\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Counts of respondents**

| Item V3 | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | | **lower** | | **middle** | | **upper** | |
| 1 |  | 2 |  | 0 |  | 0 |  |
| 2 |  | 6 |  | 0 |  | 0 |  |
| \*3 |  | 7 |  | 6 |  | 3 |  |
| 4 |  | 0 |  | 0 |  | 0 |  |
| 5 |  | 0 |  | 0 |  | 0 |  |
| 0 |  | 0 |  | 0 |  | 0 |  |
|  | | | | | | | |

| Item V4 | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | | **lower** | | **middle** | | **upper** | |
| 1 |  | 4 |  | 0 |  | 0 |  |
| 2 |  | 6 |  | 1 |  | 0 |  |
| \*3 |  | 5 |  | 5 |  | 3 |  |
| 4 |  | 0 |  | 0 |  | 0 |  |
| 5 |  | 0 |  | 0 |  | 0 |  |
| 0 |  | 0 |  | 0 |  | 0 |  |
|  | | | | | | | |

| Item V5 | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | | **lower** | | **middle** | | **upper** | |
| \*1 |  | 8 |  | 4 |  | 3 |  |
| 2 |  | 3 |  | 1 |  | 0 |  |
| 3 |  | 4 |  | 1 |  | 0 |  |
| 4 |  | 0 |  | 0 |  | 0 |  |
| 5 |  | 0 |  | 0 |  | 0 |  |
| 0 |  | 0 |  | 0 |  | 0 |  |
|  | | | | | | | |

| Item V6 | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | | **lower** | | **middle** | | **upper** | |
| 1 |  | 1 |  | 0 |  | 0 |  |
| 2 |  | 0 |  | 0 |  | 0 |  |
| \*3 |  | 9 |  | 6 |  | 3 |  |
| 4 |  | 5 |  | 0 |  | 0 |  |
| 5 |  | 0 |  | 0 |  | 0 |  |
| 0 |  | 0 |  | 0 |  | 0 |  |
|  | | | | | | | |

| Item V7 | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | | **lower** | | **middle** | | **upper** | |
| 1 |  | 0 |  | 0 |  | 0 |  |
| 2 |  | 0 |  | 0 |  | 0 |  |
| 3 |  | 1 |  | 0 |  | 0 |  |
| \*4 |  | 14 |  | 6 |  | 3 |  |
| 5 |  | 0 |  | 0 |  | 0 |  |
| 0 |  | 0 |  | 0 |  | 0 |  |
|  | | | | | | | |

| Item V9 | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | | **lower** | | **middle** | | **upper** | |
| 1 |  | 0 |  | 0 |  | 0 |  |
| 2 |  | 2 |  | 1 |  | 0 |  |
| 3 |  | 2 |  | 0 |  | 0 |  |
| \*4 |  | 9 |  | 4 |  | 3 |  |
| 5 |  | 2 |  | 1 |  | 0 |  |
| 0 |  | 0 |  | 0 |  | 0 |  |
|  | | | | | | | |

| Item V8 | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | | **lower** | | **middle** | | **upper** | |
| 1 |  | 0 |  | 0 |  | 0 |  |
| 2 |  | 1 |  | 0 |  | 0 |  |
| 3 |  | 0 |  | 0 |  | 0 |  |
| \*4 |  | 14 |  | 6 |  | 3 |  |
| 5 |  | 0 |  | 0 |  | 0 |  |
| 0 |  | 0 |  | 0 |  | 0 |  |
|  | | | | | | | |

| Item V10 | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | | **lower** | | **middle** | | **upper** | |
| 1 |  | 1 |  | 0 |  | 0 |  |
| \*2 |  | 10 |  | 5 |  | 3 |  |
| 3 |  | 1 |  | 0 |  | 0 |  |
| 4 |  | 1 |  | 0 |  | 0 |  |
| 5 |  | 1 |  | 1 |  | 0 |  |
| 0 |  | 1 |  | 0 |  | 0 |  |
|  | | | | | | | |

**Proportions of respondents**

| Item V3 | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | | **Lower** | | **Middle** | | **Upper** | |
| 1 |  | 0.133 |  | 0.00 |  | 0.00 |  |
| 2 |  | 0.400 |  | 0.00 |  | 0.00 |  |
| \*3 |  | 0.467 |  | 1.00 |  | 1.00 |  |
| 4 |  | 0.000 |  | 0.00 |  | 0.00 |  |
| 5 |  | 0.000 |  | 0.00 |  | 0.00 |  |
| 0 |  | 0.000 |  | 0.00 |  | 0.00 |  |
|  | | | | | | | |

| Item V4 | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | | **Lower** | | **Middle** | | **Upper** | |
| 1 |  | 0.267 |  | 0.000 |  | 0.00 |  |
| 2 |  | 0.400 |  | 0.167 |  | 0.00 |  |
| \*3 |  | 0.333 |  | 0.833 |  | 1.00 |  |
| 4 |  | 0.000 |  | 0.000 |  | 0.00 |  |
| 5 |  | 0.000 |  | 0.000 |  | 0.00 |  |
| 0 |  | 0.000 |  | 0.000 |  | 0.00 |  |
|  | | | | | | | |

| Item V5 | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | | **Lower** | | **Middle** | | **Upper** | |
| \*1 |  | 0.533 |  | 0.667 |  | 1.00 |  |
| 2 |  | 0.200 |  | 0.167 |  | 0.00 |  |
| 3 |  | 0.267 |  | 0.167 |  | 0.00 |  |
| 4 |  | 0.000 |  | 0.000 |  | 0.00 |  |
| 5 |  | 0.000 |  | 0.000 |  | 0.00 |  |
| 0 |  | 0.000 |  | 0.000 |  | 0.00 |  |
|  | | | | | | | |

| Item V6 | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | | **Lower** | | **Middle** | | **Upper** | |
| 1 |  | 0.0670 |  | 0.00 |  | 0.00 |  |
| 2 |  | 0.0000 |  | 0.00 |  | 0.00 |  |
| \*3 |  | 0.6000 |  | 1.00 |  | 1.00 |  |
| 4 |  | 0.3330 |  | 0.00 |  | 0.00 |  |
| 5 |  | 0.0000 |  | 0.00 |  | 0.00 |  |
| 0 |  | 0.0000 |  | 0.00 |  | 0.00 |  |
|  | | | | | | | |

| Item V7 | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | | **Lower** | | **Middle** | | **Upper** | |
| 1 |  | 0.0000 |  | 0.00 |  | 0.00 |  |
| 2 |  | 0.0000 |  | 0.00 |  | 0.00 |  |
| 3 |  | 0.0670 |  | 0.00 |  | 0.00 |  |
| \*4 |  | 0.9330 |  | 1.00 |  | 1.00 |  |
| 5 |  | 0.0000 |  | 0.00 |  | 0.00 |  |
| 0 |  | 0.0000 |  | 0.00 |  | 0.00 |  |
|  | | | | | | | |

| Item V9 | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | | **Lower** | | **Middle** | | **Upper** | |
| 1 |  | 0.000 |  | 0.000 |  | 0.00 |  |
| 2 |  | 0.133 |  | 0.167 |  | 0.00 |  |
| 3 |  | 0.133 |  | 0.000 |  | 0.00 |  |
| \*4 |  | 0.600 |  | 0.667 |  | 1.00 |  |
| 5 |  | 0.133 |  | 0.167 |  | 0.00 |  |
| 0 |  | 0.000 |  | 0.000 |  | 0.00 |  |
|  | | | | | | | |

| Item V8 | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | | **Lower** | | **Middle** | | **Upper** | |
| 1 |  | 0.0000 |  | 0.00 |  | 0.00 |  |
| 2 |  | 0.0670 |  | 0.00 |  | 0.00 |  |
| 3 |  | 0.0000 |  | 0.00 |  | 0.00 |  |
| \*4 |  | 0.9330 |  | 1.00 |  | 1.00 |  |
| 5 |  | 0.0000 |  | 0.00 |  | 0.00 |  |
| 0 |  | 0.0000 |  | 0.00 |  | 0.00 |  |
|  | | | | | | | |

| Item V10 | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | | **Lower** | | **Middle** | | **Upper** | |
| 1 |  | 0.0670 |  | 0.000 |  | 0.00 |  |
| \*2 |  | 0.6670 |  | 0.833 |  | 1.00 |  |
| 3 |  | 0.0670 |  | 0.000 |  | 0.00 |  |
| 4 |  | 0.0670 |  | 0.000 |  | 0.00 |  |
| 5 |  | 0.0670 |  | 0.167 |  | 0.00 |  |
| 0 |  | 0.0670 |  | 0.000 |  | 0.00 |  |
|  | | | | | | | |

**Summary**

| Item V3 | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Correct** | | **Response** | | **Frequency** | | **Proportion** | |
|  |  | 1 |  | 2 |  | 0.0833 |  |
|  |  | 2 |  | 6 |  | 0.2500 |  |
| \* |  | 3 |  | 16 |  | 0.6667 |  |
|  |  | 4 |  | 0 |  | 0.0000 |  |
|  |  | 5 |  | 0 |  | 0.0000 |  |
|  |  | 0 |  | 0 |  | 0.0000 |  |
|  | | | | | | | |

| Item V4 | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Correct** | | **Response** | | **Frequency** | | **Proportion** | |
|  |  | 1 |  | 4 |  | 0.167 |  |
|  |  | 2 |  | 7 |  | 0.292 |  |
| \* |  | 3 |  | 13 |  | 0.542 |  |
|  |  | 4 |  | 0 |  | 0.000 |  |
|  |  | 5 |  | 0 |  | 0.000 |  |
|  |  | 0 |  | 0 |  | 0.000 |  |
|  | | | | | | | |

| Item V5 | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Correct** | | **Response** | | **Frequency** | | **Proportion** | |
| \* |  | 1 |  | 15 |  | 0.625 |  |
|  |  | 2 |  | 4 |  | 0.167 |  |
|  |  | 3 |  | 5 |  | 0.208 |  |
|  |  | 4 |  | 0 |  | 0.000 |  |
|  |  | 5 |  | 0 |  | 0.000 |  |
|  |  | 0 |  | 0 |  | 0.000 |  |
|  | | | | | | | |

| Item V6 | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Correct** | | **Response** | | **Frequency** | | **Proportion** | |
|  |  | 1 |  | 1 |  | 0.0417 |  |
|  |  | 2 |  | 0 |  | 0.0000 |  |
| \* |  | 3 |  | 18 |  | 0.7500 |  |
|  |  | 4 |  | 5 |  | 0.2083 |  |
|  |  | 5 |  | 0 |  | 0.0000 |  |
|  |  | 0 |  | 0 |  | 0.0000 |  |
|  | | | | | | | |

| Item V7 | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Correct** | | **Response** | | **Frequency** | | **Proportion** | |
|  |  | 1 |  | 0 |  | 0.0000 |  |
|  |  | 2 |  | 0 |  | 0.0000 |  |
|  |  | 3 |  | 1 |  | 0.0417 |  |
| \* |  | 4 |  | 23 |  | 0.9583 |  |
|  |  | 5 |  | 0 |  | 0.0000 |  |
|  |  | 0 |  | 0 |  | 0.0000 |  |
|  | | | | | | | |

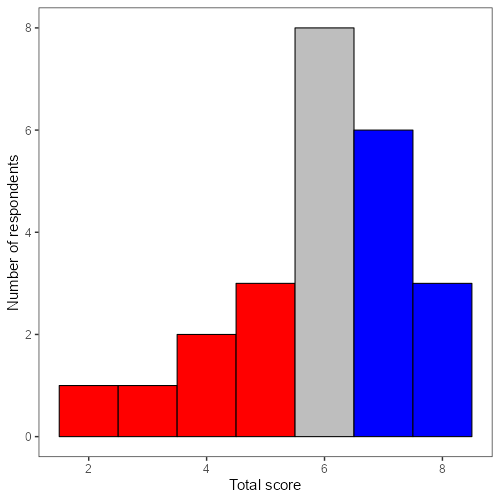
| Item V9 | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Correct** | | **Response** | | **Frequency** | | **Proportion** | |
|  |  | 1 |  | 0 |  | 0.0000 |  |
|  |  | 2 |  | 3 |  | 0.1250 |  |
|  |  | 3 |  | 2 |  | 0.0833 |  |
| \* |  | 4 |  | 16 |  | 0.6667 |  |
|  |  | 5 |  | 3 |  | 0.1250 |  |
|  |  | 0 |  | 0 |  | 0.0000 |  |
|  | | | | | | | |

| Item V8 | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Correct** | | **Response** | | **Frequency** | | **Proportion** | |
|  |  | 1 |  | 0 |  | 0.0000 |  |
|  |  | 2 |  | 1 |  | 0.0417 |  |
|  |  | 3 |  | 0 |  | 0.0000 |  |
| \* |  | 4 |  | 23 |  | 0.9583 |  |
|  |  | 5 |  | 0 |  | 0.0000 |  |
|  |  | 0 |  | 0 |  | 0.0000 |  |
|  | | | | | | | |

| Item V10 | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Correct** | | **Response** | | **Frequency** | | **Proportion** | |
|  |  | 1 |  | 1 |  | 0.0417 |  |
| \* |  | 2 |  | 18 |  | 0.7500 |  |
|  |  | 3 |  | 1 |  | 0.0417 |  |
|  |  | 4 |  | 1 |  | 0.0417 |  |
|  |  | 5 |  | 2 |  | 0.0833 |  |
|  |  | 0 |  | 1 |  | 0.0417 |  |
|  | | | | | | | |

| Item difficulty and discrimination index | | | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Item** | | **Difficulty** | | **ULI** | | **RIT** | | **RIR** | |
| V3 |  | 0.667 |  | 0.625 |  | 0.551 |  | 0.27217 |  |
| V4 |  | 0.542 |  | 0.750 |  | 0.619 |  | 0.34229 |  |
| V5 |  | 0.625 |  | 0.125 |  | 0.244 |  | -0.08121 |  |
| V6 |  | 0.750 |  | 0.500 |  | 0.610 |  | 0.37582 |  |
| V7 |  | 0.958 |  | 0.125 |  | 0.128 |  | -0.00585 |  |
| V9 |  | 0.667 |  | 0.375 |  | 0.315 |  | 0.00000 |  |
| V8 |  | 0.958 |  | 0.125 |  | 0.406 |  | 0.28590 |  |
| V10 |  | 0.750 |  | 0.500 |  | 0.675 |  | 0.46291 |  |
| Note. ULI:Upper-Lower Index, RIT:Item-Total correlation, RIR: Item-Rest correlation. | | | | | | | | | |
|  | | | | | | | | | |

**Histogram of total score**



**Distractor plot**

**References**

**[1]** The jamovi project (2022). *jamovi*. (Version 2.3) [Computer Software]. Retrieved from <https://www.jamovi.org>.

**[2]** R Core Team (2021). *R: A Language and environment for statistical computing*. (Version 4.1) [Computer software]. Retrieved from <https://cran.r-project.org>. (R packages retrieved from MRAN snapshot 2022-01-01).

**[3]** Willse, J. (2018). *CTT: Classical Test Theory Functions*. (Version 2.3.3)[R package]. Retrieved from <https://CRAN.R-project.org/package=CTT>.

**[4]** Seol, H. (2023). *snowIRT: Item Response Theory for jamovi*. (Version 4.8.8)[jamovi module]. URL <https://github.com/hyunsooseol/snowIRT>.

**[5]** Martinkova, P., & Drabinova, A. (2018). *ShinyItemAnalysis: for teaching psychometrics and to enforce routine analysis of educational tests*. (Version 1.4.2)[R package]. Retrieved from <https://CRAN.R-project.org/package=ShinyItemAnalysis>.