

Reverse-Coding Items and Calculating Scale Averages and Reliability in JASP

If you gave your participants several items from a scale to assess a specific construct (e.g., the Rosenberg Self-Esteem Scale, Beck Depression Inventory, or any other scale), you will need to calculate a scale composite (or total scale score). You may also need to reverse-code some items first so that for all items a high score denotes a high level of the construct you're measuring. Lastly, it is always a good idea to check your scale reliability and report it. Let's see how to do each of these in JASP:

Reverse-coding items

This data set contains the Rosenberg Self-Esteem Scale ("RSE"). It contains 10 items, 5 of which are reverse-scored. Item 3, for example says "All in all I am inclined to feel that I am a failure" - high agreement indicates *low* self-esteem, so we need to reverse it so that high agreement means *high* self-esteem. All items were measured on a scale from 0 (strongly disagree) to 3 (strongly agree). This means what is currently a 0 should be a 3, 1=2, 2=1, and 3=0. The easiest way to do that is to calculate "3-current score" (because 3-0=3, 3-1=2, etc.). If you had a 7-point scale, you would want to calculate "8-current score". If you had a scale from, say, -3 to 3, you would want to multiply each score by -1 so that a -3 would become a 3, and so on.

	RSE_1	RSE_2	RSE_3	RSE_4	RSE_5	RSE_6	RSE_7	RSE_8	RSE_9	RSE_10
1	3	3	0	3	0	2	2	1	0	0
2	3	3	0	3	0	3	3	3	0	0
3	3	2	1	3	1	2	2	2	2	1
4	2	2	0	2	1	2	2	1	0	0
5	2	2	1	2	2	2	1	1	1	0
6	3	2	0	3	0	2	2	1	1	0
7	3	3	0	3	0	2	2	1	1	1
8	3	2	0	2	0	2	2	2	1	0
9	3	3	2	3	0	3	2	2	1	0
10	3	3	0	3	0	3	3	0	0	0
11	3	3	2	3	2	2	1	2	3	3
12	3	3	1	2	0	2	1	2	1	1

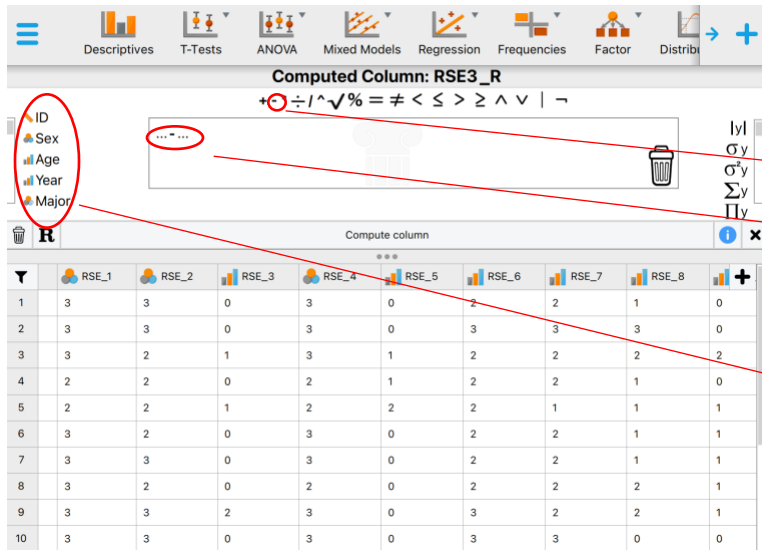
We need to reverse-score each of the 5 variables separately. To do so, we will want to create a new variable each time by clicking on the little black plus sign in the upper right hand corner.

	RSE_1	RSE_2	RSE_3	RSE_4	RSE_5	RSE_6	RSE_7	RSE_8	RSE_9	RSE_10
1	3	3	0	3	0	2	2	1	0	0
2	3	3	0	3	0	3	3	3	0	0
3	3	2	1	3	1	2	2	2	2	1
4	2	2	0	2	1	2	2	1	0	0
5	2	2	1	2	2	2	1	1	1	0
6	3	2	0	3	0	2	2	1	1	0
7	3	3	0	3	0	2	2	1	1	1
8	3	2	0	2	0	2	2	1	0	0
9	3	3	2	3	0	2	2	1	0	0
10	3	3	0	3	0	3	3	0	0	0
11	3	3	2	3	2	2	3	3	3	3
12	3	3	1	2	0	2	1	1	1	1
13	3	3	1	3	0	3	2	0	0	0
14	2	2	1	2	0	2	1	0	0	0
15	2	2	0	3	0	3	2	0	2	2

Doing so will open this window, asking you to give your new variable a name, and to identify it as scale, ordinal, nominal, or text.

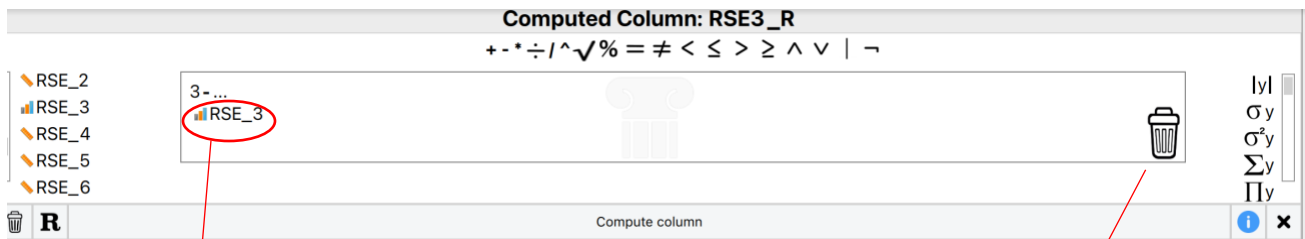
Here, I have named it "RSE_3R" to indicate I am creating the reverse of the original item

When you've done so, click on "create column"



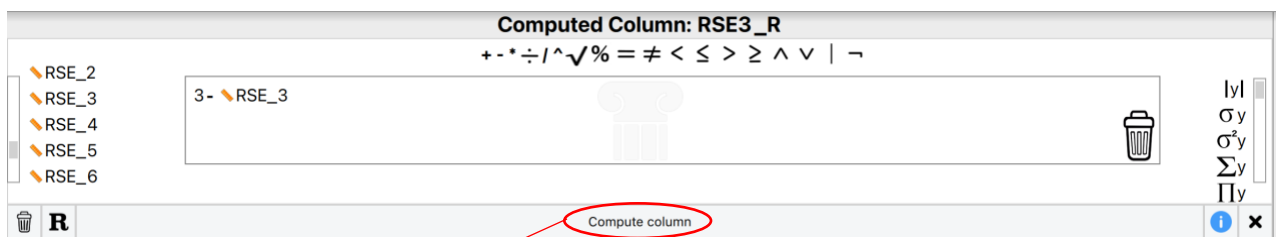
After you've created the new column, JASP wants to know how it should compute it. Because we want to calculate "3-current score", I chose the minus sign from the bar of operations, which then opens up two fields (marked by ...).

Once you click on those, you can enter a number, and/or click on a variable from the list on the left.

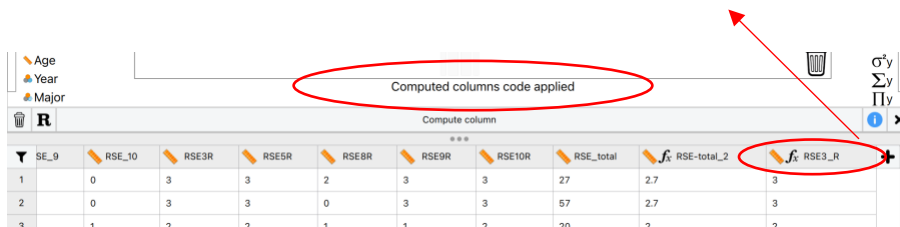


⚠ Note: mathematical operations are only possible with scale variables. If your variable is identified as ordinal or nominal, JASP will reject it by dropping it below the equation (here RSE_3 was still listed as ordinal, hence it got rejected)

To remove items from the window, highlight and drag them into the trash bin on the right

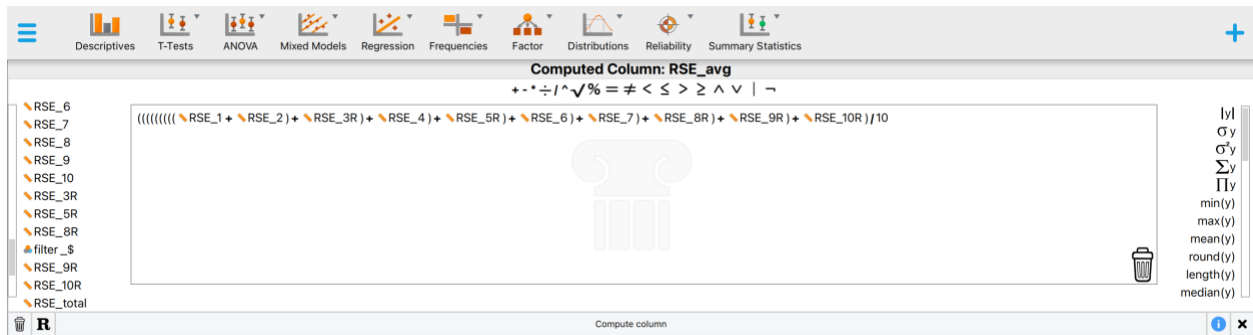


Once you click "compute column", JASP will tell you the code you entered was "applied" and the new variable will appear in a column at the very end of the data set



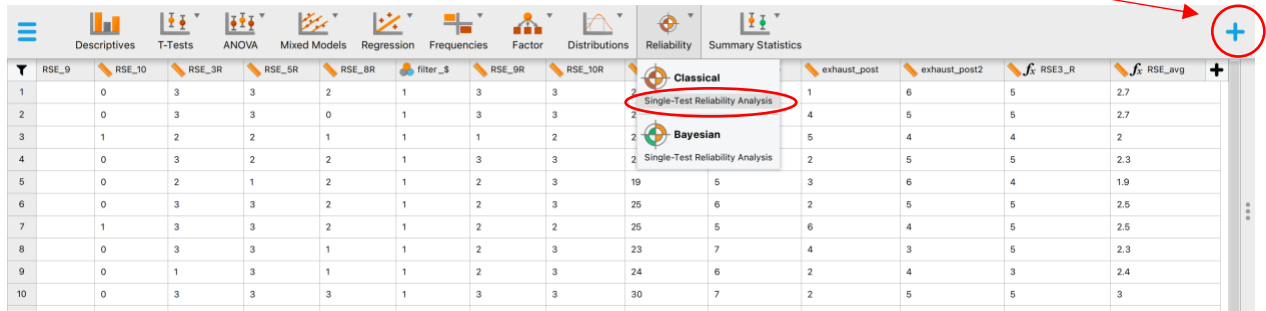
Calculating Scale Averages (or Sums)

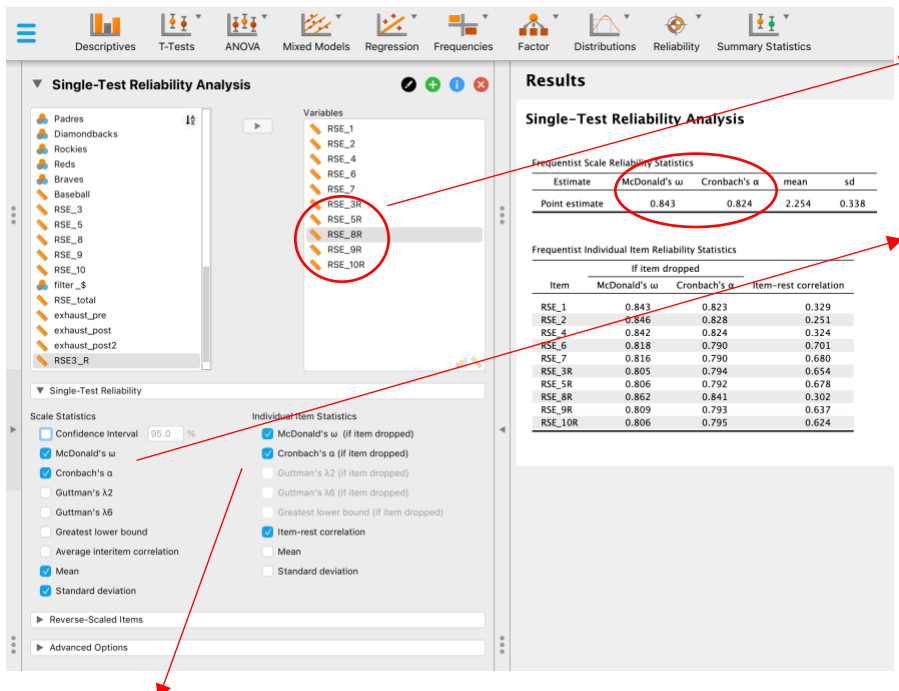
Calculating a scale composite (average or sum) essentially follows the steps above, with the exception of the code you will enter. So, click on the little + to the right of your data set, give your new variable a name (here: “RSE_avg”), click compute, and then add all relevant scale variables (include reverse coded ones where applicable) in the calculation window. If you are calculating averages, you’ll need to divide by the total number of items, as I’ve done in the example below. Notice that JASP starts adding a bunch of parentheses. This can’t be undone and doesn’t change your calculations, of course, it’s just confusing to look at. Once you’ve clicked “compute column”, the scale average will be added to the end of your data set.



Calculating Scale Reliability

This analysis can be found under “Reliability” in the main menu. If this option is not visible to you, you may need to add it by clicking on the blue + sign and selecting “Reliability” from the list. Then choose “single-test reliability analysis” under “classical.”



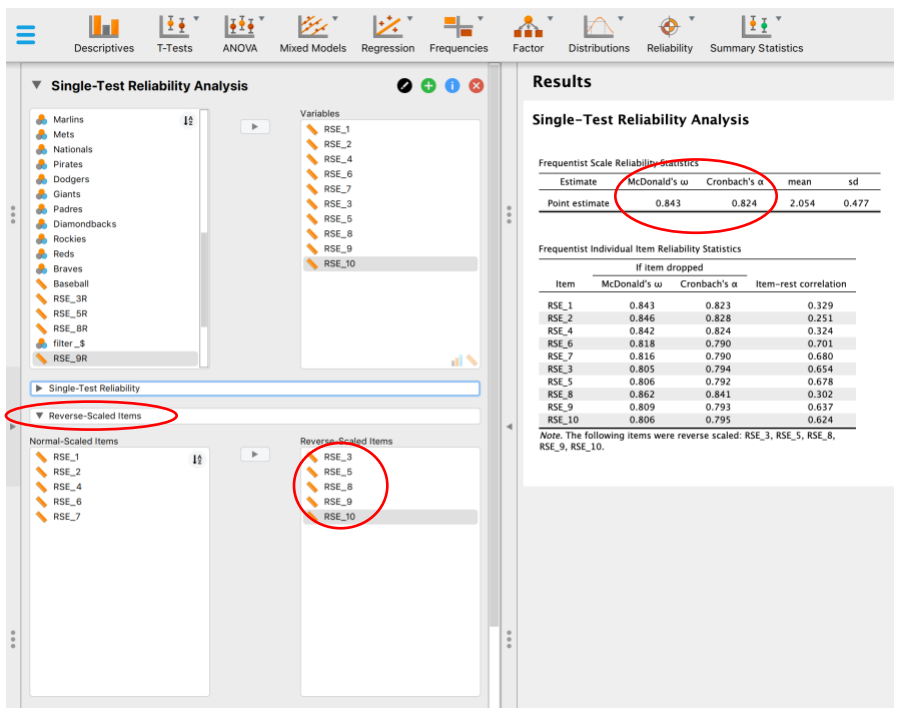


Drag all relevant items into the “Variables” window. Notice that I included the items we previously reverse-coded here.

Under “Single-test reliability”, select “Cronbach’s alpha”, scale M and SD, and (if you wish) individual item statistics as shown.

* Note that JASP defaults to calculating McDonald’s Omega, which many statisticians [now prefer to Cronbach’s Alpha](#) as an indicator of scale reliability. The interpretation is similar, though Omega tends to be slightly higher than Alpha, so some researchers suggest Omega should be > .80 (e.g. [Catalan, 2019](#))

Under “individual item Statistics” you have many options, most of which are important for scale development. “Alpha/Omega if item dropped” tells you how much the index of reliability will change if you drop this item. “Item-rest-correlation” is the correlation of the score on a specific question with the total scale score. Many researchers (e.g., Nunnally & Bernstein, 1994) consider values above .30 to be acceptable.



If (!) you have reverse-scaled items, there is another option to run these Statistics in JASP as shown here. Specifically, you can enter all original items in the “variables” window and then tell JASP under the “reverse-scaled items” options which ones should be reverse-scaled before conducting reliability analyses. As you can see, the results (with the exception of scale M and SD, as would be expected) are identical, so you can choose which way you want to run these analyses.