Background: When you use multiple variables to measure the same concept and those variables are found to have a single factor in common and they are strongly associated with one another, then those measures can be averaged together to create single scale.

In this example, we are going to explore whether four variables measuring the amount of interpersonal political talk in four different media can be combined into a single measure of interpersonal political talk.

The variables measure the number of interpersonal political conversations a person has had:
- face-to-face (variable name: inpersontalk)
- over the phone (variable name: phonetalk)
- over new media (variable name: newmediatalk)
- over e-mail (variable name: emailtalk)

1) Conduct a factor analysis to see if the variables have a single factor in common

Click on the “Analyze” tab at the top of the page ⇒ Select “Dimension Reduction” from the list ⇒ Select “Factor”
Select the variables for the factor analysis

1) To select your variables, click on the variable name in the left hand column so it is highlighted and then click the top arrow in between the two columns to move the variable to the “Variables” column on the right.

2) Once you have moved all your variables over, click the “OK” button.

Analyze the results of the factor analysis

1) Look at the “Total Variance Explained” table to see how many factors tie your variables together. You can determine the number of factors by seeing how many numbers in the “Total” column of the “Initial Eigenvalues” column are over 1. In this example there is only one factor or component.

2) If you have more than one factor, you will need to determine on which factor each of your variables load. To do this look at each variable in the table and look across the components in the table to see what component has the highest positive or negative value for that variable. Only variables that score the highest on the same factor or component should be combined into the scale.
2) Conduct a reliability analysis to determine how the remaining items in the scale hang together

Click on the “Analyze” tab at the top of the page ⇒ Select “Scale” from the list ⇒ Select “Reliability Analysis”

Select your variables for the reliability analysis

1) To select your variables, click on the variable name in the left hand column so it is highlighted and then click the arrow in between the two columns to move the variable to the right column.

2) Click on the “Statistics” button on the upper right.

3) Once you have selected your variables and statistics, select the “OK” button.
Select your statistics for the reliability analysis

1) Select “Scale if Item Deleted”

2) Once you have selected your statistics, click “Continue” and then you can click “OK” on the variable list screen.

Examine the results

1) Look at the Cronbach’s Alpha in the “Reliability Statistics” table. Generally Alphas of .7 and above are considered acceptable.

2) It is also important to check to see if there are any items that would bring down the scale. Compare the Alpha from the first step to the Alphas in the “Cronbach’s Alpha if Item Deleted” column. If any of the Alphas in that column are substantially higher than the Alpha from the first step, you might want to not include those items in your scale.

Since our example has an Alpha of .83 and it does not improve if any of the items were deleted, we will include all four variables in the scale.
3) Create the scale from the remaining items

Click on the “Transform” tab at the top of the page ⇒ Select “Compute Variable” from the list

1) Give the scale a name. It is recommended that you start the name with “scale” so that it is recognizable.

2) Click on the “Type & Label button” and give the variable a label so that you will know what went into creating it.

3) Compute the variable by:
   a) Typing a left parenthesis into the “Numeric Expression” box
   b) Moving the variables to be included in the scale over to the “Numeric Expression” box by clicking on each one, then clicking the arrow.
   c) Typing a “+” after each variable except the last one
   d) Typing a right parenthesis into the “Numeric Expression” box
   e) Dividing the expression by the number of variables to be included in the scale

4) Click “OK”
Now the scale has been added to the dataset and it is a good idea to examine the raw data and the frequencies for the scale to make sure that none of the computation has been mishandled.

See the “Frequencies in SPSS (PASW)” handout for how to run frequencies.

4) Write up the results in APA style

When discussing the formation of a scale, Cronbach’s Alphas are usually reported and they are presented in text in parentheses and should be rounded to two decimal places.

Example: The four talk variables were combined to form a single scale that measured talk ($\alpha = .83$)