

## Creating Standardized Scores Using SPSS Syntax

In this document I explain how to obtain standardized scores using SPSS syntax.

The data for this example come from the study described in the article “Self-efficacy beliefs in college statistics courses<sup>1</sup>.” In this study, the authors collected data on Statistics Self-Efficacy, among other things. The variable used for this example is the Value subscale from the Survey of Attitudes toward Statistics. This subscale assesses the degree to which respondents think statistics is valuable. The data are in the SPSS dataset “SATS Value.sav.” There are no missing values.

### Creating z- and T - Scores

#### Z-scores

Recall that computation of most standardized scores, such as T- scores and scores on the SAT or IQ metrics, starts out by converting the raw scores into z-scores.

So, the first step in creating such standardized scores is to create z-scores. These can be obtained using the syntax below.

```
DESCRIPTIVES VARIABLES=value  
/SAVE  
/STATISTICS=MEAN STDDEV MIN MAX.
```

The subcommand **SAVE** causes z-scores for the variables “value” to be saved in the active dataset. By default, these will be names as “Z” plus the original name of the variable.

#### T-scores

The z-scores can be used to create T-scores or standardized scores in other metrics.

Recall that T-scores have a mean of 50 and a standard deviation of 10. So, to create T-scores, each z-score must be multiplied by 10, and 50 must be added to each product ( $T = (z * 10) + 50$ ).

This can be done using the commands below, which will create a variable named “Tvalue” from the z-score for the variable “value” (Zvalue) that was created previously.

```
COMPUTE Tvalue=Zvalue*10+50.  
EXECUTE.
```

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<sup>1</sup> Finney, S.J., & Schraw (2003). *Contemporary Educational Psychology*, 28, 161–186

## Creating Stanine Scores

Recall that stanines are scores that range from 1 to 9. The percentages of scores within stanines 1- 9 are: 4, 7, 12, 17, 20, 17, 12, 7, 4. This means that stanines of 1 - 9 correspond to the raw scores that have the cumulative percentages of 4, 11, 23, 40, 60, 77, 89, 96. To find the scores that correspond to these cumulative percentages, use the syntax below to obtain a frequency distribution table.

**FREQUENCIES VARIABLES=** value.

You will get the frequency distribution table below. With a small number of respondents such as in this example, there will not be an exact match for each of the cumulative percentages needed (4, 11, 23, 40, 60, 77, 89, 96). I have indicated the closest matches with red arrows in the table.

		value				
		Frequency	Percent	Valid Percent	Cumulative Percent	
Valid	15.00	1	1.0	1.0	1.0	
	21.00	1	1.0	1.0	1.9	
	23.00	1	1.0	1.0	2.9	
	28.00	2	1.9	1.9	4.9	←
	33.00	6	5.8	5.8	10.7	←
	35.00	2	1.9	1.9	12.6	
	36.00	4	3.9	3.9	16.5	
	37.00	3	2.9	2.9	19.4	
	38.00	2	1.9	1.9	21.4	←
	39.00	5	4.9	4.9	26.2	
	40.00	4	3.9	3.9	30.1	
	41.00	5	4.9	4.9	35.0	
	42.00	8	7.8	7.8	42.7	←
	43.00	6	5.8	5.8	48.5	
	44.00	4	3.9	3.9	52.4	
	45.00	9	8.7	8.7	61.2	←
	46.00	6	5.8	5.8	67.0	
	47.00	2	1.9	1.9	68.9	
	48.00	4	3.9	3.9	72.8	
	49.00	3	2.9	2.9	75.7	←
	50.00	5	4.9	4.9	80.6	
	51.00	2	1.9	1.9	82.5	
	52.00	5	4.9	4.9	87.4	←
	53.00	4	3.9	3.9	91.3	
	54.00	2	1.9	1.9	93.2	
	55.00	2	1.9	1.9	95.1	
	59.00	1	1.0	1.0	96.1	←
	60.00	1	1.0	1.0	97.1	
	61.00	3	2.9	2.9	100.0	

The scores that most closely match the cumulative percentages of 4, 11, 23, 40, 60, 77, 89, 96 are 28, 33, 38, 42, 45, 49, 52, and 59.

The stanines are therefore:

- Lowest score through 28 = 1
- 29 - 33 = 2
- 34 - 38 = 3
- 39 - 42 = 4
- 43 - 45 = 5
- 46 - 49 = 6
- 50 - 52 = 7
- 53 - 59 = 8
- 60 through highest score = 9

To obtain these stanines, use the syntax below.

```
RECODE value (Lowest thru 28=1) (29 thru 33=2) (34 thru 38=3) (39 thru 42=4)  
(43 thru 45=5) (46 thru 49=6) (50 thru 52=7) (53 thru 59=8) (60 thru HIGHEST=9)  
INTO Vstanine.
```

```
EXECUTE.
```

These commands will create a new variable (Vstanine) with values of 1 – 9 that correspond to the specified score ranges for “value.”

### Obtaining Percentile Points

Percentile points that correspond to any percentile rank can be obtained using the **FREQUENCIES** command. The commands below specify the percentile points corresponding to the ten deciles (percentile ranks of 10, 20, 30, etc.).

```
FREQUENCIES VARIABLES=value  
/FORMAT=NOTABLE  
/PERCENTILES=10.0 20.0 30.0 40.0 50.0 60.0 70.0 80.0 90.0.
```

The subcommand **FORMAT=NOTABLE** suppresses printing of the frequency distribution table. The default is to print tables for all variables listed.

This syntax will provide the table below.

**Statistics**

value

N	Valid	103
	Missing	0
Percentiles	10	33.0000
	20	37.8000
	30	40.2000
	40	42.0000
	50	44.0000
	60	45.0000
	70	48.0000
	80	50.2000
	90	53.0000