Al-Mustaqbal University

College of Health and Medical Technologies

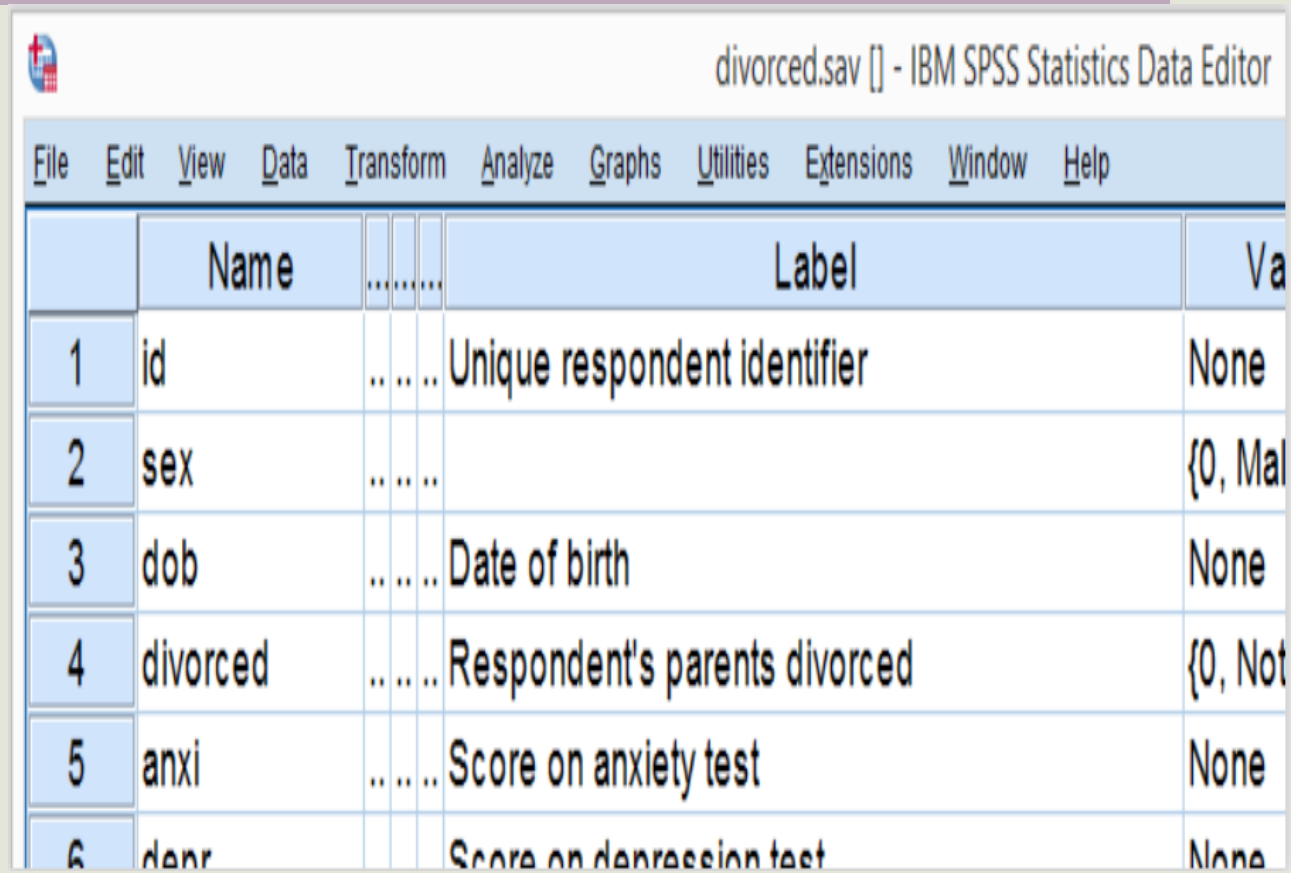
Lecturer Mohammed Qasim Al Azzawi

mohammed.qasim.obayes@uomus.edu.iq

Independent Samples T- Tests in SPSS

SPSS Independent T-Test Example

- A scientist wants to know if children from divorced parents score differently on some psychological tests than children from non divorced parents. The data collected are in divorced.sav, part of which is shown below.



	Name	Label	Va
1	id	Unique respondent identifier	None
2	sex		{0, Mal
3	dob	Date of birth	None
4	divorced	Respondent's parents divorced	{0, Not
5	anxi	Score on anxiety test	None
6	depr	Score on depression test	None

Independent Samples T-Test - Assumptions

- Conclusions from an independent samples t-test can be trusted if the following assumptions are met:
- **Independent observations**. This often holds if each case in SPSS represents a different person or other statistical unit. This seems to hold for our data.
- **Normality**: the dependent variable must follow a normal distribution in the population. This is only needed for samples smaller than some 25 units. We'll see the actual samples sizes used for our t-test after running it so we won't bother about normality until then.

Independent Samples T-Test - Assumptions

Homogeneity: the standard deviation of our dependent variable must be equal in both populations. We only need this assumption if our sample sizes are (sharply) unequal.

SPSS tests if this holds when we run our t-test. If it doesn't, we can still report corrected test results.

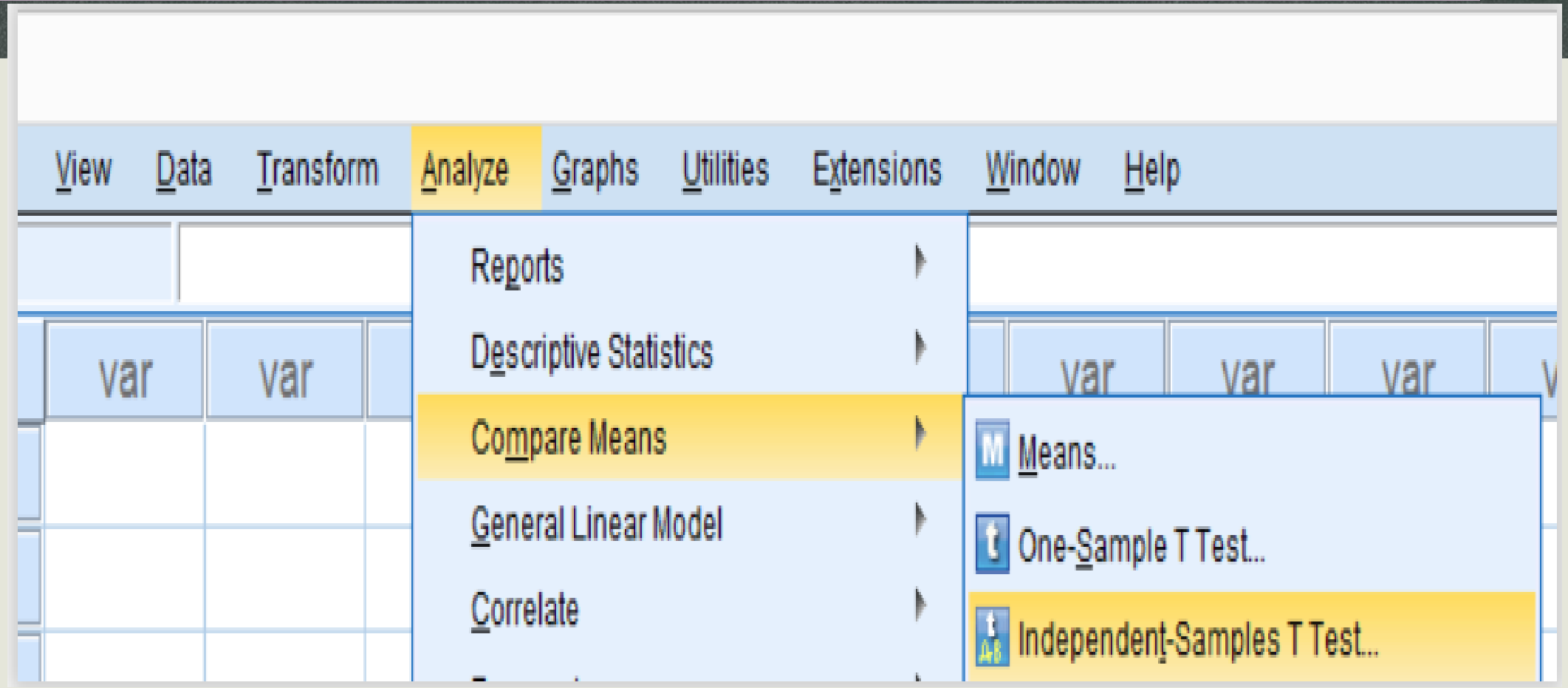
Quick Data Check

The data at hand have been prepared and are good to go.

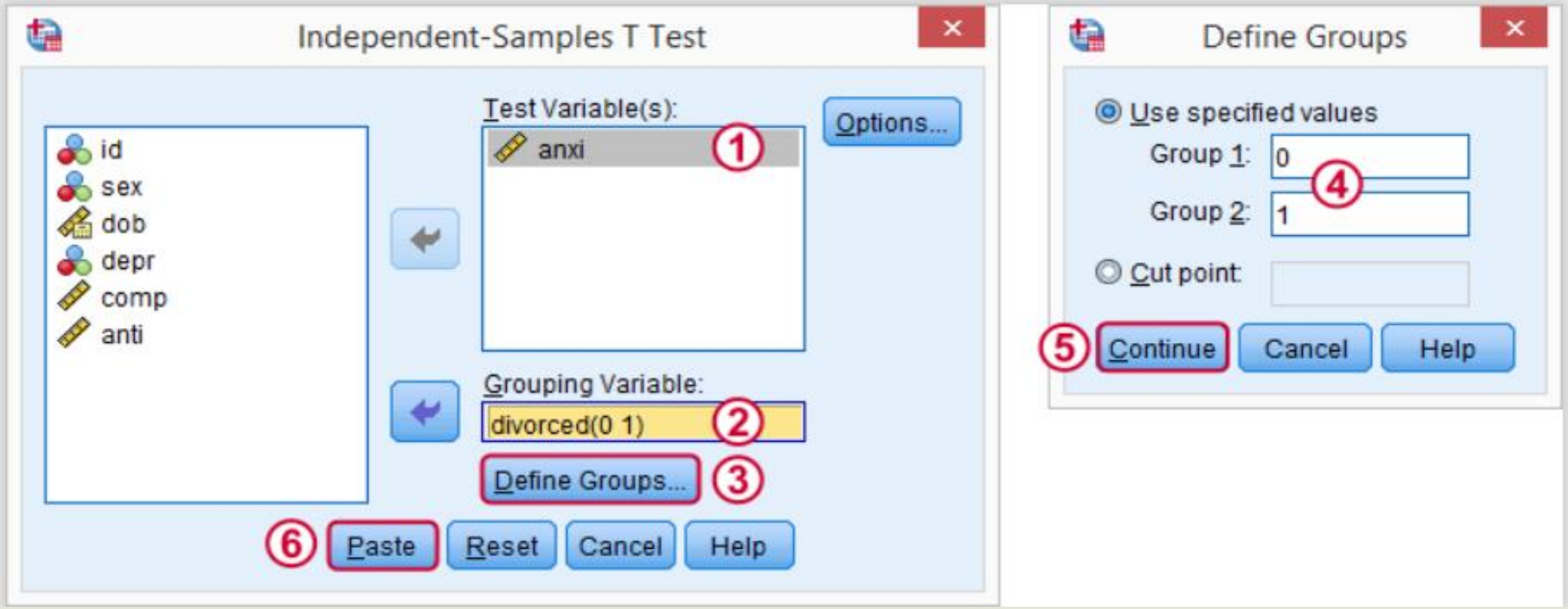
However, if you run a t-test on other data, you should at least inspect some histograms of your dependent variable(s).

Make sure their distributions look plausible. If they contain any extreme values, specify them as user missing values.

Quick Data Check



Quick Data Check



Quick Data Check

① We'll first-test anxi and make sure we understand the output. We'll get to the other 3 dependent variables later.

⑥ Clicking Paste creates the syntax below. Let's run it.

SPSS Independent Samples T-Test Syntax

```
*Independent-samples t-test syntax for anxi by divorced.

T-TEST GROUPS=divorced(0 1)
/MISSING=ANALYSIS
/VARIABLES=anxi
/CRITERIA=CI(.95).
```

SPSS Output for an Independent Samples T-Test

Group Statistics

	Respondent's parents divorced	N	Mean	Std. Deviation	Std. Error Mean
Score on anxiety test	Not divorced	49	21.49	2.623	.375
	Divorced	34	22.79	3.488	.598

Children from divorced parents have an average anxiety score of 22.8 whereas the other children score 21.5.

- note that the **sample sizes** used for our t-test are 49 and 34. Since both are larger than 25, we don't need to bother about the **normality** assumption.

Independent Samples T-Test Output

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	② Sig.	⑤ t	④ df	③ Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Score on anxiety test	Equal variances assumed	2.021	.159	-1.944	81	.055	-1.304	.671	-2.639	.031
①	Equal variances not assumed			-1.848	57.851	.070	-1.304	.706	-2.717	.109

"The mean anxiety scores did **not** differ, t(81) = -1.94, p = 0.055."

Independent Samples T-Test Output

Note that we have two lines of t-test results: **equal variances assumed** and **equal variances not assumed**. So which line should we report? Well, this depends on Levene's test for equal variances which tests the aforementioned homogeneity assumption.

- As a rule of thumb, if **Sig. > 0.05**, we conclude that the assumption of equal variances holds. Since **Sig. = 0.159** here, we report the first line of t-test results, denoted as **equal variances assumed**.

Independent Samples T-Test Output

- If **Sig. (2-tailed) > 0.05**, we usually conclude that our **population means are equal.**

- "Sig." is called a p-value (or just "p") in reports. P indicates how likely our *sample* result is if our *population* means are really equal. In our case, p = 0.055 (a 5.5% probability) and that's not unlikely enough for rejecting our null hypothesis.


THANK YOU!