Dominance and VDA-like (es_dominance)

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Introduction

The *es_dominance* function calculates a dominance score and a Vargha-Delaney A like effect size measure.

This document contains the details on how to use the functions, and formulas used in them.

1 About the Function

1.1 Input parameters:

- **data**
  - Excel: a specific range with the numeric scores
  - Python: a pandas series with the numeric scores
  - R: a vector with the numeric scores
- *Optional parameters*
  - **hypMed**
    the hypothesized median. If not specified the midrange will be used.
  - **out** (default is "value") – only applies to non-array VBA function
    Choice what to show as result. Either:
    - "dom" (default): the dominance score
    - "vda" : a Vargha-Delaney A like measure

1.2 Output

- **hypMed**
  The hypothesized median used
- **dominance**
  The dominance score
- **VDA**
  The Vargha-Delaney A like measure

Note for *Excel:*

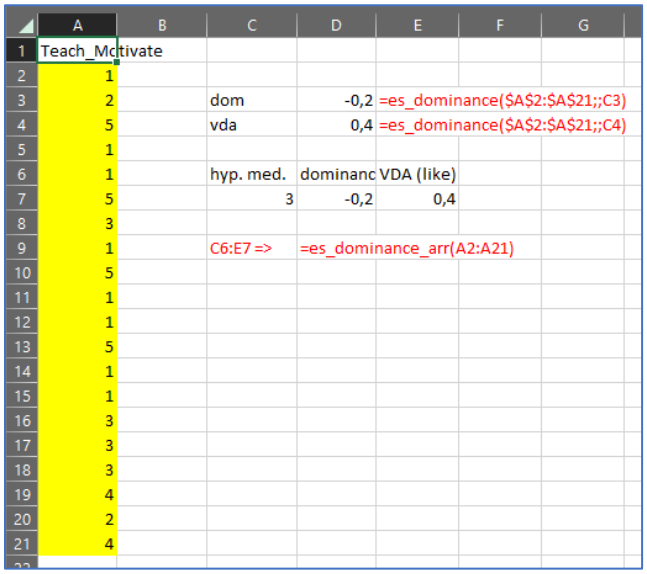
the array function *es_dominance_arr* will require 2 rows and 3 columns.

1.3 Dependencies

- **Excel**
  - None, but you can run the **es_dominance_addHelp** macro so that the function will be available with some help in the 'User Defined' category in the functions overview.
- **Python**
  The following libraries are needed:
  - pandas is needed for data entry and showing the results
- **R**
  None

2 Examples

2.1 Excel



	A	B	C	D	E	F	G
1	Teach_Motivate						
2	1						
3	2		dom	-0,2	=es_dominance($A$2:$A$21;;C3)		
4	5		vda	0,4	=es_dominance($A$2:$A$21;;C4)		
5	1						
6	1		hyp. med.	dominanc	VDA (like)		
7	5		3	-0,2	0,4		
8	3						
9	1		C6:E7 =>	=es_dominance_arr(A2:A21)			
10	5						
11	1						
12	1						
13	5						
14	1						
15	1						
16	3						
17	3						
18	3						
19	4						
20	2						
21	4						

2.2 Python

```
from eff_size_dominance import es_dominance
import pandas as pd

dataList = [1, 2, 5, 1, 1, 5, 3, 1, 5, 1, 1, 5, 1, 1, 3, 3, 3, 4, 2, 4]
data = pd.Series(dataList)

es_dominance(data)
```

	hypMed	dominance	VDA
0	3.0	-0.2	0.4

```
es_dominance(data, hypMed = 2)
```

	hypMed	dominance	VDA
0	2	0.1	0.55

2.3 R

```
> source("eff_size_dominance.R")
>
> data <- c(1, 2, 5, 1, 1, 5, 3, 1, 5, 1, 1, 5, 1, 1, 3, 3, 3, 4, 2, 4)
> es_dominance(data)
  hypMed dominance VDA
1      3      -0.2 0.4
> es_dominance(data, hypMed=2)
  hypMed dominance  VDA
1      2       0.1 0.55
```

3 Details of Calculations

$$Dominance = p_+ - p_-$$

$$VDA_{like} = \frac{Dominance + 1}{2}$$

Symbols

- p_+ is the proportion of cases above the hypothesized median
- p_- is the proportion of cases below the hypothesized median

Note

The VDA is short for 'Vargha Delaney A', but this measure is actually different and uses the Wilcoxon test statistic.

4 Sources

Effect size statistics

One way to assess the effect size after a one-sample sign test is to use a dominance statistic. This statistic simply looks at the proportion of observations greater than the default median value minus the proportion of observations less than the default median value. A value of 1 would indicate that all

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observations are greater than the default median, and a value of –1 would indicate that all observations are less than the default median. A value of 0 indicates that the number of observations greater than the default median are equal to the number that are less than the default median.

A VDA-like statistic can be calculated as *Dominance / 2 + 0.5*. This statistic varies from 0 to 1, with 0.5 being equivalent to a dominance value of 0.

Note that neither of these statistics take into account values tied to the default median value.

(Mangiafico, 2016, pp. 223–224)

References

Mangiafico, S. S. (2016). *Summary and analysis of extension program evaluation in R* (1.20.01). Rutger Cooperative Extension.