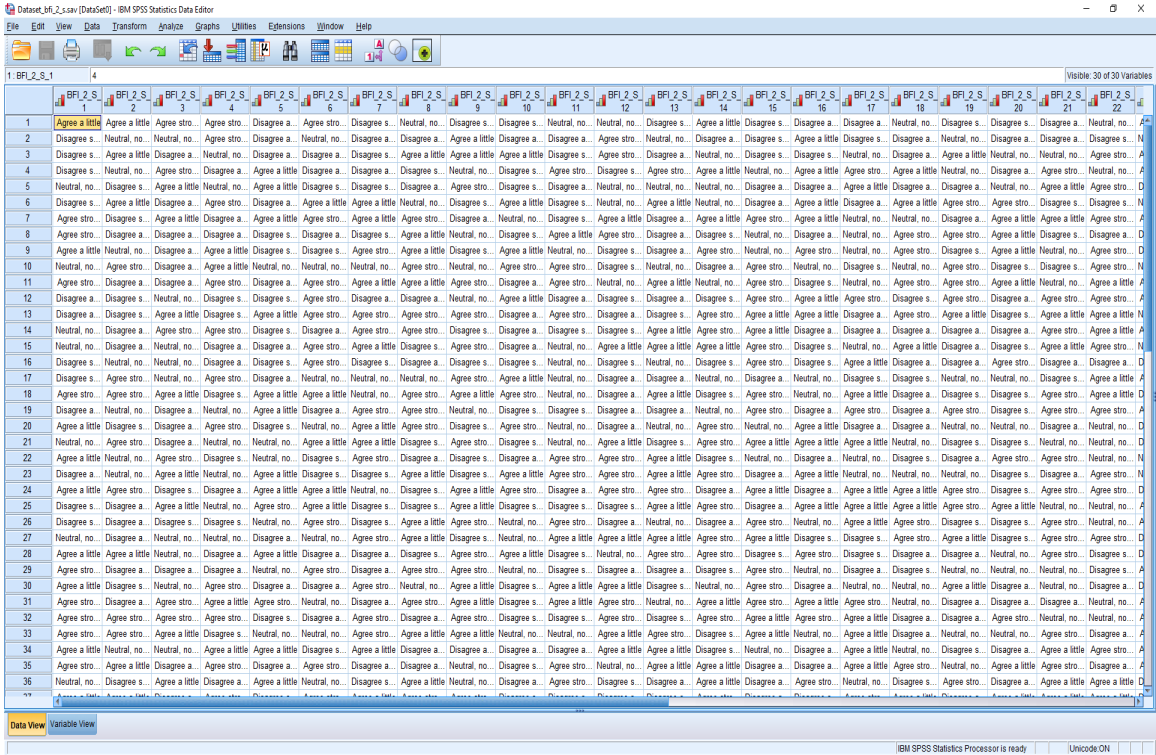

1. What do I need to do right after data collection (scale scores)?

SPSS: BFI-2-S example/ to get a complete set of data i strongly recommend…

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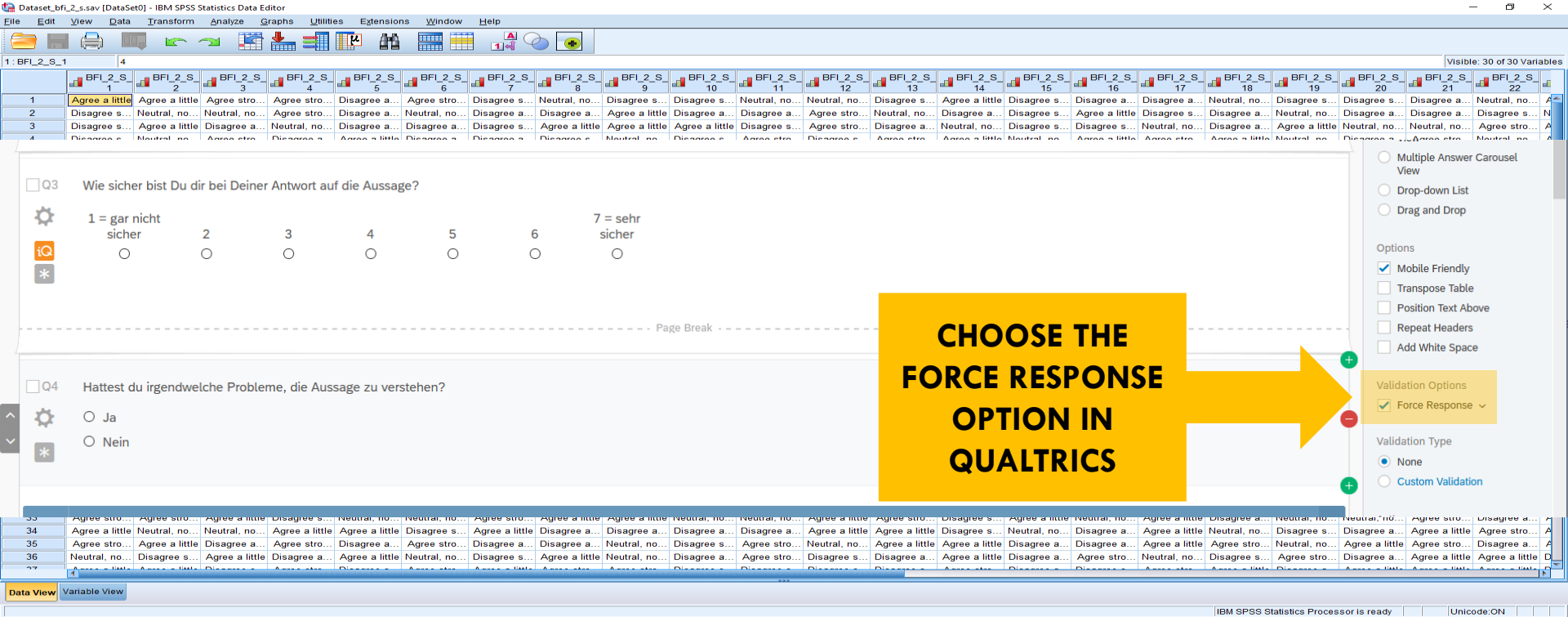

1. What do I need to do right after data collection (scale scores)?

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SPSS: BFI-2-S example/ dimension score procedure

- The next step in data preparation is to calculate the dimension scores
- Each dimension consists of some items, and if you sum up the items of a given dimension, you have the dimension score then; sounds easy, right? Maybe, but there could be a little bit of a problem…
- So let's take a look at the first dimension, which is called Extraversion

1. What do I need to do right after data collection (scale scores)?

SPSS: BFI-2-S example/ dimension score procedure – reverse coded variables

Extraversion: Sum up the following items: 1R + 6 + 11 + 16 + 21R + 26R

- To get the dimension score, you will have to sum up the items 1, 6, 11, 21, 26
- However, what does the letter "R" mean, that is linked to the items 1, 21 and 26?

1. What do I need to do right after data collection (scale scores)?

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SPSS: BFI-2-S example/ dimension score procedure – reverse coded variables

Extraversion: Sum up the following items: 1R + 6 + 11 + 16 + 21R + 26R

- R means "Reverse" → these items are formulated in a way that is to some point the opposite to items which belong to the same dimension and are not denoted with the letter "R"; for instance:

- Item 21 states: *I am someone who is less active than other people*
- Item 6 states: *I am someone who is full of energy*

1. What do I need to do right after data collection (scale scores)?

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SPSS: BFI-2-S example/ dimension score procedure – reverse coded variables

Extraversion: Sum up the following items: 1R + 6 + 11 + 16 + 21R + 26R

- The best way to handle this issue is to recode the items 1, 21 and 26 via the SPSS command **Transform → recode into different variables …**
- …and tell SPSS to reverse the coding scheme, so that the answer option 5 turns into 1, 4 turns into 2, and so on

1. What do I need to do right after data collection (scale scores)?

SPSS: BFI-2-S example/ dimension score procedure – reverse coded variables

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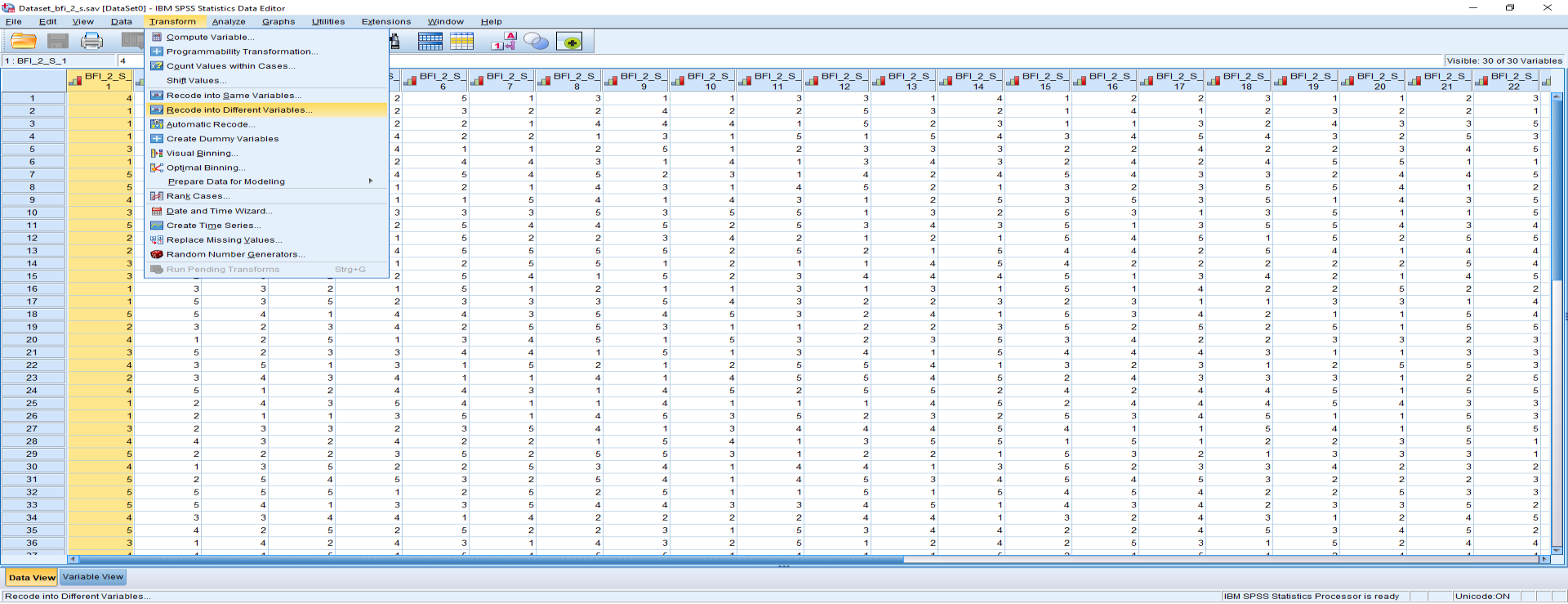

1. What do I need to do right after data collection (scale scores)?

SPSS: BFI-2-S example/ dimension score procedure – reverse coded variables

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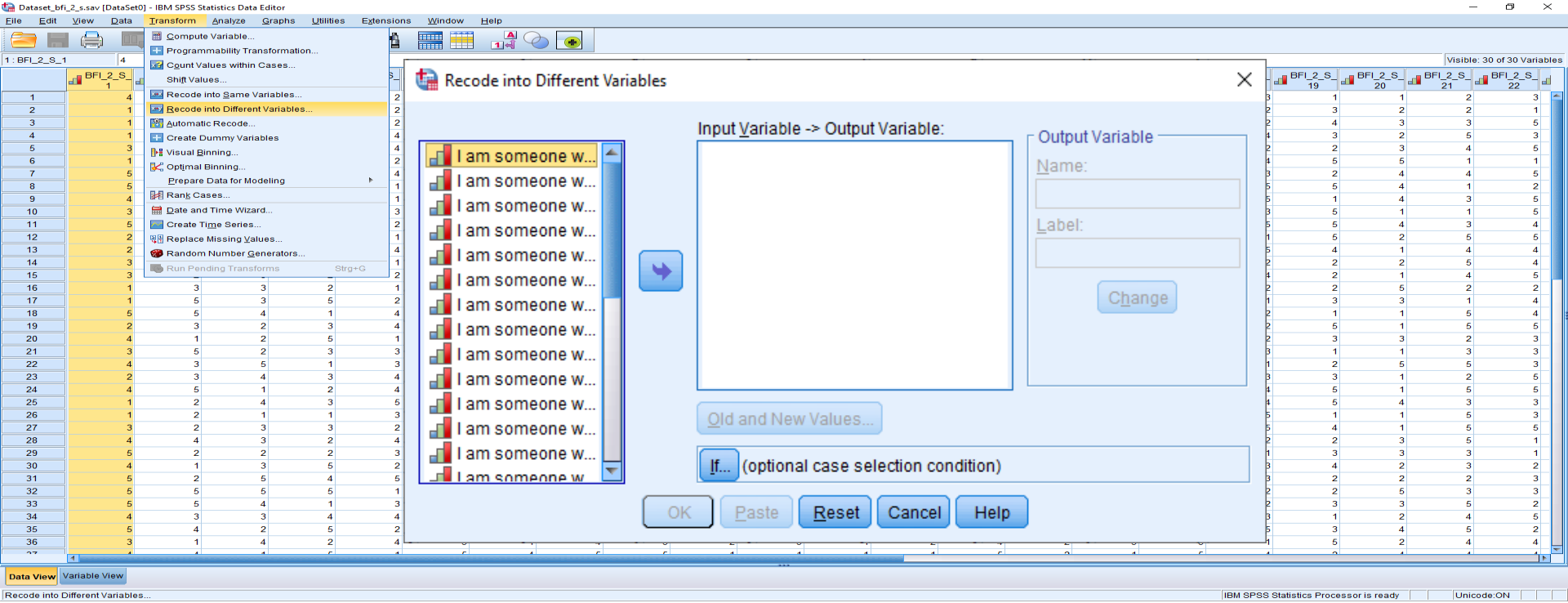

1. What do I need to do right after data collection (scale scores)?

SPSS: BFI-2-S example/ dimension score procedure – reverse coded variables

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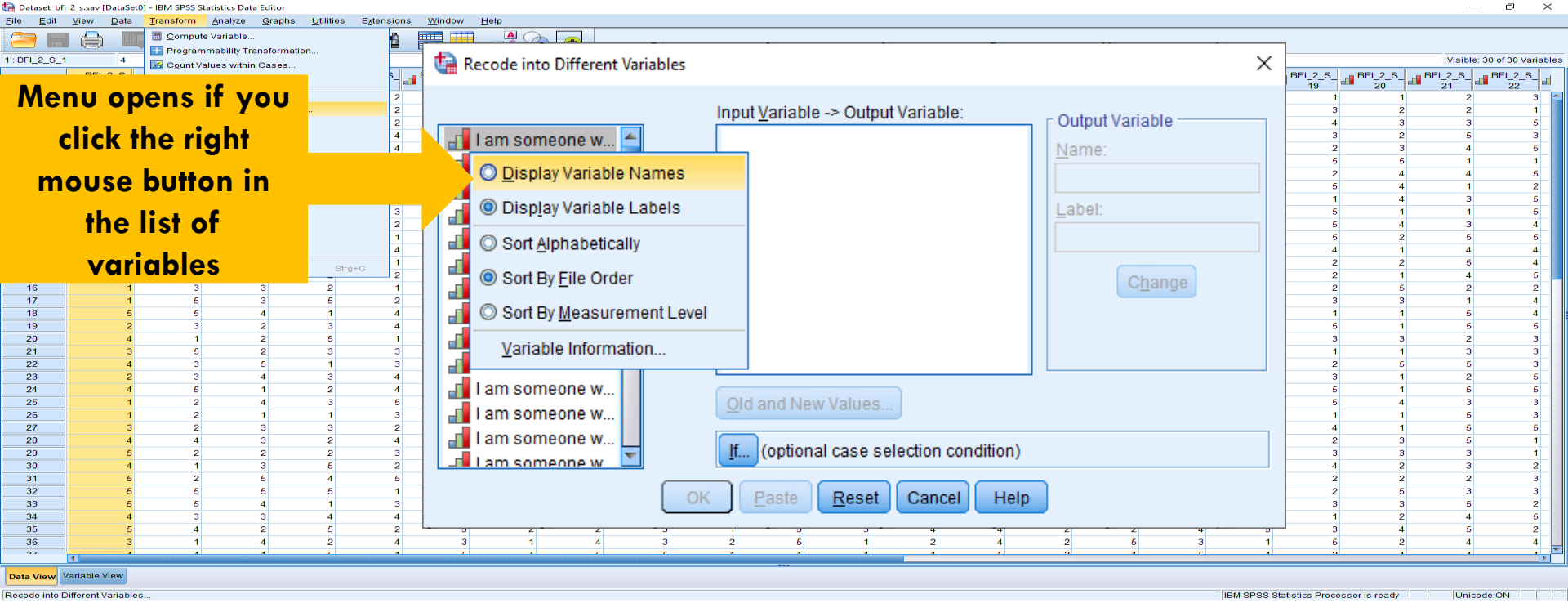
Menu opens if you click the right mouse button in the list of variables



1. What do I need to do right after data collection (scale scores)?

SPSS: BFI-2-S example/ dimension score procedure – reverse coded variables

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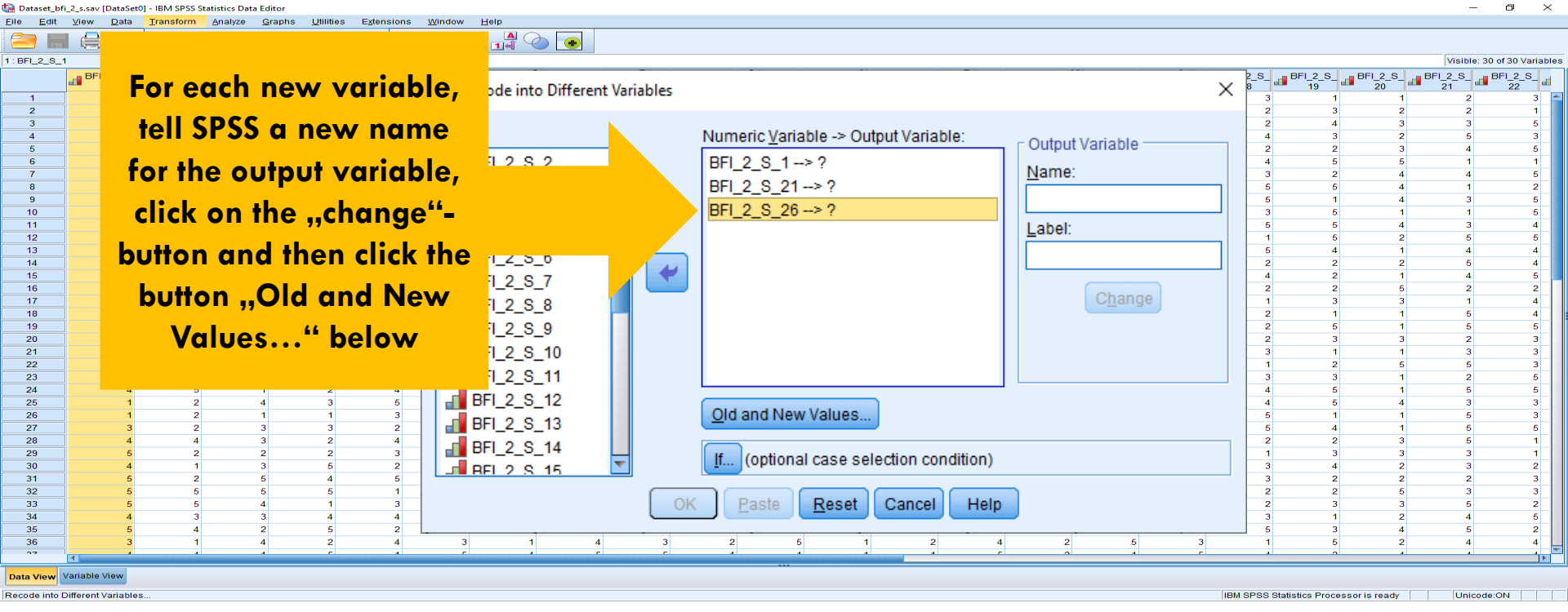

1. What do I need to do right after data collection (scale scores)?

SPSS: BFI-2-S example/ dimension score procedure – reverse coded variables

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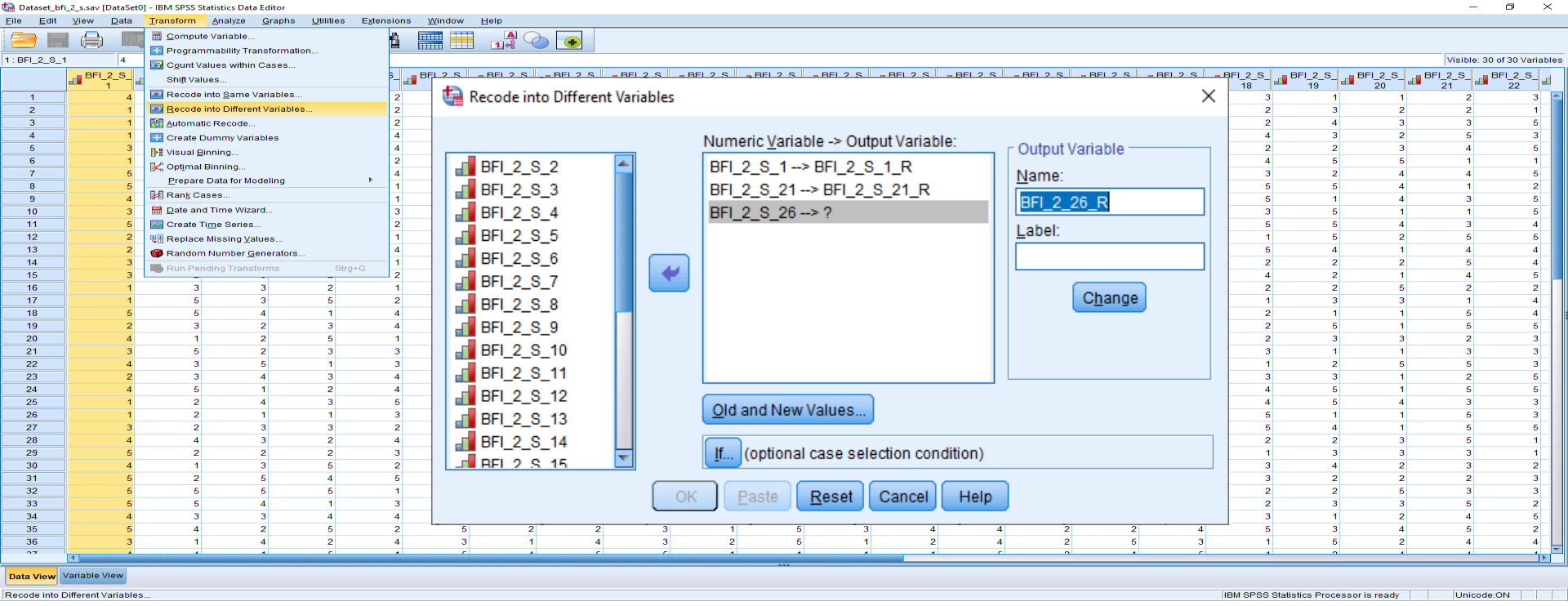

1. What do I need to do right after data collection (scale scores)?

SPSS: BFI-2-S example/ dimension score procedure – reverse coded variables

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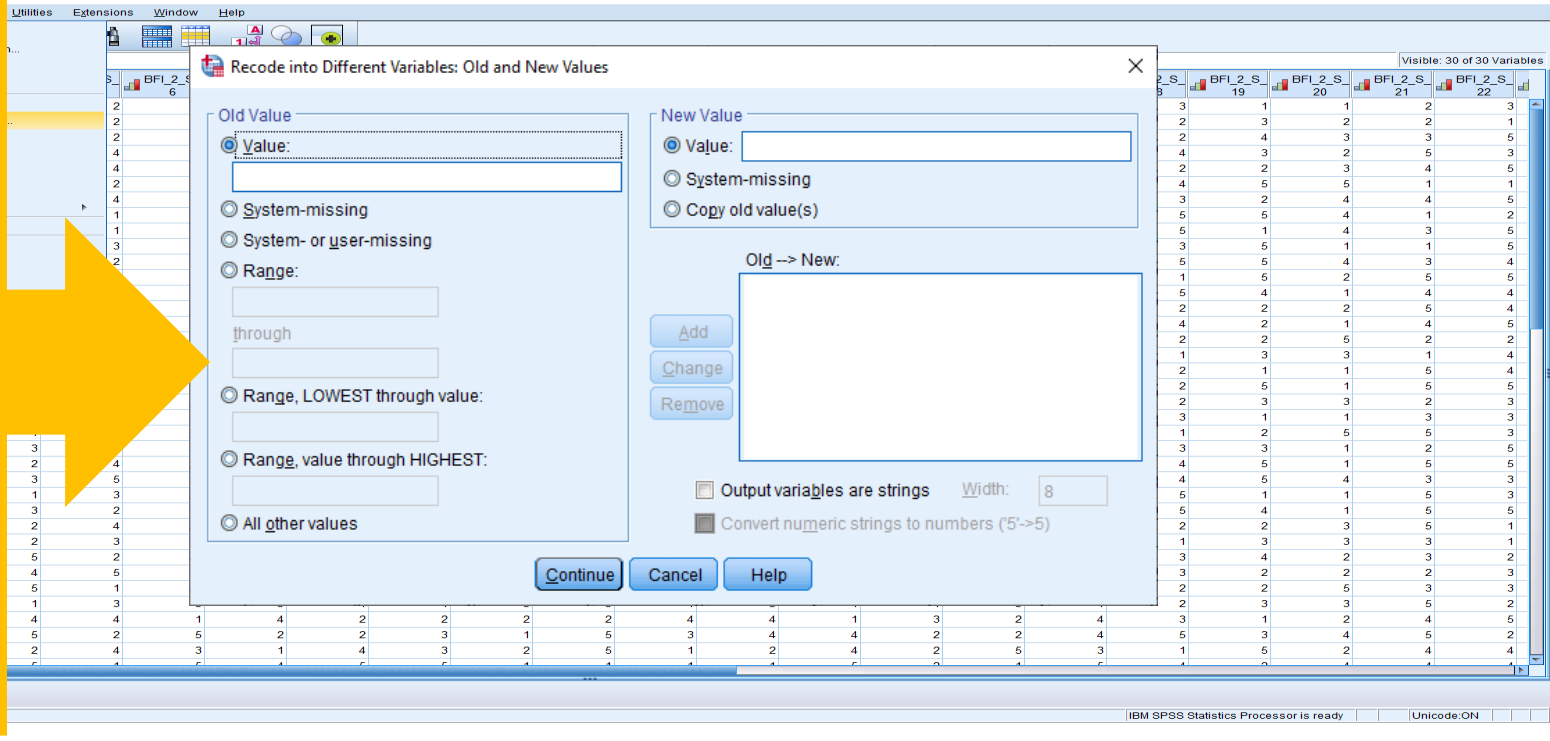
Put in the old coding scheme on the left (each number separately), put in the new coding scheme on the right (the corresponding new number separately), and then click on the „Add“-button on the right



1. What do I need to do right after data collection (scale scores)?

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SPSS: BFI-2-S example/ dimension score procedure – reverse coded variables

Extraversion: Sum up the following items: 1R + 6 + 11 + 16 + 21R + 26R

- Now you can tell SPSS to reverse the coding scheme, so that the answer option 5 turns into 1, 4 turns into 2, and so on…

1. What do I need to do right after data collection (scale scores)?

SPSS: BFI-2-S example/ dimension score procedure – reverse coded variables

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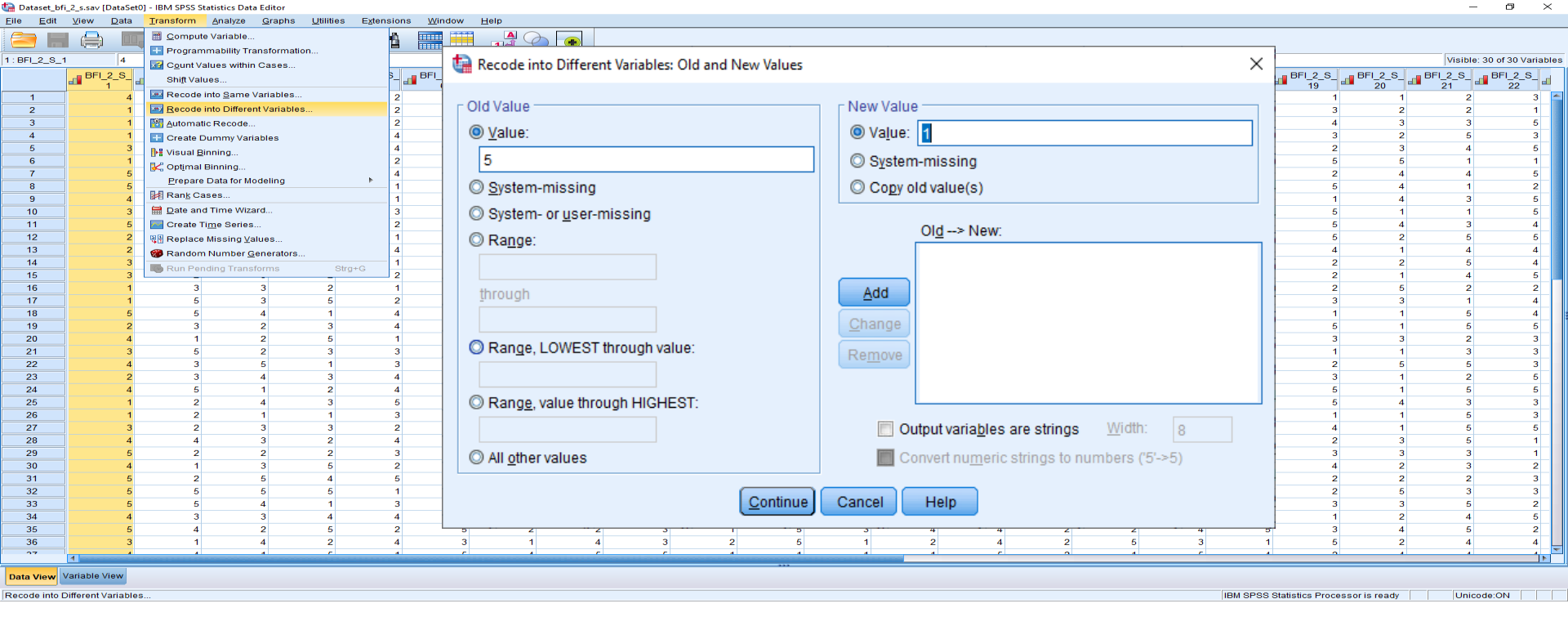

1. What do I need to do right after data collection (scale scores)?

SPSS: BFI-2-S example/ dimension score procedure – reverse coded variables

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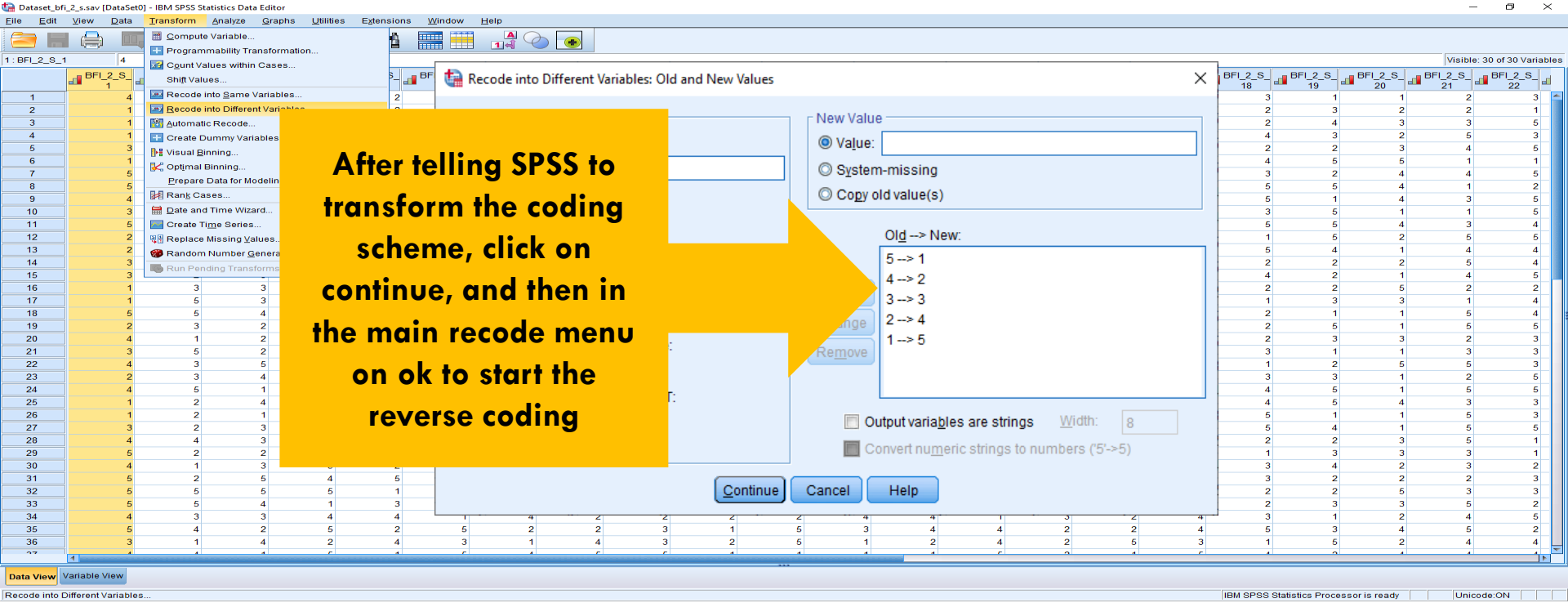

After telling SPSS to transform the coding scheme, click on continue, and then in the main recode menu on ok to start the reverse coding

1. What do I need to do right after data collection (scale scores)?

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SPSS: BFI-2-S example/ dimension score procedure – reverse coded variables

Extraversion: Sum up the following items: 1R + 6 + 11 + 16 + 21R + 26R

- You can see then in the variable view mode that SPSS has created the three reverse coded items, which you can use for the calculation of the dimension Extraversion

1. What do I need to do right after data collection (scale scores)?

SPSS: BFI-2-S example/ dimension score procedure – reverse coded variables

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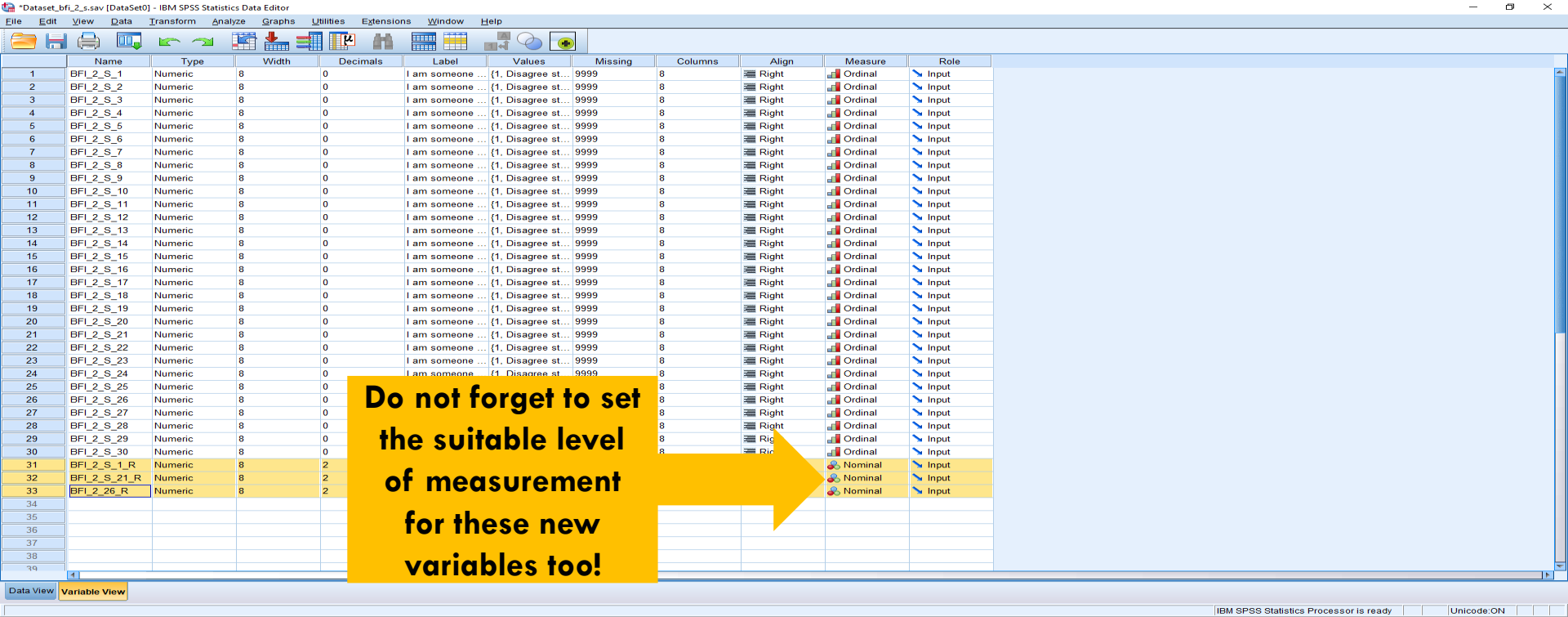

1. What do I need to do right after data collection (scale scores)?

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SPSS: BFI-2-S example/ dimension score procedure – reverse coded variables

Extraversion: Sum up the following items: 1R + 6 + 11 + 16 + 21R + 26R

- Now you are able to build the sum of the six items – use the SPSS command **Transform → Compute Variable** to do so…

1. What do I need to do right after data collection (scale scores)?

SPSS: BFI-2-S example/ dimension score procedure – reverse coded variables

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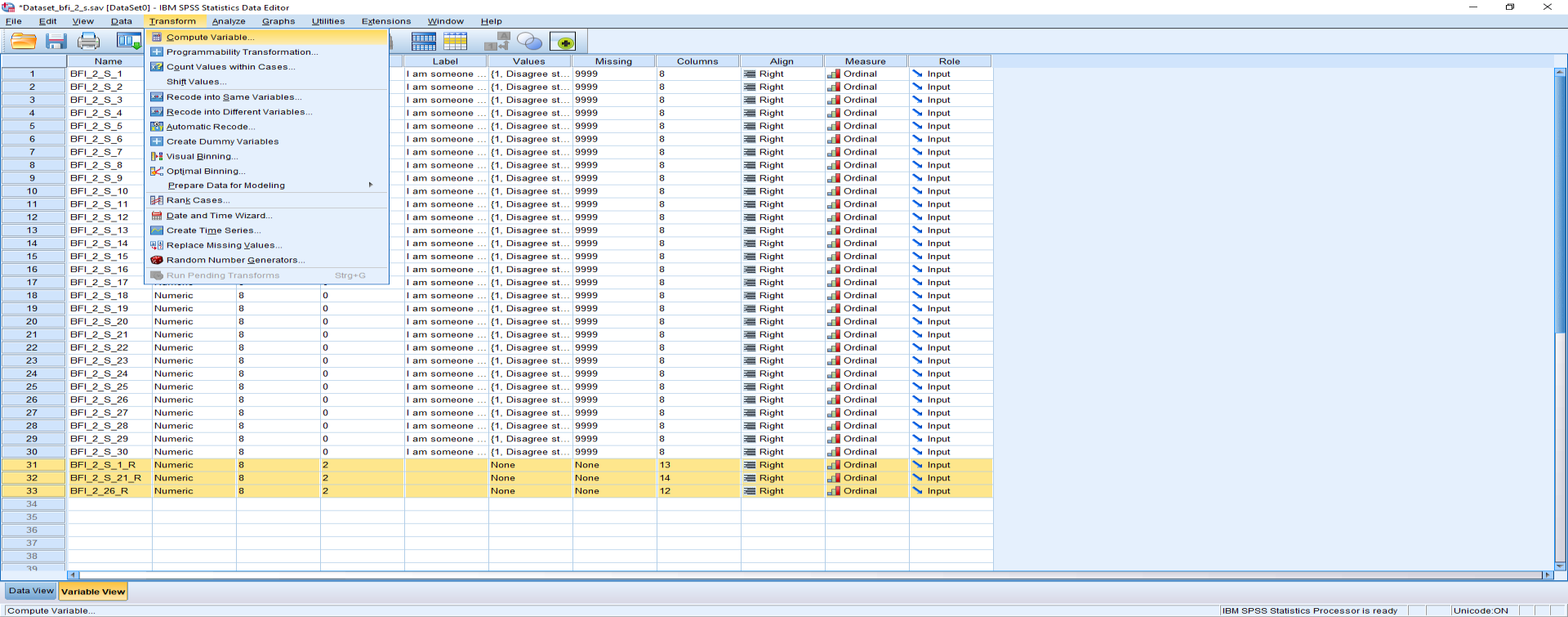

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1. What do I need to do right after data collection (scale scores)?

SPSS: BFI-2-S example/ dimension score procedure – reverse coded variables

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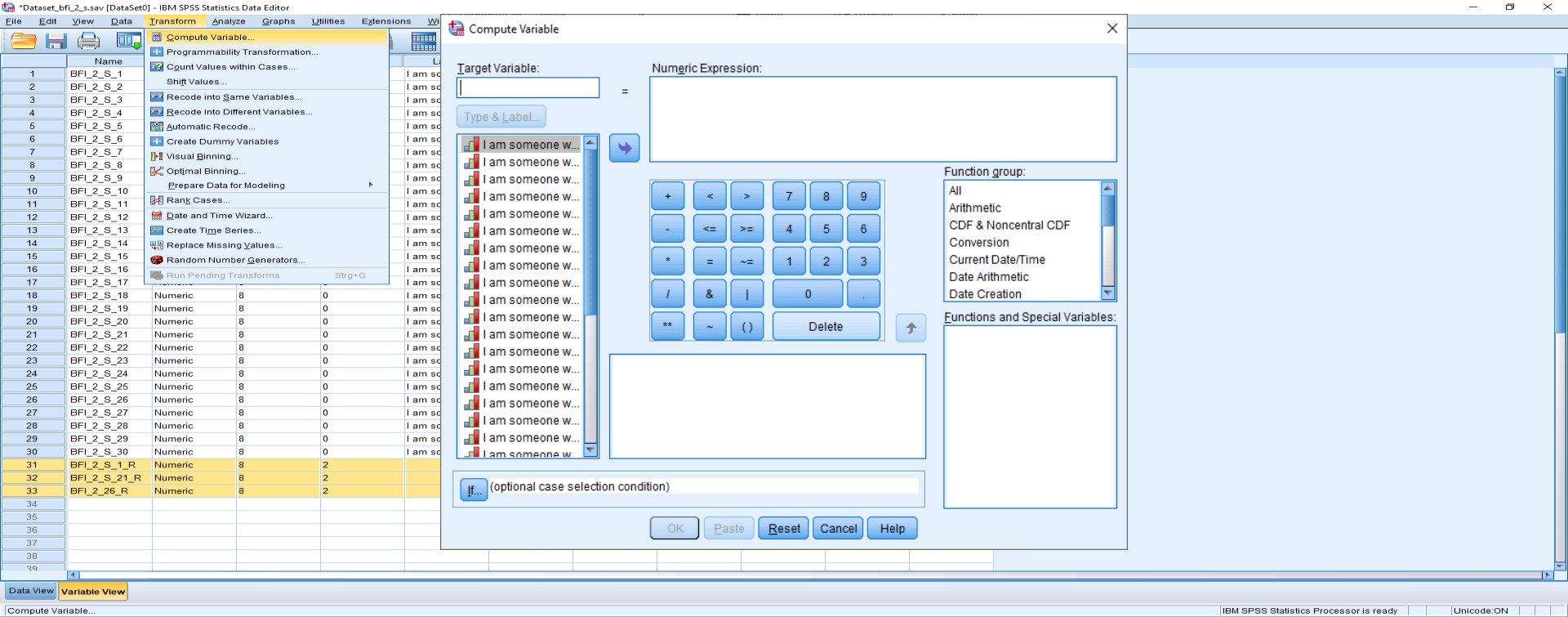

1. What do I need to do right after data collection (scale scores)?

SPSS: BFI-2-S example/ dimension score procedure – reverse coded variables

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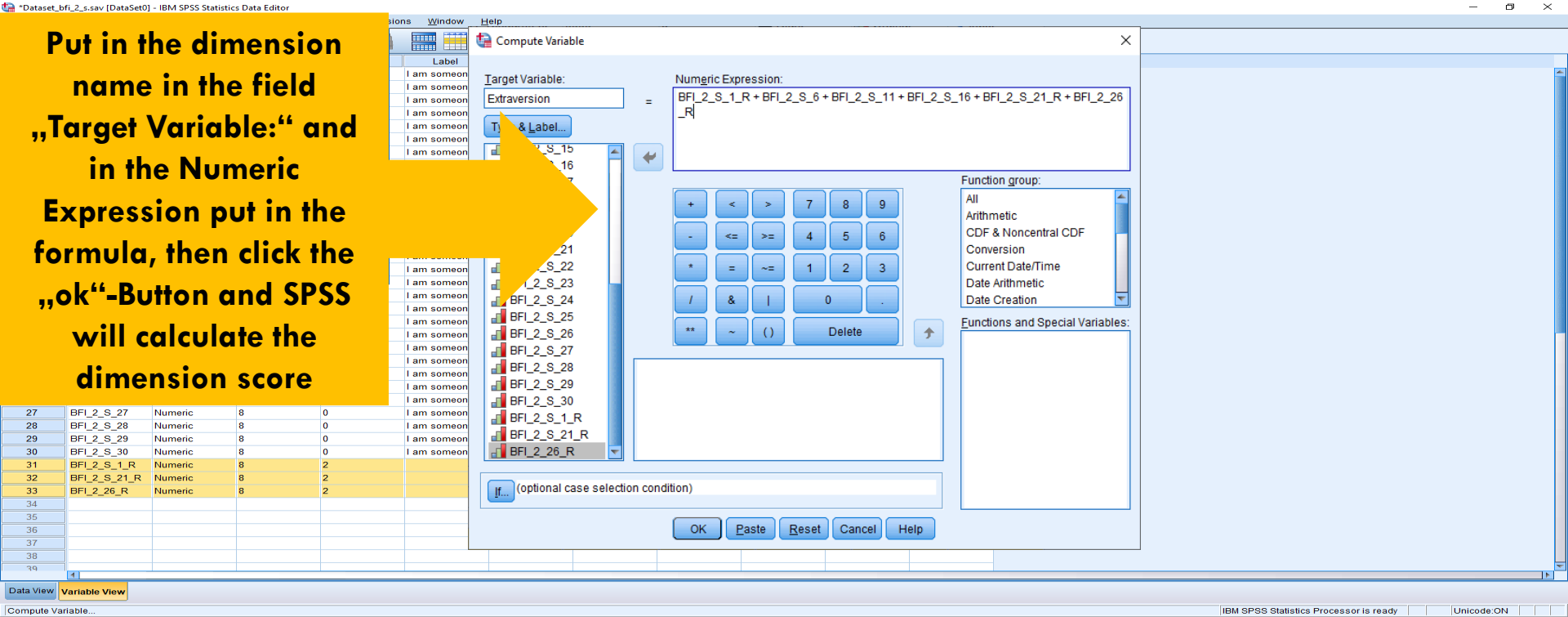
Put in the dimension name in the field „Target Variable:“ and in the Numeric Expression put in the formula, then click the „ok“-Button and SPSS will calculate the dimension score



1. What do I need to do right after data collection (scale scores)?

SPSS: BFI-2-S example/ dimension score procedure – reverse coded variables

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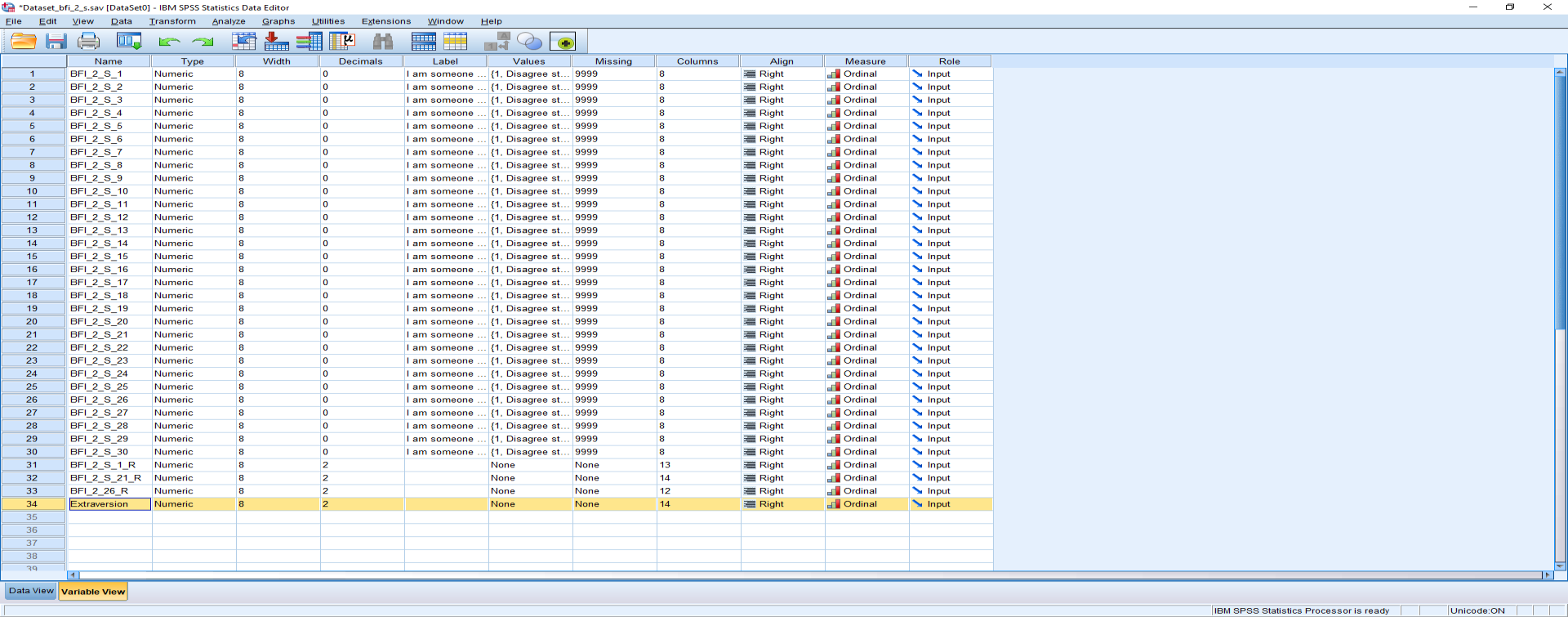

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1. What do I need to do right after data collection (scale scores)?

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SPSS: BFI-2-S example/ dimension score procedure

- So we have calculated the respective score for the dimension extraversion – you will have to do these steps for each of the remaining dimensions
- Note: it could be that a scale do not have any items which are needed to be reverse scored – then you have nothing to do in this regard!
- If you have calculated all of your relevant dimension scores, you are ready for data analysis – the first thing to do with respect to data analysis is to get some descriptive statistics!

2. What are descriptive statistics and which of them do I need?

Step 2:
Describe your data

2. What are descriptive statistics and which of them do I need?

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Definition

- Descriptive means that you want to describe your sample dataset with certain statistical parameters

- Variables with nominal scale => Frequencies and percentages
- Variables with ordinal scale => Frequencies and percent or median, minimum, maximum
- Variables with interval scale => Mean, median, standard deviation, (optionally: minimum, maximum)

2. What are descriptive statistics and which of them do I need?

Definition

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- The following statistics which you will need will be explained:

1. Frequency tables providing counts and percentages

2. Measures of the central tendency of your collected scores → Mean and Median

3. Dispersion measures: spread of your collected scores → Variance and Standard deviation

2. What are descriptive statistics and which of them do I need?

1. Frequency tables for nominal and optionally ordinal scaled variables

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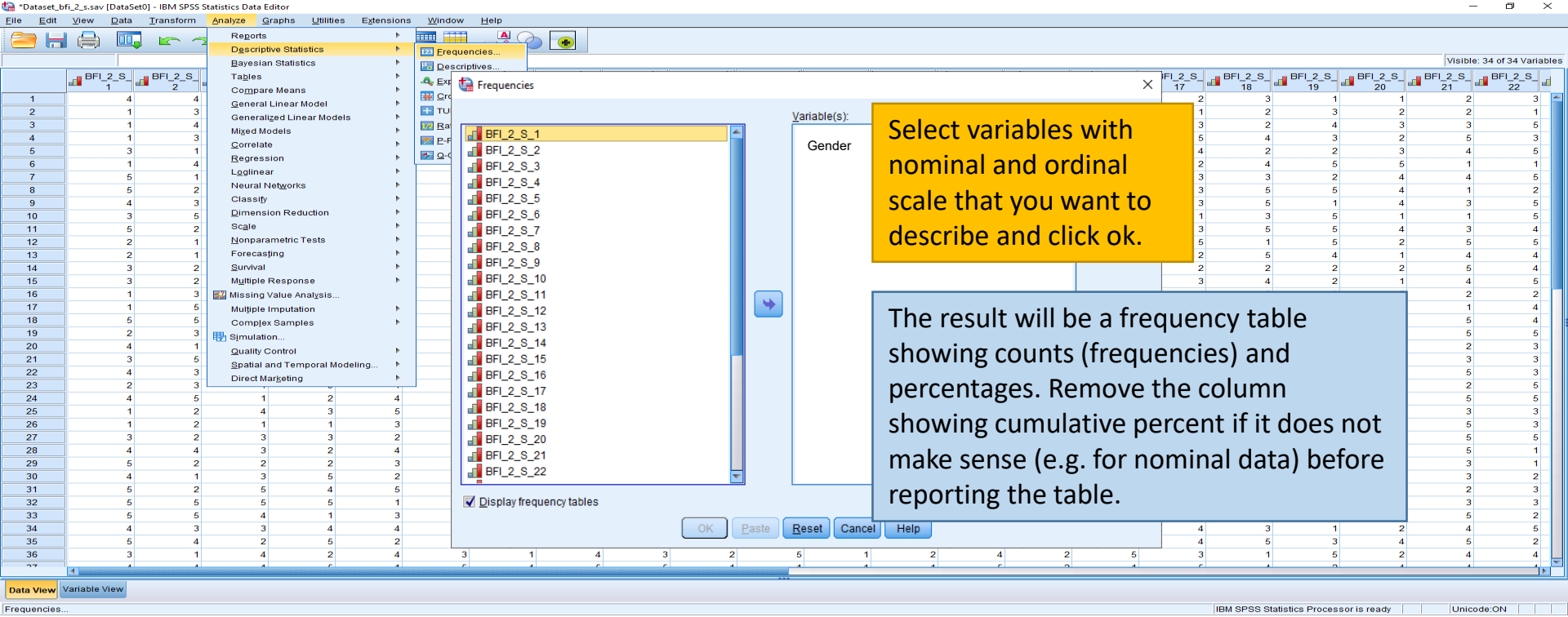


Select variables with nominal and ordinal scale that you want to describe and click ok.

The result will be a frequency table showing counts (frequencies) and percentages. Remove the column showing cumulative percent if it does not make sense (e.g. for nominal data) before reporting the table.

2. What are descriptive statistics and which of them do I need?

2. Measures of central tendency/ Mean

- The mean is the sum of all scores of a given variable (or calculated dimension) divided by the number of scores; however, the value of the mean can be influenced quite heavily by extreme scores

2. Measures of central tendency/ Median

- The median is the middle score when the scores are placed in ascending order; it is not as influenced by extreme scores as the mean, but it is also a little bit less informative (because the calculation of the mean includes all of the scores, whereas the median is built upon the ranking of the scores, but not on the scores itself!)

3. Dispersion measures/variance and standard deviation

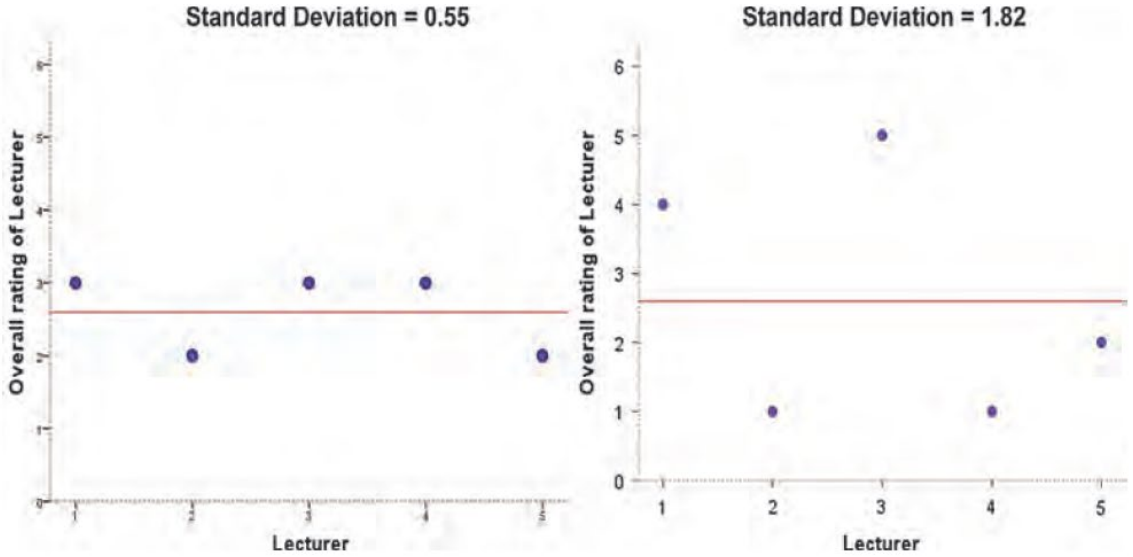
- The variance is the average distance of scores from the mean (it is the number of squared errors divided by the number of scores); it tells us about how widely spreaded scores are around the mean

- The standard deviation is the square root of the variance (it is the variance converted back to the original units of measurement of the scores used to compute it); large standard deviations relative to the mean suggest data are widely spread around the mean, whereas small standard deviations suggest data are closely packed around the mean

2. What are descriptive statistics and which of them do I need?

3. Dispersion measures/variance and standard deviation

FIGURE 2.5
Graphs illustrating data that have the same mean but different standard deviations



3. Dispersion measures/variance and standard deviation

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- So let‘s take a look at the mean, the median as well as variance and standard deviation for the dimension Extraversion…

- In SPSS, you will find all these statistics using the command:
  Analyze → Descriptive Statistics → Frequencies

2. What are descriptive statistics and which of them do I need?

Measures of central tendency & dispersion measures in SPSS

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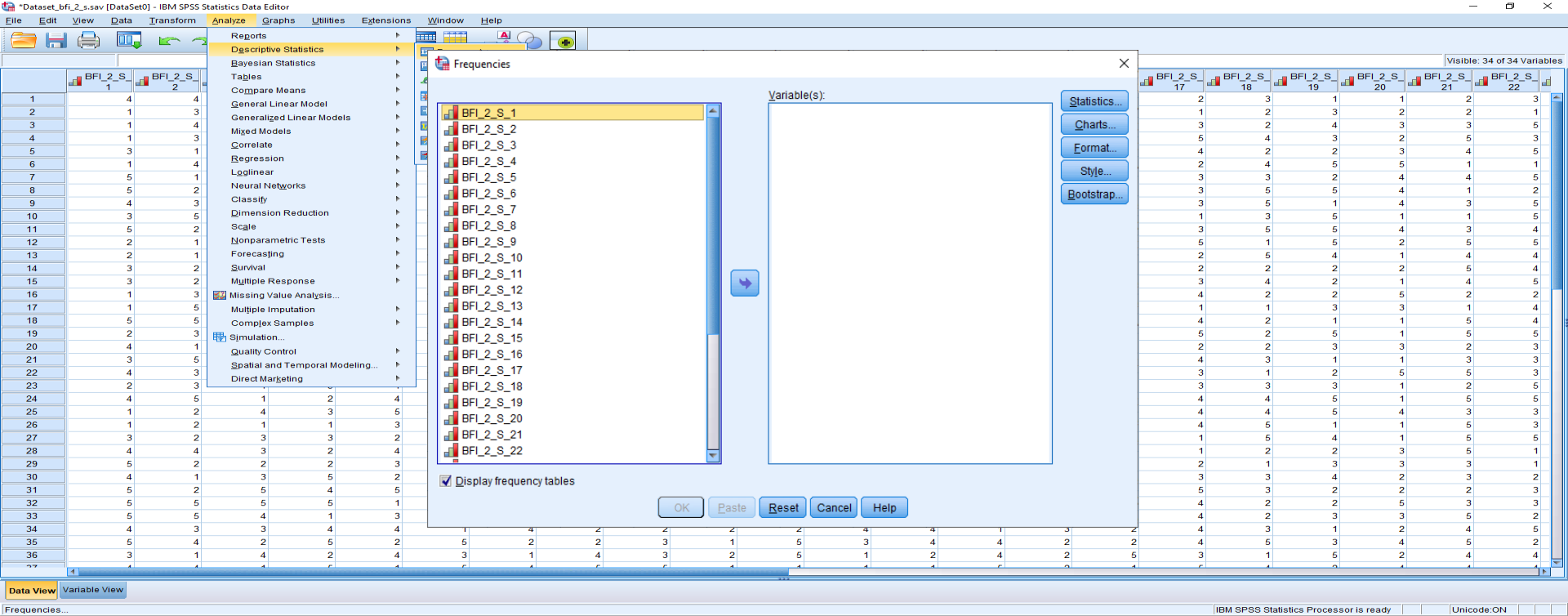

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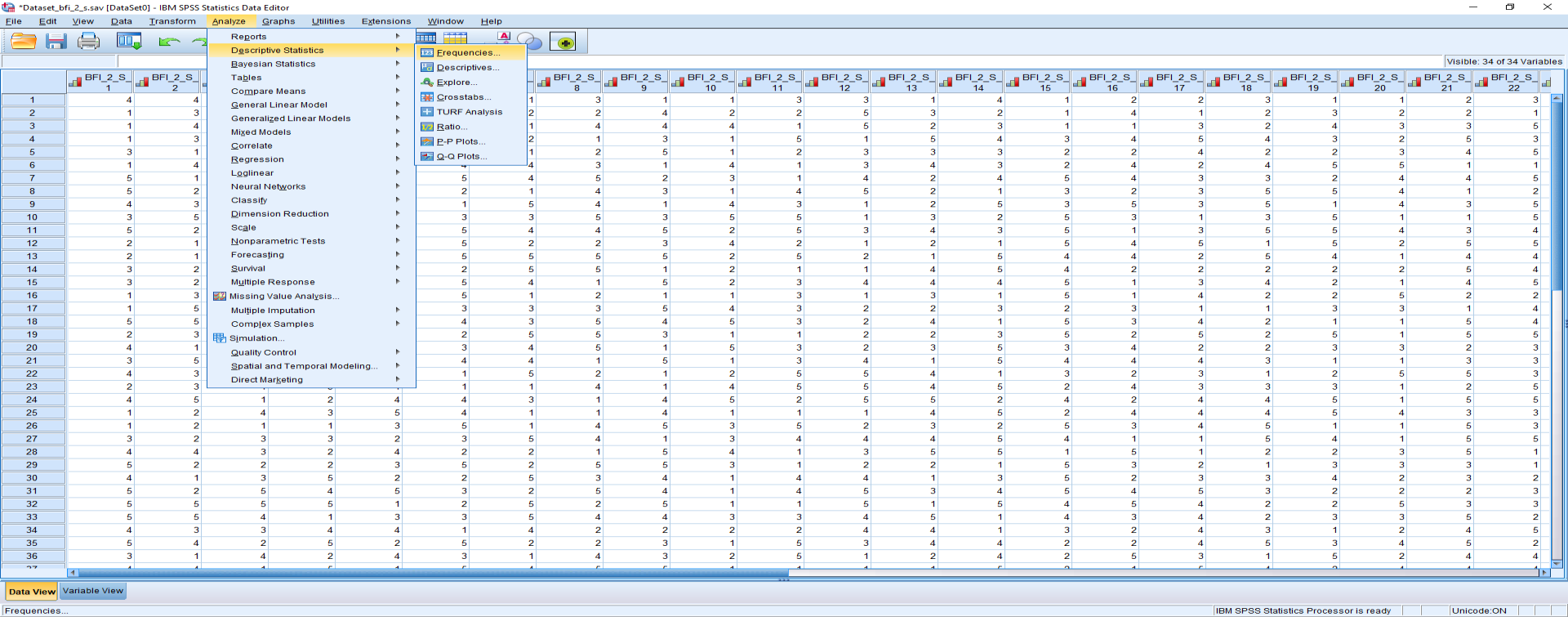

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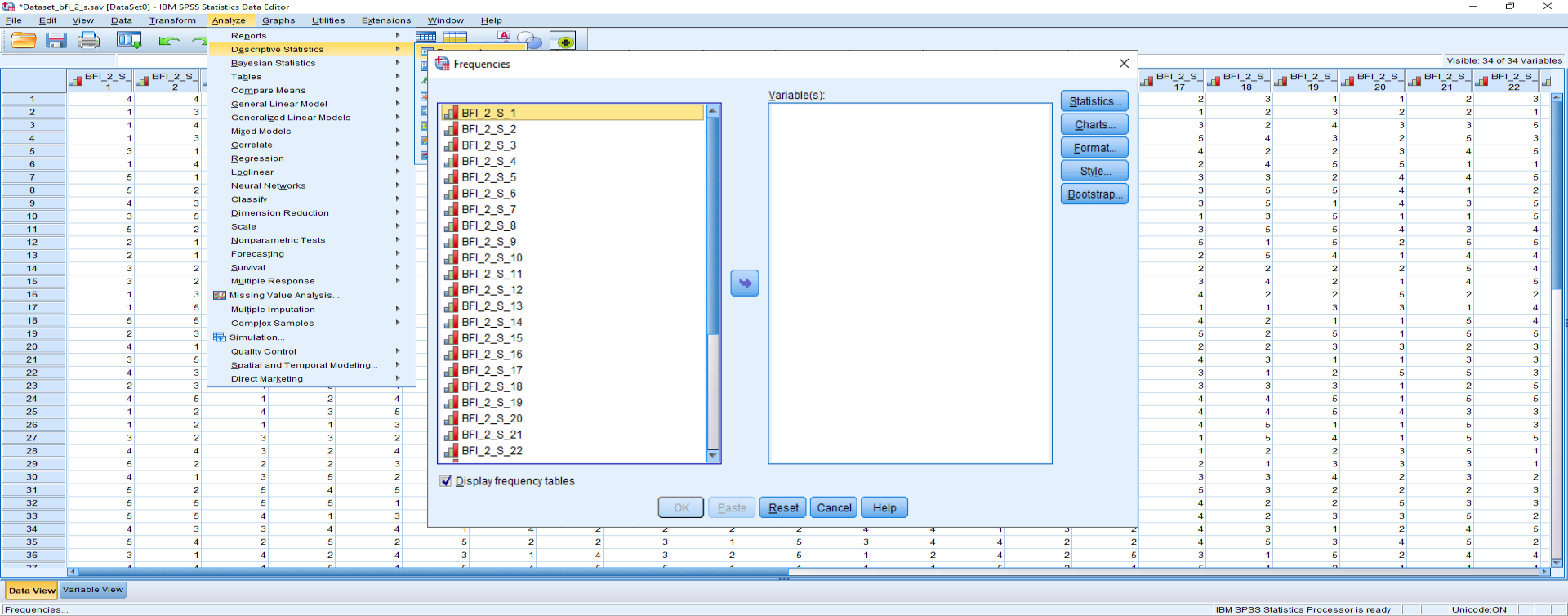

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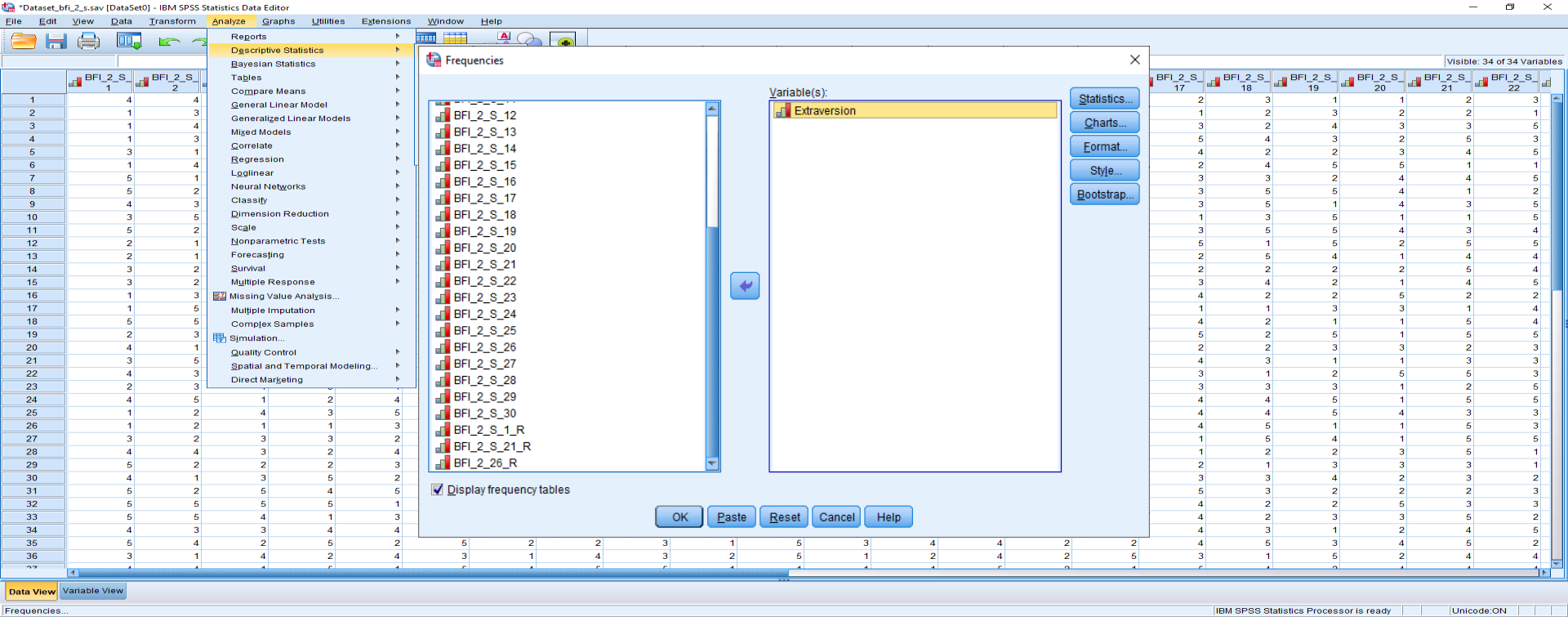

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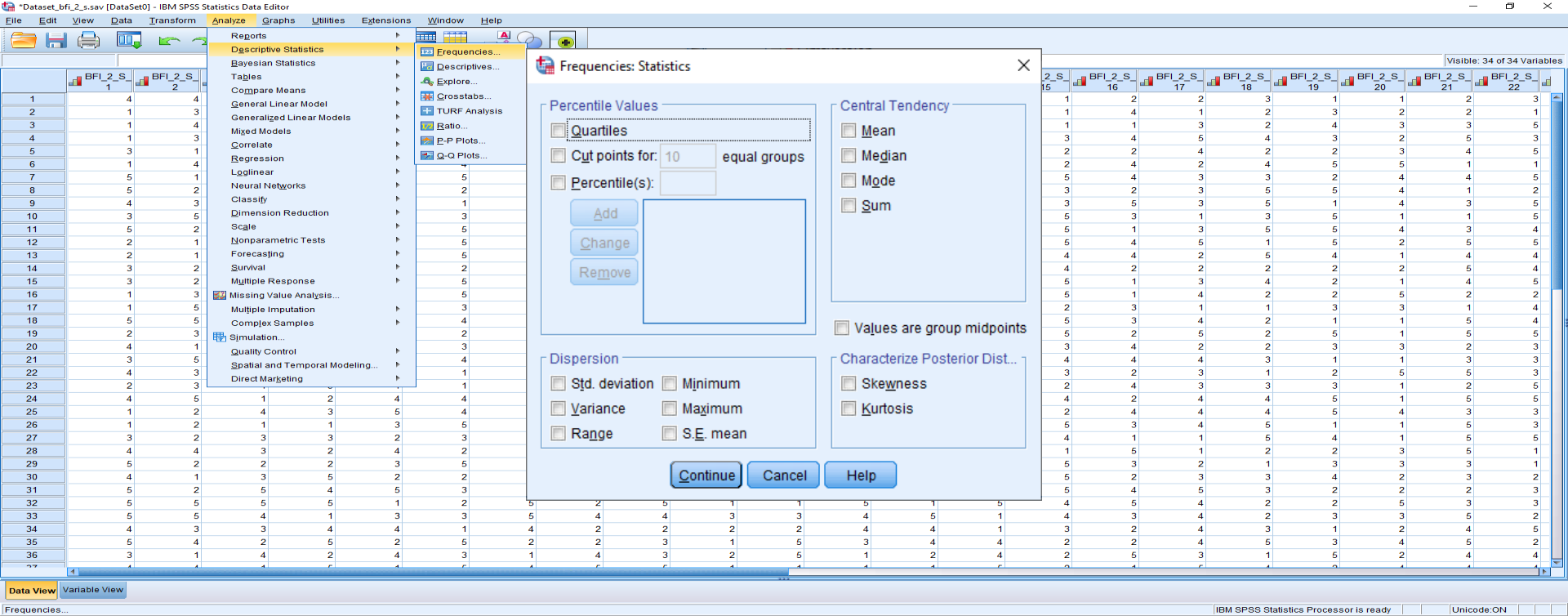

2. What are descriptive statistics and which of them do I need?

Measures of central tendency & dispersion measures in SPSS

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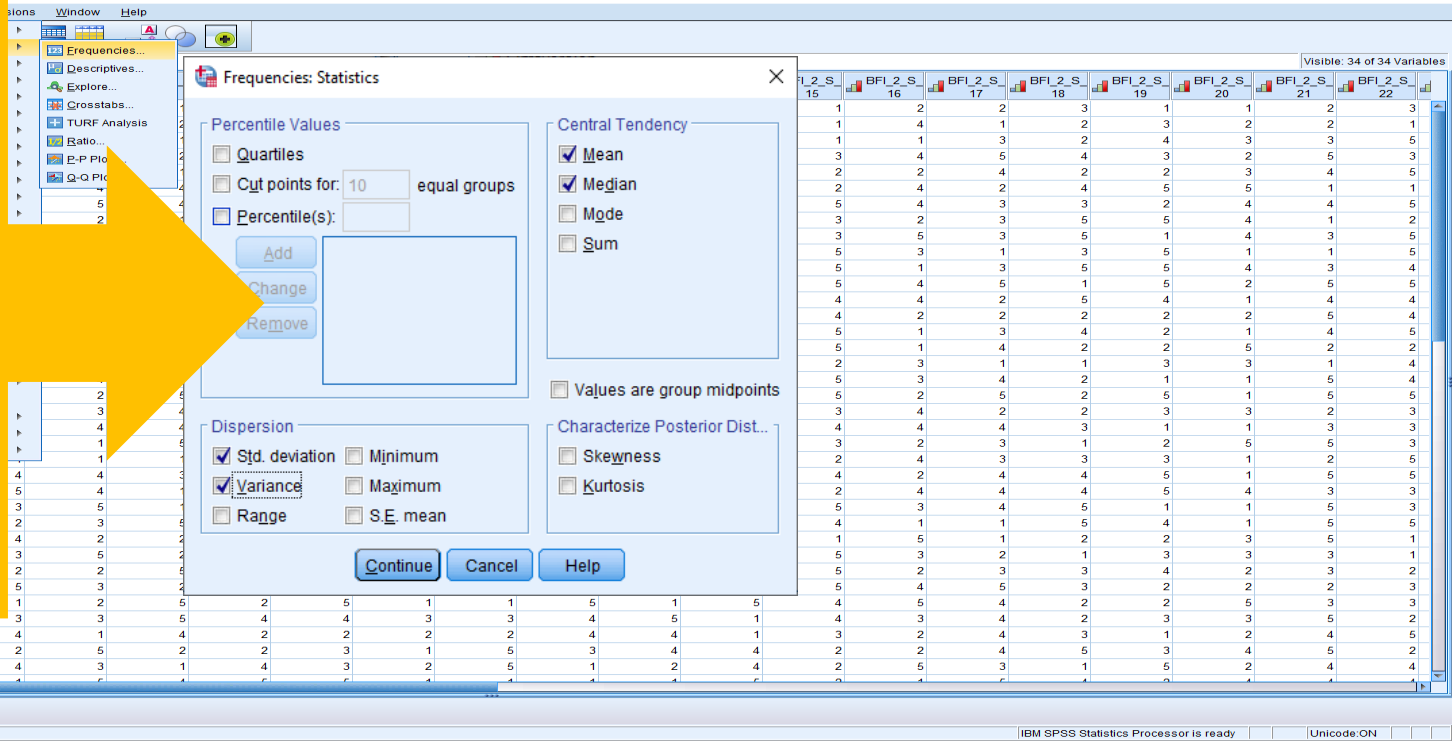
Choose the options Mean, Median, Std. deviation (and optionally Variance, Minimum, Maximum), **click on the „continue“-button, and then in the main menu the „ok“-button to get these descriptive statistics** (SPSS will show them in the output window)



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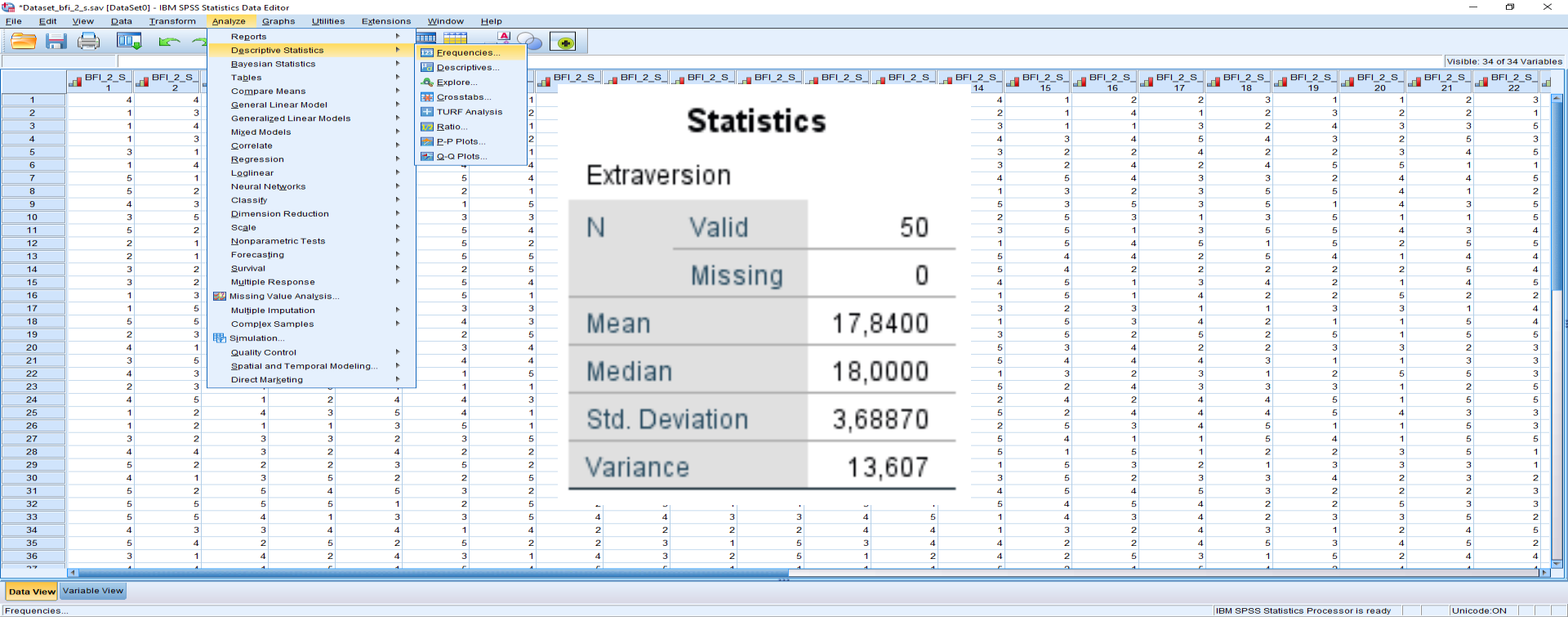

2. What are descriptive statistics and which of them do I need?

How to report?

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- **Example**: The table with the sample descriptive statistics (n=50) of the scores regarding the dimension Extraversion of the BFI-2-S scale shows the following: the mean score is 17.84 (SD = 3.69), whereas the median has a value of 18.

- Note: n = sample size which was used to calculate the statistics; SD = Standard Deviation (usually only the standard deviation is reported, but not the variance)

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3. How do I perform a hypothesis test and what do I do with the p-value?

3. How do I perform a hypothesis test and what do I do with the p-value?

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Remember the last lecture and the examples of hypotheses

1. **Descriptive questions**
   - More than 50% of college students have felt depressed in the last year.
2. **Comparative questions**
   - Millenial adults have different attitudes towards online banking than generation x people. (two-sided; postulated effect without direction)
   - Painkiller A is more effective for headaches than painkiller B. (one-sided; postulated effect with direction)
3. **Relationship-based questions**
   - The higher the income, the greater the job satisfaction. (one-sided; postulated effect with direction)
   - There is a relationship between disposable income and self-confidence amongst young adults. (two-sided; postulated effect without direction)
4. **Causal (comparative or relational) questions**
   - There are differences in exam performance depending upon the teaching method used. (two-sided; postulated effect without direction)
   - Age and the length of experience have positive influence on the salaries of professional soccer players. (one-sided; postulated effect with direction)

3. How do I perform a hypothesis test and what do I do with the p-value?

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The hypothesis regarding your group task is a relationship-based hypothesis

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3. How do I perform a hypothesis test and what do I do with the p-value?

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The hypothesis regarding your group task is a relationship-based hypothesis

- Usually, a hypothesis test consists of two hypotheses – an alternative hypothesis and a null hypothesis

- Alternative hypothesis → the prediction that there will be an effect (in terms of your group task: that there is a relationship between different dimensions)

- Null hypothesis → the reverse of the alternative hypotheses; it states that the predicted effect cannot be detected (in terms of your group task: that there is not a relationship between different dimensions)

3. How do I perform a hypothesis test and what do I do with the p-value?

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The hypothesis regarding your group task is a relationship-based hypothesis

- The hypothesis test now tests the null hypothesis, or in other words: it is determined **how high the probability of the result you found is under the assumption that the null hypothesis is true.**

This probability is provided by the p-value.

- If – with the assumption that the null hypothesis is true – this probability is very low, then we can be very confident that the null hypothesis is not true and we accept the alternative hypothesis.

- Else, we cannot be certain that the alternative hypothesis holds and we have to maintain the null hypothesis.

3. How do I perform a hypothesis test and what do I do with the p-value?

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The hypothesis regarding your group task is a relationship-based hypothesis

- And is there a value for a “very low probability”?
- In the social sciences it is usually determined with a threshold value of ≤ 5% (= significance level).
- If therefore your test result (in terms of your group task: your “relationship” test statistic) has a probability to occur - with the assumption of the null hypothesis to be true - at 5% or below this threshold, you can accept the alternative hypothesis (it is then called a statistically significant result).
- If therefore your result (in terms of your group task: your “relationship” test statistic) has a probability to occur - with the assumption of the null hypothesis to be true - above that 5%-threshold, you cannot accept the alternative hypothesis (it is then called a statistically non significant result).

3. How do I perform a hypothesis test and what do I do with the p-value?

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The hypothesis regarding your group task is a relationship-based hypothesis

- And what is such a “very low probability”?

- This probability value of your found results is called the p-value and it informs you whether your result is statistically significant or not:

- Short summary:
- **p-value ≤ 5% ➔ statistically significant result**

- **p-value > 5% ➔ statistically non significant result**

4. What is a correlational analysis and how do I conduct it?

4. What is a correlational analysis and how do I conduct it?

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Definition

- Correlational research

- …is a form of research in which you observe what naturally goes on in the world without directly interfering with it

- …this term implies that data will be analysed so as to look at relationships between naturally occurring variables rather than making statements about cause and effect

4. What is a correlational analysis and how do I conduct it?

Scatterplot

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- A first hint whether and how two variables relate to each other somehow is by looking at a scatterplot
- A scatterplot is a graph that plots each person‘s score on one variable against their score on another; it visualizes the relationship between the variables
- Let‘s look at some examples…

4. What is a correlational analysis and how do I conduct it?

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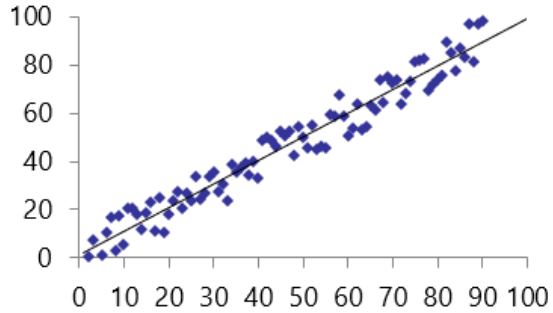
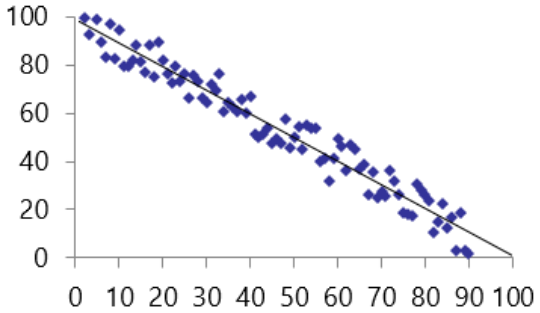
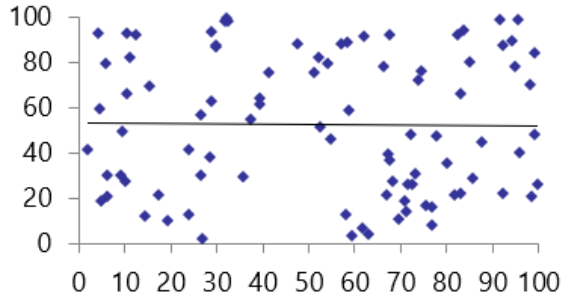
Scatterplot







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4. What is a correlational analysis and how do I conduct it?

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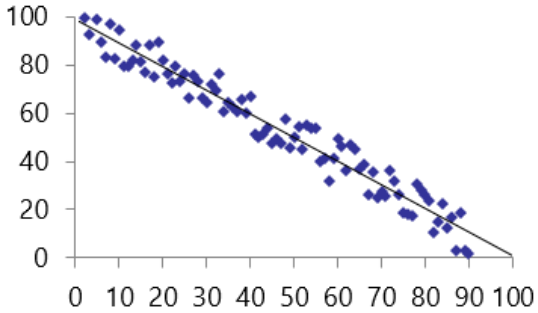
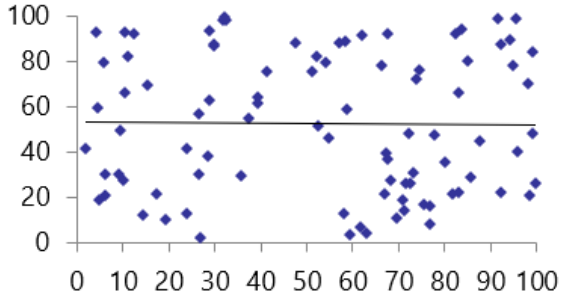
Scatterplot

This scatterplot shows a linear positive relationship between the two variables (as the scores in one variable get higher, the scores in the other variable also gets higher)





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4. What is a correlational analysis and how do I conduct it?

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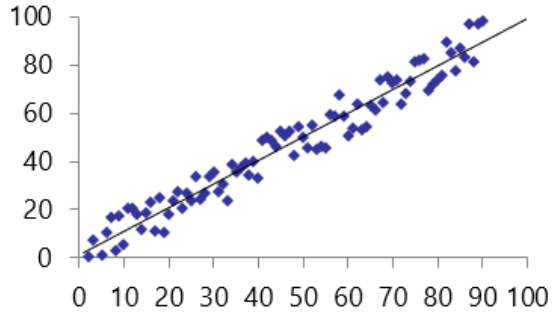
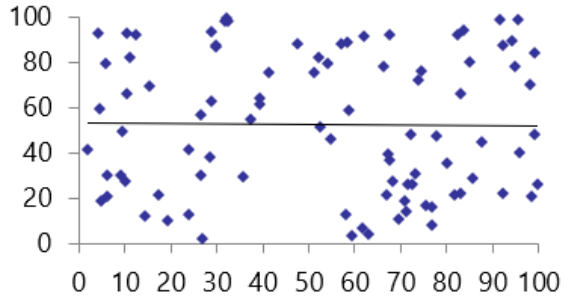
Scatterplot



This scatterplot shows a linear negative relationship between the two variables (as the scores in one variable get higher, the scores in the other variable gets lower)



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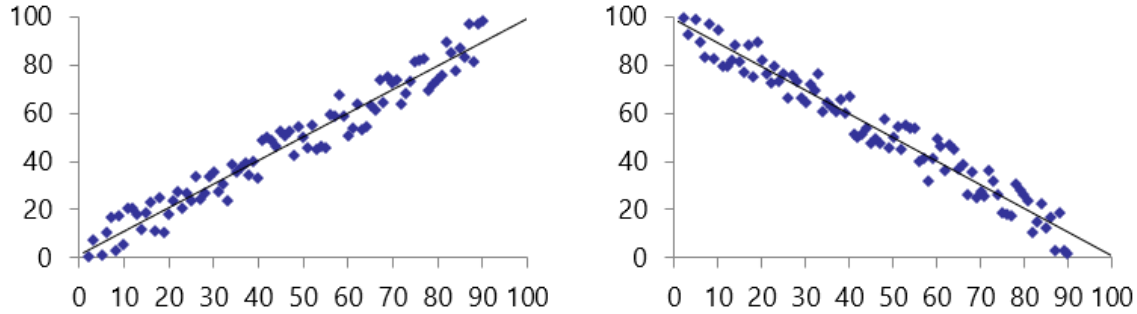
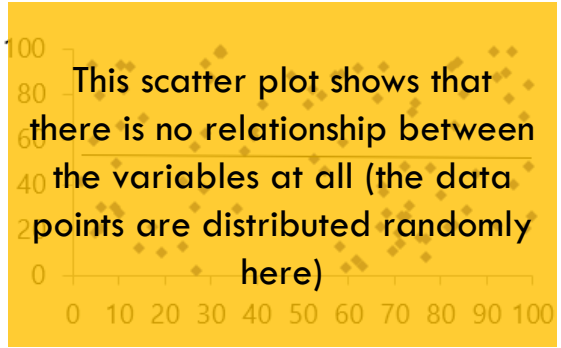
Scatterplot





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Scatterplot in SPSS

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- Let‘s assume we are interested if the dimension Extraversion is correlated to another personality dimension, such as agreeableness (the steps to calculate the dimension scores for agreeableness are already taken)

- The respective pair of hypotheses would therefore be:
  - Alternative hypothesis (H1): There is a relationship between the dimensions Extraversion and Agreeableness.
  - Null hypothesis (H0): There is not a relationship between the dimensions Extraversion and Agreeableness.

- So we look at scatterplot of the two dimensions

Step 3:
Visualize your data

4. What is a correlational analysis and how do I conduct it?

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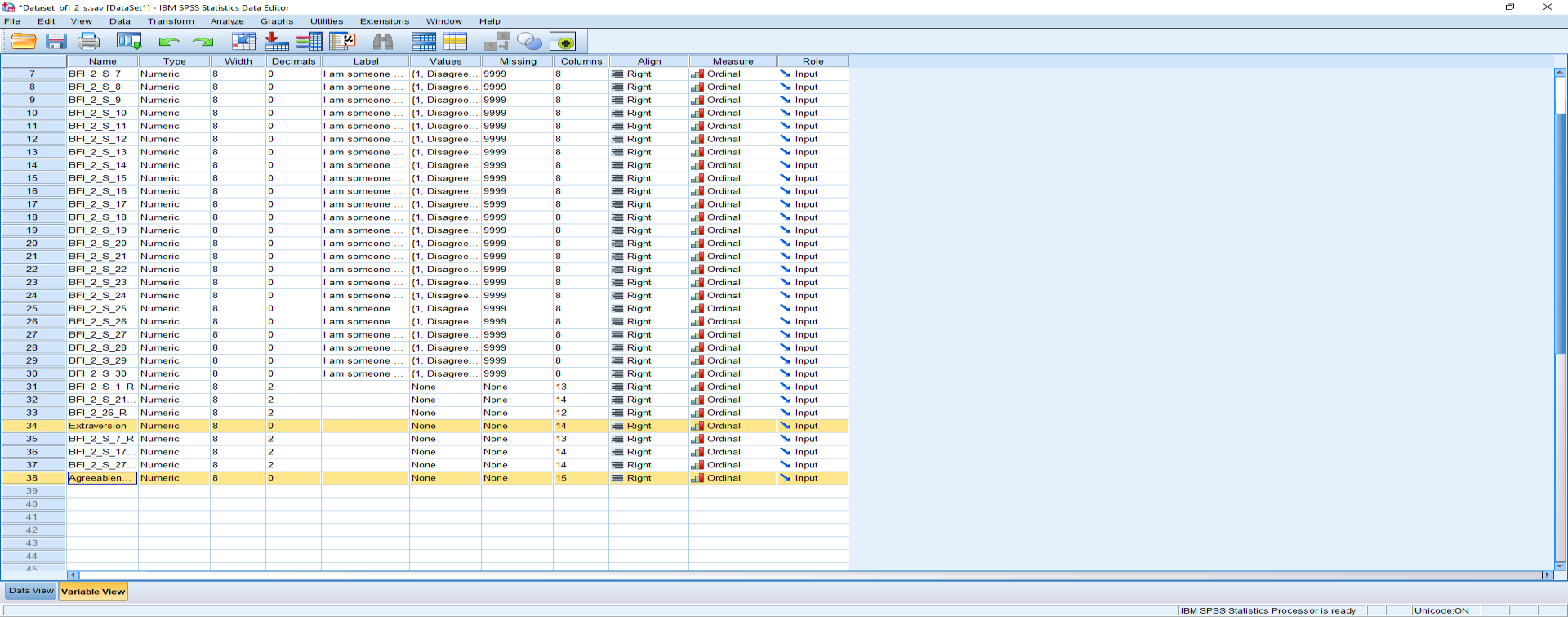
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Data View | Variable View

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Scatterplot in SPSS

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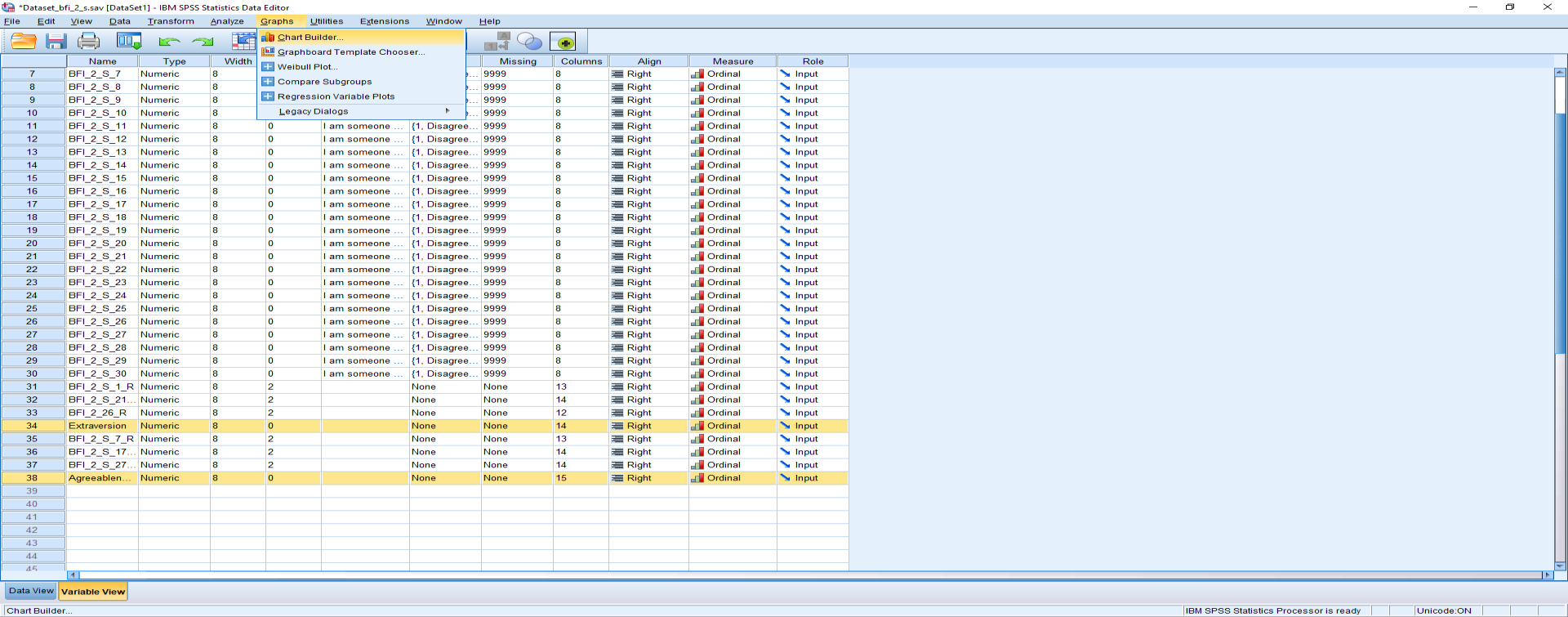

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4. What is a correlational analysis and how do I conduct it?

Scatterplot in SPSS

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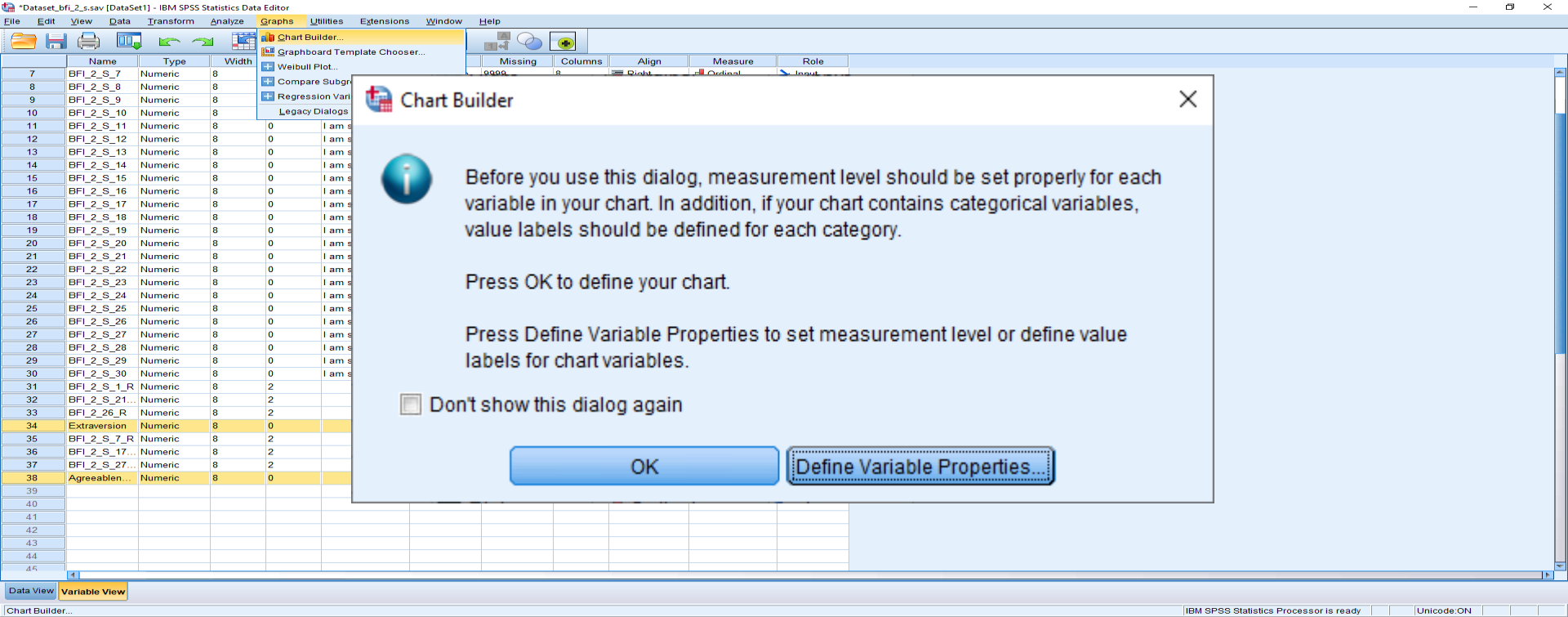

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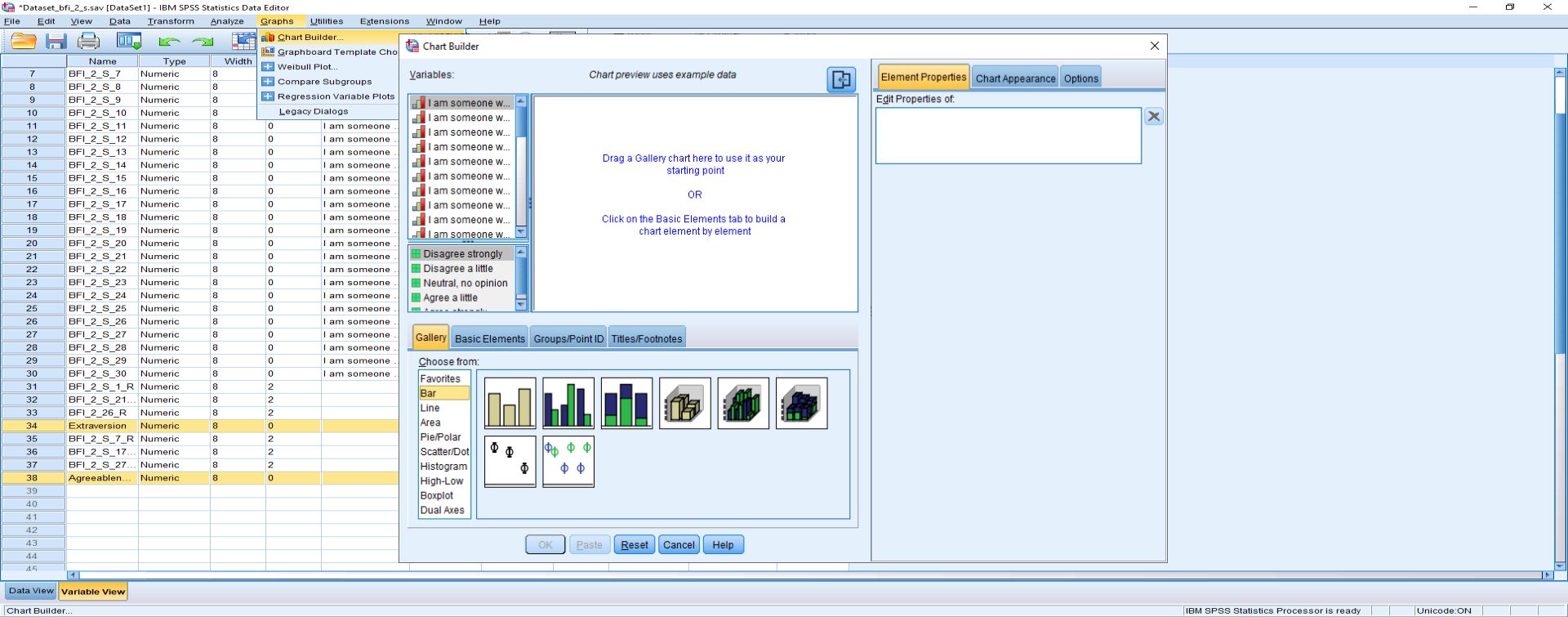

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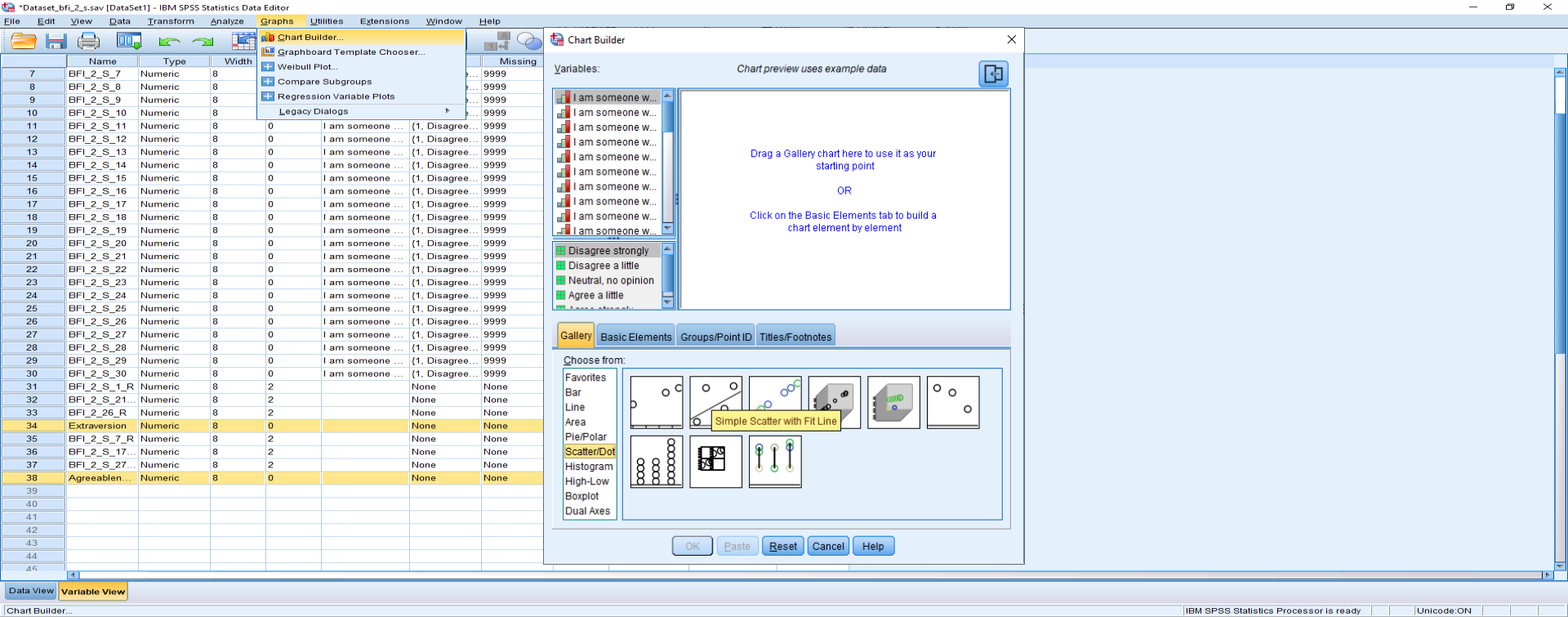

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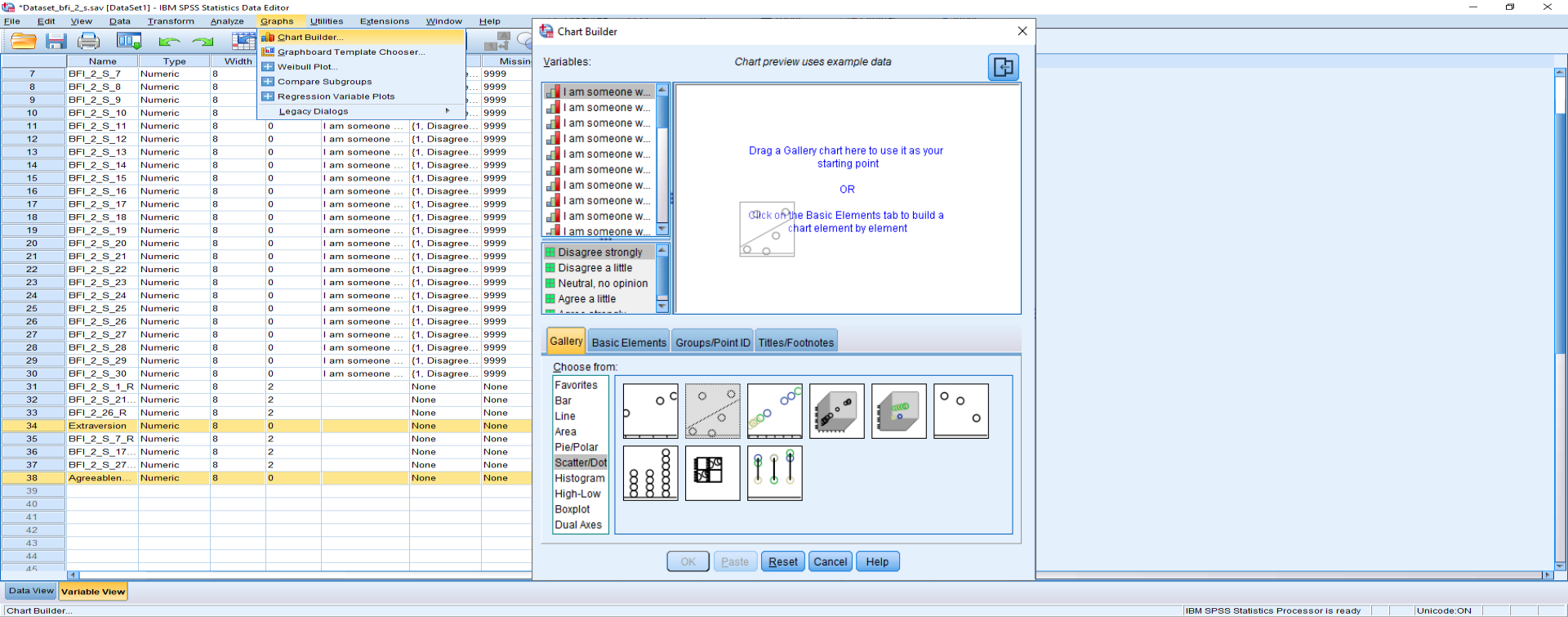

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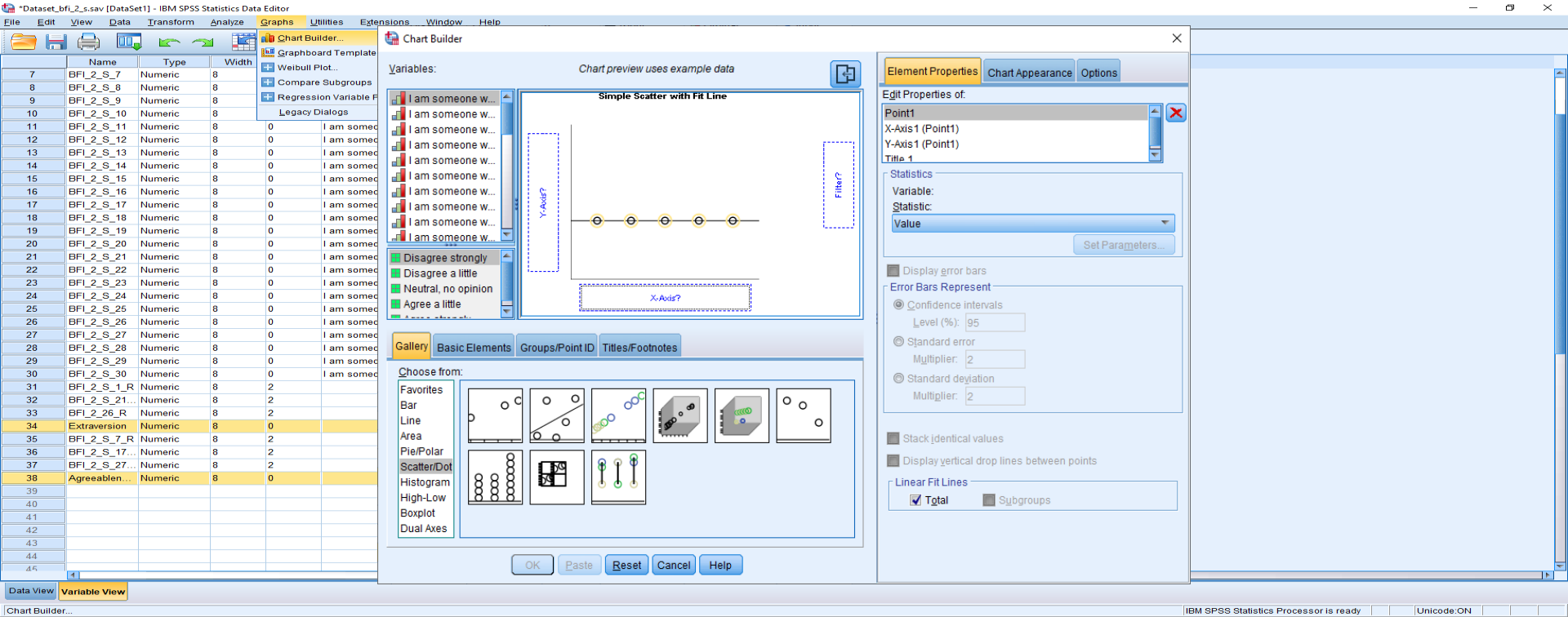

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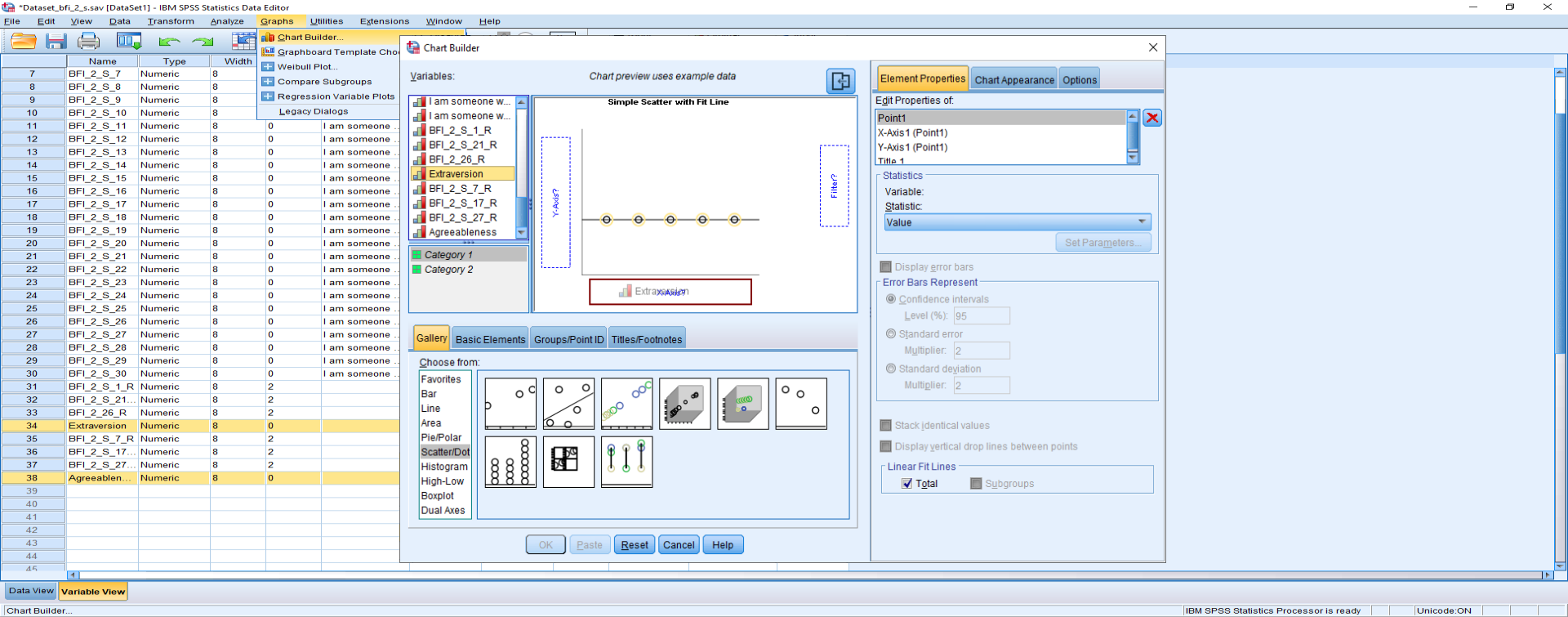

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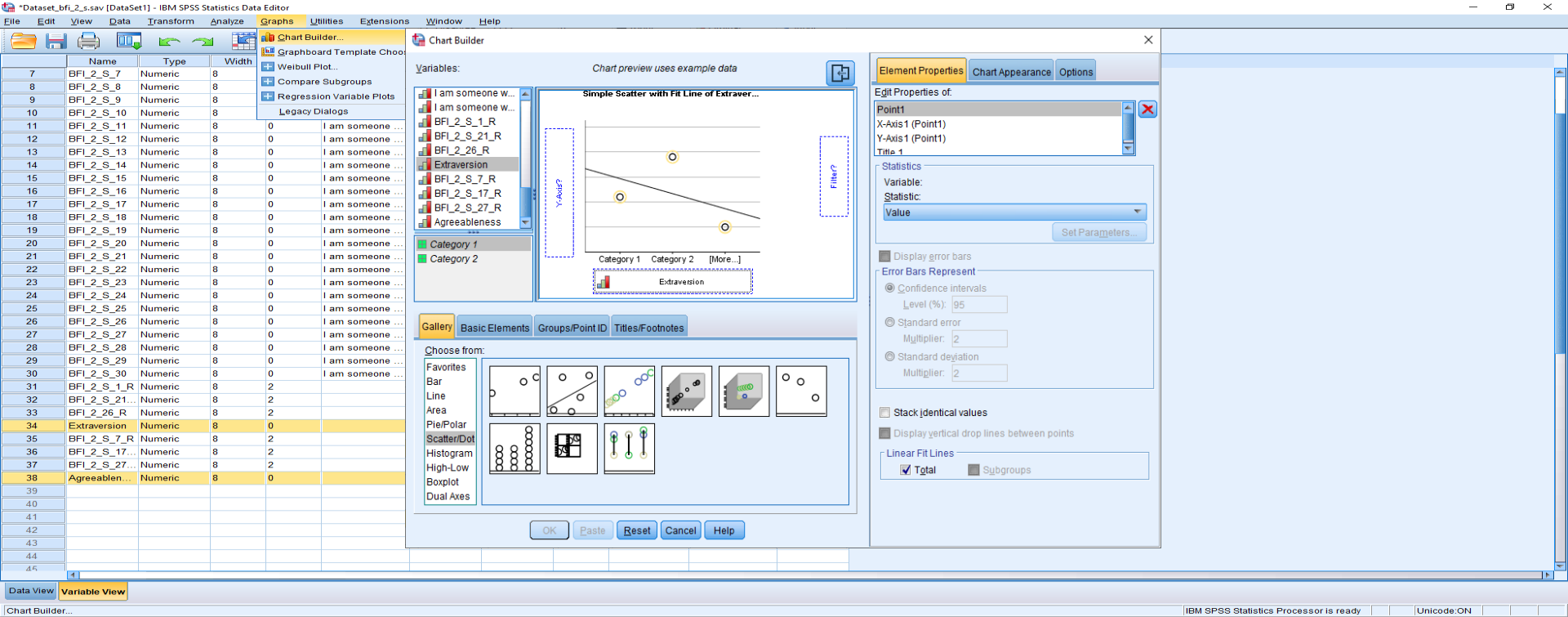

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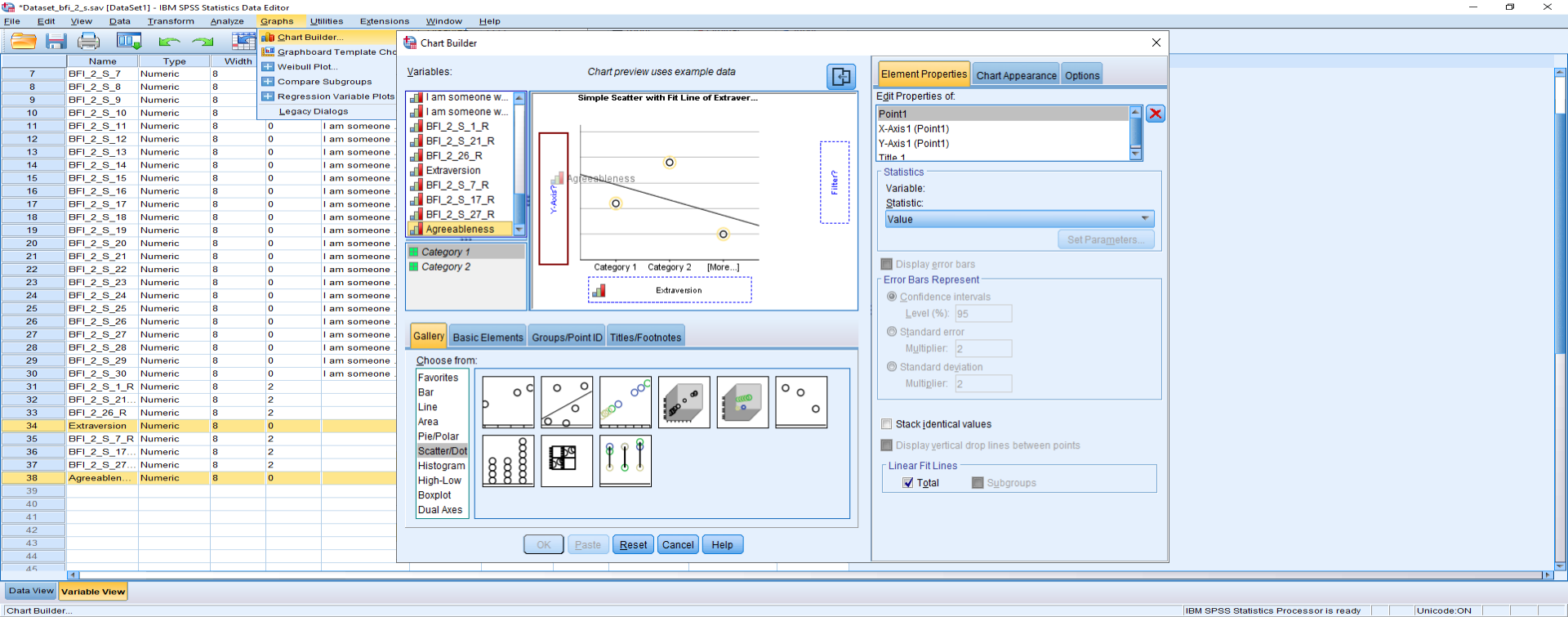

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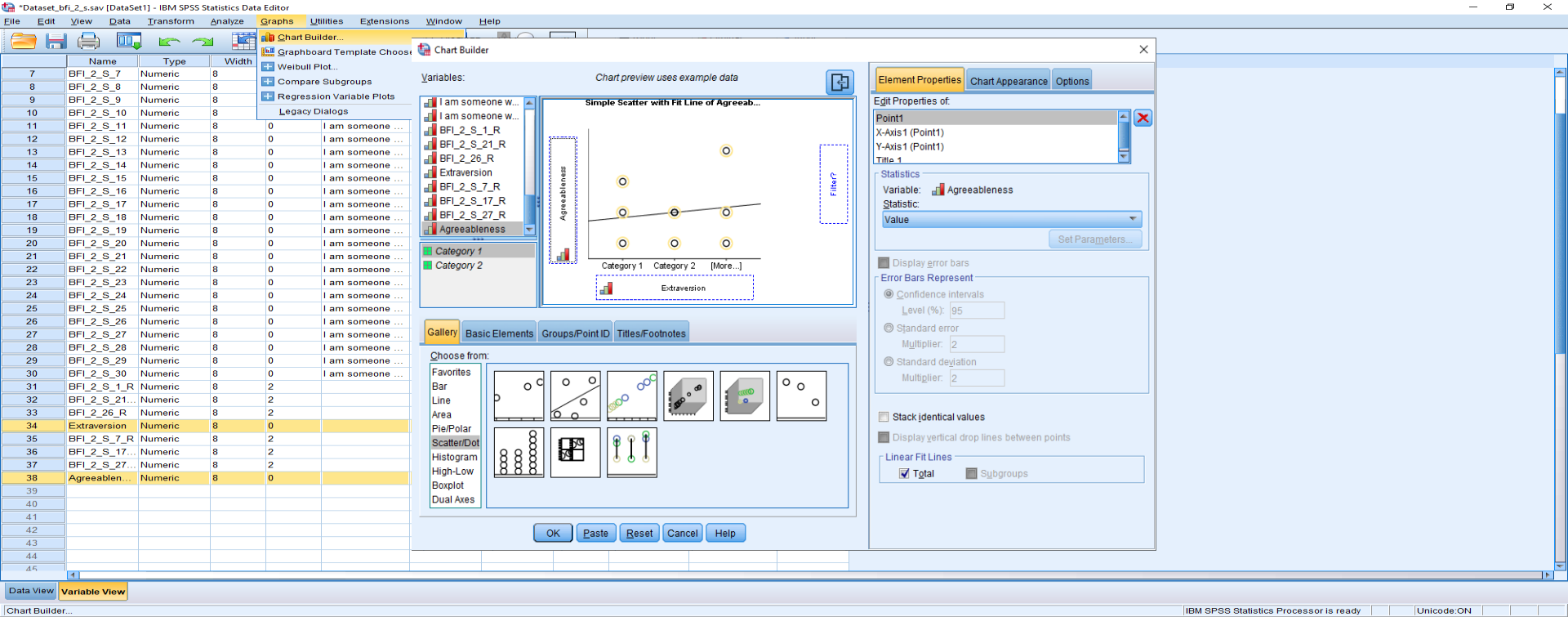

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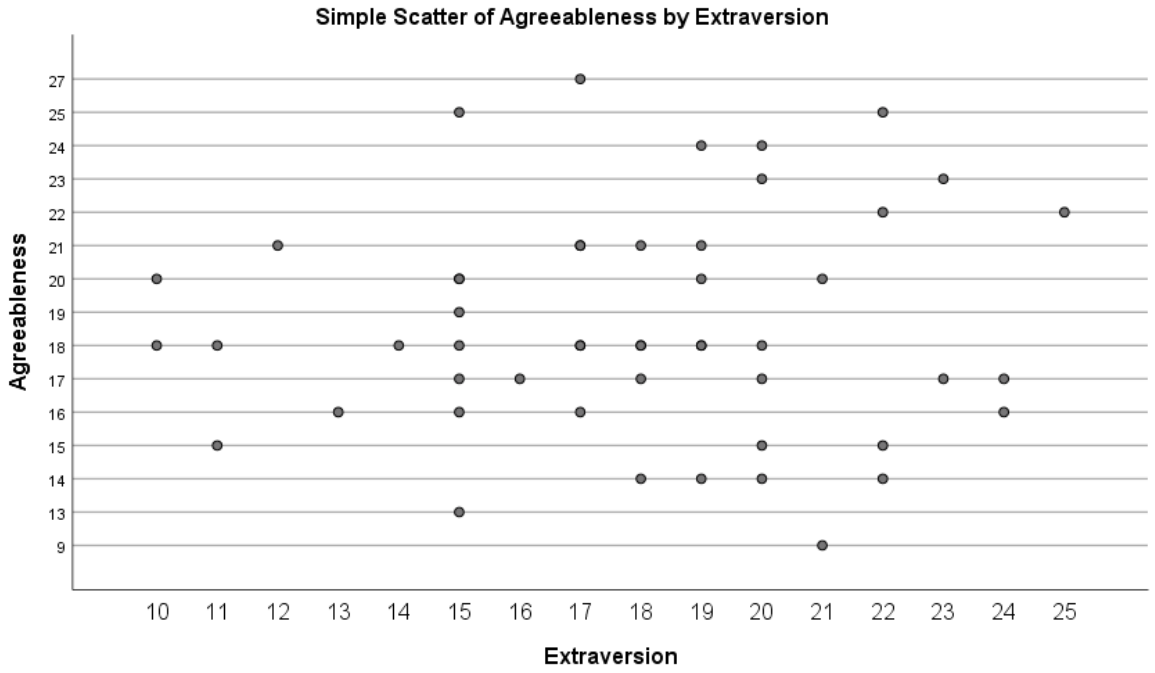

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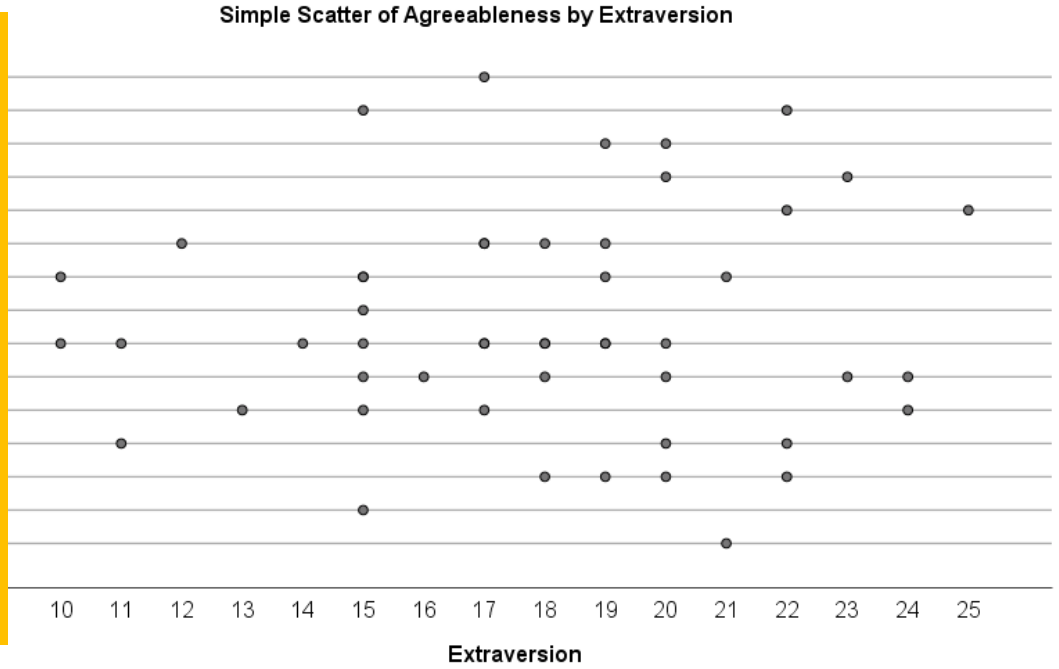
Scatterplot in SPSS

But where is the line????

Answer: because we treated our variables as ordinal scaled variables, SPSS does not show a line at all!!

Remember: scale scores are often treated as interval scaled although (strictly speaking) they are ordinal scaled!



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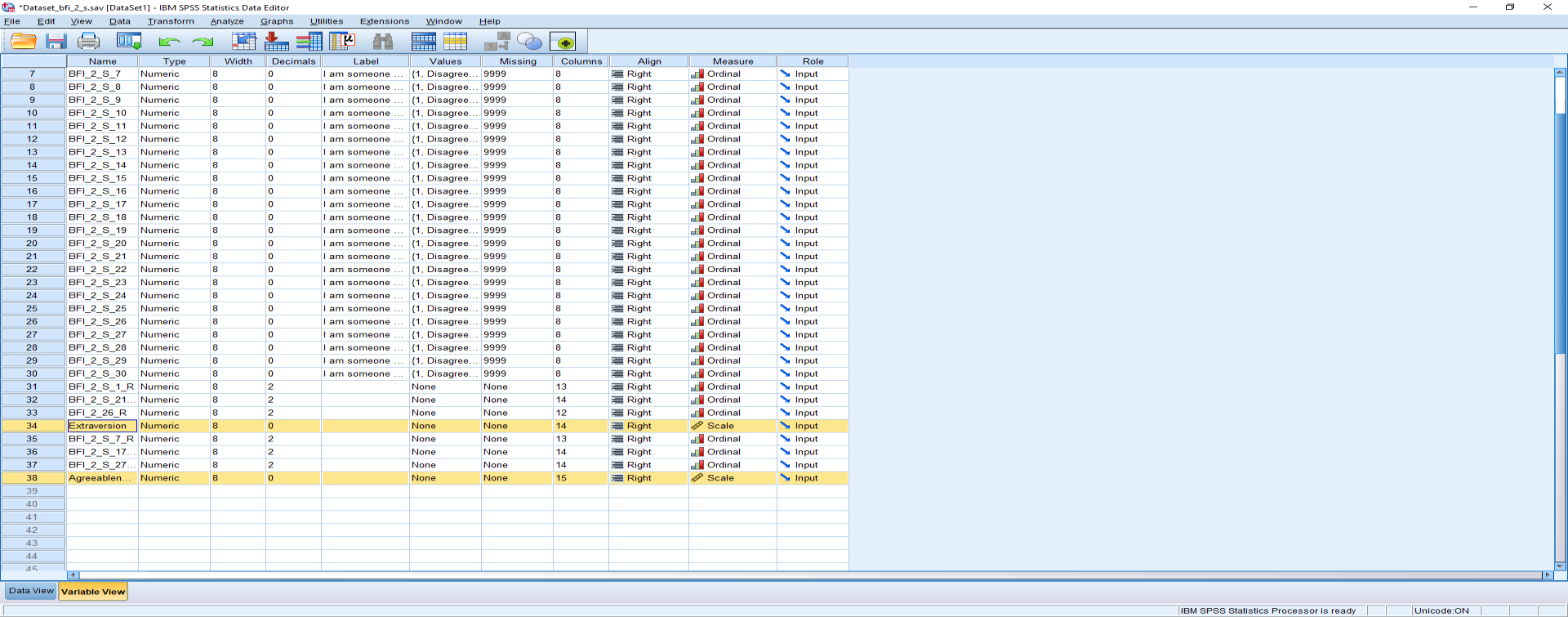

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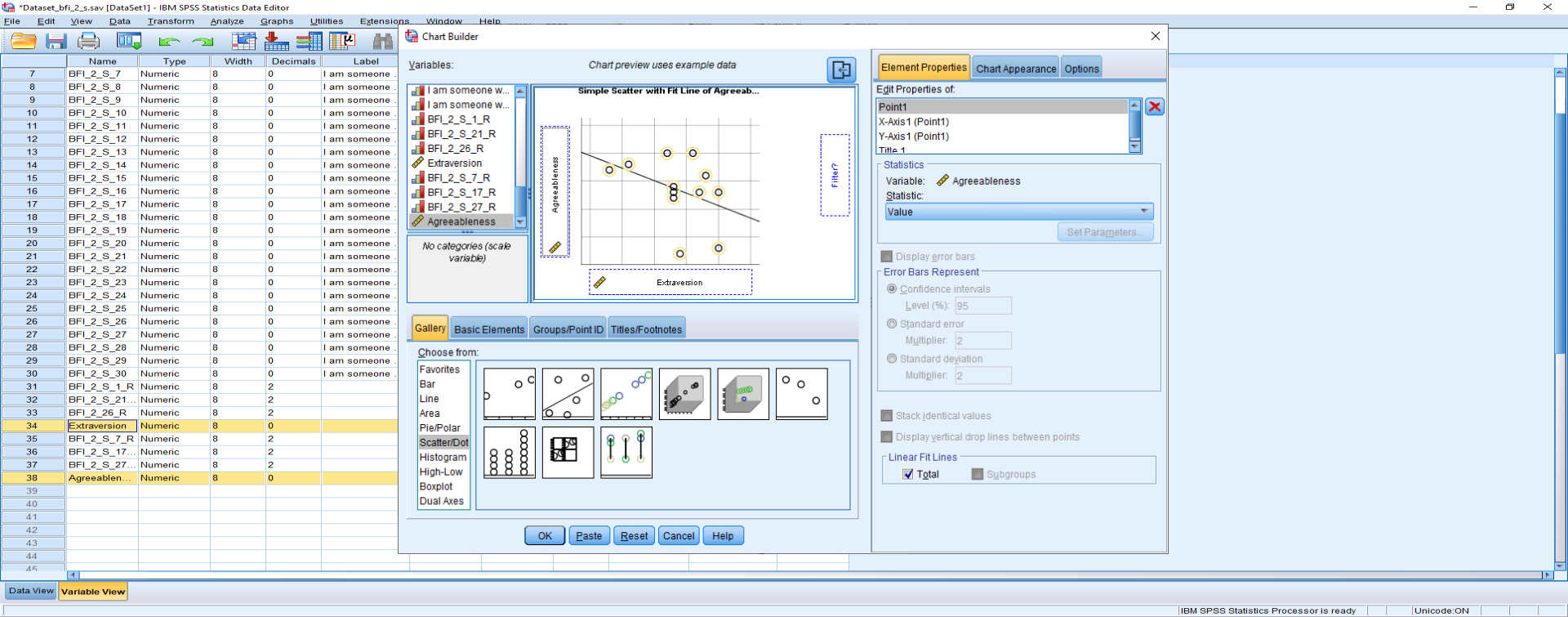

4. What is a correlational analysis and how do I conduct it?

Scatterplot in SPSS

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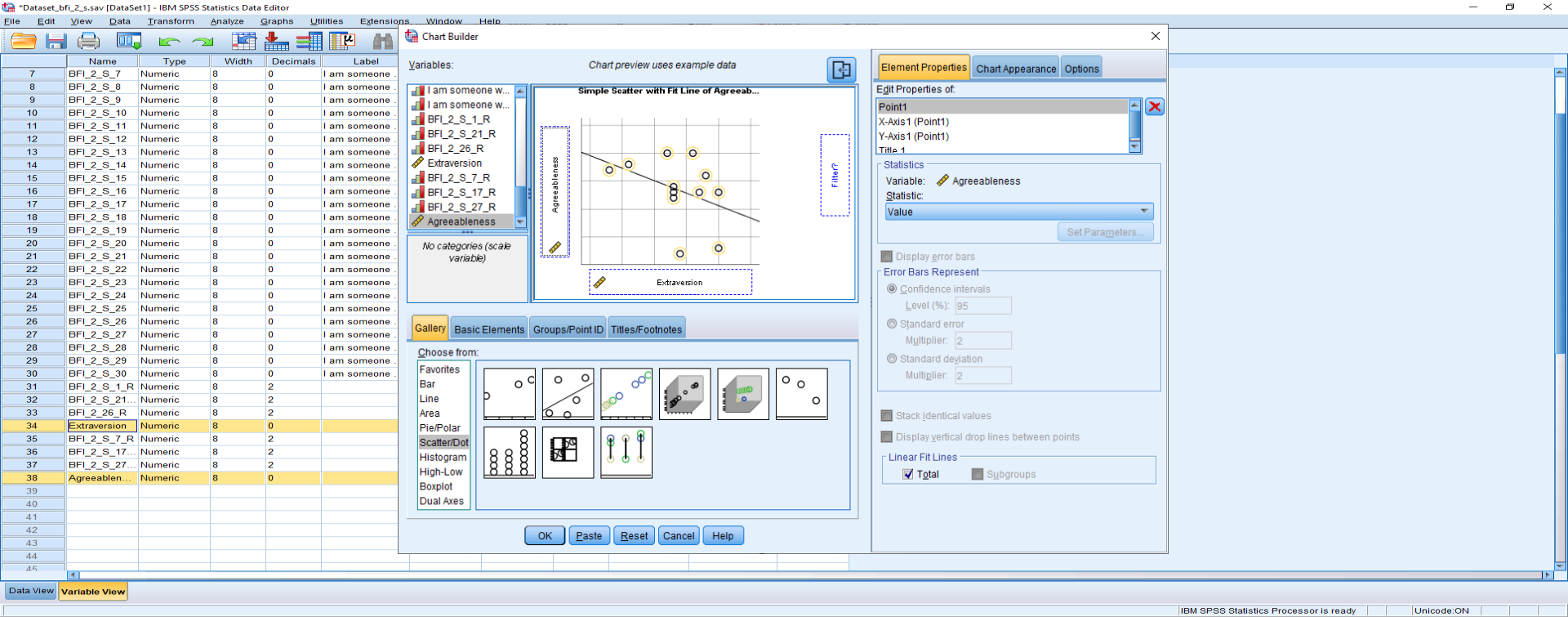

4. What is a correlational analysis and how do I conduct it?

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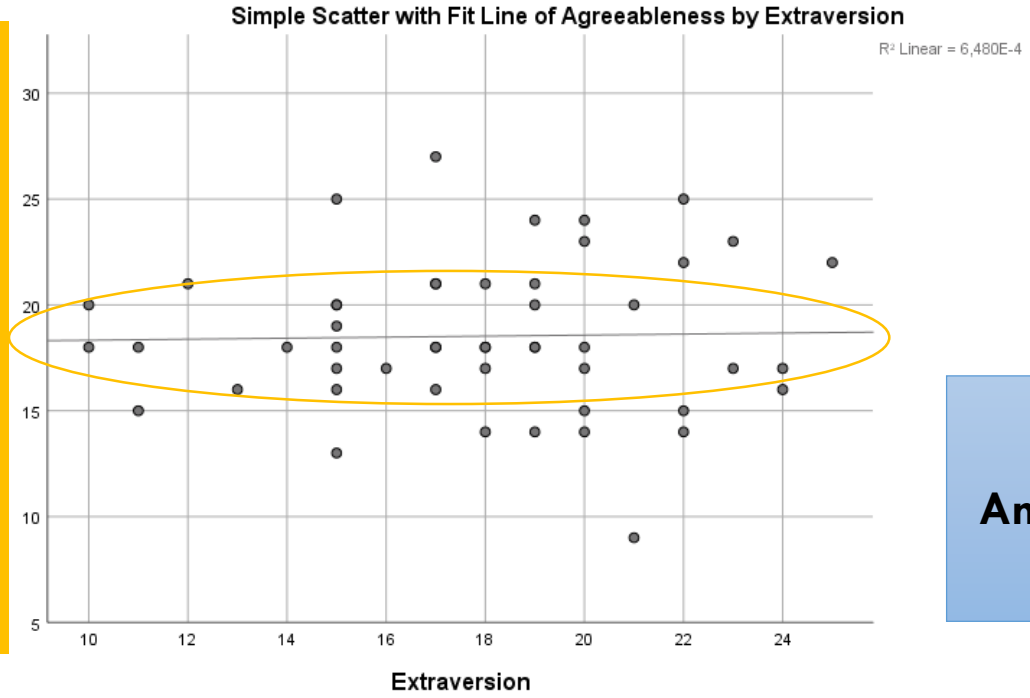
Scatterplot in SPSS

Now, SPSS shows us the line

It seems there is a very slightly linear positive relationship between the two variables (the probability is very high that this relationship will not be significant)

But how can I calculate if the relationship is significant or not????



Step 4:
Analyze your data

4. What is a correlational analysis and how do I conduct it?

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Test statistic for correlational analysis

- This leads us to the test-statistics which tell you if the relationship is significant or not

- The most prominent two ways to calculate the relationship are…

1. Pearson correlation coefficent (denoted as *r*) → is used when
   - ✓ you have interval or ratio variables
   - ✓ the relationship is presumably linear (=> scatterplot)
   - ✓ no strong outliers, no subgroups (=> scatterplot)

For experts: This refers to the assumption of bivariate normality

2. Spearman correlation coefficient (denoted as r_s) → is used when you have ordinal data and/or the assumptions for computing a Pearson correlation coefficient are not met

4. What is a correlational analysis and how do I conduct it?

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Test statistic for correlational analysis

- Pearson is the favored one (because it is more sensitive than Spearman – think back to the difference between the mean and the median - it is basically the same case); however, the meaning of them is the same; that is
- ... these correlation coefficients are standardized measures of the relationship between variables
- … these correlation coefficients have to lie between -1 and +1
- … a coefficient of + 1 indicates a perfect positive relationship, a coefficient of -1 indicates a perfect negative relationship, and a coefficient of 0 indicates no linear relationship
- … these correlation coefficients are a commonly used measure of the size of an effect: values of ± 0.1 represent a small effect, ± 0.3 is a medium effect and ± 0.5 is a large effect

4. What is a correlational analysis and how do I conduct it?

Test statistic for correlational analysis

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- With respect to our example and thinking of the assumptions for calculating the **Pearson correlation coefficient *r*** (we strive to use Pearson – see the argument on the previous slide),

- …at fist we have to think about our dimension scores: are they ordinal or interval data? If we decide that our scores are interval scaled data (and it is to some extent reasonable, because many of the researchers in the scientific community do that), then we have to decide if the assumption of a linear relationship is met and if the distribution of the data allows for computing Pearson's r (no strong outliers that might influence the relationship, no subgroups) by checking the scatter plot.

- …if we decide that our scores are ordinal scaled data or any of the assumptions for Pearson's r are not met, we conduct the **Spearman correlation analysis** (path 2)

4. What is a correlational analysis and how do I conduct it?

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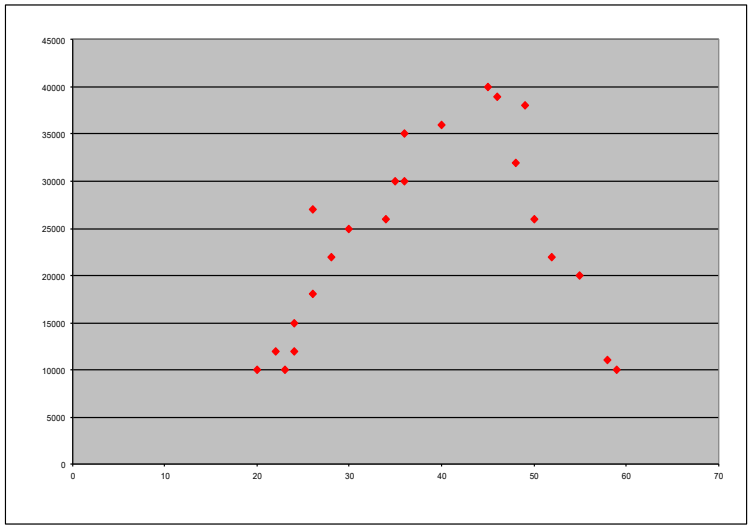
Pearsons‘ assumption: Linear relationship

Problem: relationship is non-linear

(check by means of scatterplot)

=> exponential or parabolic or logarithmic or cubic relationship

r=0.28 (only!)



4. What is a correlational analysis and how do I conduct it?

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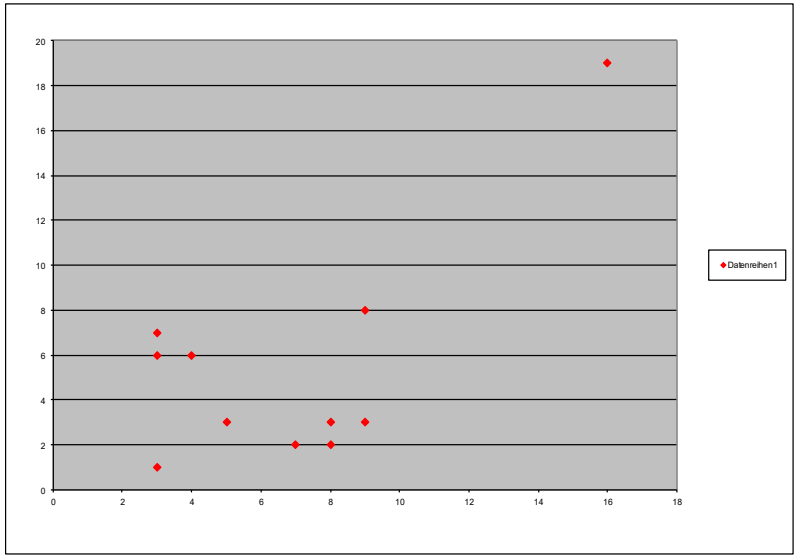
Pearsons‘ assumption: No strong outliers (bivariate normality)

Problem: outliers

With outlier: r=0.66, without outlier: r=-0.14



4. What is a correlational analysis and how do I conduct it?

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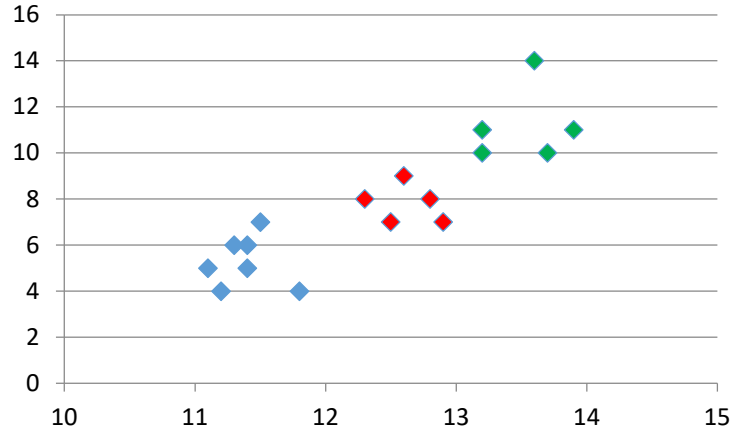
Pearsons‘ assumption: No sub groups (bivariate normality)

Problem: sub groups

Effect of confounding factor (e.g. effect of age group on the relationship between shoe size and homeworks)

r=0.87 (!) for all, but small or even negative (r=-0.05, -0.23 and 0.19) for the subgroups



4. What is a correlational analysis and how do I conduct it?

Test statistic for correlational analysis/ path 1 (Pearson)

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- In our example testing the relationship between Extraversion and Agreeableness, all assumptions for computing Pearson‘s r hold.
- I will use the Pearson correlation coefficient to test for a statistical significant relationship between the two dimensions Extraversion and agreeableness
- SPSS command: Analyze → Correlate → Bivariate…

4. What is a correlational analysis and how do I conduct it?

Test statistic for correlational analysis/ path 1 (Pearson)

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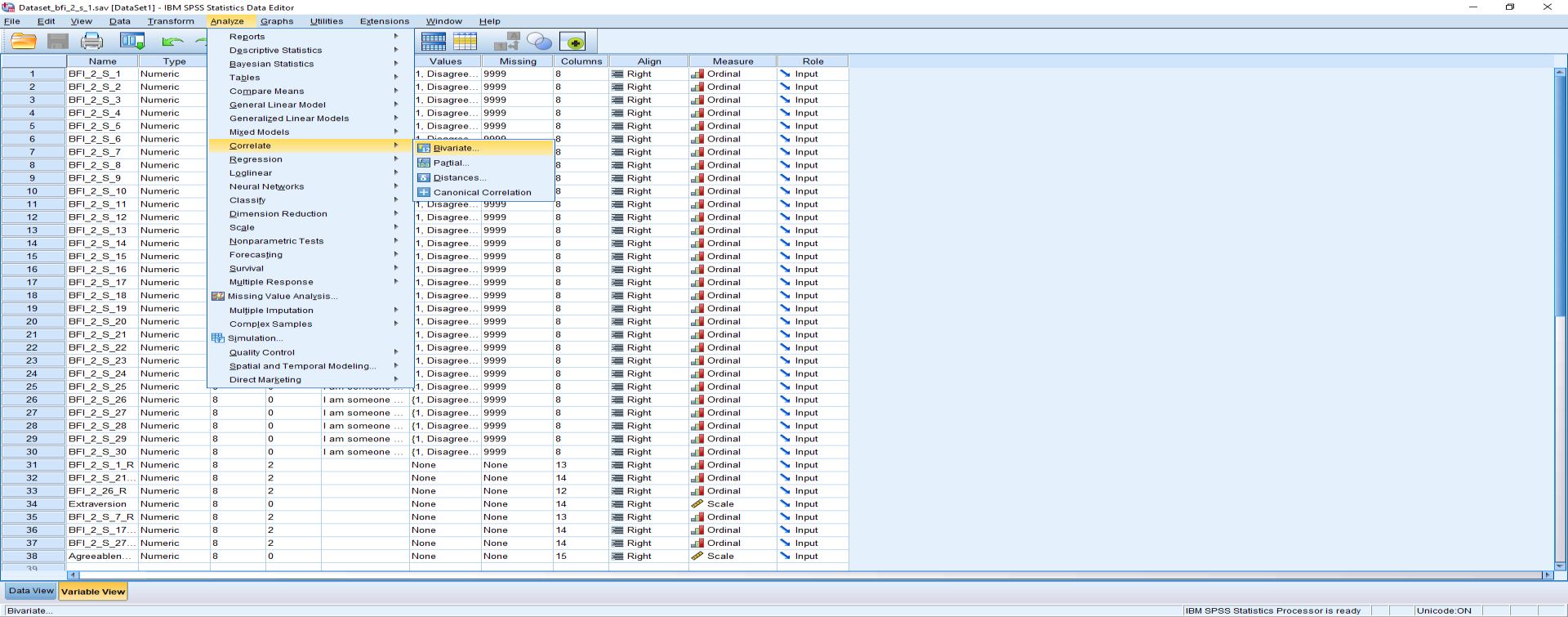

4. What is a correlational analysis and how do I conduct it?

Test statistic for correlational analysis/ path 1 (Pearson)

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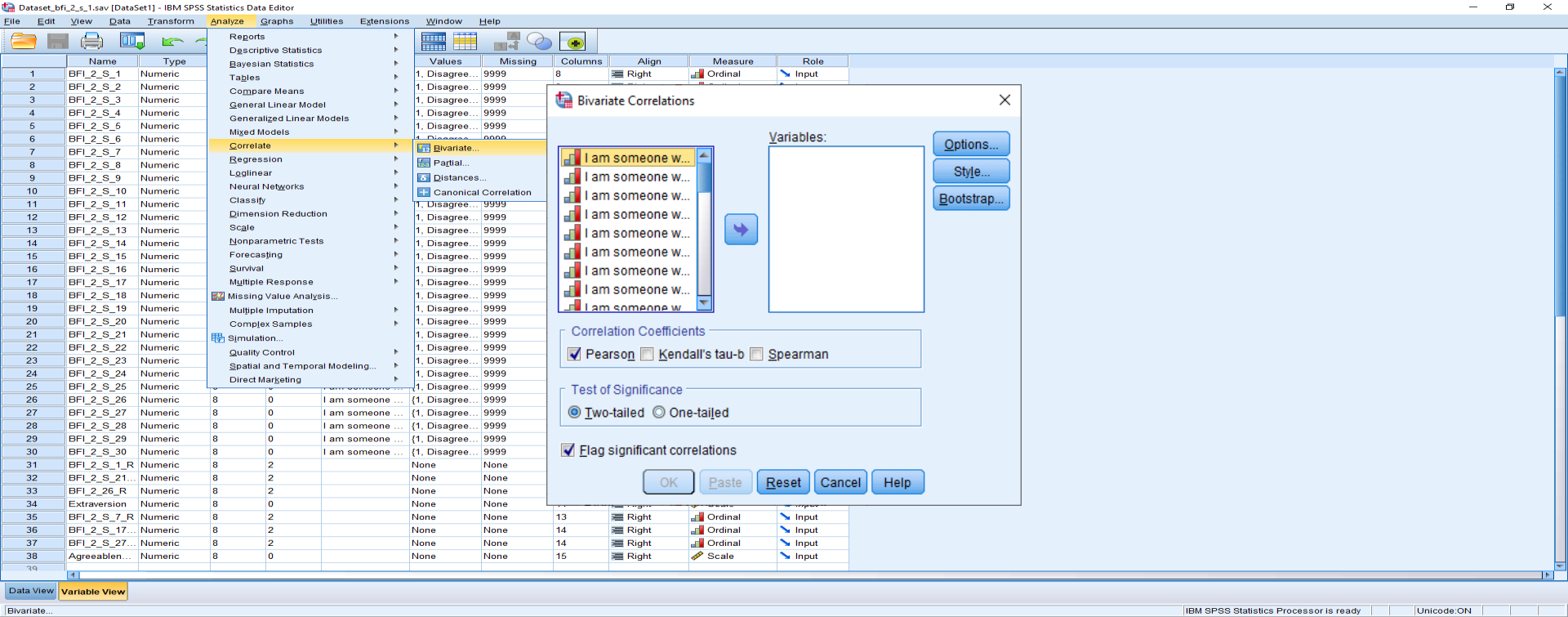

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Test statistic for correlational analysis/ path 1 (Pearson)

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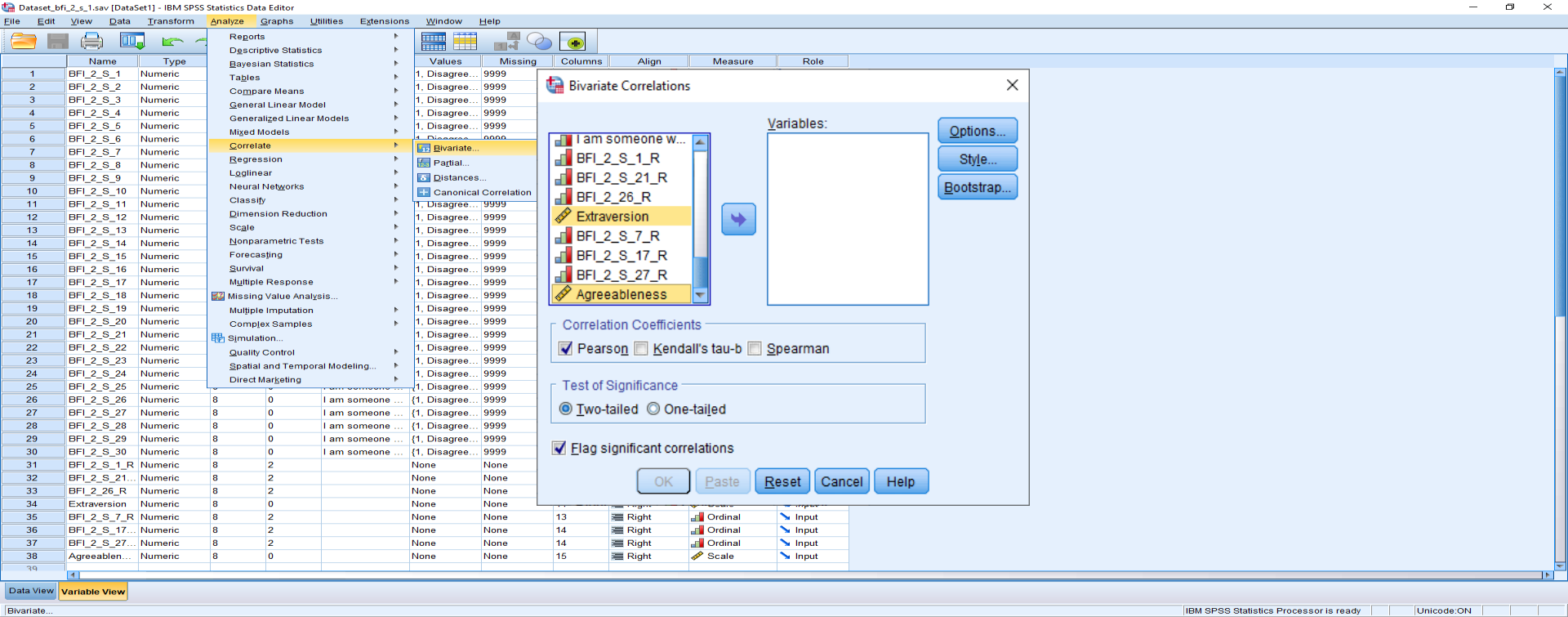

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Test statistic for correlational analysis/ path 1 (Pearson)

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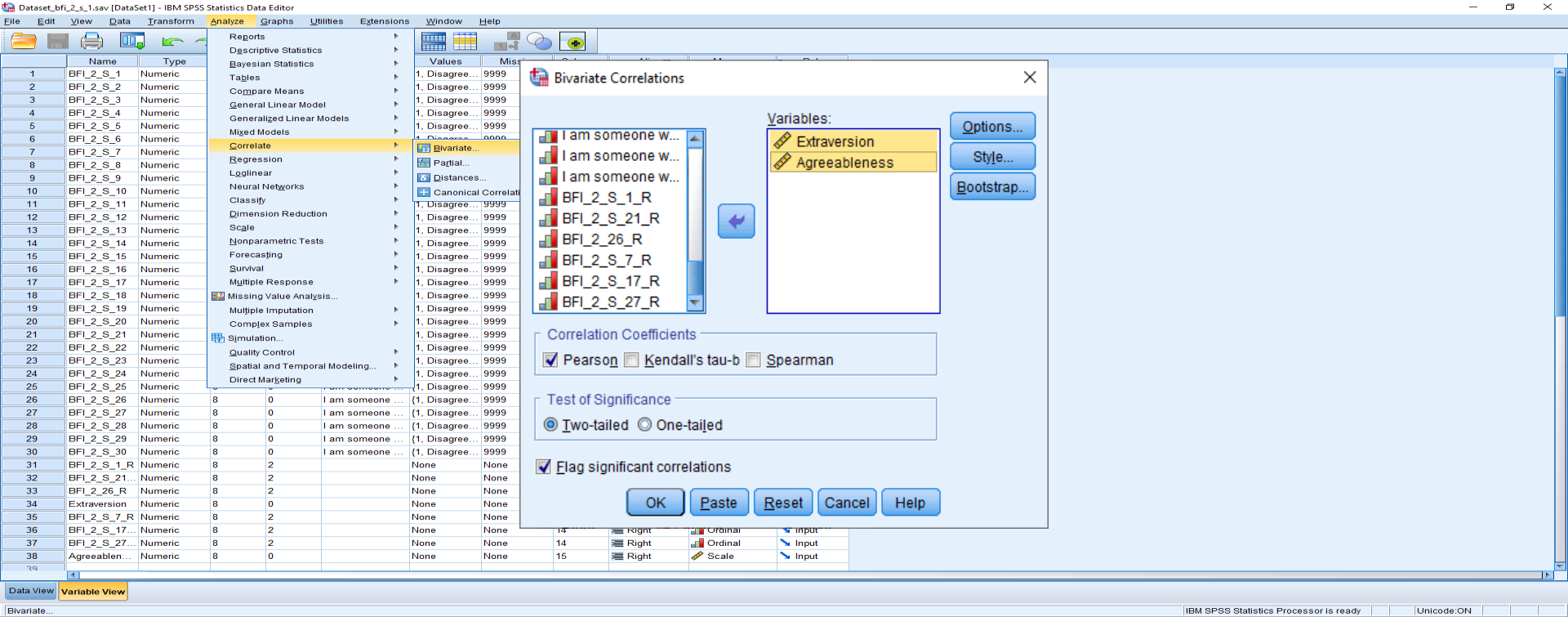

4. What is a correlational analysis and how do I conduct it?

Test statistic for correlational analysis/ path 1 (Pearson)

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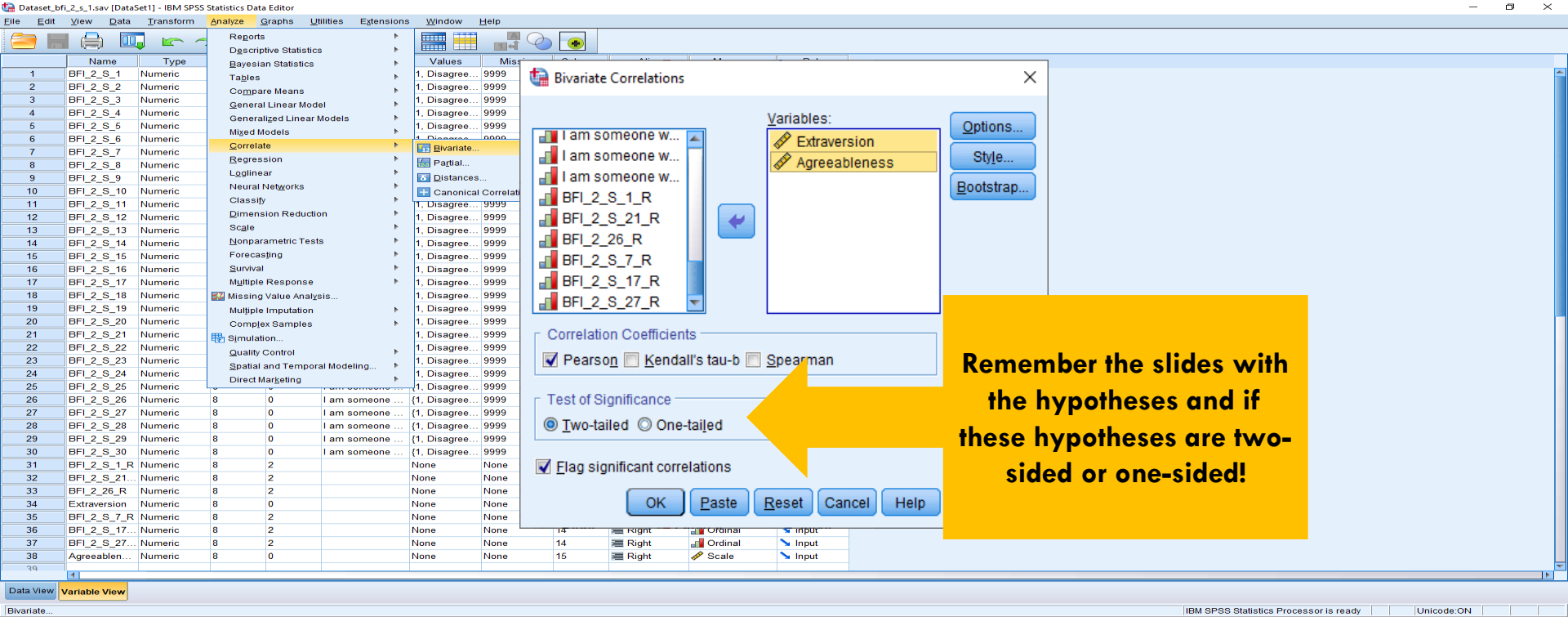

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Test statistic for correlational analysis/ path 1 (Pearson)

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- Output
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    - Case Processing Sur
    - Descriptives
    - Tests of Normality
    - Extraversion
      - Title
      - Histogram
      - Normal Q-Q Plot
      - Detrended Norm
      - Boxplot
    - Agreeableness
      - Title
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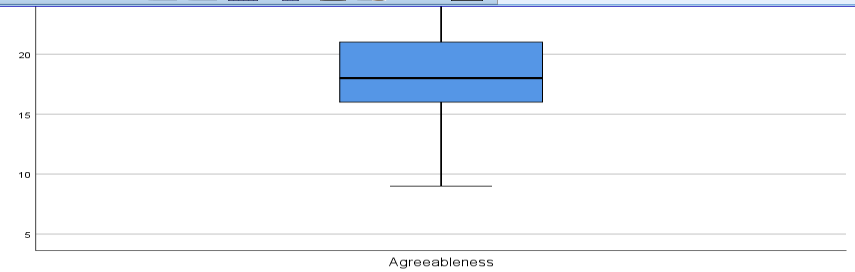
    - Notes
    - Descriptive Statistics
    - Correlations

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  /MISSING=LISTWISE.
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Correlations

Descriptive Statistics

	Mean	Std. Deviation	N
Extraversion	17,84	3,689	50
Agreeableness	18,52	3,512	50

Correlations[a]

		Extraversion	Agreeableness
Extraversion	Pearson Correlation	1	,025
	Sig. (2-tailed)		,861
Agreeableness	Pearson Correlation	,025	1
	Sig. (2-tailed)	,861	

a. Listwise N=50

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4. What is a correlational analysis and how do I conduct it?

Test statistic for correlational analysis/ path 1 (Pearson)

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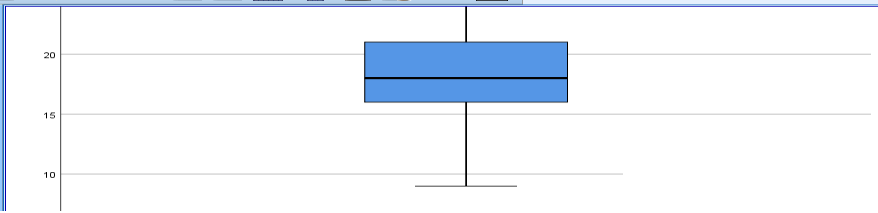

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4. What is a correlational analysis and how do I conduct it?

Test statistic for correlational analysis/ path 1 (Pearson)

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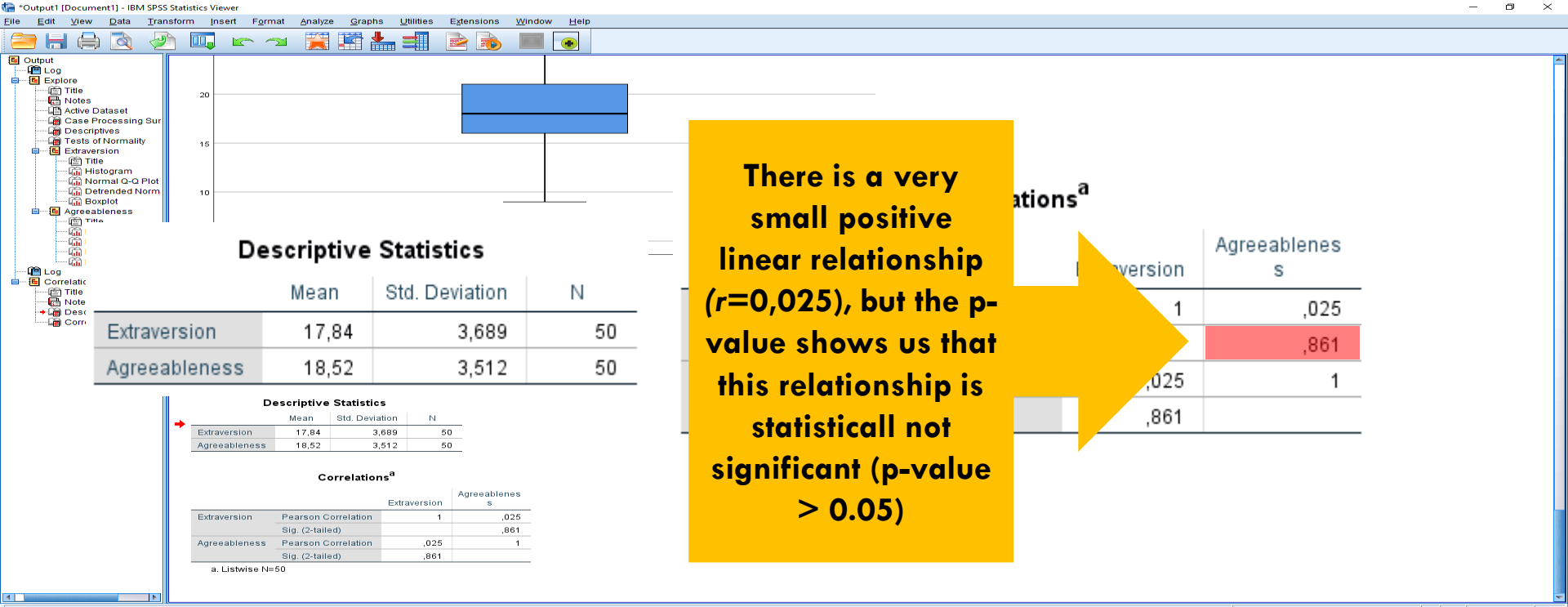

4. What is a correlational analysis and how do I conduct it?

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Test statistic for correlational analysis/ path 2 (ordinal data → Spearman)

- Alternative path: **Spearman correlation** if assumptions for Pearson's correlation do not hold (e.g. ordinal scaled variables, strong outliers …)

- SPSS command: Analyze → Correlate → Bivariate…

4. What is a correlational analysis and how do I conduct it?

Test statistic for correlational analysis/ path 2 (Spearman)

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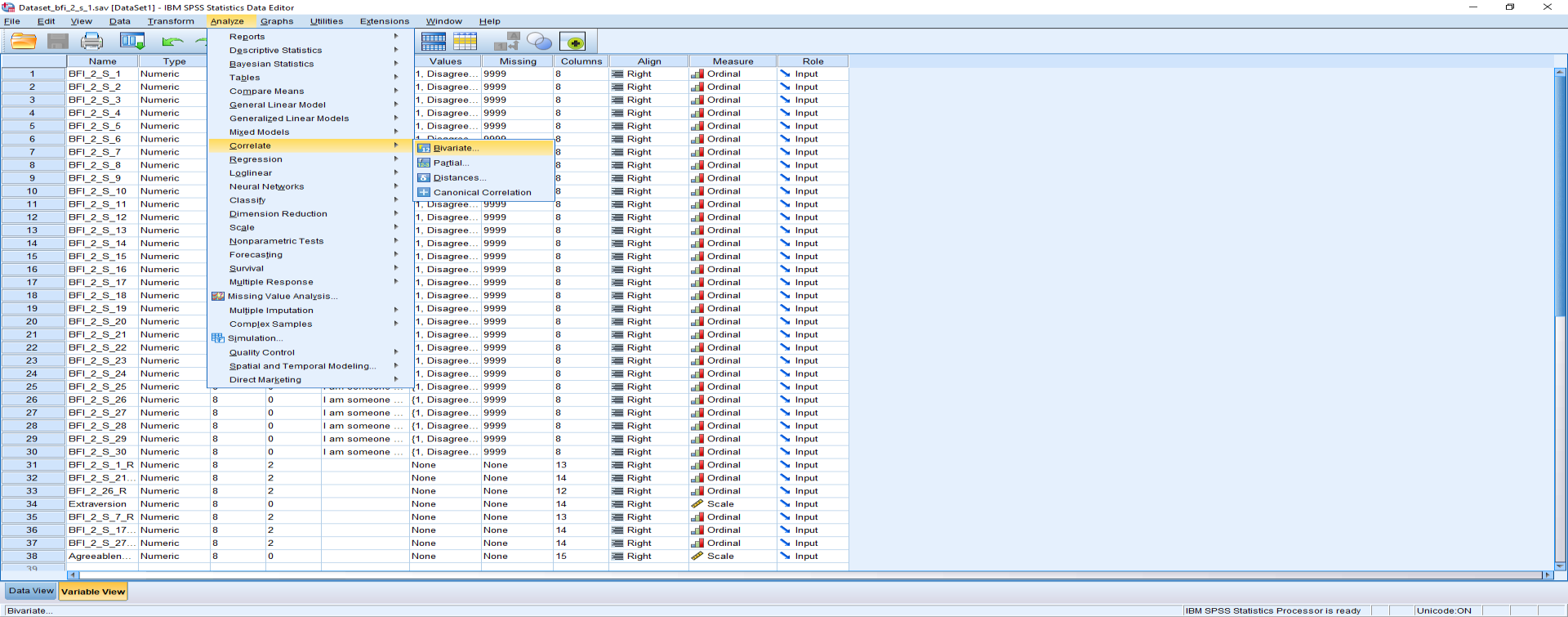

4. What is a correlational analysis and how do I conduct it?

Test statistic for correlational analysis/ path 2 (Spearman)

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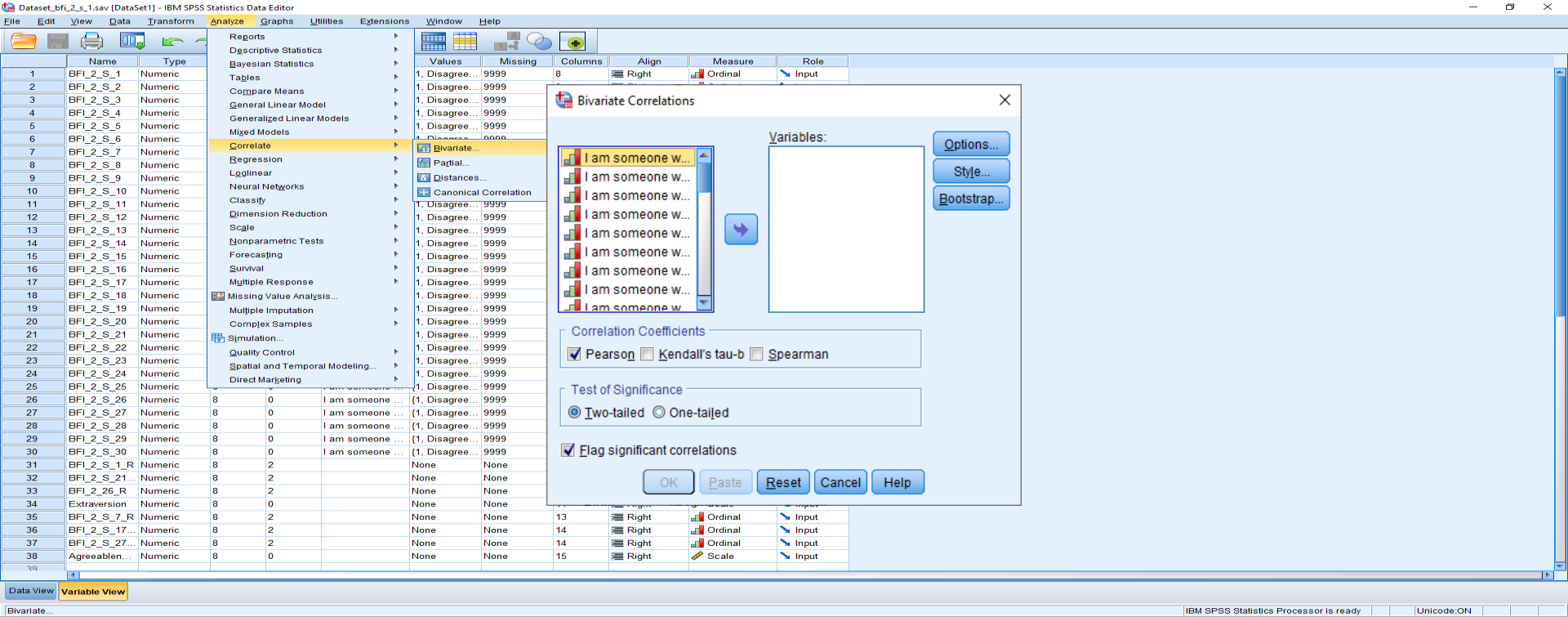

4. What is a correlational analysis and how do I conduct it?

Test statistic for correlational analysis/ path 2 (Spearman)

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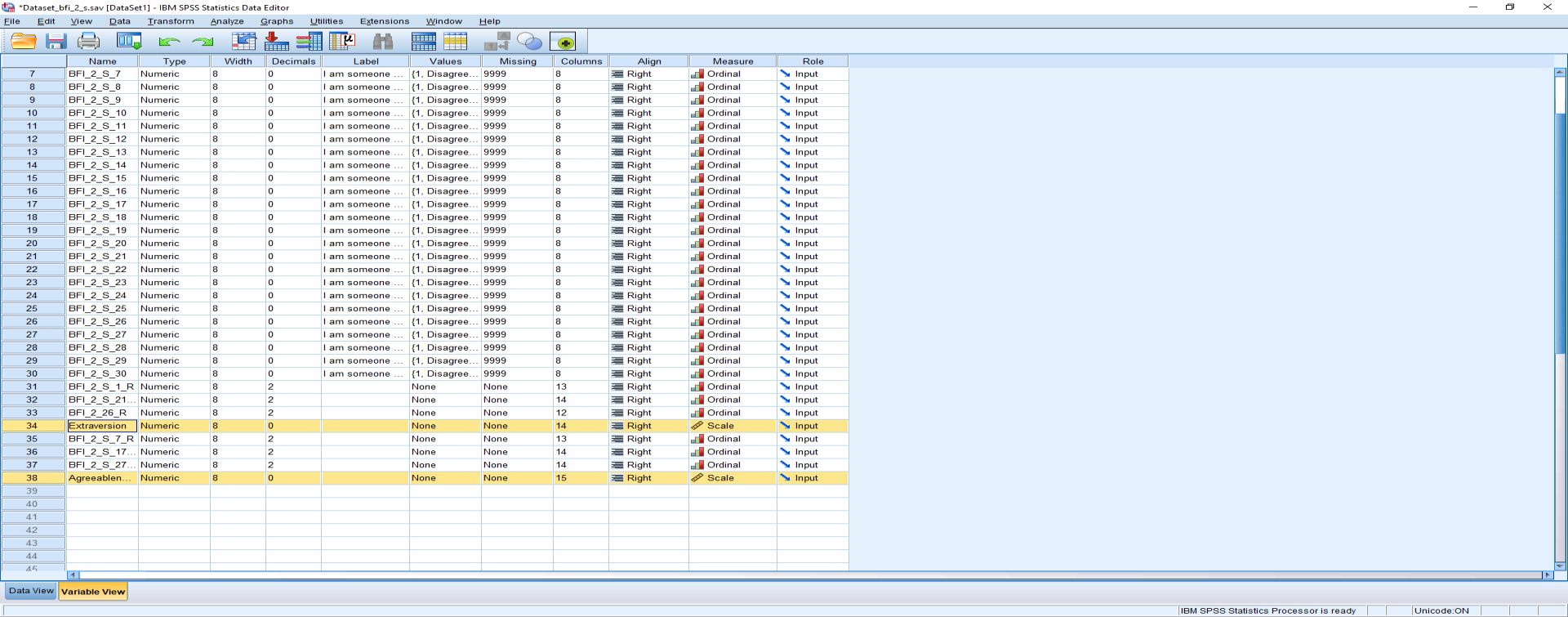

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4. What is a correlational analysis and how do I conduct it?

Test statistic for correlational analysis/ path 2 (Spearman)

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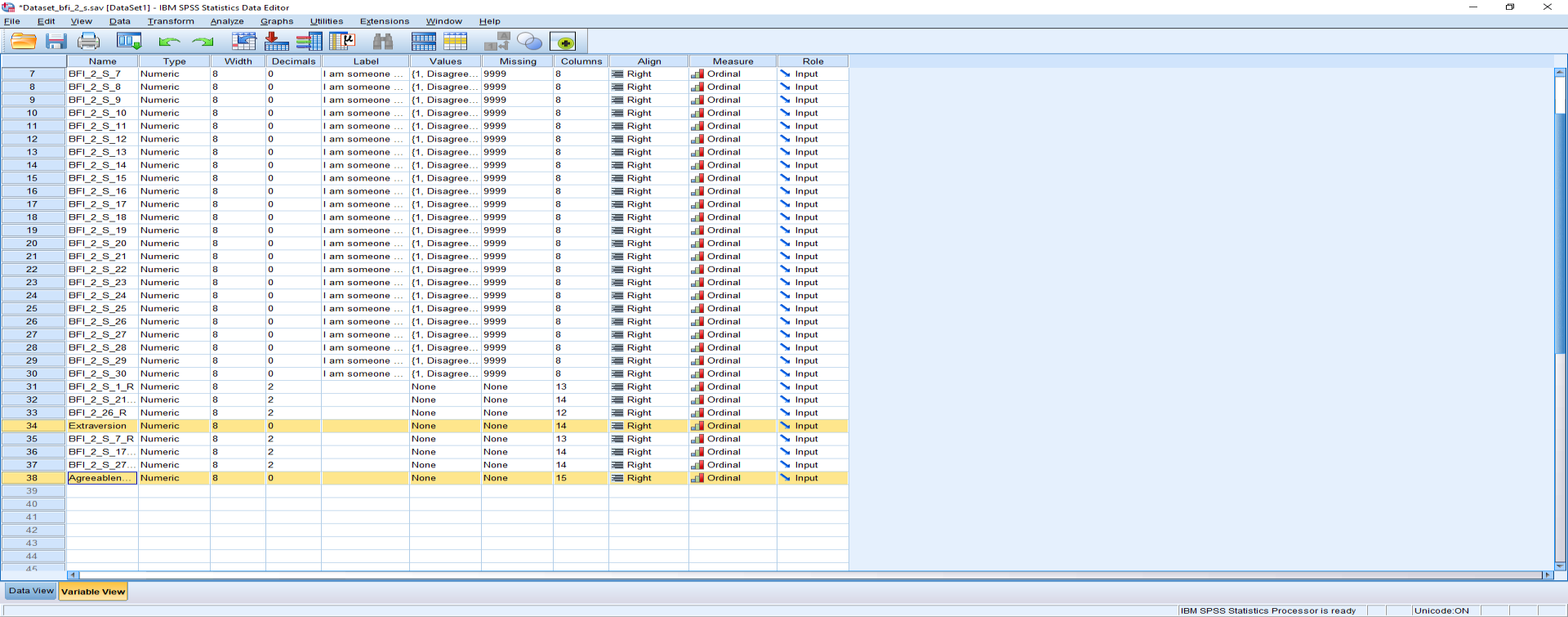

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4. What is a correlational analysis and how do I conduct it?

Test statistic for correlational analysis/ path 2 (Spearman)

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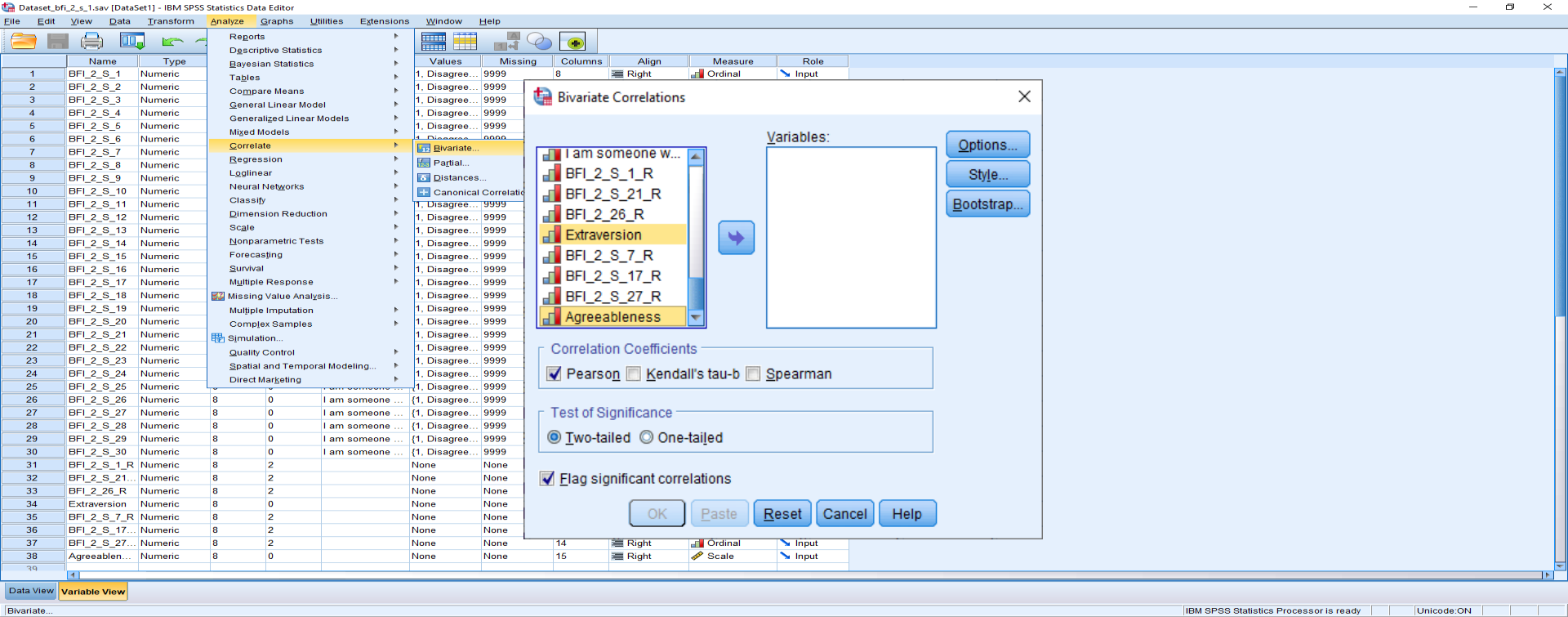

4. What is a correlational analysis and how do I conduct it?

Test statistic for correlational analysis/ path 2 (Spearman)

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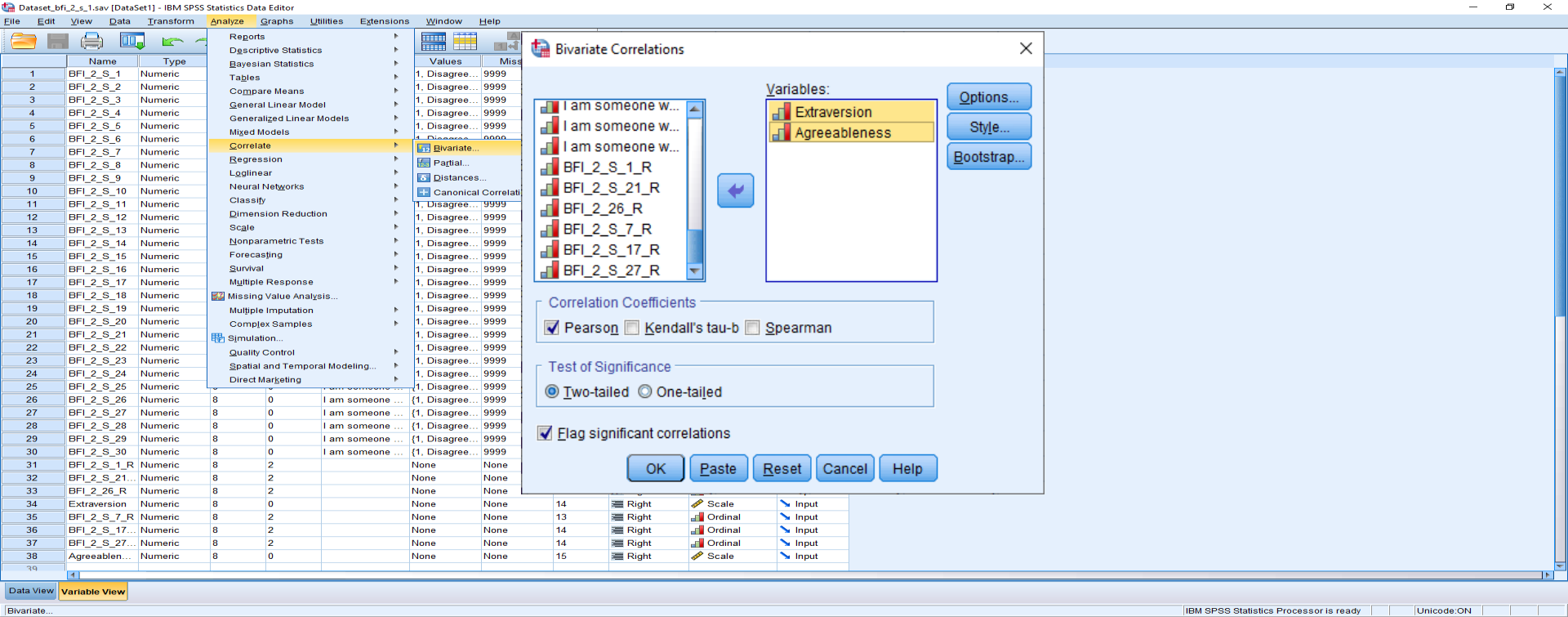

4. What is a correlational analysis and how do I conduct it?

Test statistic for correlational analysis/ path 2 (Spearman)

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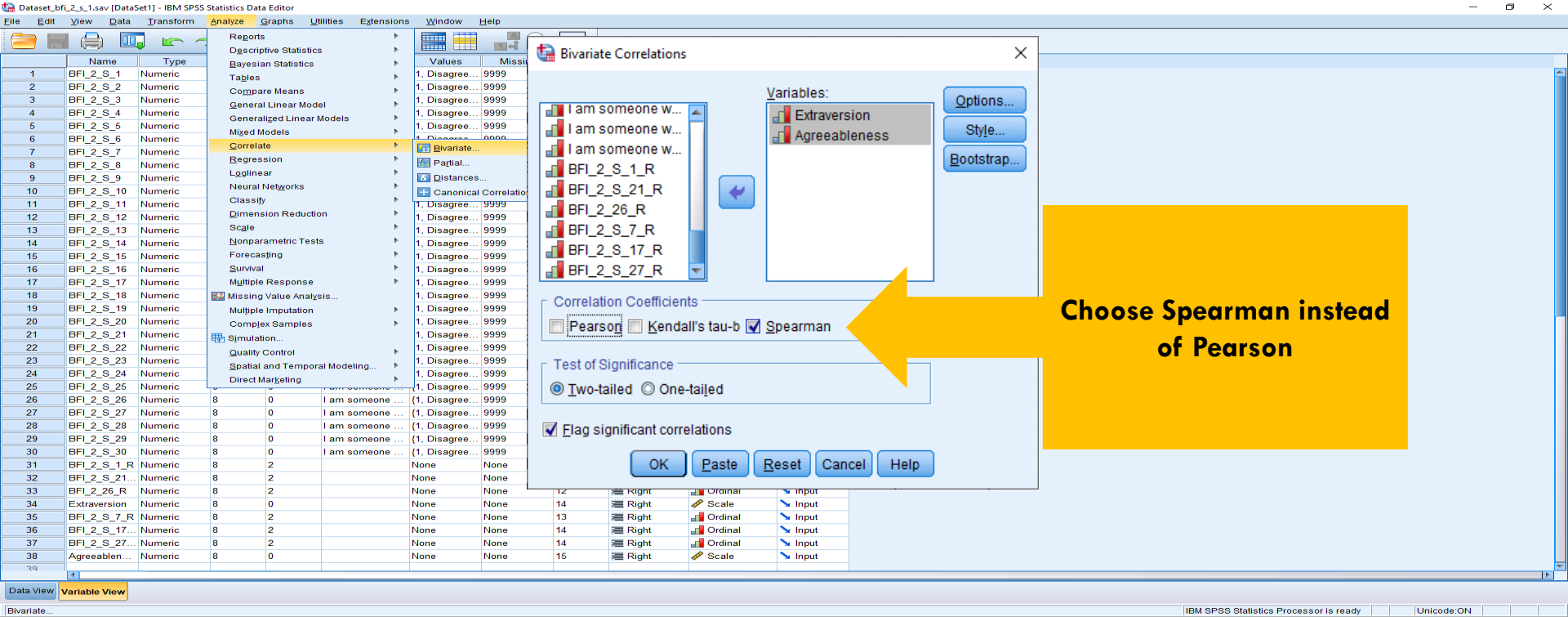

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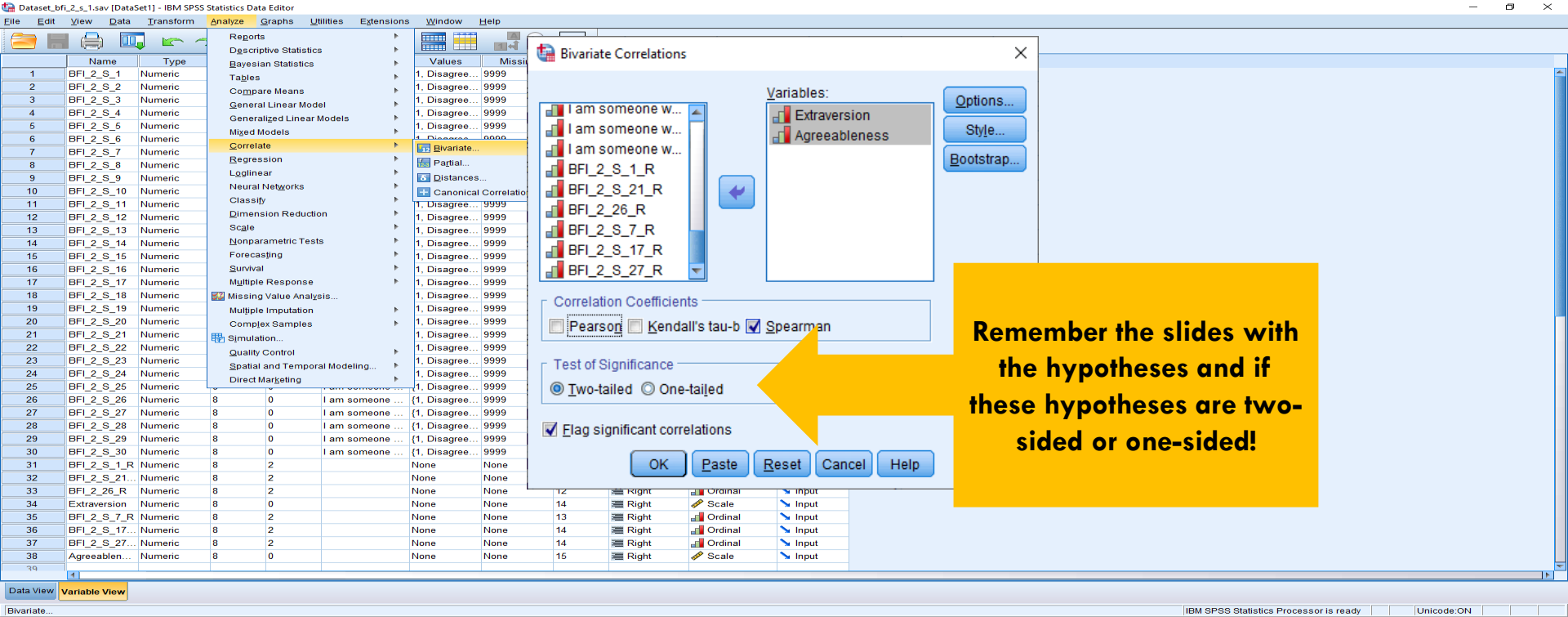

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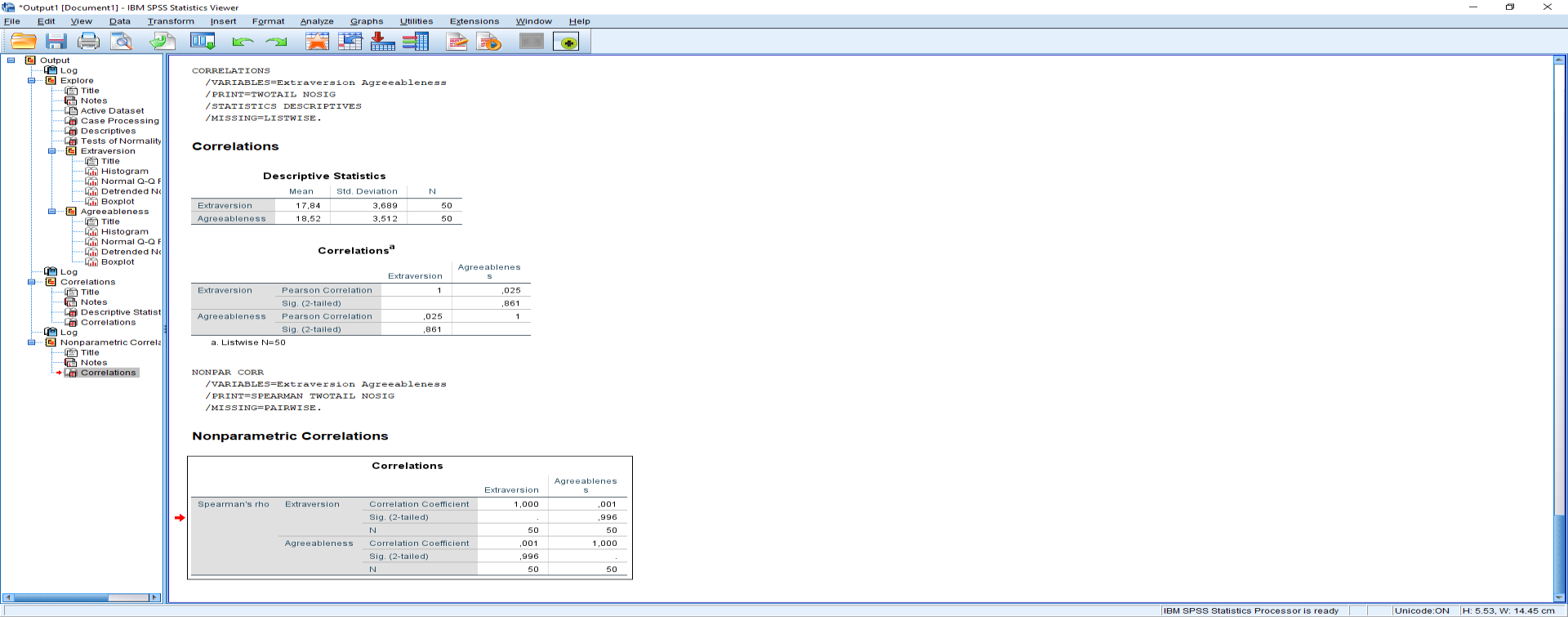

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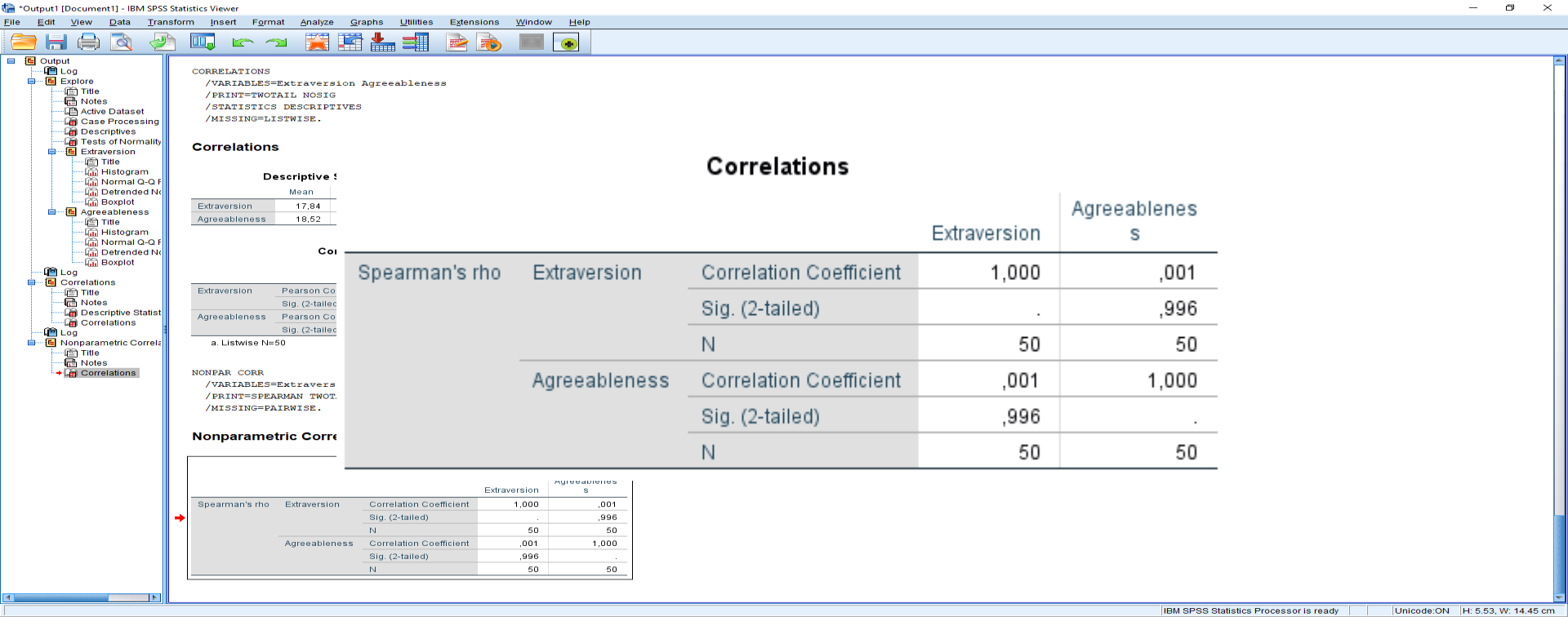

Correlations

			Extraversion	Agreeableness
Spearman's rho	Extraversion	Correlation Coefficient	1,000	,001
		Sig. (2-tailed)	.	,996
		N	50	50
	Agreeableness	Correlation Coefficient	,001	1,000
		Sig. (2-tailed)	,996	.
		N	50	50

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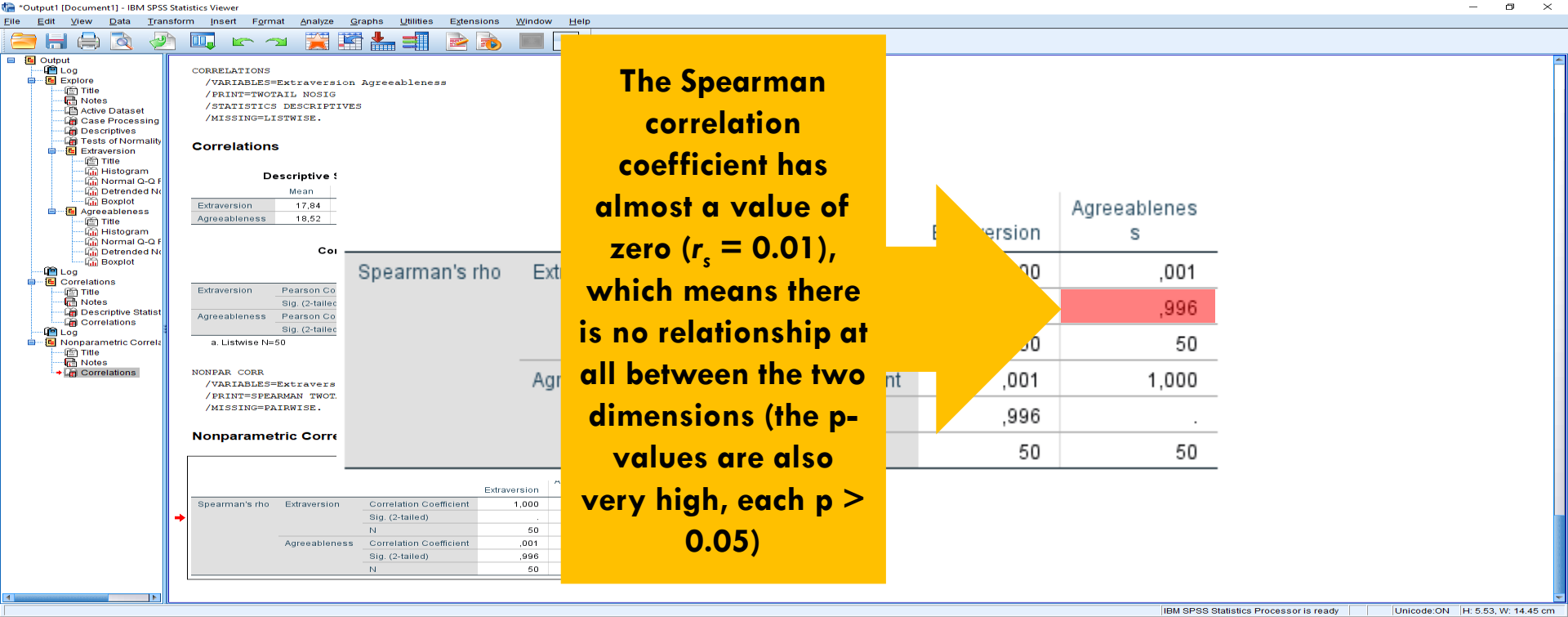

The Spearman correlation coefficient has almost a value of zero (r_s = 0.01), which means there is no relationship at all between the two dimensions (the p-values are also very high, each p > 0.05)

4. What is a correlational analysis and how do I conduct it?

How to report?

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- **Example:**

- Pearson (Path 1): Extraversion was not significantly related to the dimension Agreeableness ($r = 0.025$, $p = 0.861$).

- Spearman (Path 2): Extraversion was not significantly related to the dimension Agreeableness ($r_s = 0.001$, $p = 0.996$)

- If SPSS shows p = 0.000 report it as p < 0,001

Summary

Minimum requirement for result presentation marked yellow

Step 1: Prepare your data

Variable view: Check lables and scales

Data view:
Check if all scales scores are complete

Compute dimension scores and set their scales

Step 2: Describe your data

Variables with nominal scale: Frequency tables (remove cumulative percent)

Variables with ordinal scale: Freuqeuncy tables and/or median, min, max

Varialbes with interval scale: Mean, median, standard deviation *(variance, min, max)*

Step 3: Visualize your data

Variables with nominal scale: bar chart or pie chart

Variables with ordinal scale: bar chart

Variables with interval scale: histogram

Relationship between two variables: scatter plot

Step 4: Analyze your data

Decide for either Person or Spearman

Choose between one- and two-tailed

Report and interpret correlation coefficient (r) and p-value (sig.)

Attention – Multiple testing problem

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Bonferroni Correction

If you perform multiple statistical tests with the same set of variables or testing the same hypothesis, the probability of making an error when accepting the alternative hypothesis increases (the so-called alpha-error or type I error). This is also called the „type I error inflation“.
Therefore, you should correct your significance level (the alpha level that we set at $\alpha = 0.05$ by convention). Divide α by the number of tests you perform to receive your new significance level α‘.

E.g. if you perform 5 significance tests instead of one, divide alpha (0.05) by 5. Your new significance level is 0.01.

$\alpha = 0.05$; $\alpha' = \frac{0.05}{\#\ tests}$; in our example: $\alpha' = \frac{0.05}{5} = 0.01$

This is called the Bonferroni correction.
Each p-value of your significance test is now compared to 0.01 an only considered statistically significant if $p \leq \alpha'$.

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5. What happens next?

8. What happens next?

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Submissions, ZUB-Session and Lecture

- Today: Deadline for qualitative interview guideline submission; Once graded and feedback provided => conduct interviews!

- ZUB: Video about other research methods => Edunet; Please watch this video prior to our class on Thursday!

- Thursday: Role play about ethics in designing research
- Thursday: Deadline for quantitative survey submission (after self-check)

- … to be continued

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So long and thanks for all the fish.