Ninja Warrior - Part 1

Approximately many times would you say the 'Salmon Ladder' was used?

Whole Population

	Control	Truncated	Logarithmic
N	70.0000000	70.0000000	6.700000e+01
Min.	40.0000000	40.0000000	9.000000e+00
1st Qu.	41.0000000	41.0000000	3.000000e+01
Median	41.0000000	41.0000000	3.500000e+01
Mean	41.2071429	41.3535714	1.492539e+13
3rd Qu.	42.0000000	42.0000000	4.050000e+01
Max.	45.0000000	45.0000000	1.000000e+15
Var	0.7427019	0.7527045	1.492537e+28

Control - Language comparison

	Whole Pop	R	Python
N	70.0000000	38.0000000	32.0000000
Min.	40.0000000	40.0000000	40.0000000
1st Qu.	41.0000000	41.0000000	40.0000000
Median	41.0000000	41.0000000	41.0000000
Mean	41.2071429	41.4868421	40.8750000
3rd Qu.	42.0000000	42.0000000	41.0000000
Max.	45.0000000	43.0000000	45.0000000
Var	0.7427019	0.4119844	0.9516129

Truncated - Language comparison

	Whole Pop	R	Python
N	70.0000000	38.0000000	32.0000000
Min.	40.0000000	40.0000000	40.0000000
1st Qu.	41.0000000	41.0000000	41.0000000
Median	41.0000000	41.0000000	41.0000000
Mean	41.3535714	41.5657895	41.1015625

```
3rd Qu. 42.0000000 42.0000000 41.2500000
Max.    45.0000000 45.0000000 44.0000000
Var      0.7527045  0.7590683  0.6486265
```

Logarithmic - Language comparison

```
           Whole Pop         R       Python
N       6.700000e+01  38.00000 2.900000e+01
Min.    9.000000e+00  30.00000 9.000000e+00
1st Qu. 3.000000e+01  35.00000 1.200000e+01
Median  3.500000e+01  35.00000 1.500000e+01
Mean    1.492539e+13  39.73684 3.448279e+13
3rd Qu. 4.050000e+01  40.00000 5.000000e+01
Max.    1.000000e+15 120.00000 1.000000e+15
Var     1.492537e+28 206.95590 3.448276e+28
```

Control - Degree comparison

```
              STEM Humanities Social Sci  Arts   Business NA
N       29.0000000   3.000000 30.0000000  2.00  4.0000000  1
Min.    40.0000000  40.000000 40.0000000 41.00 40.0000000 41
1st Qu. 41.0000000  40.500000 41.0000000 41.25 40.7500000 41
Median  41.0000000  41.000000 41.0000000 41.50 41.5000000 41
Mean    41.1379310  41.333333 41.2333333 41.50 41.2500000 41
3rd Qu. 42.0000000  42.000000 41.0000000 41.75 42.0000000 41
Max.    42.0000000  43.000000 45.0000000 42.00 42.0000000 41
Var      0.5517241   2.333333  0.9436782  0.50  0.9166667 NA
```

Truncated - Degree comparison

```
              STEM Humanities Social Sci Arts   Business NA
N       29.0000000       3.00  31.000000    2  4.0000000  1
Min.    40.0000000      42.00  40.000000   42 40.0000000 41
1st Qu. 41.0000000      42.25  41.000000   42 40.7500000 41
Median  41.0000000      42.50  41.000000   42 41.5000000 41
Mean    41.0775862      42.50  41.483871   42 41.2500000 41
3rd Qu. 41.0000000      42.75  42.000000   42 42.0000000 41
Max.    42.0000000      43.00  45.000000   42 42.0000000 41
Var      0.2638547       0.25   1.120565    0  0.9166667 NA
```

Logarithmic - Degree comparison

```
             STEM Humanities   Social Sci  Arts Business  NA
N        28.00000    3.00000 3.000000e+01  2.00   4.0000   1
Min.     10.00000    9.00000 1.000000e+01 33.00  10.0000  NA
```

```
1st Qu.  26.25000   21.50000 3.400000e+01 34.75  10.3750  NA
Median   35.00000   34.00000 3.850000e+01 36.50  10.7500  NA
Mean     34.46429   26.33333 3.333337e+13 36.50  16.6250 NaN
3rd Qu.  40.00000   35.00000 5.375000e+01 38.25  17.0000  NA
Max.    120.00000   36.00000 1.000000e+15 40.00  35.0000  NA
NA's     10.00000    9.00000 1.000000e+01 33.00  10.0000   1
Var     422.10979  226.33333 3.333333e+28 24.50 150.2292  NA
```

Num skills - log

	uni	sp_aware	obs_skl	num_skl	log_1	log_2	log_3	log_4
101	Technology	4	4	3	Don't know	4	2	0.5
121	None	4	3	3	Next to none.	1	1	5
102	Social Sciences	5	5	4	10^15	5	3	0.85
84	psychology	3	5	1	10^9	3	2	0.9

Shapiro Tests - Whole

```
    Shapiro-Wilk normality test

data:  control_1
W = 0.81359, p-value = 5.596e-08
```

```
    Shapiro-Wilk normality test

data:  truncated_1
W = 0.82679, p-value = 1.327e-07
```

```
    Shapiro-Wilk normality test

data:  logarithmic_1
W = 0.10138, p-value < 2.2e-16
```

Symmetry Tests - Whole

```
    m-out-of-n bootstrap symmetry test by Miao, Gel, and Gastwirth (2006)

data:  control_1
Test statistic = 3.3278, p-value = 0.048
alternative hypothesis: the distribution is asymmetric.
sample estimates:
```

```
bootstrap optimal m
                 39


    m-out-of-n bootstrap symmetry test by Miao, Gel, and Gastwirth (2006)

data:  truncated_1
Test statistic = 5.5016, p-value = 0.008
alternative hypothesis: the distribution is asymmetric.
sample estimates:
bootstrap optimal m
                 55


    m-out-of-n bootstrap symmetry test by Miao, Gel, and Gastwirth (2006)

data:  logarithmic_1
Test statistic = 8.6444, p-value < 2.2e-16
alternative hypothesis: the distribution is asymmetric.
sample estimates:
bootstrap optimal m
                 18
```

Shapiro Tests - Language comp

```
    Shapiro-Wilk normality test

data:  control_1_r
W = 0.80497, p-value = 1.322e-05


    Shapiro-Wilk normality test

data:  truncated_1_r
W = 0.77542, p-value = 3.428e-06


    Shapiro-Wilk normality test

data:  logarithmic_1_r
W = 0.43931, p-value = 6.923e-11


    Shapiro-Wilk normality test
```

```
data:  control_1_py
W = 0.67942, p-value = 4.341e-07


    Shapiro-Wilk normality test

data:  truncated_1_py
W = 0.82735, p-value = 0.0001392


    Shapiro-Wilk normality test

data:  logarithmic_1_py
W = 0.18384, p-value = 1.315e-11
```

symmetry Tests - Language comp

```
    m-out-of-n bootstrap symmetry test by Miao, Gel, and Gastwirth (2006)

data:  control_1_r
Test statistic = 5.875, p-value < 2.2e-16
alternative hypothesis: the distribution is asymmetric.
sample estimates:
bootstrap optimal m
                 17


    m-out-of-n bootstrap symmetry test by Miao, Gel, and Gastwirth (2006)

data:  truncated_1_r
Test statistic = 5.713, p-value < 2.2e-16
alternative hypothesis: the distribution is asymmetric.
sample estimates:
bootstrap optimal m
                 21


    m-out-of-n bootstrap symmetry test by Miao, Gel, and Gastwirth (2006)

data:  logarithmic_1_r
Test statistic = 5.3265, p-value < 2.2e-16
alternative hypothesis: the distribution is asymmetric.
sample estimates:
bootstrap optimal m
```

```
                17


    m-out-of-n bootstrap symmetry test by Miao, Gel, and Gastwirth (2006)

data:  control_1_py
Test statistic = -1.3276, p-value = 0.334
alternative hypothesis: the distribution is asymmetric.
sample estimates:
bootstrap optimal m
                16


    m-out-of-n bootstrap symmetry test by Miao, Gel, and Gastwirth (2006)

data:  truncated_1_py
Test statistic = 1.2732, p-value = 0.376
alternative hypothesis: the distribution is asymmetric.
sample estimates:
bootstrap optimal m
                28


    m-out-of-n bootstrap symmetry test by Miao, Gel, and Gastwirth (2006)

data:  logarithmic_1_py
Test statistic = 5.6872, p-value < 2.2e-16
alternative hypothesis: the distribution is asymmetric.
sample estimates:
bootstrap optimal m
                18
```

Sign tests - Whole pop

```
    One-sample Sign-Test

data:  control_1
s = 22, p-value = 0.1214
alternative hypothesis: true median is not equal to 41
95 percent confidence interval:
 41 41
sample estimates:
median of x
         41
```

```
Achieved and Interpolated Confidence Intervals:

                  Conf.Level L.E.pt U.E.pt
Lower Achieved CI     0.9278     41     41
Interpolated CI       0.9500     41     41
Upper Achieved CI     0.9586     41     41


    One-sample Sign-Test

data:  truncated_1
s = 28, p-value = 0.002563
alternative hypothesis: true median is not equal to 41
95 percent confidence interval:
 41.00 41.25
sample estimates:
median of x
         41

Achieved and Interpolated Confidence Intervals:

                  Conf.Level L.E.pt U.E.pt
Lower Achieved CI     0.9278     41  41.25
Interpolated CI       0.9500     41  41.25
Upper Achieved CI     0.9586     41  41.25


    One-sample Sign-Test

data:  logarithmic_1
s = 15, p-value = 1.572e-05
alternative hypothesis: true median is not equal to 41
95 percent confidence interval:
 34.00546 40.00000
sample estimates:
median of x
         35

Achieved and Interpolated Confidence Intervals:

                  Conf.Level  L.E.pt U.E.pt
Lower Achieved CI     0.9136 35.0000     40
Interpolated CI       0.9500 34.0055     40
Upper Achieved CI     0.9502 34.0000     40
```

```
    Dependent-samples Sign-Test

data:  control_1 and truncated_1
S = 14, p-value = 0.1877
alternative hypothesis: true median difference is not equal to 0
95 percent confidence interval:
 0 0
sample estimates:
median of x-y
           0

Achieved and Interpolated Confidence Intervals:

                  Conf.Level L.E.pt U.E.pt
Lower Achieved CI     0.9278      0      0
Interpolated CI       0.9500      0      0
Upper Achieved CI     0.9586      0      0
```

Sign tests - Lang comp

```
    One-sample Sign-Test

data:  control_1_r
s = 18, p-value = 7.629e-05
alternative hypothesis: true median is not equal to 41
95 percent confidence interval:
 41 42
sample estimates:
median of x
         41

Achieved and Interpolated Confidence Intervals:

                  Conf.Level L.E.pt U.E.pt
Lower Achieved CI     0.9270     41     42
Interpolated CI       0.9500     41     42
Upper Achieved CI     0.9664     41     42


    One-sample Sign-Test

data:  truncated_1_r
s = 18, p-value = 0.0004025
```

```
alternative hypothesis: true median is not equal to 41
95 percent confidence interval:
 41 42
sample estimates:
median of x
         41

Achieved and Interpolated Confidence Intervals:

                  Conf.Level L.E.pt U.E.pt
Lower Achieved CI     0.9270     41     42
Interpolated CI       0.9500     41     42
Upper Achieved CI     0.9664     41     42


    One-sample Sign-Test

data:  logarithmic_1_r
s = 5, p-value = 1.291e-05
alternative hypothesis: true median is not equal to 41
95 percent confidence interval:
 35 40
sample estimates:
median of x
         35

Achieved and Interpolated Confidence Intervals:

                  Conf.Level L.E.pt U.E.pt
Lower Achieved CI     0.9270     35     40
Interpolated CI       0.9500     35     40
Upper Achieved CI     0.9664     35     40


    One-sample Sign-Test

data:  control_1_py
s = 4, p-value = 0.1185
alternative hypothesis: true median is not equal to 41
95 percent confidence interval:
 40 41
sample estimates:
median of x
         41
```

```
Achieved and Interpolated Confidence Intervals:

                  Conf.Level L.E.pt U.E.pt
Lower Achieved CI     0.9499     40     41
Interpolated CI       0.9500     40     41
Upper Achieved CI     0.9799     40     41
```

Wilcox tests - Py

```
    Wilcoxon signed rank test with continuity correction

data:  truncated_1_py
V = 84.5, p-value = 0.7188
alternative hypothesis: true location is not equal to 41


    Wilcoxon signed rank test with continuity correction

data:  logarithmic_1_py
V = 194, p-value = 0.6187
alternative hypothesis: true location is not equal to 41
```

First Plot Comp

```
          Control Truncated  Logarithmic
N       25.000000 23.000000 2.200000e+01
Min.    40.000000 40.000000 9.000000e+00
1st Qu. 41.000000 41.000000 3.075000e+01
Median  41.000000 41.250000 3.750000e+01
Mean    41.160000 41.695652 4.545455e+14
3rd Qu. 41.000000 42.000000 4.375000e+01
Max.    45.000000 45.000000 1.000000e+16
Var      1.056667  1.192935 4.545455e+30
```

Approximately how much more than 'Log Grip' would you say 'Salmon Ladder' was was used?

Whole pop summary

```
          Control Truncated Logarithmic
N       70.000000 70.000000   70.000000
Min.     3.000000  1.000000    1.000000
1st Qu.  4.250000  5.000000    2.250000
```

```
Median   5.000000  6.000000    3.500000
Mean     5.357143  5.871429    3.671429
3rd Qu.  6.000000  7.000000    5.000000
Max.     7.000000  7.000000    7.000000
Var      1.334369  1.997723    2.745549
```

Shapiro tests

```
    Shapiro-Wilk normality test

data:  control_2
W = 0.90456, p-value = 5.895e-05


    Shapiro-Wilk normality test

data:  truncated_2
W = 0.76579, p-value = 3.263e-09


    Shapiro-Wilk normality test

data:  logarithmic_2
W = 0.93942, p-value = 0.002105
```

Symmetry tests

```
    m-out-of-n bootstrap symmetry test by Miao, Gel, and Gastwirth (2006)

data:  control_2
Test statistic = 3.297, p-value < 2.2e-16
alternative hypothesis: the distribution is asymmetric.
sample estimates:
bootstrap optimal m
                 11


    m-out-of-n bootstrap symmetry test by Miao, Gel, and Gastwirth (2006)

data:  truncated_2
Test statistic = -1.1525, p-value = 0.298
alternative hypothesis: the distribution is asymmetric.
sample estimates:
```

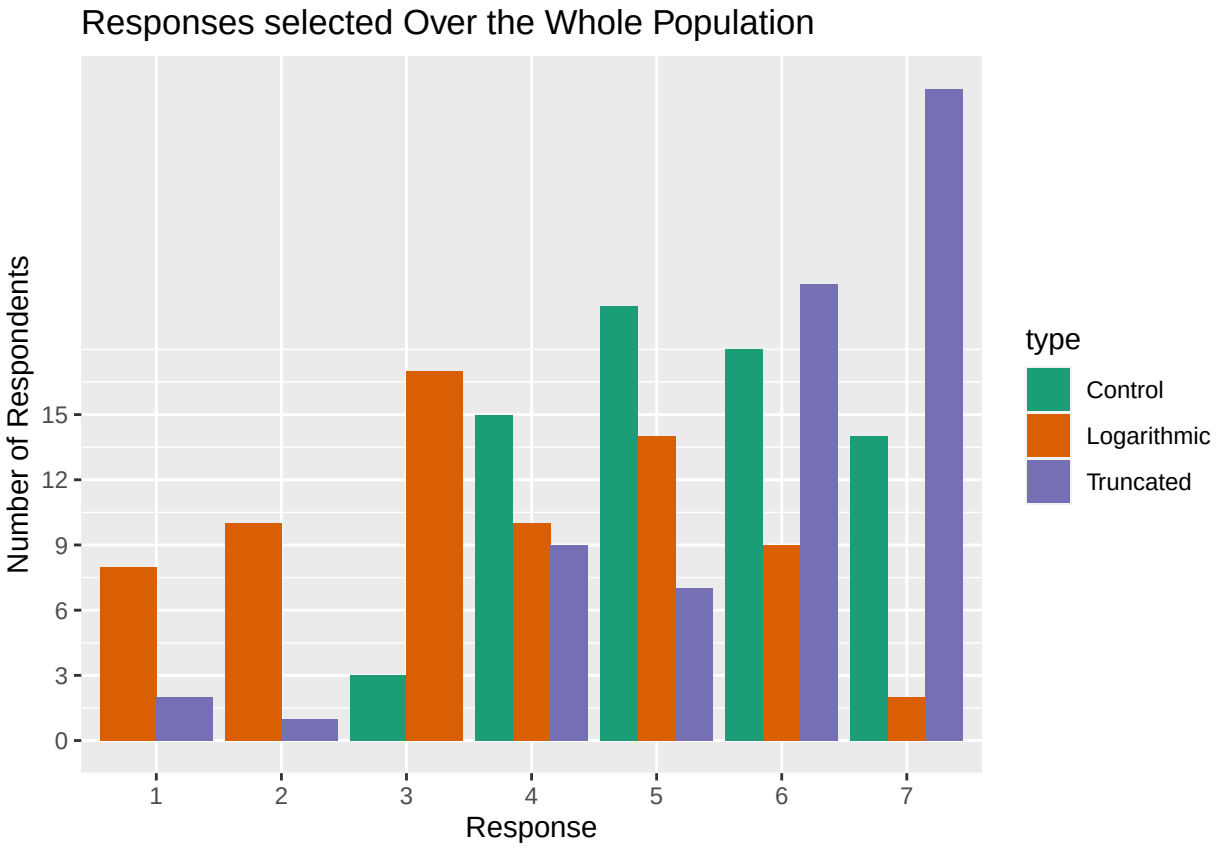
```
bootstrap optimal m
                 70


    m-out-of-n bootstrap symmetry test by Miao, Gel, and Gastwirth (2006)

data:  logarithmic_2
Test statistic = 1.071, p-value = 0.376
alternative hypothesis: the distribution is asymmetric.
sample estimates:
bootstrap optimal m
                 11
```

Pairwise Sign Tests

```
    Dependent-samples Sign-Test

data:  control_2 and truncated_2
S = 7, p-value = 0.0001911
alternative hypothesis: true median difference is not equal to 0
95 percent confidence interval:
 -1  0
sample estimates:
median of x-y
            0

Achieved and Interpolated Confidence Intervals:

                  Conf.Level L.E.pt U.E.pt
Lower Achieved CI     0.9278     -1      0
Interpolated CI       0.9500     -1      0
Upper Achieved CI     0.9586     -1      0


    Dependent-samples Sign-Test

data:  control_2 and logarithmic_2
S = 51, p-value = 2.047e-11
alternative hypothesis: true median difference is not equal to 0
95 percent confidence interval:
 1 2
sample estimates:
median of x-y
            2
```

```
Achieved and Interpolated Confidence Intervals:

                  Conf.Level L.E.pt U.E.pt
Lower Achieved CI     0.9278      1      2
Interpolated CI       0.9500      1      2
Upper Achieved CI     0.9586      1      2


    Wilcoxon rank sum test with continuity correction

data:  logarithmic_2 and truncated_2
W = 751.5, p-value = 6.669e-13
alternative hypothesis: true location shift is not equal to 0
```

Whole pop bars



Control - Lang comp

Control - Lang comp

```
     [,1]      [,2]      [,3]
```

```
N       70.000000 38.000000 32.000000
Min.     3.000000  3.000000  3.000000
1st Qu.  4.250000  5.000000  4.000000
Median   5.000000  6.000000  5.000000
Mean     5.357143  5.500000  5.187500
3rd Qu.  6.000000  6.000000  6.000000
Max.     7.000000  7.000000  7.000000
Var      1.334369  1.283784  1.383065
```

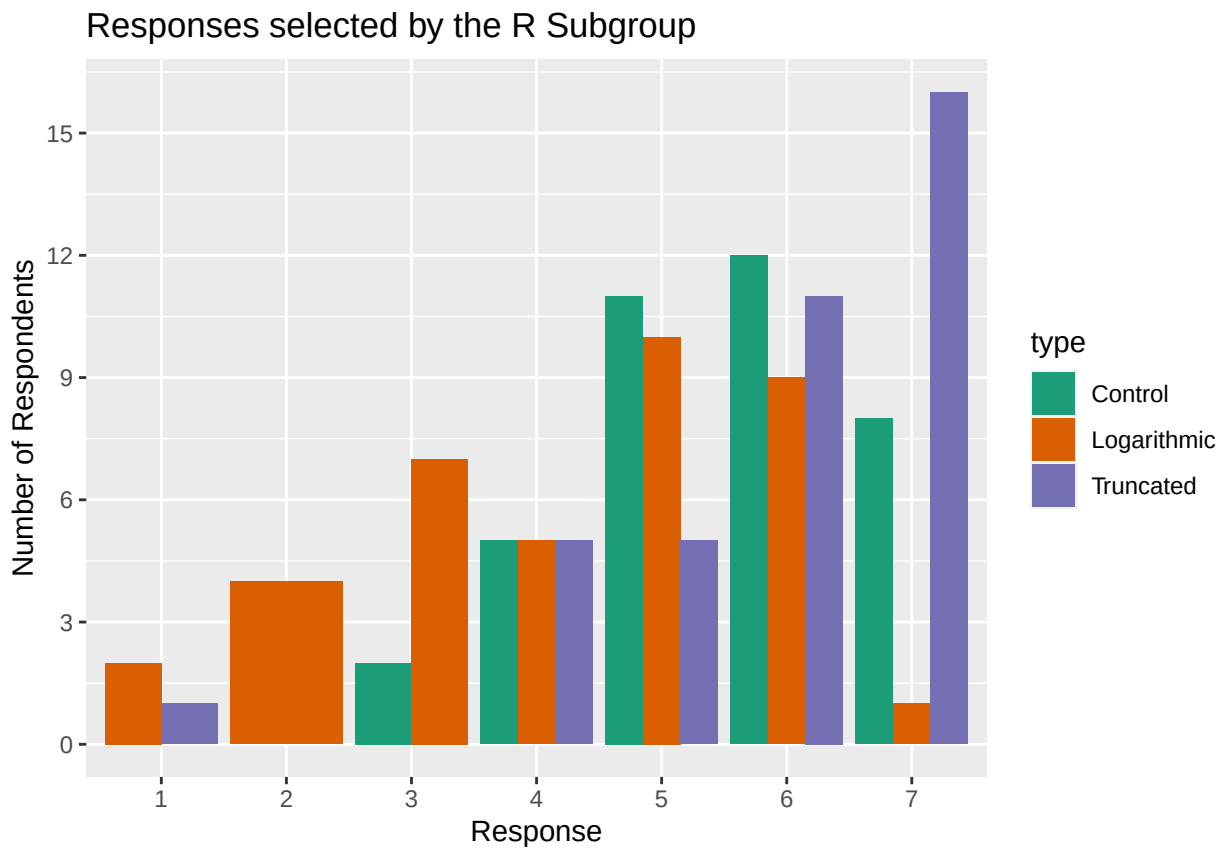
Truncated - Lang comp

```
        Whole Pop         R    Python
N       70.000000 38.000000 32.000000
Min.     1.000000  1.000000  1.000000
1st Qu.  5.000000  5.000000  5.750000
Median   6.000000  6.000000  6.000000
Mean     5.871429  5.894737  5.843750
3rd Qu.  7.000000  7.000000  7.000000
Max.     7.000000  7.000000  7.000000
Var      1.997723  1.772404  2.329637
```

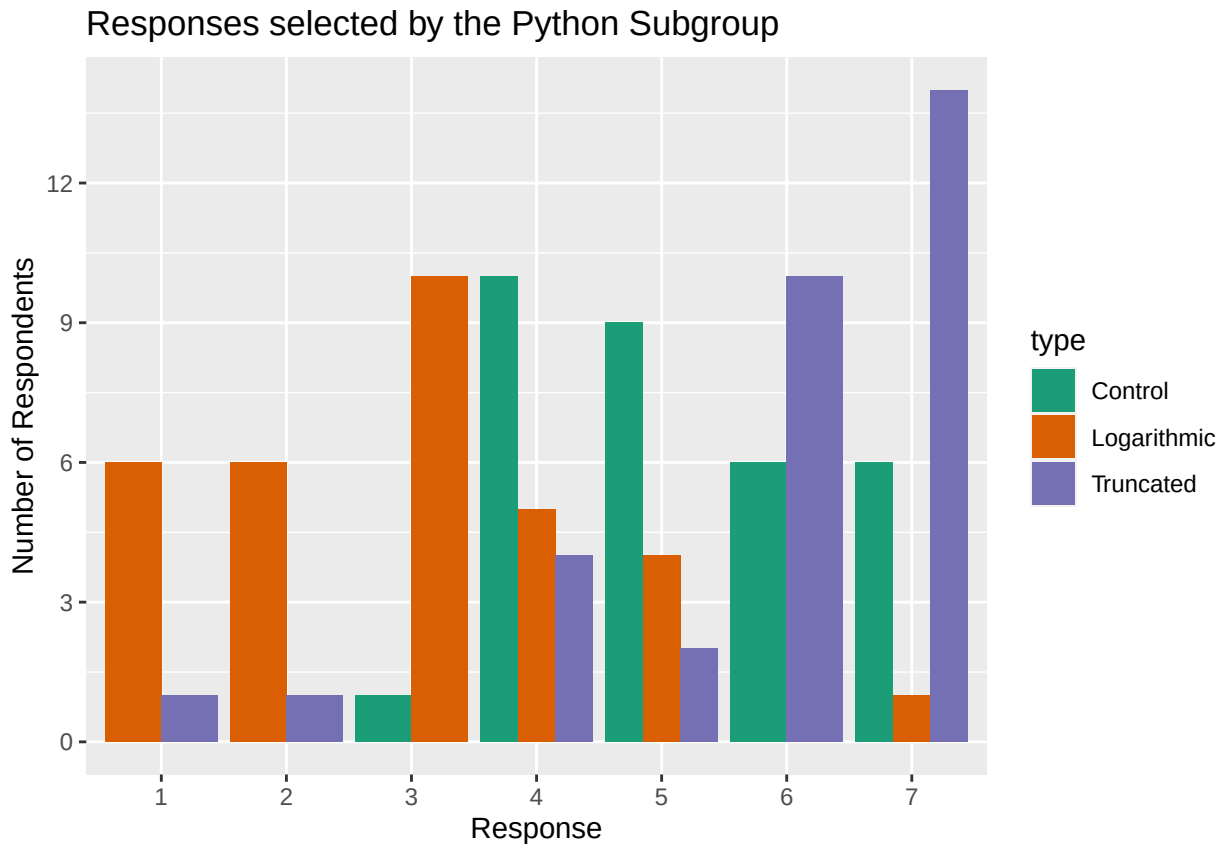
Logarithmic - Lang comp

```
        Whole Pop         R    Python
N       70.000000 38.000000 32.000000
Min.     1.000000  1.000000  1.000000
1st Qu.  2.250000  3.000000  2.000000
Median   3.500000  5.000000  3.000000
Mean     3.671429  4.263158  2.968750
3rd Qu.  5.000000  5.750000  4.000000
Max.     7.000000  7.000000  7.000000
Var      2.745549  2.523471  2.160282
```

R bars


Responses selected by the R Subgroup
Number of Respondents
0
3
6
9
12
15
1
2
3
4
5
6
7
Response
type
Control
Logarithmic
Truncated

Py bars



Control - Degree comparison

	STEM	Humanities	Social Sci	Arts	Business	NA
N	29.000000	3.000000	31.000000	2.0	4.000000	1
Min.	4.000000	3.000000	3.000000	4.0	4.000000	7
1st Qu.	5.000000	4.000000	4.500000	4.5	4.750000	7
Median	5.000000	5.000000	5.000000	5.0	5.500000	7
Mean	5.344828	4.333333	5.419355	5.0	5.500000	7
3rd Qu.	6.000000	5.000000	6.500000	5.5	6.250000	7
Max.	7.000000	5.000000	7.000000	6.0	7.000000	7
Var	1.019704	1.333333	1.584946	2.0	1.666667	NA

Truncated - Degree comparison

	STEM	Humanities	Social Sci	Arts	Business	NA
N	29.000000	3.000000	31.000000	2.0	4	1
Min.	1.000000	4.000000	1.000000	4.0	7	7
1st Qu.	5.000000	5.000000	5.500000	4.5	7	7
Median	6.000000	6.000000	6.000000	5.0	7	7
Mean	5.655172	5.333333	6.000000	5.0	7	7

3rd Qu.	7.000000	6.000000	7.000000	5.5	7	7
Max.	7.000000	6.000000	7.000000	6.0	7	7
Var	2.376847	1.333333	1.866667	2.0	0	NA

Logarithmic - Degree comparison

	STEM	Humanities	Social Sci	Arts	Business	NA
N	29.000000	3.000000	31.000000	2.00	4.0000000	1
Min.	1.000000	3.000000	1.000000	2.00	1.0000000	1
1st Qu.	2.000000	3.000000	3.000000	2.75	1.7500000	1
Median	4.000000	3.000000	4.000000	3.50	2.0000000	1
Mean	3.827586	3.666667	3.838710	3.50	2.0000000	1
3rd Qu.	5.000000	4.000000	5.000000	4.25	2.2500000	1
Max.	6.000000	5.000000	7.000000	5.00	3.0000000	1
Var	3.004926	1.333333	2.539785	4.50	0.6666667	NA

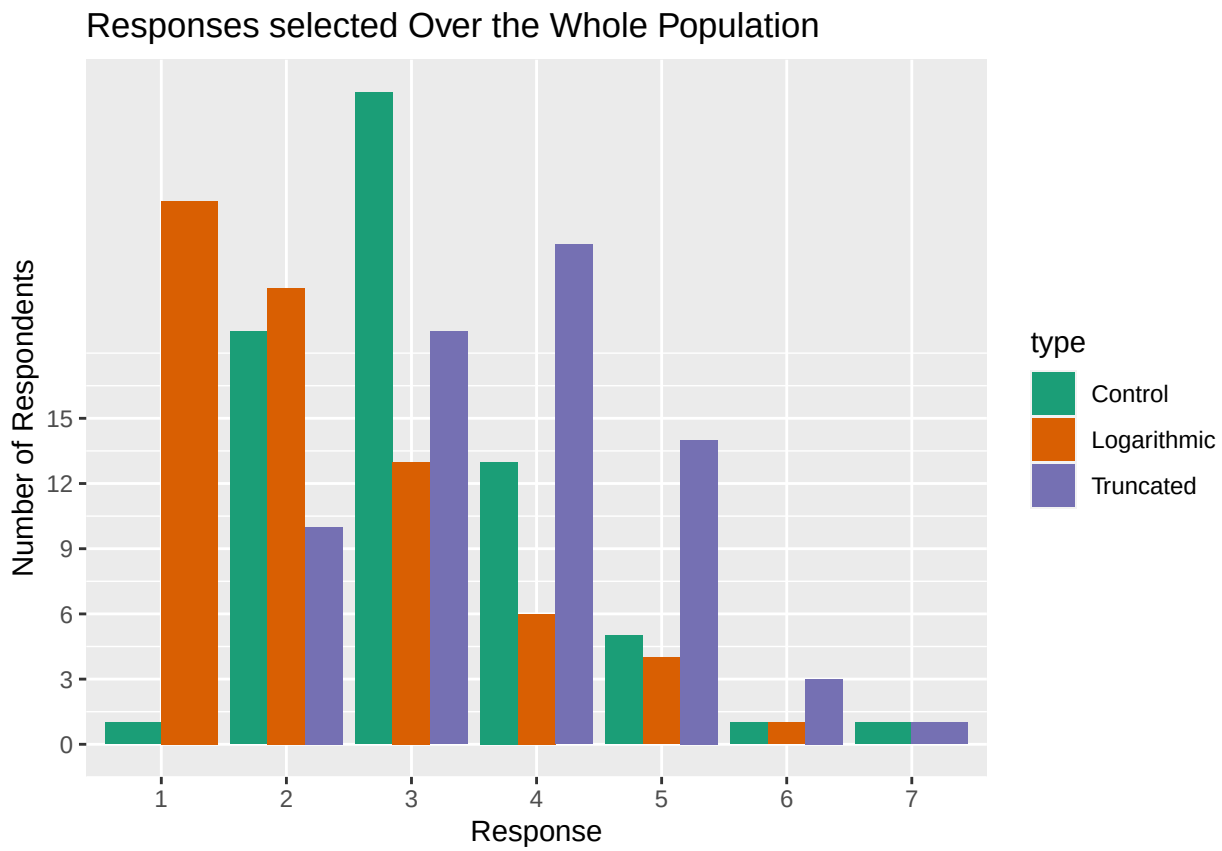
First Plot Comp

	Control	Truncated	Logarithmic
N	25.00	23.000000	22.000000
Min.	4.00	1.000000	1.000000
1st Qu.	5.00	5.000000	3.000000
Median	6.00	6.000000	5.000000
Mean	5.56	5.565217	4.136364
3rd Qu.	7.00	7.000000	5.750000
Max.	7.00	7.000000	6.000000
Var	1.34	2.166008	3.075758

Approximately how much more than 'Quintuple Steps' would you say 'Salmon Ladder' was used?

Whole Population

	Control	Truncated	Logarithmic
N	70.000000	70.000000	70.000000
Min.	1.000000	2.000000	1.000000
1st Qu.	2.000000	3.000000	1.000000
Median	3.000000	4.000000	2.000000
Mean	3.128571	3.771429	2.228571
3rd Qu.	4.000000	4.750000	3.000000
Max.	7.000000	7.000000	6.000000
Var	1.157143	1.309317	1.599172



Shapiro tests

```
    Shapiro-Wilk normality test

data:  control_3
W = 0.86962, p-value = 2.966e-06


    Shapiro-Wilk normality test

data:  truncated_3
W = 0.92078, p-value = 0.0002851


    Shapiro-Wilk normality test

data:  logarithmic_3
W = 0.84623, p-value = 5.102e-07
```

Symmetry tests

```
    m-out-of-n bootstrap symmetry test by Miao, Gel, and Gastwirth (2006)

data:  control_3
Test statistic = 1.5593, p-value = 0.208
alternative hypothesis: the distribution is asymmetric.
sample estimates:
bootstrap optimal m
                 11


    m-out-of-n bootstrap symmetry test by Miao, Gel, and Gastwirth (2006)

data:  truncated_3
Test statistic = -2.2802, p-value = 0.048
alternative hypothesis: the distribution is asymmetric.
sample estimates:
bootstrap optimal m
                 11


    m-out-of-n bootstrap symmetry test by Miao, Gel, and Gastwirth (2006)

data:  logarithmic_3
Test statistic = 2.142, p-value = 0.082
alternative hypothesis: the distribution is asymmetric.
sample estimates:
bootstrap optimal m
                 31
```

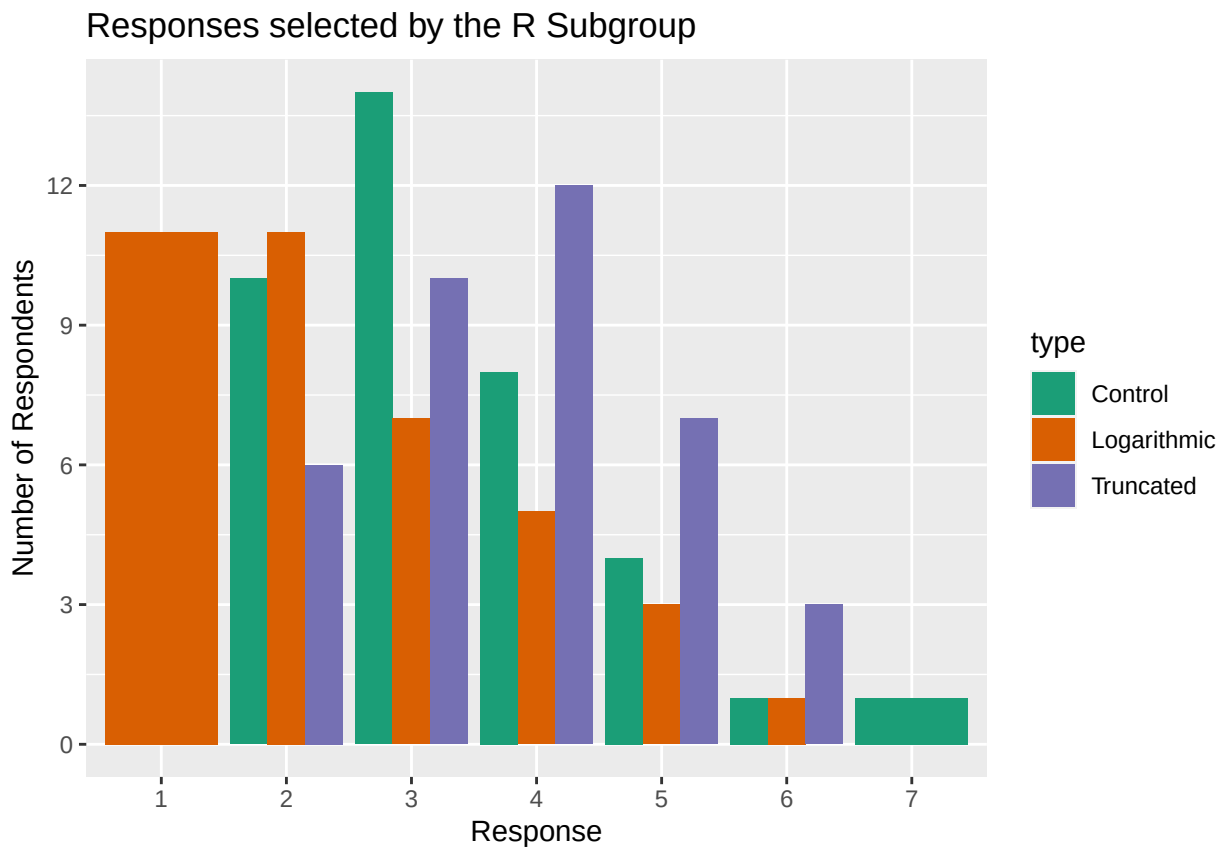
Pairwise Sign Tests

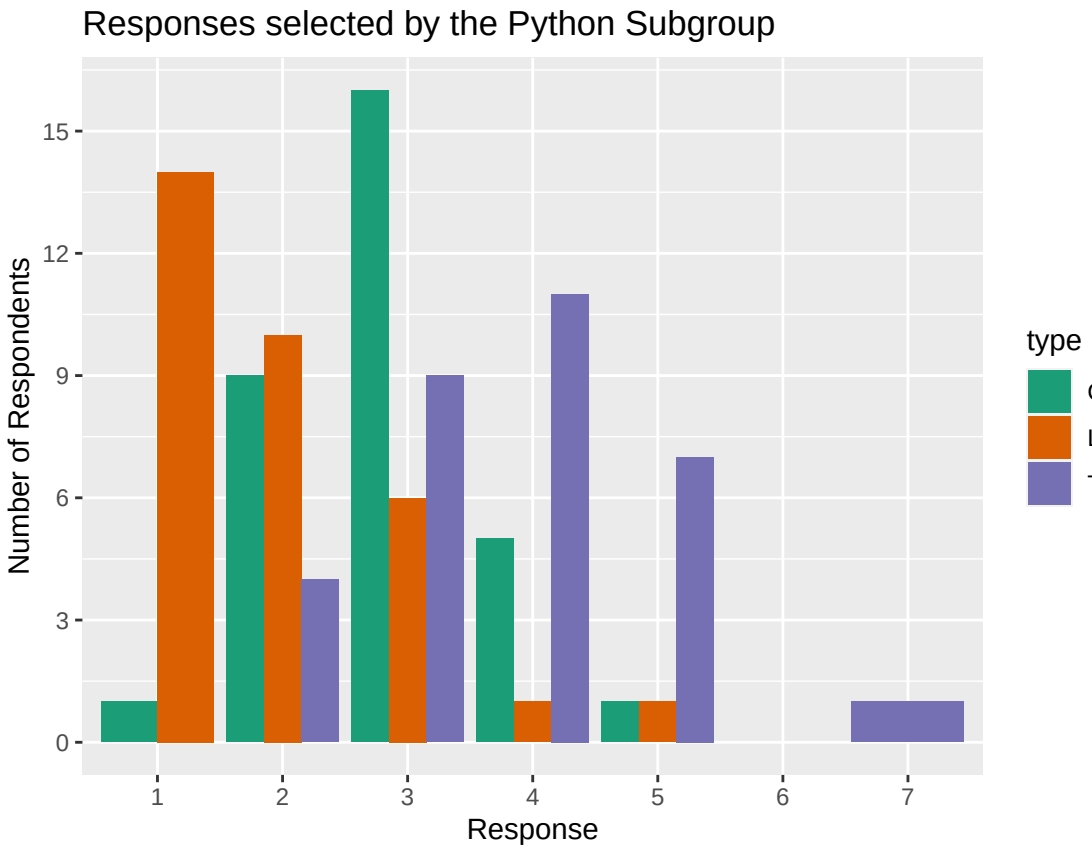
```
    Dependent-samples Sign-Test

data:  control_3 and truncated_3
S = 8, p-value = 9.248e-06
alternative hypothesis: true median difference is not equal to 0
95 percent confidence interval:
 -1  0
sample estimates:
median of x-y
           -1
```

```
Achieved and Interpolated Confidence Intervals:

                  Conf.Level L.E.pt U.E.pt
Lower Achieved CI     0.9278     -1      0
Interpolated CI       0.9500     -1      0
Upper Achieved CI     0.9586     -1      0


    Wilcoxon rank sum test with continuity correction

data:  control_3 and logarithmic_3
W = 3542.5, p-value = 2.633e-06
alternative hypothesis: true location shift is not equal to 0


    Dependent-samples Sign-Test

data:  logarithmic_3 and truncated_3
S = 5, p-value = 1.17e-10
alternative hypothesis: true median difference is not equal to 0
95 percent confidence interval:
 -2 -1
sample estimates:
median of x-y
         -1.5

Achieved and Interpolated Confidence Intervals:

                  Conf.Level L.E.pt U.E.pt
Lower Achieved CI     0.9278     -2     -1
Interpolated CI       0.9500     -2     -1
Upper Achieved CI     0.9586     -2     -1
```

R Population

```
        Whole Pop          R     Python
N       70.000000 38.000000 32.0000000
Min.     1.000000  2.000000  1.0000000
1st Qu.  2.000000  2.250000  2.0000000
Median   3.000000  3.000000  3.0000000
Mean     3.128571  3.342105  2.8750000
3rd Qu.  4.000000  4.000000  3.0000000
Max.     7.000000  7.000000  5.0000000
Var      1.157143  1.474395  0.6935484
```


Responses selected by the R Subgroup
Number of Respondents
0
3
6
9
12
1
2
3
4
5
6
7
Response
type
Control
Logarithmic
Truncated



Python Population

First Plot Comp

	Control	Truncated	Logarithmic
N	25.00	23.0000000	22.000000
Min.	2.00	2.0000000	1.000000
1st Qu.	2.00	3.0000000	1.250000
Median	3.00	3.0000000	2.500000
Mean	3.08	3.4782609	2.681818
3rd Qu.	4.00	4.0000000	4.000000
Max.	7.00	5.0000000	6.000000
Var	1.41	0.9881423	2.132035

Differences in means for Q2 and Q3

All

	Control	Truncated	Logarithmic
Control	0.0000000	-0.5142857	1.685714
Truncated	0.5142857	0.0000000	2.200000
Logarithmic	-1.6857143	-2.2000000	0.000000

Shapiro tests

```
    Shapiro-Wilk normality test

data:  control_2
W = 0.90456, p-value = 5.895e-05


    Shapiro-Wilk normality test

data:  truncated_2
W = 0.76579, p-value = 3.263e-09


    Shapiro-Wilk normality test

data:  logarithmic_2
W = 0.93942, p-value = 0.002105
```

Symmetry tests

```
    m-out-of-n bootstrap symmetry test by Miao, Gel, and Gastwirth (2006)

data:  control_2
Test statistic = 3.297, p-value = 0.012
alternative hypothesis: the distribution is asymmetric.
sample estimates:
bootstrap optimal m
                 19


    m-out-of-n bootstrap symmetry test by Miao, Gel, and Gastwirth (2006)

data:  truncated_2
Test statistic = -1.1525, p-value = 0.442
alternative hypothesis: the distribution is asymmetric.
sample estimates:
bootstrap optimal m
                 11


    m-out-of-n bootstrap symmetry test by Miao, Gel, and Gastwirth (2006)

data:  logarithmic_2
```

```
Test statistic = 1.071, p-value = 0.44
alternative hypothesis: the distribution is asymmetric.
sample estimates:
bootstrap optimal m
                 11
```

Pairwise Sign Tests

```
    Dependent-samples Sign-Test

data:  control_2 and truncated_2
S = 7, p-value = 0.0001911
alternative hypothesis: true median difference is not equal to 0
95 percent confidence interval:
 -1  0
sample estimates:
median of x-y
            0

Achieved and Interpolated Confidence Intervals:

                  Conf.Level L.E.pt U.E.pt
Lower Achieved CI     0.9278     -1      0
Interpolated CI       0.9500     -1      0
Upper Achieved CI     0.9586     -1      0


    Dependent-samples Sign-Test

data:  control_2 and logarithmic_2
S = 51, p-value = 2.047e-11
alternative hypothesis: true median difference is not equal to 0
95 percent confidence interval:
 1 2
sample estimates:
median of x-y
            2

Achieved and Interpolated Confidence Intervals:

                  Conf.Level L.E.pt U.E.pt
Lower Achieved CI     0.9278      1      2
Interpolated CI       0.9500      1      2
Upper Achieved CI     0.9586      1      2
```

```
    Dependent-samples Sign-Test

data:  logarithmic_2 and truncated_2
S = 5, p-value = 3.066e-12
alternative hypothesis: true median difference is not equal to 0
95 percent confidence interval:
 -3 -1
sample estimates:
median of x-y
          -2

Achieved and Interpolated Confidence Intervals:

                  Conf.Level L.E.pt U.E.pt
Lower Achieved CI     0.9278     -3     -1
Interpolated CI       0.9500     -3     -1
Upper Achieved CI     0.9586     -3     -1
```

Pairwise Wilcox Tests

```
    Wilcoxon rank sum test with continuity correction

data:  control_2 and truncated_2
W = 1732.5, p-value = 0.002002
alternative hypothesis: true location shift is not equal to 0


    Wilcoxon rank sum test with continuity correction

data:  control_2 and logarithmic_2
W = 3828.5, p-value = 5.303e-09
alternative hypothesis: true location shift is not equal to 0


    Wilcoxon rank sum test with continuity correction

data:  logarithmic_2 and truncated_2
W = 751.5, p-value = 6.669e-13
alternative hypothesis: true location shift is not equal to 0

              Control  Truncated Logarithmic
Control      0.0000000 -0.6428571    0.900000
Truncated    0.6428571  0.0000000    1.542857
```

```
Logarithmic -0.9000000 -1.5428571    0.000000
```

Shapiro tests

```
    Shapiro-Wilk normality test

data:  control_3_py
W = 0.87891, p-value = 0.001877


    Shapiro-Wilk normality test

data:  truncated_3_py
W = 0.90666, p-value = 0.009193


    Shapiro-Wilk normality test

data:  logarithmic_3_py
W = 0.80872, p-value = 5.969e-05
```

Symmetry tests

```
    m-out-of-n bootstrap symmetry test by Miao, Gel, and Gastwirth (2006)

data:  control_3_py
Test statistic = -1.3276, p-value = 0.228
alternative hypothesis: the distribution is asymmetric.
sample estimates:
bootstrap optimal m
                 14


    m-out-of-n bootstrap symmetry test by Miao, Gel, and Gastwirth (2006)

data:  truncated_3_py
Test statistic = -1.5488, p-value = 0.138
alternative hypothesis: the distribution is asymmetric.
sample estimates:
bootstrap optimal m
                 14


    m-out-of-n bootstrap symmetry test by Miao, Gel, and Gastwirth (2006)
```

```
data:  logarithmic_3_py
Test statistic = -0.7169, p-value = 0.532
alternative hypothesis: the distribution is asymmetric.
sample estimates:
bootstrap optimal m
                 14
```

Pairwise Sign Tests

```
    Dependent-samples Sign-Test

data:  control_3_py and truncated_3_py
S = 2, p-value = 0.0001211
alternative hypothesis: true median difference is not equal to 0
95 percent confidence interval:
 -1  0
sample estimates:
median of x-y
          -1

Achieved and Interpolated Confidence Intervals:

                  Conf.Level L.E.pt U.E.pt
Lower Achieved CI     0.9499     -1      0
Interpolated CI       0.9500     -1      0
Upper Achieved CI     0.9799     -1      0


    Dependent-samples Sign-Test

data:  control_3_py and logarithmic_3_py
S = 21, p-value = 0.0009105
alternative hypothesis: true median difference is not equal to 0
95 percent confidence interval:
 0 2
sample estimates:
median of x-y
           1

Achieved and Interpolated Confidence Intervals:

                  Conf.Level L.E.pt U.E.pt
Lower Achieved CI     0.9499      0      2
```

```
Interpolated CI       0.9500      0      2
Upper Achieved CI     0.9799      0      2


    Dependent-samples Sign-Test

data:  logarithmic_3_py and truncated_3_py
S = 1, p-value = 8.047e-07
alternative hypothesis: true median difference is not equal to 0
95 percent confidence interval:
 -3 -1
sample estimates:
median of x-y
          -2

Achieved and Interpolated Confidence Intervals:

                 Conf.Level L.E.pt U.E.pt
Lower Achieved CI     0.9499     -3     -1
Interpolated CI       0.9500     -3     -1
Upper Achieved CI     0.9799     -3     -1
```

Pairwise Wilcox Tests

```
    Wilcoxon rank sum test with continuity correction

data:  control_3_py and truncated_3_py
W = 274, p-value = 0.0008548
alternative hypothesis: true location shift is not equal to 0


    Wilcoxon rank sum test with continuity correction

data:  control_3_py and logarithmic_3_py
W = 794, p-value = 8.105e-05
alternative hypothesis: true location shift is not equal to 0


    Wilcoxon rank sum test with continuity correction

data:  logarithmic_3_py and truncated_3_py
W = 117, p-value = 6.224e-08
alternative hypothesis: true location shift is not equal to 0
```

R

```
              Control  Truncated Logarithmic
Control      0.0000000 -0.3947368    1.236842
Truncated    0.3947368  0.0000000    1.631579
Logarithmic -1.2368421 -1.6315789    0.000000
```

Shapiro tests

```
    Shapiro-Wilk normality test

data:  control_2_r
W = 0.90334, p-value = 0.003172


    Shapiro-Wilk normality test

data:  truncated_2_r
W = 0.78345, p-value = 4.896e-06


    Shapiro-Wilk normality test

data:  logarithmic_2_r
W = 0.92234, p-value = 0.01159
```

Symmetry tests

```
    m-out-of-n bootstrap symmetry test by Miao, Gel, and Gastwirth (2006)

data:  control_2_r
Test statistic = -3.5341, p-value = 0.038
alternative hypothesis: the distribution is asymmetric.
sample estimates:
bootstrap optimal m
                 17


    m-out-of-n bootstrap symmetry test by Miao, Gel, and Gastwirth (2006)

data:  truncated_2_r
Test statistic = -0.72335, p-value = 0.55
alternative hypothesis: the distribution is asymmetric.
sample estimates:
```

```
bootstrap optimal m
                 12


    m-out-of-n bootstrap symmetry test by Miao, Gel, and Gastwirth (2006)

data:  logarithmic_2_r
Test statistic = -3.6457, p-value < 2.2e-16
alternative hypothesis: the distribution is asymmetric.
sample estimates:
bootstrap optimal m
                 15
```

Pairwise Sign Tests

```
    Dependent-samples Sign-Test

data:  control_2_r and truncated_2_r
S = 4, p-value = 0.01921
alternative hypothesis: true median difference is not equal to 0
95 percent confidence interval:
 -1  0
sample estimates:
median of x-y
           0

Achieved and Interpolated Confidence Intervals:

                  Conf.Level L.E.pt U.E.pt
Lower Achieved CI     0.9270     -1      0
Interpolated CI       0.9500     -1      0
Upper Achieved CI     0.9664     -1      0


    Dependent-samples Sign-Test

data:  control_2_r and logarithmic_2_r
S = 25, p-value = 0.0001037
alternative hypothesis: true median difference is not equal to 0
95 percent confidence interval:
 0.4174619 2.0000000
sample estimates:
median of x-y
           1
```

```
Achieved and Interpolated Confidence Intervals:

                  Conf.Level L.E.pt U.E.pt
Lower Achieved CI     0.9270 1.0000      2
Interpolated CI       0.9500 0.4175      2
Upper Achieved CI     0.9664 0.0000      2


    Dependent-samples Sign-Test

data:  logarithmic_2_r and truncated_2_r
S = 2, p-value = 2.463e-07
alternative hypothesis: true median difference is not equal to 0
95 percent confidence interval:
 -2 -1
sample estimates:
median of x-y
        -1.5

Achieved and Interpolated Confidence Intervals:

                  Conf.Level L.E.pt U.E.pt
Lower Achieved CI     0.9270     -2     -1
Interpolated CI       0.9500     -2     -1
Upper Achieved CI     0.9664     -2     -1

               Control  Truncated Logarithmic
Control      0.0000000 -0.4210526   0.8421053
Truncated    0.4210526  0.0000000   1.2631579
Logarithmic -0.8421053 -1.2631579   0.0000000
```

Shapiro tests

```
    Shapiro-Wilk normality test

data:  control_3_r
W = 0.86888, p-value = 0.000377


    Shapiro-Wilk normality test

data:  truncated_3_r
W = 0.91674, p-value = 0.007836
```

```
    Shapiro-Wilk normality test

data:  logarithmic_3_r
W = 0.88157, p-value = 0.0008004
```

Symmetry tests

```
    m-out-of-n bootstrap symmetry test by Miao, Gel, and Gastwirth (2006)

data:  control_3_r
Test statistic = 2.5646, p-value = 0.016
alternative hypothesis: the distribution is asymmetric.
sample estimates:
bootstrap optimal m
                 12


    m-out-of-n bootstrap symmetry test by Miao, Gel, and Gastwirth (2006)

data:  truncated_3_r
Test statistic = -1.674, p-value = 0.152
alternative hypothesis: the distribution is asymmetric.
sample estimates:
bootstrap optimal m
                 19


    m-out-of-n bootstrap symmetry test by Miao, Gel, and Gastwirth (2006)

data:  logarithmic_3_r
Test statistic = 3.0169, p-value = 0.06
alternative hypothesis: the distribution is asymmetric.
sample estimates:
bootstrap optimal m
                 21
```

Pairwise Wilcox Tests

```
    Wilcoxon rank sum test with continuity correction

data:  control_3_r and truncated_3_r
W = 560.5, p-value = 0.08416
```

```
alternative hypothesis: true location shift is not equal to 0


    Wilcoxon rank sum test with continuity correction

data:  control_3_r and logarithmic_3_r
W = 991.5, p-value = 0.004125
alternative hypothesis: true location shift is not equal to 0


    Wilcoxon rank sum test with continuity correction

data:  logarithmic_3_r and truncated_3_r
W = 351, p-value = 8.635e-05
alternative hypothesis: true location shift is not equal to 0
```

Py

```
             Control Truncated Logarithmic
Control      0.00000  -0.65625     2.21875
Truncated    0.65625   0.00000     2.87500
Logarithmic -2.21875  -2.87500     0.00000
```

Shapiro tests

```
    Shapiro-Wilk normality test

data:  control_2_py
W = 0.88651, p-value = 0.002858


    Shapiro-Wilk normality test

data:  truncated_2_py
W = 0.75295, p-value = 5.976e-06


    Shapiro-Wilk normality test

data:  logarithmic_2_py
W = 0.92098, p-value = 0.02211
```

Symmetry tests

```
    m-out-of-n bootstrap symmetry test by Miao, Gel, and Gastwirth (2006)

data:  control_2_py
Test statistic = 1.1948, p-value = 0.282
alternative hypothesis: the distribution is asymmetric.
sample estimates:
bootstrap optimal m
                 22


    m-out-of-n bootstrap symmetry test by Miao, Gel, and Gastwirth (2006)

data:  truncated_2_py
Test statistic = -0.90517, p-value = 0.446
alternative hypothesis: the distribution is asymmetric.
sample estimates:
bootstrap optimal m
                 16


    m-out-of-n bootstrap symmetry test by Miao, Gel, and Gastwirth (2006)

data:  logarithmic_2_py
Test statistic = -0.17069, p-value = 0.836
alternative hypothesis: the distribution is asymmetric.
sample estimates:
bootstrap optimal m
                 16
```

Pairwise Sign Tests

```
    Dependent-samples Sign-Test

data:  control_2_py and truncated_2_py
S = 3, p-value = 0.007538
alternative hypothesis: true median difference is not equal to 0
95 percent confidence interval:
 -1  0
sample estimates:
median of x-y
            0

Achieved and Interpolated Confidence Intervals:
```

```
                  Conf.Level L.E.pt U.E.pt
Lower Achieved CI     0.9499     -1      0
Interpolated CI       0.9500     -1      0
Upper Achieved CI     0.9799     -1      0


    Dependent-samples Sign-Test

data:  control_2_py and logarithmic_2_py
S = 26, p-value = 2.98e-08
alternative hypothesis: true median difference is not equal to 0
95 percent confidence interval:
 1 3
sample estimates:
median of x-y
            2

Achieved and Interpolated Confidence Intervals:

                  Conf.Level L.E.pt U.E.pt
Lower Achieved CI     0.9499      1      3
Interpolated CI       0.9500      1      3
Upper Achieved CI     0.9799      1      3


    Dependent-samples Sign-Test

data:  logarithmic_2_py and truncated_2_py
S = 3, p-value = 8.43e-06
alternative hypothesis: true median difference is not equal to 0
95 percent confidence interval:
 -4 -2
sample estimates:
median of x-y
           -3

Achieved and Interpolated Confidence Intervals:

                  Conf.Level L.E.pt U.E.pt
Lower Achieved CI     0.9499     -4     -2
Interpolated CI       0.9500     -4     -2
Upper Achieved CI     0.9799     -4     -2
```

Pairwise Wilcox Test

```
    Wilcoxon rank sum test with continuity correction

data:  logarithmic_2_py and truncated_2_py
W = 105, p-value = 3.168e-08
alternative hypothesis: true location shift is not equal to 0
```

Pairwise T-Test

```
    Welch Two Sample t-test

data:  logarithmic_2_py and truncated_2_py
t = -7.6753, df = 61.912, p-value = 1.461e-10
alternative hypothesis: true difference in means is not equal to 0
95 percent confidence interval:
 -3.623795 -2.126205
sample estimates:
mean of x mean of y
  2.96875   5.84375
```

Q3

```
             Control Truncated Logarithmic
Control      0.00000  -0.90625     0.96875
Truncated    0.90625   0.00000     1.87500
Logarithmic -0.96875  -1.87500     0.00000
```

Shapiro tests

```
    Shapiro-Wilk normality test

data:  control_3_py
W = 0.87891, p-value = 0.001877


    Shapiro-Wilk normality test

data:  truncated_3_py
W = 0.90666, p-value = 0.009193


    Shapiro-Wilk normality test
```

```
data:  logarithmic_3_py
W = 0.80872, p-value = 5.969e-05
```

Symmetry tests

```
    m-out-of-n bootstrap symmetry test by Miao, Gel, and Gastwirth (2006)

data:  control_3_py
Test statistic = -1.3276, p-value = 0.236
alternative hypothesis: the distribution is asymmetric.
sample estimates:
bootstrap optimal m
                 20


    m-out-of-n bootstrap symmetry test by Miao, Gel, and Gastwirth (2006)

data:  truncated_3_py
Test statistic = -1.5488, p-value = 0.158
alternative hypothesis: the distribution is asymmetric.
sample estimates:
bootstrap optimal m
                 16


    m-out-of-n bootstrap symmetry test by Miao, Gel, and Gastwirth (2006)

data:  logarithmic_3_py
Test statistic = -0.7169, p-value = 0.538
alternative hypothesis: the distribution is asymmetric.
sample estimates:
bootstrap optimal m
                 18
```

Pairwise Sign Tests

```
    Dependent-samples Sign-Test

data:  control_3_py and truncated_3_py
S = 2, p-value = 0.0001211
alternative hypothesis: true median difference is not equal to 0
95 percent confidence interval:
```

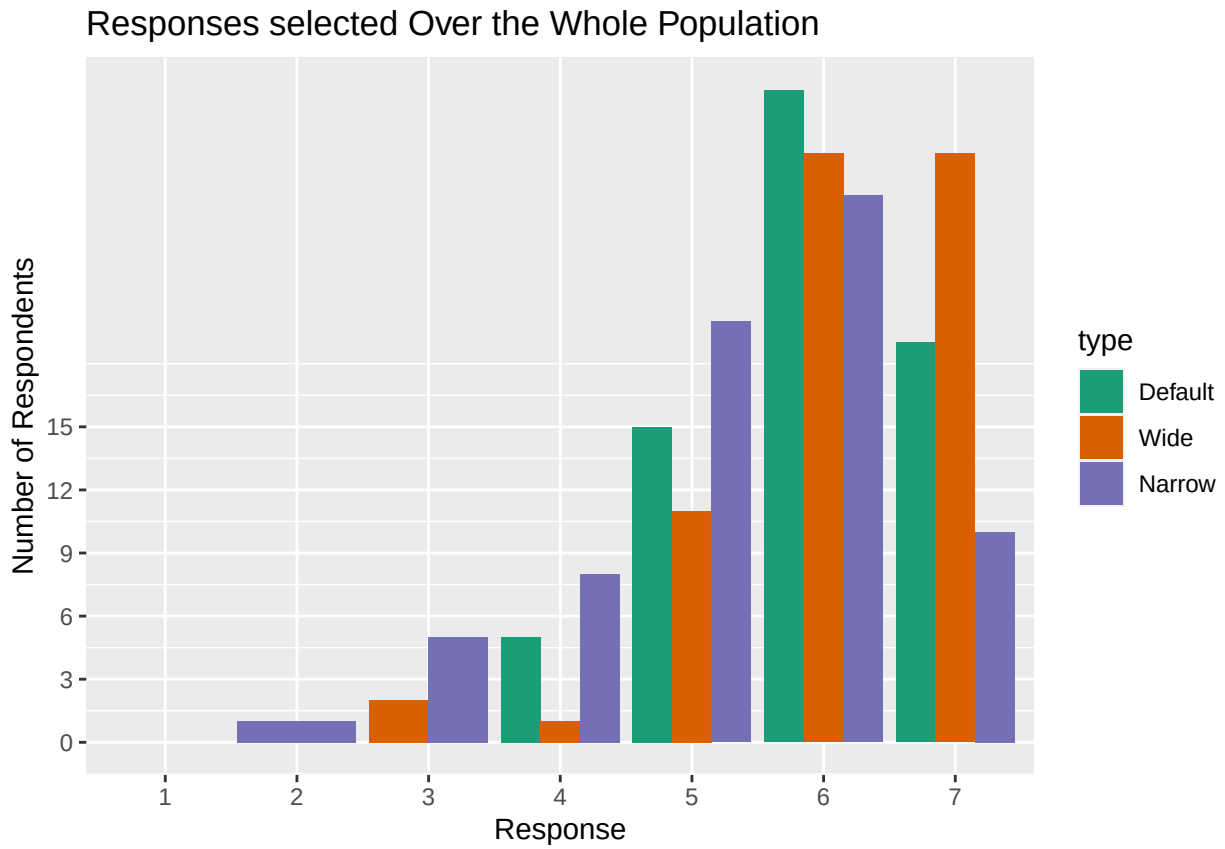
```
 -1  0
sample estimates:
median of x-y
          -1

Achieved and Interpolated Confidence Intervals:

                  Conf.Level L.E.pt U.E.pt
Lower Achieved CI     0.9499     -1      0
Interpolated CI       0.9500     -1      0
Upper Achieved CI     0.9799     -1      0


    Dependent-samples Sign-Test

data:  control_3_py and logarithmic_3_py
S = 21, p-value = 0.0009105
alternative hypothesis: true median difference is not equal to 0
95 percent confidence interval:
 0 2
sample estimates:
median of x-y
           1

Achieved and Interpolated Confidence Intervals:

                  Conf.Level L.E.pt U.E.pt
Lower Achieved CI     0.9499      0      2
Interpolated CI       0.9500      0      2
Upper Achieved CI     0.9799      0      2


    Dependent-samples Sign-Test

data:  logarithmic_3_py and truncated_3_py
S = 1, p-value = 8.047e-07
alternative hypothesis: true median difference is not equal to 0
95 percent confidence interval:
 -3 -1
sample estimates:
median of x-y
          -2

Achieved and Interpolated Confidence Intervals:
```

```
                  Conf.Level L.E.pt U.E.pt
Lower Achieved CI     0.9499     -3     -1
Interpolated CI       0.9500     -3     -1
Upper Achieved CI     0.9799     -3     -1
```

Ninja Warrior - Part 2

###How large would you say the difference between 'Jumping spider' and 'Salmon Ladder' is?

```
           Default     Narrow      Wide
N       70.0000000 70.0000000 70.000000
Min.     4.0000000  3.0000000  2.000000
1st Qu.  5.0000000  6.0000000  5.000000
Median   6.0000000  6.0000000  6.000000
Mean     5.9142857  6.1285714  5.357143
3rd Qu.  7.0000000  7.0000000  6.000000
Max.     7.0000000  7.0000000  7.000000
Var      0.7751553  0.8672878  1.363354
```



Shapiro tests

```
    Shapiro-Wilk normality test

data:  default_1
W = 0.85456, p-value = 9.371e-07


    Shapiro-Wilk normality test

data:  narrow_1
W = 0.79448, p-value = 1.709e-08


    Shapiro-Wilk normality test

data:  wide_1
W = 0.89767, p-value = 3.141e-05
```

Symmetry tests

```
    m-out-of-n bootstrap symmetry test by Miao, Gel, and Gastwirth (2006)

data:  default_1
Test statistic = -1.2049, p-value = 0.258
alternative hypothesis: the distribution is asymmetric.
sample estimates:
bootstrap optimal m
                 62


    m-out-of-n bootstrap symmetry test by Miao, Gel, and Gastwirth (2006)

data:  narrow_1
Test statistic = 1.692, p-value = 0.166
alternative hypothesis: the distribution is asymmetric.
sample estimates:
bootstrap optimal m
                 39


    m-out-of-n bootstrap symmetry test by Miao, Gel, and Gastwirth (2006)

data:  wide_1
```

```
Test statistic = -6.1171, p-value < 2.2e-16
alternative hypothesis: the distribution is asymmetric.
sample estimates:
bootstrap optimal m
                 39
```

Pairwise Sign Tests

```
    Dependent-samples Sign-Test

data:  default_1 and narrow_1
S = 8, p-value = 0.01612
alternative hypothesis: true median difference is not equal to 0
95 percent confidence interval:
 0 0
sample estimates:
median of x-y
            0

Achieved and Interpolated Confidence Intervals:

                  Conf.Level L.E.pt U.E.pt
Lower Achieved CI     0.9278      0      0
Interpolated CI       0.9500      0      0
Upper Achieved CI     0.9586      0      0


    Dependent-samples Sign-Test

data:  default_1 and wide_1
S = 31, p-value = 1.291e-05
alternative hypothesis: true median difference is not equal to 0
95 percent confidence interval:
 0 1
sample estimates:
median of x-y
            0

Achieved and Interpolated Confidence Intervals:

                  Conf.Level L.E.pt U.E.pt
Lower Achieved CI     0.9278      0      1
Interpolated CI       0.9500      0      1
Upper Achieved CI     0.9586      0      1
```

```
    Dependent-samples Sign-Test

data:  wide_1 and narrow_1
S = 4, p-value = 1.705e-08
alternative hypothesis: true median difference is not equal to 0
95 percent confidence interval:
 -1  0
sample estimates:
median of x-y
          -1

Achieved and Interpolated Confidence Intervals:

                  Conf.Level L.E.pt U.E.pt
Lower Achieved CI     0.9278     -1      0
Interpolated CI       0.9500     -1      0
Upper Achieved CI     0.9586     -1      0
```

Lang comp - Default

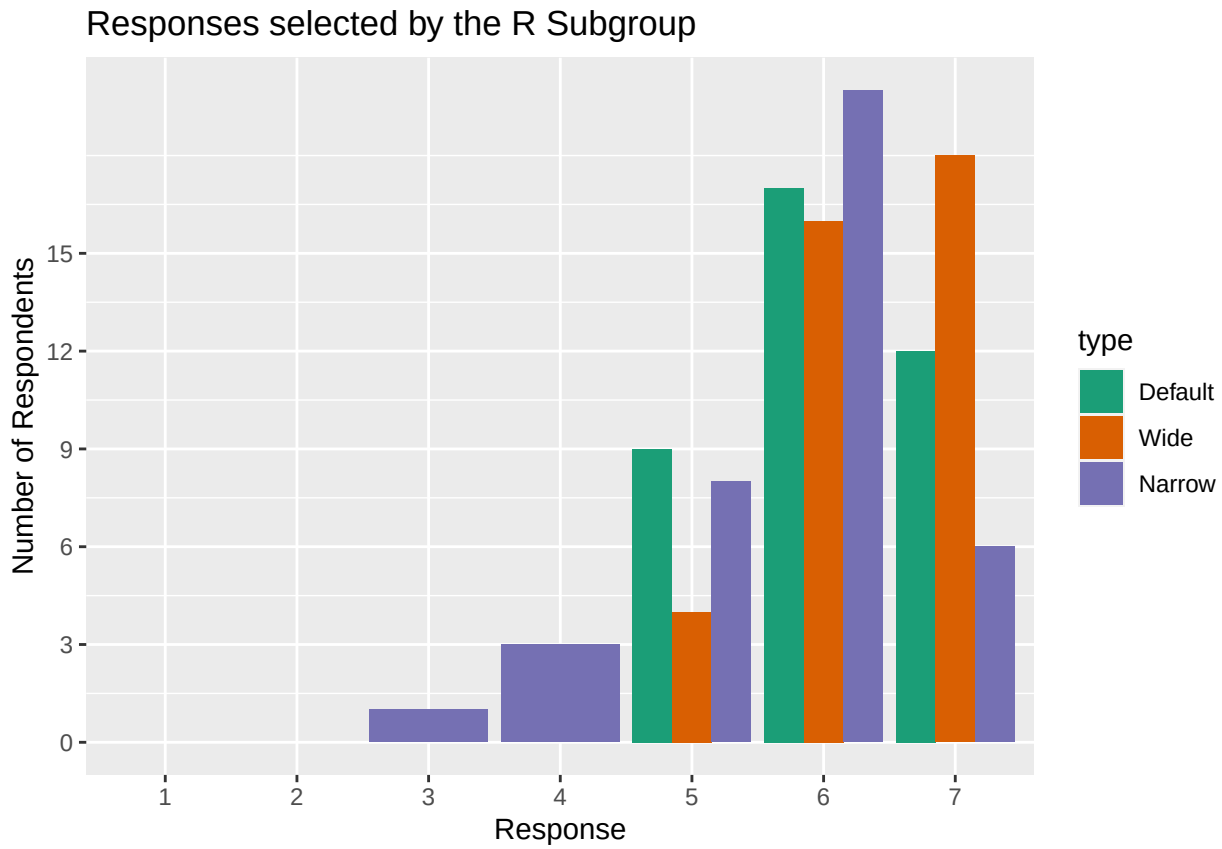
	Whole Pop	R	Python
N	70.0000000	38.0000000	32.0000000
Min.	4.0000000	5.0000000	4.0000000
1st Qu.	5.0000000	6.0000000	5.0000000
Median	6.0000000	6.0000000	6.0000000
Mean	5.9142857	6.0789474	5.7187500
3rd Qu.	7.0000000	7.0000000	6.0000000
Max.	7.0000000	7.0000000	7.0000000
Var	0.7751553	0.5611664	0.9828629

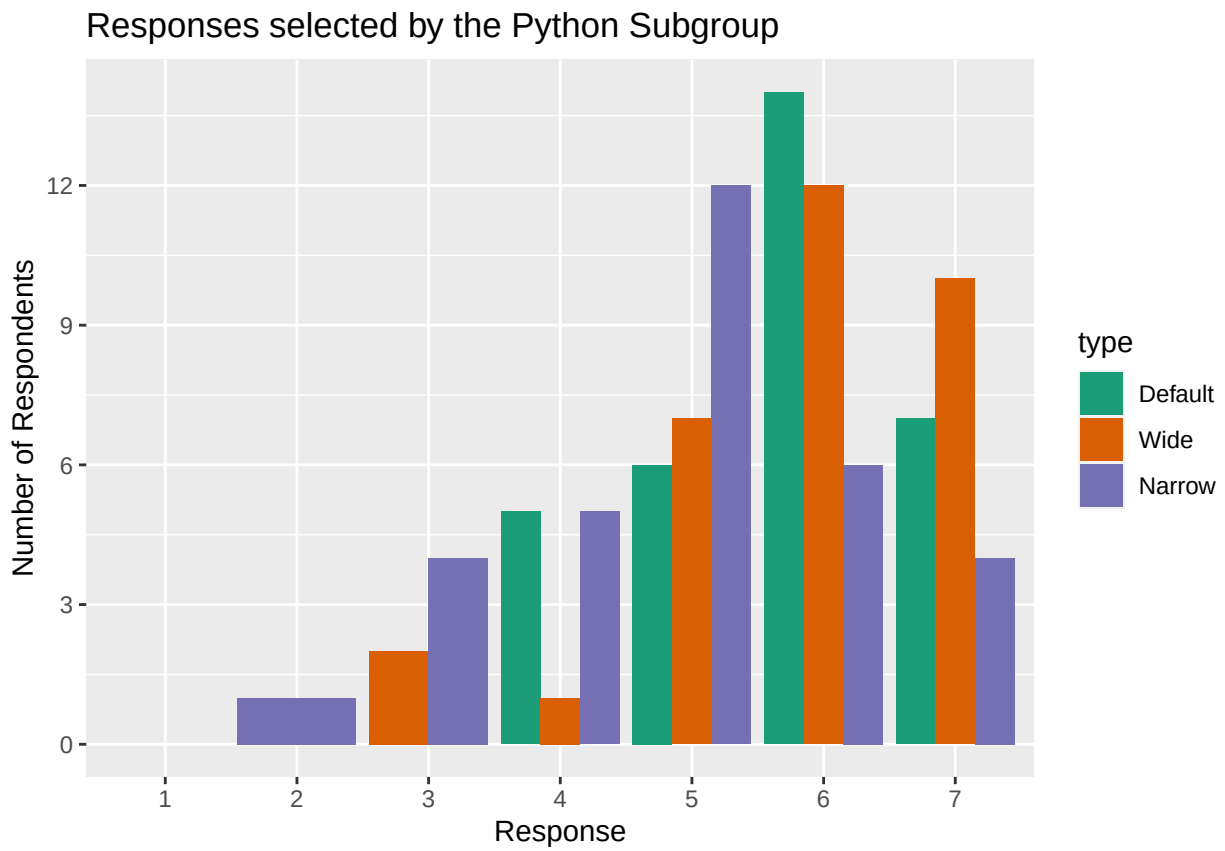
Lang comp - Narrow

	Whole Pop	R	Python
N	70.0000000	38.000000	32.000000
Min.	3.0000000	5.000000	3.000000
1st Qu.	6.0000000	6.000000	5.000000
Median	6.0000000	6.000000	6.000000
Mean	6.1285714	6.368421	5.843750
3rd Qu.	7.0000000	7.000000	7.000000
Max.	7.0000000	7.000000	7.000000
Var	0.8672878	0.455192	1.232863

Lang comp - Wide

	Whole Pop	R	Python
N	70.000000	38.0000000	32.000000
Min.	2.000000	3.0000000	2.000000
1st Qu.	5.000000	5.0000000	4.000000
Median	6.000000	6.0000000	5.000000
Mean	5.357143	5.7105263	4.937500
3rd Qu.	6.000000	6.0000000	6.000000
Max.	7.000000	7.0000000	7.000000
Var	1.363354	0.8598862	1.673387





Shapiro tests

```
    Shapiro-Wilk normality test

data:  default_1_r
W = 0.80887, p-value = 1.593e-05


    Shapiro-Wilk normality test

data:  narrow_1_r
W = 0.76209, p-value = 1.927e-06


    Shapiro-Wilk normality test

data:  wide_1_r
W = 0.84858, p-value = 0.0001207
```

Symmetry tests

```
    m-out-of-n bootstrap symmetry test by Miao, Gel, and Gastwirth (2006)

data:  default_1_r
Test statistic = 0.93002, p-value = 0.44
alternative hypothesis: the distribution is asymmetric.
sample estimates:
bootstrap optimal m
                 21


    m-out-of-n bootstrap symmetry test by Miao, Gel, and Gastwirth (2006)

data:  narrow_1_r
Test statistic = 4.1428, p-value < 2.2e-16
alternative hypothesis: the distribution is asymmetric.
sample estimates:
bootstrap optimal m
                 15


    m-out-of-n bootstrap symmetry test by Miao, Gel, and Gastwirth (2006)

data:  wide_1_r
Test statistic = -3.1136, p-value = 0.07
alternative hypothesis: the distribution is asymmetric.
sample estimates:
bootstrap optimal m
                 30
```

Pairwise Sign Tests

```
    Dependent-samples Sign-Test

data:  default_1_r and narrow_1_r
S = 1, p-value = 0.006348
alternative hypothesis: true median difference is not equal to 0
95 percent confidence interval:
 0 0
sample estimates:
median of x-y
            0
```

```
Achieved and Interpolated Confidence Intervals:

                  Conf.Level L.E.pt U.E.pt
Lower Achieved CI     0.9270      0      0
Interpolated CI       0.9500      0      0
Upper Achieved CI     0.9664      0      0


    Dependent-samples Sign-Test

data:  default_1_r and wide_1_r
S = 13, p-value = 0.02127
alternative hypothesis: true median difference is not equal to 0
95 percent confidence interval:
 0.0000000 0.5825381
sample estimates:
median of x-y
            0

Achieved and Interpolated Confidence Intervals:

                  Conf.Level L.E.pt U.E.pt
Lower Achieved CI     0.9270      0 0.0000
Interpolated CI       0.9500      0 0.5825
Upper Achieved CI     0.9664      0 1.0000


    Dependent-samples Sign-Test

data:  wide_1_r and narrow_1_r
S = 1, p-value = 5.722e-06
alternative hypothesis: true median difference is not equal to 0
95 percent confidence interval:
 -1  0
sample estimates:
median of x-y
           -1

Achieved and Interpolated Confidence Intervals:

                  Conf.Level L.E.pt U.E.pt
Lower Achieved CI     0.9270     -1      0
Interpolated CI       0.9500     -1      0
Upper Achieved CI     0.9664     -1      0
```

Shapiro tests

```
    Shapiro-Wilk normality test

data:  default_1_py
W = 0.85878, p-value = 0.0006465


    Shapiro-Wilk normality test

data:  narrow_1_py
W = 0.84044, p-value = 0.0002593


    Shapiro-Wilk normality test

data:  wide_1_py
W = 0.93019, p-value = 0.03965
```

Symmetry tests

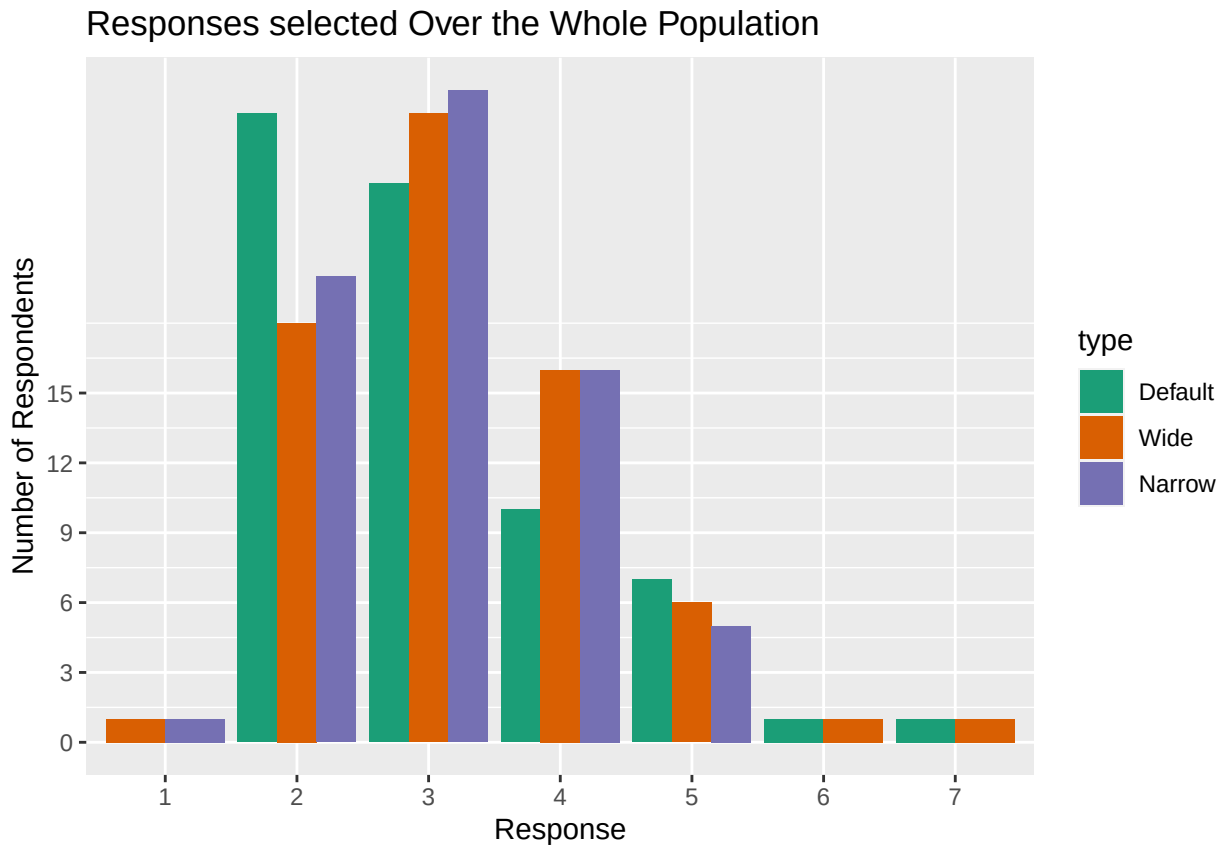
```
    m-out-of-n bootstrap symmetry test by Miao, Gel, and Gastwirth (2006)

data:  default_1_py
Test statistic = -2.3377, p-value = 0.052
alternative hypothesis: the distribution is asymmetric.
sample estimates:
bootstrap optimal m
                 22


    m-out-of-n bootstrap symmetry test by Miao, Gel, and Gastwirth (2006)

data:  narrow_1_py
Test statistic = -1.1948, p-value = 0.272
alternative hypothesis: the distribution is asymmetric.
sample estimates:
bootstrap optimal m
                 20


    m-out-of-n bootstrap symmetry test by Miao, Gel, and Gastwirth (2006)

data:  wide_1_py
```

```
Test statistic = -0.39828, p-value = 0.734
alternative hypothesis: the distribution is asymmetric.
sample estimates:
bootstrap optimal m
                 20
```

	Default	Narrow	Wide
N	23.0000000	22.0000000	23.0000000
Min.	3.0000000	5.0000000	3.0000000
1st Qu.	5.0000000	5.2500000	5.0000000
Median	5.0000000	6.0000000	5.0000000
Mean	5.2173913	6.0454545	5.2173913
3rd Qu.	6.0000000	7.0000000	6.0000000
Max.	7.0000000	7.0000000	7.0000000
Var	0.9960474	0.6168831	0.9960474

##How large would you say the difference between 'Log Grip' and 'Floating Steps' is?

	Default	Narrow	Wide
N	70.000000	70.000000	70.0000000
Min.	2.000000	1.000000	1.0000000
1st Qu.	2.000000	2.000000	2.0000000
Median	3.000000	3.000000	3.0000000
Mean	3.057143	3.214286	3.0571429
3rd Qu.	4.000000	4.000000	4.0000000
Max.	7.000000	7.000000	5.0000000
Var	1.301035	1.214286	0.8662526



Shapiro tests

```
    Shapiro-Wilk normality test

data:  default_2
W = 0.82288, p-value = 1.023e-07


    Shapiro-Wilk normality test

data:  narrow_2
W = 0.89138, p-value = 1.801e-05


    Shapiro-Wilk normality test

data:  wide_2
W = 0.88477, p-value = 1.022e-05
```

Symmetry tests

```
    m-out-of-n bootstrap symmetry test by Miao, Gel, and Gastwirth (2006)

data:  default_2
Test statistic = 0.60937, p-value = 0.61
alternative hypothesis: the distribution is asymmetric.
sample estimates:
bootstrap optimal m
                 24
```

```
    m-out-of-n bootstrap symmetry test by Miao, Gel, and Gastwirth (2006)

data:  narrow_2
Test statistic = 2.4098, p-value = 0.064
alternative hypothesis: the distribution is asymmetric.
sample estimates:
bootstrap optimal m
                 19
```

```
    m-out-of-n bootstrap symmetry test by Miao, Gel, and Gastwirth (2006)

data:  wide_2
Test statistic = 0.73632, p-value = 0.5
alternative hypothesis: the distribution is asymmetric.
sample estimates:
bootstrap optimal m
                 35
```

Pairwise Sign Tests

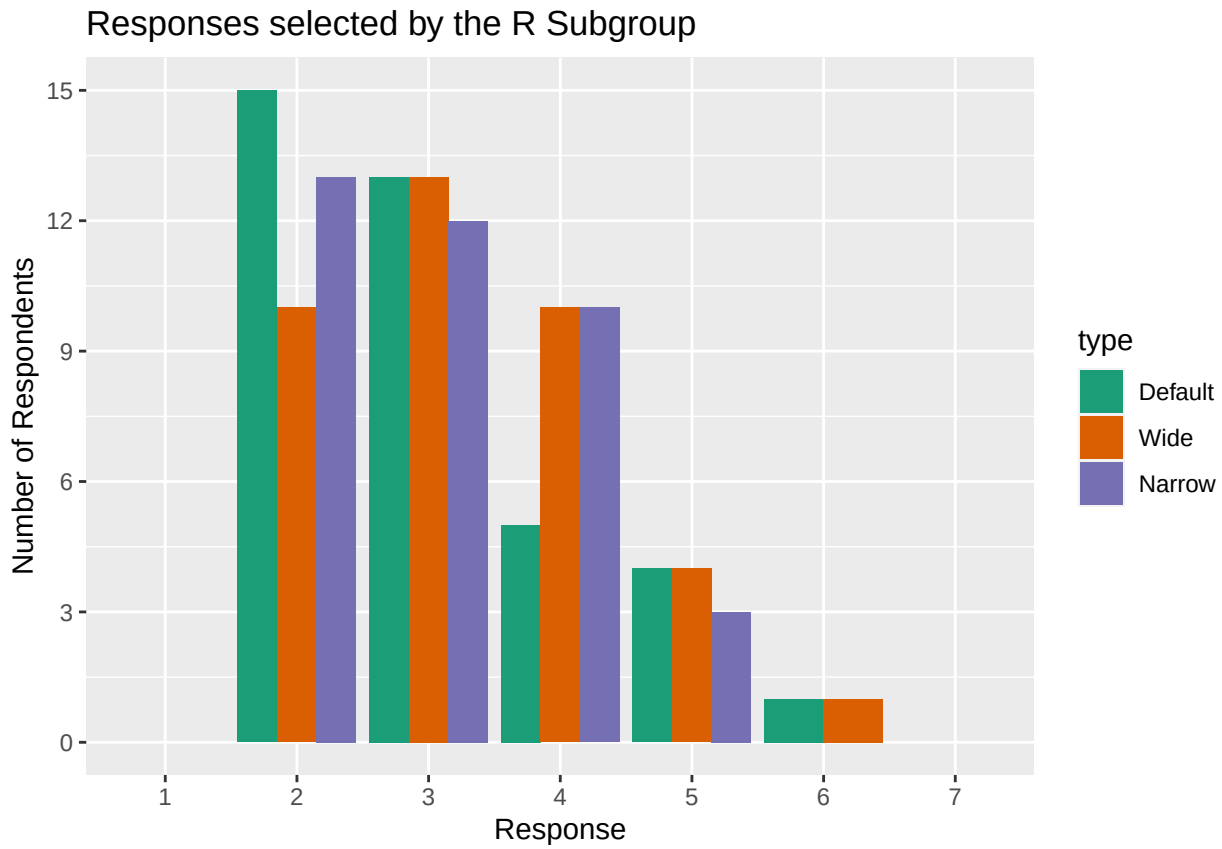
```
    Dependent-samples Sign-Test

data:  default_2 and narrow_2
S = 14, p-value = 0.243
alternative hypothesis: true median difference is not equal to 0
95 percent confidence interval:
 0 0
sample estimates:
median of x-y
            0
```

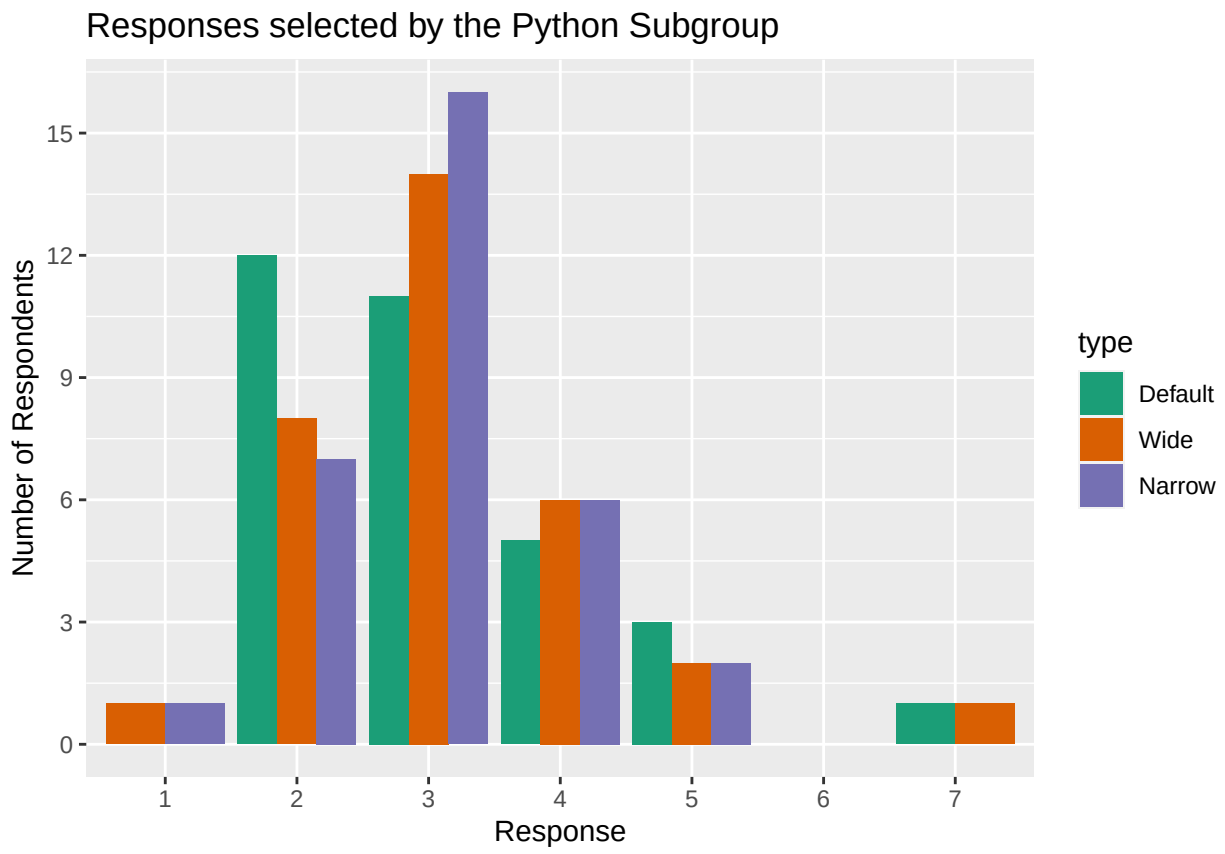
```
Achieved and Interpolated Confidence Intervals:

                  Conf.Level L.E.pt U.E.pt
Lower Achieved CI     0.9278      0      0
Interpolated CI       0.9500      0      0
Upper Achieved CI     0.9586      0      0


    Dependent-samples Sign-Test

data:  default_2 and wide_2
S = 16, p-value = 0.4177
alternative hypothesis: true median difference is not equal to 0
95 percent confidence interval:
 0 0
sample estimates:
median of x-y
            0

Achieved and Interpolated Confidence Intervals:

                  Conf.Level L.E.pt U.E.pt
Lower Achieved CI     0.9278      0      0
Interpolated CI       0.9500      0      0
Upper Achieved CI     0.9586      0      0


    Dependent-samples Sign-Test

data:  wide_2 and narrow_2
S = 17, p-value = 0.7428
alternative hypothesis: true median difference is not equal to 0
95 percent confidence interval:
 0 0
sample estimates:
median of x-y
            0

Achieved and Interpolated Confidence Intervals:

                  Conf.Level L.E.pt U.E.pt
Lower Achieved CI     0.9278      0      0
Interpolated CI       0.9500      0      0
Upper Achieved CI     0.9586      0      0
```

Pairwise Wilcox Tests

```
    Wilcoxon rank sum test with continuity correction

data:  default_2 and wide_2
W = 2319.5, p-value = 0.5688
alternative hypothesis: true location shift is not equal to 0
```

	Whole Pop	R	Python
N	70.000000	38.000000	32.00000
Min.	2.000000	2.000000	2.00000
1st Qu.	2.000000	2.000000	2.00000
Median	3.000000	3.000000	3.00000
Mean	3.057143	3.026316	3.09375
3rd Qu.	4.000000	3.750000	4.00000
Max.	7.000000	6.000000	7.00000
Var	1.301035	1.215505	1.44254





Shapiro tests

```
    Shapiro-Wilk normality test

data:  default_2_r
W = 0.82519, p-value = 3.556e-05


    Shapiro-Wilk normality test

data:  narrow_2_r
W = 0.88751, p-value = 0.001153


    Shapiro-Wilk normality test

data:  wide_2_r
W = 0.85259, p-value = 0.0001502
```

Symmetry tests

```
    m-out-of-n bootstrap symmetry test by Miao, Gel, and Gastwirth (2006)

data:  default_2_r
Test statistic = 0.21, p-value = 0.852
alternative hypothesis: the distribution is asymmetric.
sample estimates:
bootstrap optimal m
                 12


    m-out-of-n bootstrap symmetry test by Miao, Gel, and Gastwirth (2006)

data:  narrow_2_r
Test statistic = 2.3101, p-value = 0.074
alternative hypothesis: the distribution is asymmetric.
sample estimates:
bootstrap optimal m
                 15


    m-out-of-n bootstrap symmetry test by Miao, Gel, and Gastwirth (2006)

data:  wide_2_r
Test statistic = 0.67346, p-value = 0.536
alternative hypothesis: the distribution is asymmetric.
sample estimates:
bootstrap optimal m
                 19
```

Pairwise Wilcox Tests

```
    Wilcoxon rank sum test with continuity correction

data:  default_2_r and narrow_2_r
W = 607, p-value = 0.2138
alternative hypothesis: true location shift is not equal to 0


    Wilcoxon rank sum test with continuity correction

data:  narrow_2_r and wide_2_r
W = 796, p-value = 0.4254
```

```
alternative hypothesis: true location shift is not equal to 0


    Wilcoxon rank sum test with continuity correction

data:  wide_2_r and default_2_r
W = 765.5, p-value = 0.6389
alternative hypothesis: true location shift is not equal to 0
```

Shapiro tests

```
    Shapiro-Wilk normality test

data:  default_2_py
W = 0.81676, p-value = 8.555e-05


    Shapiro-Wilk normality test

data:  narrow_2_py
W = 0.86709, p-value = 0.0009957


    Shapiro-Wilk normality test

data:  wide_2_py
W = 0.88958, p-value = 0.003397
```

Symmetry tests

```
    m-out-of-n bootstrap symmetry test by Miao, Gel, and Gastwirth (2006)

data:  default_2_py
Test statistic = 0.66379, p-value = 0.616
alternative hypothesis: the distribution is asymmetric.
sample estimates:
bootstrap optimal m
                 14


    m-out-of-n bootstrap symmetry test by Miao, Gel, and Gastwirth (2006)

data:  narrow_2_py
Test statistic = 0.99569, p-value = 0.416
```

```
alternative hypothesis: the distribution is asymmetric.
sample estimates:
bootstrap optimal m
                 25


    m-out-of-n bootstrap symmetry test by Miao, Gel, and Gastwirth (2006)

data:  wide_2_py
Test statistic = 0.31443, p-value = 0.836
alternative hypothesis: the distribution is asymmetric.
sample estimates:
bootstrap optimal m
                 32
```

Pairwise Sign Tests

```
    Dependent-samples Sign-Test

data:  default_2_py and narrow_2_py
S = 8, p-value = 0.8145
alternative hypothesis: true median difference is not equal to 0
95 percent confidence interval:
 -0.00341068  0.00000000
sample estimates:
median of x-y
            0

Achieved and Interpolated Confidence Intervals:

                  Conf.Level  L.E.pt U.E.pt
Lower Achieved CI     0.9499  0.0000      0
Interpolated CI       0.9500 -0.0034      0
Upper Achieved CI     0.9799 -1.0000      0


    Dependent-samples Sign-Test

data:  default_2_py and wide_2_py
S = 8, p-value = 1
alternative hypothesis: true median difference is not equal to 0
95 percent confidence interval:
 0 0
sample estimates:
```

```
median of x-y
            0

Achieved and Interpolated Confidence Intervals:

                  Conf.Level L.E.pt U.E.pt
Lower Achieved CI     0.9499      0      0
Interpolated CI       0.9500      0      0
Upper Achieved CI     0.9799      0      0


    Dependent-samples Sign-Test

data:  wide_2_py and narrow_2_py
S = 10, p-value = 1
alternative hypothesis: true median difference is not equal to 0
95 percent confidence interval:
 0.00000000 0.00341068
sample estimates:
median of x-y
            0

Achieved and Interpolated Confidence Intervals:

                  Conf.Level L.E.pt U.E.pt
Lower Achieved CI     0.9499      0 0.0000
Interpolated CI       0.9500      0 0.0034
Upper Achieved CI     0.9799      0 1.0000
```

Pairwise Wilcox Tests

```
    Wilcoxon rank sum test with continuity correction

data:  default_2_py and wide_2_py
W = 490, p-value = 0.76
alternative hypothesis: true location shift is not equal to 0

           Default     Narrow       Wide
N       23.0000000 22.0000000 23.0000000
Min.     2.0000000  2.0000000  2.0000000
1st Qu.  3.0000000  2.0000000  3.0000000
Median   3.0000000  3.0000000  3.0000000
Mean     3.3043478  3.0000000  3.3043478
3rd Qu.  4.0000000  3.0000000  4.0000000
```

```
Max.     5.0000000  5.0000000  5.0000000
Var      0.8577075  0.8571429  0.8577075
```

Differences in means for Q1 and Q2

All

```
           Default     Narrow      Wide
Default  0.0000000 -0.2142857 0.5571429
Narrow   0.2142857  0.0000000 0.7714286
Wide    -0.5571429 -0.7714286 0.0000000
```

```
          Default     Narrow      Wide
Default 0.0000000 -0.1571429 0.0000000
Narrow  0.1571429  0.0000000 0.1571429
Wide    0.0000000 -0.1571429 0.0000000
```

R

```
           Default     Narrow      Wide
Default  0.0000000 -0.2894737 0.3684211
Narrow   0.2894737  0.0000000 0.6578947
Wide    -0.3684211 -0.6578947 0.0000000
```

```
           Default     Narrow        Wide
Default 0.00000000 -0.2631579 -0.05263158
Narrow  0.26315789  0.0000000  0.21052632
Wide    0.05263158 -0.2105263  0.00000000
```

Py

```
         Default   Narrow    Wide
Default  0.00000 -0.12500 0.78125
Narrow   0.12500  0.00000 0.90625
Wide    -0.78125 -0.90625 0.00000
```

```
         Default   Narrow    Wide
Default  0.00000 -0.03125 0.06250
Narrow   0.03125  0.00000 0.09375
Wide    -0.06250 -0.09375 0.00000
```

##How many times would you say 'Floating Steps' were used?

Whole Population

```
           Default     Narrow      Wide
N       70.0000000 70.0000000 70.000000
Min.    26.0000000 23.0000000 24.000000
1st Qu. 27.1250000 27.0000000 27.000000
Median  28.0000000 28.0000000 28.000000
Mean    27.9714286 27.3857143 28.035714
3rd Qu. 28.0000000 28.0000000 29.000000
Max.    33.0000000 29.0000000 30.000000
Var      0.9774327  0.8708075  1.929865
```

Shapiro tests

```
    Shapiro-Wilk normality test

data:  default_3
W = 0.73638, p-value = 6.81e-10


    Shapiro-Wilk normality test

data:  narrow_3
W = 0.68453, p-value = 5.579e-11


    Shapiro-Wilk normality test

data:  wide_3
W = 0.89126, p-value = 1.782e-05
```

Symmetry tests

```
    m-out-of-n bootstrap symmetry test by Miao, Gel, and Gastwirth (2006)

data:  default_3
Test statistic = -0.46504, p-value = 0.79
alternative hypothesis: the distribution is asymmetric.
sample estimates:
bootstrap optimal m
                 49


    m-out-of-n bootstrap symmetry test by Miao, Gel, and Gastwirth (2006)
```

```
data:  narrow_3
Test statistic = -8.4431, p-value < 2.2e-16
alternative hypothesis: the distribution is asymmetric.
sample estimates:
bootstrap optimal m
                 24


    m-out-of-n bootstrap symmetry test by Miao, Gel, and Gastwirth (2006)

data:  wide_3
Test statistic = 0.32725, p-value = 0.778
alternative hypothesis: the distribution is asymmetric.
sample estimates:
bootstrap optimal m
                 62
```

Pairwise Sign Tests

```
    Dependent-samples Sign-Test

data:  default_3 and narrow_3
S = 24, p-value = 0.00018
alternative hypothesis: true median difference is not equal to 0
95 percent confidence interval:
 0 0
sample estimates:
median of x-y
            0

Achieved and Interpolated Confidence Intervals:

                  Conf.Level L.E.pt U.E.pt
Lower Achieved CI     0.9278      0      0
Interpolated CI       0.9500      0      0
Upper Achieved CI     0.9586      0      0


    Dependent-samples Sign-Test

data:  default_3 and wide_3
S = 17, p-value = 0.6271
alternative hypothesis: true median difference is not equal to 0
```

```
95 percent confidence interval:
 0 0
sample estimates:
median of x-y
            0

Achieved and Interpolated Confidence Intervals:

                  Conf.Level L.E.pt U.E.pt
Lower Achieved CI     0.9278      0      0
Interpolated CI       0.9500      0      0
Upper Achieved CI     0.9586      0      0


    Dependent-samples Sign-Test

data:  wide_3 and narrow_3
S = 32, p-value = 0.0009407
alternative hypothesis: true median difference is not equal to 0
95 percent confidence interval:
 0 1
sample estimates:
median of x-y
            0

Achieved and Interpolated Confidence Intervals:

                  Conf.Level L.E.pt U.E.pt
Lower Achieved CI     0.9278      0      1
Interpolated CI       0.9500      0      1
Upper Achieved CI     0.9586      0      1
```

Pairwise Wilcox Tests

```
    Wilcoxon rank sum test with continuity correction

data:  default_3 and wide_3
W = 2252, p-value = 0.378
alternative hypothesis: true location shift is not equal to 0
```

Default - Language comparison

```
         Whole Pop         R     Python
N       70.0000000 38.000000 32.0000000
```

```
Min.    26.0000000 26.000000 27.0000000
1st Qu. 27.1250000 28.000000 27.0000000
Median  28.0000000 28.000000 28.0000000
Mean    27.9714286 27.973684 27.9687500
3rd Qu. 28.0000000 28.000000 28.0000000
Max.    33.0000000 33.000000 30.0000000
Var      0.9774327  1.053343  0.9183468
```

Narrow - Language comparison

```
         Whole Pop          R    Python
N       70.0000000 38.0000000 32.000000
Min.    23.0000000 24.0000000 23.000000
1st Qu. 27.0000000 27.0000000 27.000000
Median  28.0000000 28.0000000 27.000000
Mean    27.3857143 27.5000000 27.250000
3rd Qu. 28.0000000 28.0000000 28.000000
Max.    29.0000000 28.0000000 29.000000
Var      0.8708075  0.6891892  1.080645
```

Wide - Language comparison

```
        Whole Pop          R    Python
N       70.000000 38.0000000 32.000000
Min.    24.000000 25.0000000 24.000000
1st Qu. 27.000000 27.2500000 27.000000
Median  28.000000 28.0000000 28.500000
Mean    28.035714 27.8157895 28.296875
3rd Qu. 29.000000 28.0000000 30.000000
Max.    30.000000 30.0000000 30.000000
Var      1.929865  0.7489331  3.271925
```

Shapiro tests

```
    Shapiro-Wilk normality test

data:  default_3_r
W = 0.59978, p-value = 5.639e-09
```

```
    Shapiro-Wilk normality test

data:  narrow_3_r
W = 0.63037, p-value = 1.482e-08
```

```
    Shapiro-Wilk normality test

data:  wide_3_r
W = 0.8221, p-value = 3.046e-05
```

Symmetry tests

```
    m-out-of-n bootstrap symmetry test by Miao, Gel, and Gastwirth (2006)

data:  default_3_r
Test statistic = -0.38295, p-value = 0.862
alternative hypothesis: the distribution is asymmetric.
sample estimates:
bootstrap optimal m
                 21
```

```
    m-out-of-n bootstrap symmetry test by Miao, Gel, and Gastwirth (2006)

data:  narrow_3_r
Test statistic = -6.5102, p-value < 2.2e-16
alternative hypothesis: the distribution is asymmetric.
sample estimates:
bootstrap optimal m
                 17
```

```
    m-out-of-n bootstrap symmetry test by Miao, Gel, and Gastwirth (2006)

data:  wide_3_r
Test statistic = -2.3985, p-value = 0.134
alternative hypothesis: the distribution is asymmetric.
sample estimates:
bootstrap optimal m
                 17
```

Pairwise Wilcox Tests

```
    Wilcoxon rank sum test with continuity correction

data:  default_3_r and narrow_3_r
W = 889.5, p-value = 0.03838
```

```
alternative hypothesis: true location shift is not equal to 0


    Wilcoxon rank sum test with continuity correction

data:  narrow_3_r and wide_3_r
W = 585, p-value = 0.101
alternative hypothesis: true location shift is not equal to 0


    Wilcoxon rank sum test with continuity correction

data:  wide_3_r and default_3_r
W = 698.5, p-value = 0.7788
alternative hypothesis: true location shift is not equal to 0
```

Shapiro tests

```
    Shapiro-Wilk normality test

data:  default_3_py
W = 0.79971, p-value = 4.024e-05


    Shapiro-Wilk normality test

data:  narrow_3_py
W = 0.69403, p-value = 7.086e-07


    Shapiro-Wilk normality test

data:  wide_3_py
W = 0.84294, p-value = 0.0002928
```

Symmetry tests

```
    m-out-of-n bootstrap symmetry test by Miao, Gel, and Gastwirth (2006)

data:  default_3_py
Test statistic = -0.28448, p-value = 0.876
alternative hypothesis: the distribution is asymmetric.
sample estimates:
bootstrap optimal m
```

```
                18


    m-out-of-n bootstrap symmetry test by Miao, Gel, and Gastwirth (2006)

data:  narrow_3_py
Test statistic = 2.3897, p-value = 0.176
alternative hypothesis: the distribution is asymmetric.
sample estimates:
bootstrap optimal m
                20


    m-out-of-n bootstrap symmetry test by Miao, Gel, and Gastwirth (2006)

data:  wide_3_py
Test statistic = -0.80066, p-value = 0.586
alternative hypothesis: the distribution is asymmetric.
sample estimates:
bootstrap optimal m
                16
```

Pairwise Sign Tests

```
    Dependent-samples Sign-Test

data:  default_3_py and narrow_3_py
S = 12, p-value = 0.01294
alternative hypothesis: true median difference is not equal to 0
95 percent confidence interval:
 0 1
sample estimates:
median of x-y
            0

Achieved and Interpolated Confidence Intervals:

                  Conf.Level L.E.pt U.E.pt
Lower Achieved CI     0.9499      0      1
Interpolated CI       0.9500      0      1
Upper Achieved CI     0.9799      0      1


    Dependent-samples Sign-Test
```

```
data:  default_3_py and wide_3_py
S = 9, p-value = 0.4049
alternative hypothesis: true median difference is not equal to 0
95 percent confidence interval:
 -1.003411  0.000000
sample estimates:
median of x-y
            0

Achieved and Interpolated Confidence Intervals:

                  Conf.Level  L.E.pt U.E.pt
Lower Achieved CI     0.9499 -1.0000      0
Interpolated CI       0.9500 -1.0034      0
Upper Achieved CI     0.9799 -2.0000      0


    Dependent-samples Sign-Test

data:  wide_3_py and narrow_3_py
S = 19, p-value = 0.02896
alternative hypothesis: true median difference is not equal to 0
95 percent confidence interval:
 0.000000 2.501705
sample estimates:
median of x-y
          1.5

Achieved and Interpolated Confidence Intervals:

                  Conf.Level L.E.pt U.E.pt
Lower Achieved CI     0.9499      0 2.5000
Interpolated CI       0.9500      0 2.5017
Upper Achieved CI     0.9799      0 3.0000
```

Pairwise Wilcox Tests

```
    Wilcoxon rank sum test with continuity correction

data:  default_3_py and wide_3_py
W = 417, p-value = 0.1904
alternative hypothesis: true location shift is not equal to 0
```

Default - Degree comparison

	STEM	Humanities	Social Sci	Arts	Business	NA
N	0	0	0	0	0	0
Min.	NA	NA	NA	NA	NA	NA
1st Qu.	NA	NA	NA	NA	NA	NA
Median	NA	NA	NA	NA	NA	NA
Mean	NaN	NaN	NaN	NaN	NaN	NaN
3rd Qu.	NA	NA	NA	NA	NA	NA
Max.	NA	NA	NA	NA	NA	NA
Var	NA	NA	NA	NA	NA	NA

Narrow - Degree comparison

	STEM	Humanities	Social Sci	Arts	Business	NA
N	29.0000000	3.000000	31.0000000	2	4.0	1
Min.	26.0000000	23.000000	24.0000000	28	25.0	28
1st Qu.	27.0000000	24.500000	27.0000000	28	26.5	28
Median	28.0000000	26.000000	27.0000000	28	27.5	28
Mean	27.5517241	25.666667	27.3870968	28	27.0	28
3rd Qu.	28.0000000	27.000000	28.0000000	28	28.0	28
Max.	28.0000000	28.000000	29.0000000	28	28.0	28
Var	0.3275862	6.333333	0.6951613	0	2.0	NA

Wide - Degree comparison

	STEM	Humanities	Social Sci	Arts	Business	NA
N	29.000000	3.0	31.000000	2.0	4.0	1
Min.	1.000000	2.0	1.000000	1.0	1.0	1
1st Qu.	1.000000	2.0	1.000000	1.5	1.0	1
Median	2.000000	2.0	2.000000	2.0	1.0	1
Mean	2.206897	3.0	2.322581	2.0	1.5	1
3rd Qu.	3.000000	3.5	3.000000	2.5	1.5	1
Max.	6.000000	5.0	5.000000	3.0	3.0	1
Var	1.669951	3.0	1.559140	2.0	1.0	NA

	Default	Narrow	Wide
N	23.000000	22.000000	23.000000
Min.	24.000000	23.000000	24.000000
1st Qu.	27.250000	27.000000	27.250000
Median	28.000000	28.000000	28.000000
Mean	27.891304	27.272727	27.891304
3rd Qu.	28.500000	28.000000	28.500000
Max.	30.000000	28.000000	30.000000
Var	1.999012	1.445887	1.999012

Ratio Comparison questions - All

	Default	Narrow	Wide
Most aesthetically pleasing?	37	14	18
Easiest to read and interpret?	36	15	19
Hardest to read and interpret?	20	20	30

Ratio Comparison questions - R

	A	B	C
Most aesthetically pleasing?	14	14	9
Easiest to read and interpret?	16	9	13
Hardest to read and interpret?	2	18	18

Ratio Comparison questions - Py

	A	B	C
Most aesthetically pleasing?	12	11	9
Easiest to read and interpret?	14	8	10
Hardest to read and interpret?	12	9	11

Ninja Warrior - Part 3

##How many times would you say 'Floating Steps' were used in the Finals (Regional/City) round?

Whole pop summary

	Stacked	Grouped
N	70.00000	70.00000
Min.	9.00000	10.00000
1st Qu.	10.00000	11.00000
Median	11.00000	11.00000
Mean	14.32857	11.80000
3rd Qu.	14.00000	12.00000
Max.	35.00000	40.00000
Var	54.83251	13.14783

R population

	Stacked	Grouped
N	38.00000	38.0000000
Min.	9.00000	10.0000000
1st Qu.	10.00000	11.0000000
Median	10.00000	11.0000000

```
Mean    13.15789 11.2368421
3rd Qu. 12.00000 12.0000000
Max.    35.00000 12.0000000
Var     45.37980  0.4018492
```

Py population

```
         Stacked    Grouped
N       32.00000 32.0000000
Min.     9.00000 10.0000000
1st Qu. 10.00000 11.0000000
Median  11.50000 11.0000000
Mean    15.71875 12.4687500
3rd Qu. 16.25000 12.0000000
Max.    35.00000 40.0000000
Var     45.37980  0.4018492
```

Shapiro and symmetry tests for the responses for the stacked bar plot

```
    Shapiro-Wilk normality test

data:  stacked_1
W = 0.63951, p-value = 7.897e-12


    m-out-of-n bootstrap symmetry test by Miao, Gel, and Gastwirth (2006)

data:  stacked_1
Test statistic = 6.75, p-value < 2.2e-16
alternative hypothesis: the distribution is asymmetric.
sample estimates:
bootstrap optimal m
                 15


    Shapiro-Wilk normality test

data:  stacked_1_r
W = 0.53859, p-value = 9.347e-10


    m-out-of-n bootstrap symmetry test by Miao, Gel, and Gastwirth (2006)
```

```
data:  stacked_1_r
Test statistic = 6.4034, p-value < 2.2e-16
alternative hypothesis: the distribution is asymmetric.
sample estimates:
bootstrap optimal m
                 15


    Shapiro-Wilk normality test

data:  stacked_1_py
W = 0.73207, p-value = 2.722e-06


    m-out-of-n bootstrap symmetry test by Miao, Gel, and Gastwirth (2006)

data:  stacked_1_py
Test statistic = 4.5565, p-value < 2.2e-16
alternative hypothesis: the distribution is asymmetric.
sample estimates:
bootstrap optimal m
                 14
```

Shapiro and symmetry tests for the responses for the grouped bar plot

```
    Shapiro-Wilk normality test

data:  grouped_1
W = 0.29757, p-value < 2.2e-16


    m-out-of-n bootstrap symmetry test by Miao, Gel, and Gastwirth (2006)

data:  grouped_1
Test statistic = 6.3437, p-value < 2.2e-16
alternative hypothesis: the distribution is asymmetric.
sample estimates:
bootstrap optimal m
                 22


    Shapiro-Wilk normality test
```

```
data:  grouped_1_r
W = 0.7742, p-value = 3.25e-06


    m-out-of-n bootstrap symmetry test by Miao, Gel, and Gastwirth (2006)

data:  grouped_1_r
Test statistic = 3.4466, p-value = 0.018
alternative hypothesis: the distribution is asymmetric.
sample estimates:
bootstrap optimal m
                 12


    Shapiro-Wilk normality test

data:  grouped_1_py
W = 0.38626, p-value = 1.833e-10


    m-out-of-n bootstrap symmetry test by Miao, Gel, and Gastwirth (2006)

data:  grouped_1_py
Test statistic = 4.603, p-value < 2.2e-16
alternative hypothesis: the distribution is asymmetric.
sample estimates:
bootstrap optimal m
                 14
```

Sign tests for the responses for the stacked bar plot

```
    One-sample Sign-Test

data:  stacked_1
s = 28, p-value = 0.5258
alternative hypothesis: true median is not equal to 11
95 percent confidence interval:
 10 12
sample estimates:
median of x
         11

Achieved and Interpolated Confidence Intervals:
```

```
                  Conf.Level L.E.pt U.E.pt
Lower Achieved CI     0.9278     10     12
Interpolated CI       0.9500     10     12
Upper Achieved CI     0.9586     10     12


    One-sample Sign-Test

data:  stacked_1_r
s = 12, p-value = 0.1214
alternative hypothesis: true median is not equal to 11
95 percent confidence interval:
 10 11
sample estimates:
median of x
         10

Achieved and Interpolated Confidence Intervals:

                  Conf.Level L.E.pt U.E.pt
Lower Achieved CI     0.9270     10     11
Interpolated CI       0.9500     10     11
Upper Achieved CI     0.9664     10     11


    One-sample Sign-Test

data:  stacked_1_py
s = 16, p-value = 0.5716
alternative hypothesis: true median is not equal to 11
95 percent confidence interval:
 10 15
sample estimates:
median of x
       11.5

Achieved and Interpolated Confidence Intervals:

                  Conf.Level L.E.pt U.E.pt
Lower Achieved CI     0.9499     10     15
Interpolated CI       0.9500     10     15
Upper Achieved CI     0.9799     10     15
```

Sign test for the responses for the grouped bar plot

```
    One-sample Sign-Test

data:  grouped_1
s = 28, p-value = 0.009475
alternative hypothesis: true median is not equal to 11
95 percent confidence interval:
 11 12
sample estimates:
median of x
         11

Achieved and Interpolated Confidence Intervals:

                  Conf.Level L.E.pt U.E.pt
Lower Achieved CI     0.9278     11     12
Interpolated CI       0.9500     11     12
Upper Achieved CI     0.9586     11     12


    One-sample Sign-Test

data:  grouped_1_r
s = 13, p-value = 0.04904
alternative hypothesis: true median is not equal to 11
95 percent confidence interval:
 11.00000 11.58254
sample estimates:
median of x
         11

Achieved and Interpolated Confidence Intervals:

                  Conf.Level L.E.pt  U.E.pt
Lower Achieved CI     0.9270     11 11.0000
Interpolated CI       0.9500     11 11.5825
Upper Achieved CI     0.9664     11 12.0000


    One-sample Sign-Test

data:  grouped_1_py
s = 15, p-value = 0.1338
```

```
alternative hypothesis: true median is not equal to 11
95 percent confidence interval:
 11 12
sample estimates:
median of x
         11

Achieved and Interpolated Confidence Intervals:

                  Conf.Level L.E.pt U.E.pt
Lower Achieved CI     0.9499     11     12
Interpolated CI       0.9500     11     12
Upper Achieved CI     0.9799     11     12
```

##How many times would you say 'Log Grip' was used in the Finals (Regional/City) round?

Whole pop summary

```
         Stacked   Grouped
N       70.00000 70.000000
Min.     6.00000  2.000000
1st Qu.  8.00000  8.000000
Median   9.00000  9.000000
Mean    10.57143  9.057143
3rd Qu. 10.00000 10.000000
Max.    25.00000 15.000000
Var     23.92961  1.967702
```

R population

```
         Stacked    Grouped
N       38.00000 38.0000000
Min.     6.00000  7.0000000
1st Qu.  8.00000  9.0000000
Median   9.00000  9.0000000
Mean    10.10526  9.0526316
3rd Qu. 10.00000 10.0000000
Max.    23.00000 10.0000000
Var     18.36700  0.6458037
```

Py population

```
        Stacked    Grouped
N        32.000 32.0000000
Min.      6.000  2.0000000
```

```
1st Qu.   8.000  8.0000000
Median    9.000  9.0000000
Mean     11.125  9.0625000
3rd Qu.  10.000 10.0000000
Max.     25.000 15.0000000
Var      18.367  0.6458037
```

###Shapiro tests for the responses for the stacked bar plot

```
    Shapiro-Wilk normality test

data:  stacked_2
W = 0.66339, p-value = 2.179e-11


    m-out-of-n bootstrap symmetry test by Miao, Gel, and Gastwirth (2006)

data:  stacked_2
Test statistic = 4.9088, p-value < 2.2e-16
alternative hypothesis: the distribution is asymmetric.
sample estimates:
bootstrap optimal m
                 17


    Shapiro-Wilk normality test

data:  stacked_2_r
W = 0.60137, p-value = 5.922e-09


    m-out-of-n bootstrap symmetry test by Miao, Gel, and Gastwirth (2006)

data:  stacked_2_r
Test statistic = 3.1794, p-value = 0.004
alternative hypothesis: the distribution is asymmetric.
sample estimates:
bootstrap optimal m
                 12


    Shapiro-Wilk normality test

data:  stacked_2_py
W = 0.71251, p-value = 1.345e-06
```

```
    m-out-of-n bootstrap symmetry test by Miao, Gel, and Gastwirth (2006)

data:  stacked_2_py
Test statistic = 3.6271, p-value = 0.002
alternative hypothesis: the distribution is asymmetric.
sample estimates:
bootstrap optimal m
                 16
```

###Shapiro test for the responses for the grouped bar plot

```
    Shapiro-Wilk normality test

data:  grouped_2
W = 0.7287, p-value = 4.611e-10


    m-out-of-n bootstrap symmetry test by Miao, Gel, and Gastwirth (2006)

data:  grouped_2
Test statistic = 0.63113, p-value = 0.67
alternative hypothesis: the distribution is asymmetric.
sample estimates:
bootstrap optimal m
                 19


    Shapiro-Wilk normality test

data:  grouped_2_r
W = 0.84122, p-value = 8.138e-05


    m-out-of-n bootstrap symmetry test by Miao, Gel, and Gastwirth (2006)

data:  grouped_2_r
Test statistic = 0.59183, p-value = 0.6
alternative hypothesis: the distribution is asymmetric.
sample estimates:
bootstrap optimal m
                 27


    Shapiro-Wilk normality test
```

```
data:  grouped_2_py
W = 0.7515, p-value = 5.65e-06


    m-out-of-n bootstrap symmetry test by Miao, Gel, and Gastwirth (2006)

data:  grouped_2_py
Test statistic = 0.35142, p-value = 0.842
alternative hypothesis: the distribution is asymmetric.
sample estimates:
bootstrap optimal m
                 14
```

###Sign tests for the responses for the stacked bar plot

```
    One-sample Sign-Test

data:  stacked_2
s = 11, p-value = 7.556e-09
alternative hypothesis: true median is not equal to 11
95 percent confidence interval:
 8.000000 9.720922
sample estimates:
median of x
          9

Achieved and Interpolated Confidence Intervals:

                  Conf.Level L.E.pt  U.E.pt
Lower Achieved CI     0.9278      8  9.0000
Interpolated CI       0.9500      8  9.7209
Upper Achieved CI     0.9586      8 10.0000


    One-sample Sign-Test

data:  stacked_2_r
s = 4, p-value = 1.084e-06
alternative hypothesis: true median is not equal to 11
95 percent confidence interval:
  8 10
sample estimates:
median of x
```

```
          9

Achieved and Interpolated Confidence Intervals:

                  Conf.Level L.E.pt U.E.pt
Lower Achieved CI     0.9270      8     10
Interpolated CI       0.9500      8     10
Upper Achieved CI     0.9664      8     10


    One-sample Sign-Test

data:  stacked_2_py
s = 7, p-value = 0.002102
alternative hypothesis: true median is not equal to 11
95 percent confidence interval:
  8 10
sample estimates:
median of x
          9

Achieved and Interpolated Confidence Intervals:

                  Conf.Level L.E.pt U.E.pt
Lower Achieved CI     0.9499      8     10
Interpolated CI       0.9500      8     10
Upper Achieved CI     0.9799      8     10
```

###Sign test for the responses for the grouped bar plot

```
    One-sample Sign-Test

data:  grouped_2
s = 2, p-value < 2.2e-16
alternative hypothesis: true median is not equal to 11
95 percent confidence interval:
 9 9
sample estimates:
median of x
          9

Achieved and Interpolated Confidence Intervals:

                  Conf.Level L.E.pt U.E.pt
```

```
Lower Achieved CI     0.9278      9      9
Interpolated CI       0.9500      9      9
Upper Achieved CI     0.9586      9      9


    One-sample Sign-Test

data:  grouped_2_r
s = 0, p-value = 7.276e-12
alternative hypothesis: true median is not equal to 11
95 percent confidence interval:
 9 9
sample estimates:
median of x
          9

Achieved and Interpolated Confidence Intervals:

                  Conf.Level L.E.pt U.E.pt
Lower Achieved CI     0.9270      9      9
Interpolated CI       0.9500      9      9
Upper Achieved CI     0.9664      9      9


    One-sample Sign-Test

data:  grouped_2_py
s = 2, p-value = 2.463e-07
alternative hypothesis: true median is not equal to 11
95 percent confidence interval:
  8.996589 10.000000
sample estimates:
median of x
          9

Achieved and Interpolated Confidence Intervals:

                  Conf.Level L.E.pt U.E.pt
Lower Achieved CI     0.9499 9.0000     10
Interpolated CI       0.9500 8.9966     10
Upper Achieved CI     0.9799 8.0000     10
```

Please select the statement you feel applies to the bar chart above.

Whole pop

	Equal	Less	More
Stacked	27	31	11
Grouped	60	5	2

R pop

	Equal	Less	More
Stacked	11	20	6
Grouped	29	4	2

Python pop

	Equal	Less	More
Stacked	16	11	5
Grouped	31	1	31

Which obstacle do you think was used MORE in Finals (Regional/City) rounds, ‘Log Grip’ or ‘Floating Steps’?

Whole pop

	Floating Steps	Log Grip	Both the same
Stacked	56	2	12
Grouped	57	4	9

R

	Floating Steps	Log Grip	Both the same
Stacked	30	8	0
Grouped	32	1	5

Py

	Floating Steps	Log Grip	Both the same
Stacked	26	2	4
Grouped	25	3	4

Which bar chart do you feel is easiest to read and interpret?**

	A	B

```
Whole Population 32 38
R                17 21
Python           15 17
```

```
  Colour Set Main Colour Palette Secondary Colour Pallette
1          A              Viridis                    Default
2          B              Default                    Viridis
3          C              Default                  Greyscale
4          D            Greyscale                    Default
5          E              Viridis                  Greyscale
6          F            Greyscale                    Viridis
```

By colours - Whole pop

```
       A  B  A Colour  B Colour
Set A  3 10   Viridis   Default
Set B  1 11   Default   Viridis
Set C  9  1   Default Greyscale
Set D  1 11 Greyscale   Default
Set E  8  3   Viridis Greyscale
Set F 10  2 Greyscale   Viridis
```

By colours - R

```
      A B  A Colour  B Colour
Set A 2 6   Viridis   Default
Set B 6 6   Default   Viridis
Set C 4 1   Default Greyscale
Set D 1 6 Greyscale   Default
Set E 4 1   Viridis Greyscale
Set F 6 1 Greyscale   Viridis
```

By colours - Py

```
      A B  A Colour  B Colour
Set A 1 4   Viridis   Default
Set B 1 5   Default   Viridis
Set C 5 5   Default Greyscale
Set D 5 5 Greyscale   Default
Set E 4 2   Viridis Greyscale
Set F 4 1 Greyscale   Viridis
```

Which colour scheme do you find most aesthetically pleasing?

Whole pop

	A	B	A Colour	B Colour
Set A	3	10	Viridis	Default
Set B	1	11	Default	Viridis
Set C	9	1	Default	Greyscale
Set D	1	11	Greyscale	Default
Set E	8	3	Viridis	Greyscale
Set F	10	2	Greyscale	Viridis

R

	A	B	A Colour	B Colour
Set A	2	6	Viridis	Default
Set B	0	6	Default	Viridis
Set C	4	1	Default	Greyscale
Set D	1	6	Greyscale	Default
Set E	4	1	Viridis	Greyscale
Set F	6	1	Greyscale	Viridis

Py

	A	B	A Colour	B Colour
Set A	1	4	Viridis	Default
Set B	1	5	Default	Viridis
Set C	5	0	Default	Greyscale
Set D	0	5	Greyscale	Default
Set E	4	2	Viridis	Greyscale
Set F	4	1	Greyscale	Viridis

Do you feel that one of the colour schemes makes it easier to read and interpret? If so, please select which one.

Whole Pop

	None	A	B	A Colour	B Colour
Set A	3	7	3	Viridis	Default
Set B	1	11	1	Default	Viridis
Set C	9	1	9	Default	Greyscale
Set D	2	10	2	Greyscale	Default
Set E	11	11	11	Viridis	Greyscale
Set F	1	2	9	Greyscale	Viridis

R

	None	A	B	A Colour	B Colour
Set A	0	5	3	Viridis	Default
Set B	1	5	0	Default	Viridis
Set C	0	4	1	Default	Greyscale
Set D	0	1	6	Greyscale	Default
Set E	0	5	0	Viridis	Greyscale
Set F	1	2	4	Greyscale	Viridis

Py

	None	A	B	A Colour	B Colour
Set A	3	2	0	Viridis	Default
Set B	0	6	0	Default	Viridis
Set C	0	5	0	Default	Greyscale
Set D	0	1	4	Greyscale	Default
Set E	0	6	0	Viridis	Greyscale
Set F	0	0	5	Greyscale	Viridis

Sales - Part 1

How much would you say sales of each company increased between January and December? [Company A]

	Separate	Truncated	Zeroed
Min.	1.000000	1.000000	1.000000
1st Qu.	2.000000	2.000000	1.000000
Median	3.000000	2.000000	1.000000
Mean	3.043478	2.414286	1.371429
3rd Qu.	4.000000	3.000000	1.750000
Max.	7.000000	7.000000	3.000000

How much would you say sales of each company increased between January and December? [Company B]

	Separate	Truncated	Zeroed
Min.	1.000000	1.000000	1.000000
1st Qu.	4.000000	4.000000	2.000000
Median	5.000000	6.000000	2.000000
Mean	4.826087	5.144928	2.478261
3rd Qu.	6.000000	7.000000	3.000000
Max.	7.000000	7.000000	6.000000

How large would you say the drop in sales between April and July of Company A is?

```
        Separate Truncated   Zeroed
Min.    1.000000  1.000000 1.000000
1st Qu. 3.000000  2.000000 1.000000
Median  4.000000  3.000000 1.000000
Mean    4.028571  2.814286 1.571429
3rd Qu. 5.000000  3.000000 2.000000
Max.    7.000000  7.000000 6.000000
```

Sales - Part 2

Based on the above graph, how large would you say the difference is between the number of sales Company C makes and the number of sales Company D makes?

```
        Truncated Zeroed
Min.     2.000000    1.0
1st Qu.  4.000000    2.0
Median   4.000000    3.0
Mean     4.271429    2.7
3rd Qu.  5.000000    3.0
Max.     7.000000    5.0
```