

Supplimentary Analysis

Factor Analysis with Unmerged Response Option

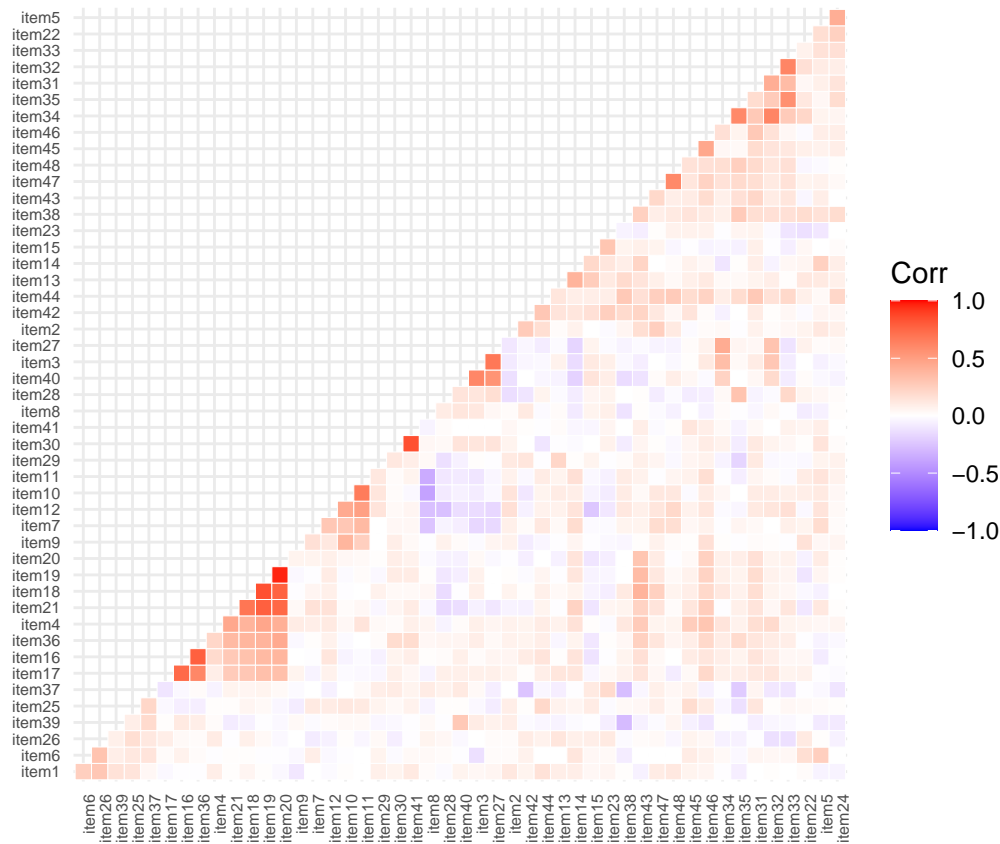


Figure 1: Correlation plot of the items

Horn’s parallel analysis with 500 iterations indicated a five-factor solution. However, Scree plot and the MAP method suggested 6-factor solution. five-factor solution . As a result, we tested both five-factor and six-factor solutions.

Five Factor Solution[Unmerged Responses] (24 Items)

F1

- I use light therapy applying a blue light box.
- I use light therapy applying a light visor.
- I use light therapy applying a white light box.
- I use light therapy applying another form of light device.
- I use an alarm with a dawn simulation light.

Five Factor Solution[Unmerged Responses] (24 Items)

F2

- I spend more than 3 hours per day (in total) outside.
- I spend between 1 and 3 hours per day (in total) outside.
- I spend as much time outside as possible.
- I spend 30 minutes or less per day (in total) outside.
- I go for a walk or exercise outside within 2 hours after waking up.
- I spend between 30 minutes and 1 hour per day (in total) outside.

F3

- I look at my mobile phone screen immediately after waking up.
- I use my mobile phone within 1 hour before attempting to fall asleep.
- I check my phone when I wake up at night.

F4

- I use a blue-filter app on my computer screen within 1 hour before attempting to fall asleep.
- I seek out knowledge on how to improve my light exposure.
- I dim my computer screen within 1 hour before attempting to fall asleep.
- I discuss the effects of light on my body with other people.
- I modify my light environment to match my current needs.
- I dim my room light within 1 hour before attempting to fall asleep.
- I use as little light as possible when I get up during the night.

F5

- I wear blue-filtering, orange-tinted, and/or red-tinted glasses indoors during the day.
 - I wear blue-filtering, orange-tinted, and/or red-tinted glasses outdoors during the day.
 - I wear blue-filtering, orange-tinted, and/or red-tinted glasses within 1 hour before attempting to fall asleep.
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Table 1: Factor loadings and communality of the retained items(Minmum Residual)

| item | MR1 | MR2 | MR3 | MR4 | MR5 | Communality | Uniqueness |
|---------------|------|-------|------|-------|------|-------------|------------|
| item16 | 1 | | | | | 0.996 | 0.004 |
| item36 | 0.94 | | | | | 0.897 | 0.103 |
| item17 | 0.8 | | | | | 0.658 | 0.342 |
| item11 | | 0.79 | | | | 0.642 | 0.358 |
| item10 | | 0.76 | | | | 0.592 | 0.408 |
| item12 | | 0.65 | | | | 0.465 | 0.535 |
| item7 | | 0.5 | | | | 0.267 | 0.733 |
| item8 | | -0.49 | | | | 0.252 | 0.748 |
| item9 | | 0.32 | | | | 0.113 | 0.887 |
| item27 | | | 0.8 | | | 0.659 | 0.341 |
| item3 | | | 0.8 | | | 0.683 | 0.317 |
| item40 | | | 0.65 | | | 0.464 | 0.536 |
| item30 | | | 0.45 | | | 0.353 | 0.647 |
| item41 | | | 0.36 | | | 0.329 | 0.671 |
| item33 | | | | 0.74 | | 0.555 | 0.445 |
| item32 | | | | 0.73 | | 0.623 | 0.377 |
| item35 | | | | 0.66 | | 0.455 | 0.545 |
| item37 | | | | -0.39 | | 0.175 | 0.825 |
| item38 | | | | 0.38 | | 0.178 | 0.822 |
| item46 | | | | | 0.6 | 0.422 | 0.578 |
| item45 | | | | | 0.59 | 0.374 | 0.626 |
| item25 | | | | | 0.41 | 0.193 | 0.807 |
| item4 | | | | | 0.41 | 0.219 | 0.781 |
| item1 | | | | | 0.4 | 0.17 | 0.83 |
| item26 | | | | | 0.35 | 0.165 | 0.835 |
| % of Variance | 0.1 | 0.1 | 0.09 | 0.08 | 0.06 | | |

Note. Only loading higher than .30 is reported

Table 2: Factor loadings and communality of the retained items(six factor)

| item | PA1 | PA4 | PA2 | PA3 | PA5 | PA6 | Communality | Uniqueness |
|---------------|------|------|------|-------|------|------|-------------|------------|
| item19 | 1.78 | | | | | | 3.318 | -2.318 |
| item5 | | | | | | | 0.11 | 0.89 |
| item16 | | 1 | | | | | 1.004 | -0.004 |
| item36 | | 0.91 | | | | | 0.86 | 0.14 |
| item17 | | 0.81 | | | | | 0.691 | 0.309 |
| item11 | | | 0.83 | | | | 0.71 | 0.29 |
| item10 | | | 0.79 | | | | 0.638 | 0.362 |
| item12 | | | 0.63 | | | | 0.465 | 0.535 |
| item8 | | | -0.5 | | | | 0.269 | 0.731 |
| item7 | | | 0.47 | | | | 0.268 | 0.732 |
| item9 | | | 0.32 | | | | 0.163 | 0.837 |
| item33 | | | | 0.83 | | | 0.698 | 0.302 |
| item32 | | | | 0.75 | | | 0.666 | 0.334 |
| item35 | | | | 0.64 | | | 0.446 | 0.554 |
| item31 | | | | 0.48 | | | 0.331 | 0.669 |
| item38 | | | | 0.39 | | | 0.191 | 0.809 |
| item37 | | | | -0.35 | | | 0.153 | 0.847 |
| item3 | | | | | 0.85 | | 0.748 | 0.252 |
| item27 | | | | | 0.8 | | 0.644 | 0.356 |
| item40 | | | | | 0.68 | | 0.507 | 0.493 |
| item46 | | | | | | 0.6 | 0.431 | 0.569 |
| item45 | | | | | | 0.56 | 0.341 | 0.659 |
| item4 | | | | | | 0.43 | 0.265 | 0.735 |
| item25 | | | | | | 0.4 | 0.178 | 0.822 |
| item1 | | | | | | 0.36 | 0.142 | 0.858 |
| item26 | | | | | | 0.36 | 0.173 | 0.827 |
| item13 | | | | | | | 0.087 | 0.913 |
| item29 | | | | | | | 0.108 | 0.892 |
| % of Variance | 0.12 | 0.09 | 0.09 | 0.08 | 0.07 | 0.06 | | |

Note. Only loading higher than .30 is reported

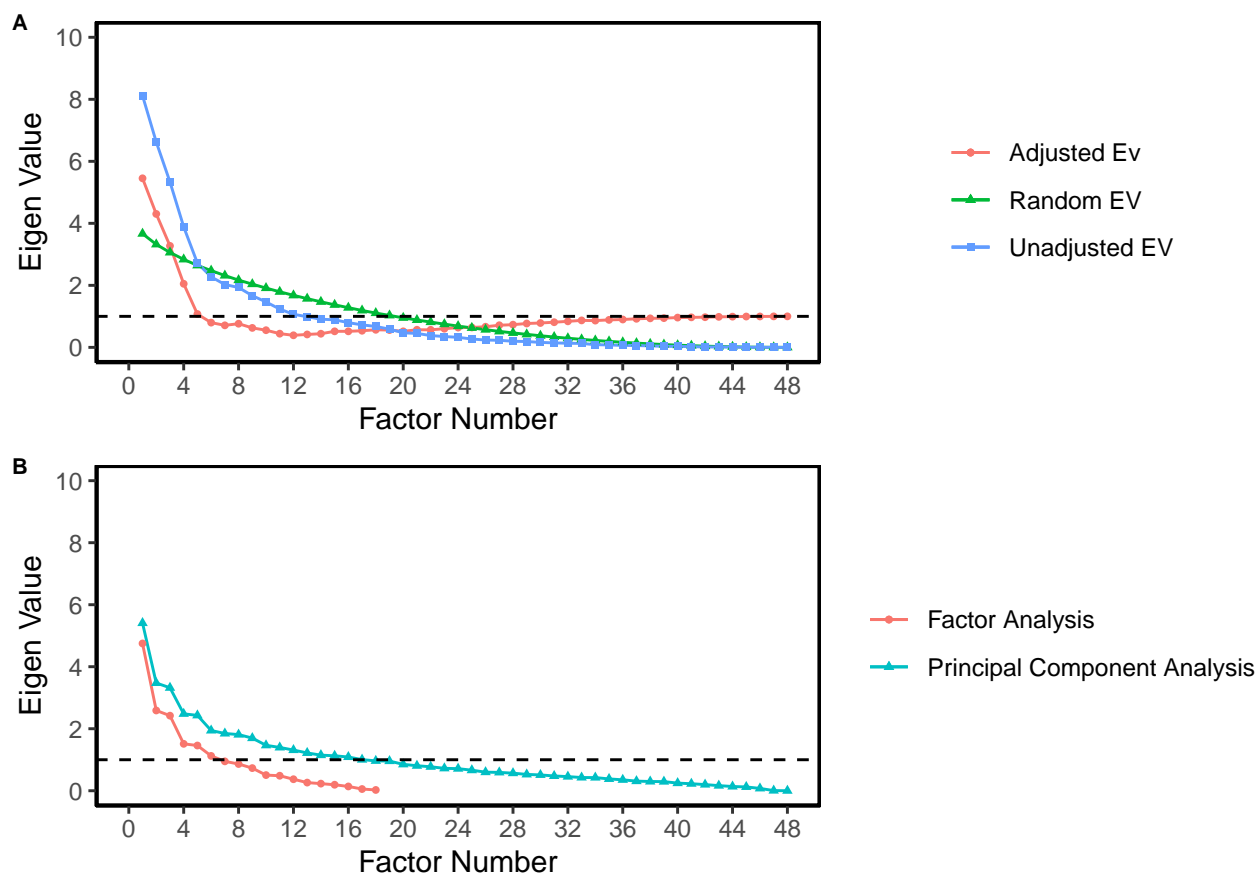


Figure 2: Factor Identification (A) Parallel analysis (B) Scree Plot

Table 3: Descriptive Statistics for Unmerged response options

| | Mean | SD | Skew | Kurtosis | Shapiro-Wilk Statistics | Item-Total Correlation |
|--------|------|------|-------|----------|-------------------------|------------------------|
| Item1 | 2.16 | 1.51 | 0.49 | -0.86 | 0.90* | .21 |
| Item2 | 2.76 | 1.75 | -0.10 | -1.42 | 0.88* | .20 |
| Item3 | 3.34 | 1.43 | -0.58 | -0.77 | 0.88* | .18 |
| Item4 | 1.30 | 1.31 | 1.93 | 2.92 | 0.62* | .32 |
| Item5 | 3.95 | 1.56 | -1.42 | 0.75 | 0.70* | .19 |
| Item6 | 2.70 | 1.66 | 0.02 | -1.33 | 0.90* | .18 |
| Item7 | 2.23 | 1.28 | 0.60 | -0.59 | 0.89* | .18 |
| Item8 | 2.95 | 1.24 | -0.19 | -0.70 | 0.93* | -.07 |
| Item9 | 2.92 | 1.09 | -0.37 | 0.11 | 0.91* | .14 |
| Item10 | 2.73 | 1.07 | -0.03 | -0.52 | 0.92* | .27 |
| Item11 | 2.17 | 0.93 | 0.44 | 0.20 | 0.89* | .25 |
| Item12 | 2.34 | 1.26 | 0.46 | -0.58 | 0.91* | .24 |
| Item13 | 2.71 | 1.49 | 0.14 | -1.29 | 0.89* | .28 |
| Item14 | 2.11 | 1.34 | 0.68 | -0.78 | 0.84* | .24 |
| Item15 | 3.26 | 1.11 | -0.34 | -0.21 | 0.91* | .11 |
| Item16 | 1.46 | 1.31 | 1.71 | 1.90 | 0.65* | .33 |
| Item17 | 1.43 | 1.30 | 1.76 | 2.12 | 0.64* | .30 |
| Item18 | 0.92 | 0.67 | 2.00 | 9.41 | 0.62* | .32 |
| Item19 | 0.85 | 0.56 | 1.71 | 10.74 | 0.55* | .34 |
| Item20 | 0.83 | 0.54 | 1.76 | 13.92 | 0.53* | .31 |
| Item21 | 0.94 | 0.75 | 2.46 | 10.66 | 0.58* | .27 |
| Item22 | 3.57 | 1.08 | -0.72 | 0.08 | 0.88* | .19 |
| Item23 | 2.53 | 1.31 | 0.22 | -0.91 | 0.92* | .11 |
| Item24 | 4.13 | 1.01 | -1.39 | 2.01 | 0.78* | .19 |
| Item25 | 2.57 | 1.43 | 0.22 | -1.23 | 0.88* | .17 |
| Item26 | 2.23 | 1.30 | 0.59 | -0.63 | 0.88* | .16 |
| Item27 | 3.78 | 1.34 | -1.01 | 0.08 | 0.82* | .18 |
| Item28 | 3.75 | 1.16 | -0.78 | -0.10 | 0.86* | .01 |
| Item29 | 2.38 | 1.40 | 0.20 | -1.04 | 0.92* | .11 |
| Item30 | 0.94 | 1.42 | 1.66 | 1.69 | 0.68* | .24 |
| Item31 | 2.91 | 1.76 | -0.24 | -1.41 | 0.87* | .45 |
| Item32 | 3.49 | 1.76 | -0.71 | -1.06 | 0.78* | .43 |
| Item33 | 3.56 | 1.75 | -0.79 | -0.95 | 0.77* | .32 |
| Item34 | 3.30 | 2.00 | -0.54 | -1.50 | 0.74* | .34 |
| Item35 | 3.80 | 1.79 | -1.07 | -0.59 | 0.67* | .24 |
| Item36 | 1.36 | 1.38 | 1.75 | 2.05 | 0.65* | .38 |
| Item37 | 1.30 | 0.94 | 2.79 | 7.65 | 0.48* | -.01 |
| Item38 | 4.27 | 1.18 | -2.07 | 4.01 | 0.65* | .23 |
| Item39 | 1.94 | 1.01 | 0.85 | 0.61 | 0.86* | .05 |
| Item40 | 2.13 | 1.24 | 0.56 | -0.54 | 0.89* | .16 |
| Item41 | 0.87 | 1.08 | 1.68 | 2.74 | 0.73* | .21 |
| Item42 | 3.90 | 1.55 | -1.15 | -0.12 | 0.72* | .17 |
| Item43 | 1.59 | 1.23 | 1.59 | 1.70 | 0.69* | .22 |
| Item44 | 3.46 | 1.41 | -0.92 | -0.01 | 0.86* | .38 |
| Item45 | 2.04 | 1.66 | 0.46 | -1.12 | 0.87* | .29 |
| Item46 | 1.57 | 1.40 | 0.97 | -0.07 | 0.82* | .38 |
| Item47 | 2.07 | 1.23 | 0.59 | -0.42 | 0.89* | .34 |
| Item48 | 2.57 | 1.30 | 0.14 | -0.74 | 0.93* | .31 |

Note. *p<.001

Table 4: Factor loadings and communality of the retained items [Unmerged Responses]

| item | PA1 | PA2 | PA5 | PA3 | PA4 | Communality | Uniqueness | Complexity |
|---------------|------|-------|------|------|------|-------------|------------|------------|
| item19 | 0.99 | | | | | 1.01 | -0.01 | 1.06 |
| item20 | 0.91 | | | | | 0.87 | 0.13 | 1.11 |
| item18 | 0.82 | | | | | 0.71 | 0.29 | 1.12 |
| item21 | 0.8 | | | | | 0.68 | 0.32 | 1.16 |
| item4 | 0.47 | | | | | 0.25 | 0.75 | 1.30 |
| item11 | | 0.83 | | | | 0.69 | 0.31 | 1.01 |
| item10 | | 0.81 | | | | 0.67 | 0.33 | 1.03 |
| item12 | | 0.56 | | | | 0.37 | 0.63 | 1.37 |
| item8 | | -0.44 | | | | 0.21 | 0.79 | 1.11 |
| item7 | | 0.42 | | | | 0.23 | 0.77 | 1.61 |
| item9 | | 0.33 | | | | 0.12 | 0.88 | 1.10 |
| item16 | | | 0.95 | | | 0.95 | 0.05 | 1.10 |
| item17 | | | 0.74 | | | 0.60 | 0.41 | 1.17 |
| item36 | 0.3 | | 0.73 | | | 0.65 | 0.35 | 1.43 |
| item3 | | | | 0.85 | | 0.75 | 0.25 | 1.05 |
| item27 | | | | 0.78 | | 0.62 | 0.38 | 1.03 |
| item40 | | | | 0.71 | | 0.51 | 0.49 | 1.05 |
| item35 | | | | | 0.58 | 0.35 | 0.65 | 1.09 |
| item48 | | | | | 0.57 | 0.35 | 0.65 | 1.14 |
| item33 | | | | | 0.55 | 0.32 | 0.68 | 1.08 |
| item47 | | | | | 0.52 | 0.29 | 0.71 | 1.19 |
| item44 | | | | | 0.45 | 0.22 | 0.78 | 1.15 |
| item31 | | | | | 0.41 | 0.21 | 0.79 | 1.48 |
| item38 | | | | | 0.33 | 0.13 | 0.87 | 1.32 |
| % of Variance | 0.15 | 0.09 | 0.09 | 0.08 | 0.08 | NA | NA | NA |

Note. Only loading higher than .30 is reported