# CODECHECK certificate 2023-012

https://doi.org/10.5281/zenodo.10213244


| Item | Value |
|---|---|
| Title | An inventory of human light exposure related behaviour |
| Authors | Mushfiqul Anwar Siraji , Rafael Lazar , Manuel Spitschan |
| Reference | Scientific Reports, in press (DOI 10.1038/s41598-023-48241-y) https://www.researchsquare.com/article/rs-2587424/v1 |
| Codechecker | Stephen J. Eglen |
| Date of check | 2023-11-26 21:00:00 |
| Summary | Comprehensive reproduction of Rmarkdown document; biggest concerns found with linux versions of R package "gt". |
| Repository | https://github.com/codecheckers/leba-manuscript |

Table 1: CODECHECK summary

| Output | Comment | Size (b) |
|---|---|---|
| `Figures/Figure2-screenshot.png` | manuscript Figure 2 | 705673 |
| `Figures/Figure3-screenshot.png` | manuscript Figure 3 | 597465 |
| `Figures/Figure4.png` | manuscript Figure 4 | 827888 |
| `Figures/Figure6.png` | manuscript Figure 6 | 891225 |
| `Figures/S1_Fig-screenshot.png` | manuscript Figure S1 | 731772 |
| `Figures/S2_Fig-screenshot.png` | manuscript Figure S2 | 667003 |
| `Figures/S3_Fig.png` | manuscript Figure S3 | 920198 |
| `Figures/S4_Fig.png` | manuscript Figure S4 | 364438 |

Table 2: Summary of output files generated

## Summary

Scientifically, this was a straightforward project to reproduce. The authors had provided a github repository containing their Rmarkdown file to generate the paper, along with all data required. The authors had also clearly enumerated which R packages were required.

The only significant problem was that one of the CRAN R packages (gt) used was troublesome to work correctly on Ubuntu 23.10, which required significant workarounds as described below.

# CODECHECKER notes

Using a recent install of Ubuntu 23.10 on a 2018 laptop, I needed to include some extra system packages to start the codecheck process.

```
sudo apt install libsodium-dev
sudo apt install librdf0-dev
sudo apt install librsvg2-dev  # for rsvg package
sudo apt install libmagick++-dev  # magick package
sudo apt install chromium-browser # for gt
sudo apt install texlive-xetex  ## needed for xelatex
```

then we could proceed, installing codecheck

```
install_github('codecheckers/codecheck')


require(codecheck)
create_codecheck_files()
```

First, I needed to install the packages as outlined in their file `install_packages.R`. This took about an hour to complete on my laptop.

Although all packages installed, once compiling the Rmarkdown, I hit two problems with the gt package. First, it only seemed to work within Rstudio, rather than in Emacs terminal. Second, the gt package was unable to convert html output to png. This has been documented online as a problem, and remains an open issue: https://github.com/rstudio/gt/issues/1029

Figure 1 is a drawio file, not computed, but generated from the website https://drawio.com using the file `LEBA_figure1.drawio` provided in the Figures folder. When I loaded this .drawio file into the web, it generated Figure1.png. I could not find the source for Figure 5. Otherwise, all figures were reproduced, although I needed to edit the Rmarkdown file to save tables as html, rather than png, using:

```
##gtsave("Figures/Figure2.png", vwidth=6000)
gtsave('Figures/Figure2.html') #sje
```

After the code had run, there were some issues generating the final pdf manuscript, namely the lack of apa6.cls and Arial font.

The html tables generated were output were loaded into a browser and then screenshots of the tables were taken for inclusion here.

## Notes

1. None of the 'classic' tables were reproduced due to the issues with the latex document not compiling.

## Recommendations

- There is no .rproj file, unlike suggested in the readme; provide one or delete reference to it.
- LaTeX requirements (apa6.cls and Arial font) should be adjusted to make them more portable.
- There is not much that could be done about the problems with the gt package; the authors report it working well on Mac. However, this could be documented.
- I'd suggest removing the code chunk (that is not run by default) to install packages, and instead ensure everytyhing is listed in the `install_packages.R` file. (Some items were missing, that are documented in my copy of the file.
- Include a final code chunk in your Rmarkdown file that calls `sessionInfo()` to list the R environment used to generate your file. You can see an example at the end of this document.
- The main figure numbers in the filenames match that used in the code; there is an 'off by one' error in the figure numbers used in the manuscript versus the numbers in the files. This could be fixed in any future versions.

## Manifest files

Figure2-screenshot.png

Comment: manuscript Figure 2

## Summary Descriptives (n=690)

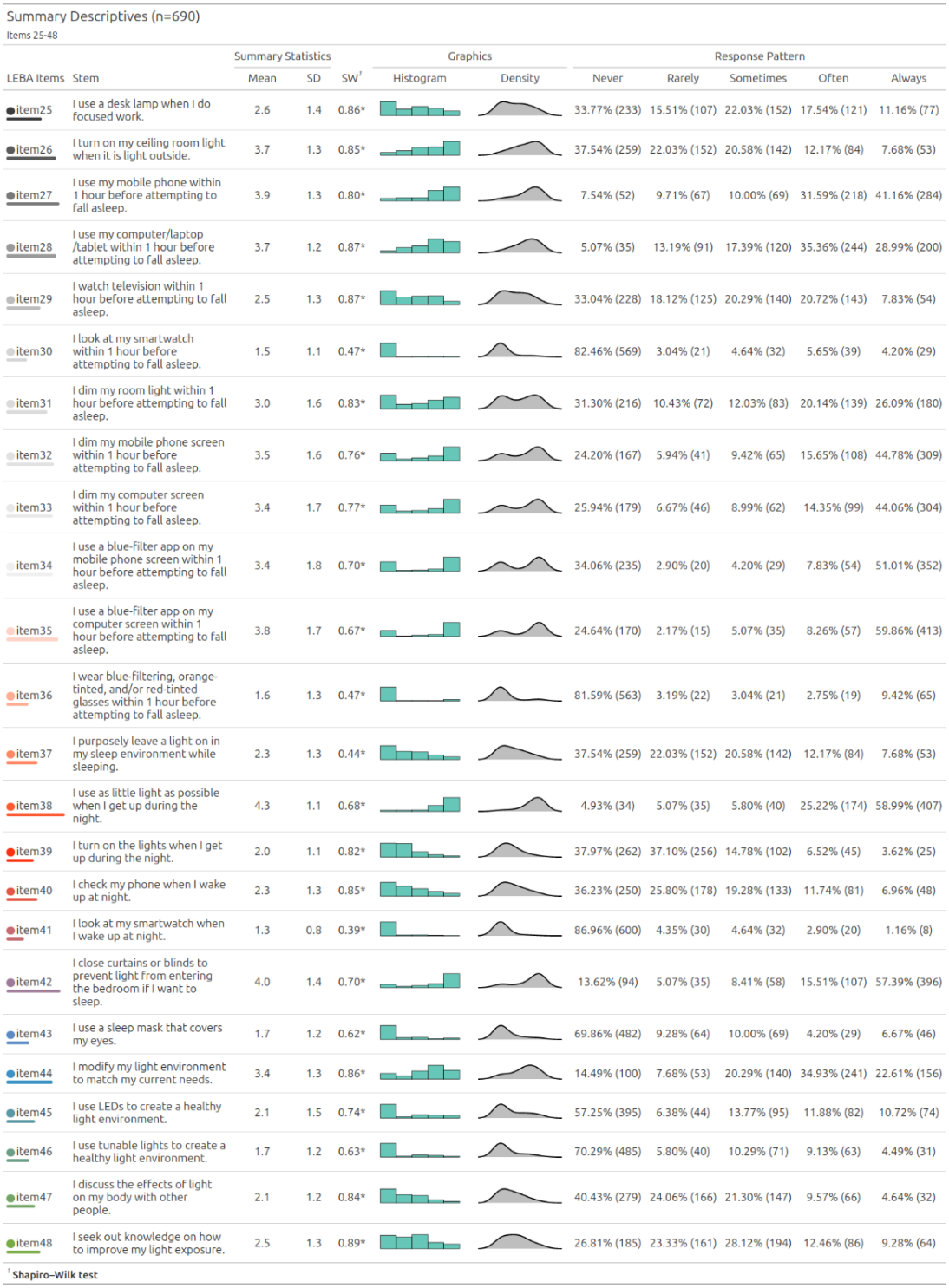
Items 01-24

| | | Summary Statistics | | | Graphics | | Response Pattern | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Items | Stem | Mean | SD | SW[1] | Histogram | Density | Never | Rarely | Sometimes | Often | Always |
| item01 | I turn on the lights immediately after waking up. | 2.3 | 1.4 | 0.82* | | | 41.59% (287) | 22.32% (154) | 13.33% (92) | 11.74% (81) | 11.01% (76) |
| item02 | I open the curtains or blinds immediately after waking up. | 2.8 | 1.6 | 0.84* | | | 32.61% (225) | 15.22% (105) | 11.30% (78) | 19.28% (133) | 21.59% (149) |
| item03 | I look at my mobile phone screen immediately after waking up. | 3.5 | 1.4 | 0.86* | | | 14.35% (99) | 9.86% (68) | 17.39% (120) | 30.00% (207) | 28.41% (196) |
| item04 | I use an alarm with a dawn simulation light. | 1.4 | 1.1 | 0.40* | | | 86.09% (594) | 3.04% (21) | 2.61% (18) | 2.46% (17) | 5.80% (40) |
| item05 | I have breakfast within 3 meters from a window. | 3.9 | 1.4 | 0.74* | | | 14.35% (99) | 4.78% (33) | 11.01% (76) | 18.26% (126) | 51.59% (356) |
| item06 | I have breakfast in a brightly lit room (illuminated by electric light). | 2.7 | 1.5 | 0.85* | | | 33.19% (229) | 15.36% (106) | 16.38% (113) | 16.09% (111) | 18.99% (131) |
| item07 | I go for a walk or exercise outside within 2 hours after waking up. | 2.2 | 1.2 | 0.84* | | | 38.70% (267) | 26.23% (181) | 16.23% (112) | 13.04% (90) | 5.80% (40) |
| item08 | I spend 30 minutes or less per day (in total) outside. | 3.0 | 1.2 | 0.91* | | | 13.91% (96) | 22.46% (155) | 25.22% (174) | 28.26% (195) | 10.14% (70) |
| item09 | I spend between 30 minutes and 1 hour per day (in total) outside. | 2.9 | 1.0 | 0.91* | | | 11.30% (78) | 20.58% (142) | 38.99% (269) | 23.91% (165) | 5.22% (36) |
| item10 | I spend between 1 and 3 hours per day (in total) outside. | 2.7 | 1.1 | 0.91* | | | 14.06% (97) | 30.58% (211) | 30.43% (210) | 21.74% (150) | 3.19% (22) |
| item11 | I spend more than 3 hours per day (in total) outside. | 2.2 | 0.9 | 0.86* | | | 23.77% (164) | 46.38% (320) | 22.03% (152) | 6.38% (44) | 1.45% (10) |
| item12 | I spend as much time outside as possible. | 2.3 | 1.2 | 0.87* | | | 30.72% (212) | 30.14% (208) | 20.58% (142) | 11.88% (82) | 6.67% (46) |
| item13 | I use sunglasses when I go outside in bright daylight. | 2.7 | 1.5 | 0.87* | | | 30.14% (208) | 17.54% (121) | 17.83% (123) | 18.70% (129) | 15.80% (109) |
| item14 | I wear a visor or cap when I go outside in bright daylight. | 2.1 | 1.3 | 0.79* | | | 47.54% (328) | 18.84% (130) | 12.90% (89) | 15.22% (105) | 5.51% (38) |
| item15 | I seek shade when I am outside in bright daylight. | 3.3 | 1.1 | 0.91* | | | 7.97% (55) | 13.91% (96) | 35.36% (244) | 27.97% (193) | 14.78% (102) |
| item16 | I wear blue-filtering, orange-tinted, and/or red-tinted glasses indoors during the day. | 1.6 | 1.3 | 0.51* | | | 79.13% (546) | 3.91% (27) | 4.06% (28) | 5.07% (35) | 7.83% (54) |
| item17 | I wear blue-filtering, orange-tinted, and/or red-tinted glasses outdoors during the day. | 1.5 | 1.2 | 0.49* | | | 80.43% (555) | 3.33% (23) | 5.22% (36) | 3.04% (21) | 7.97% (55) |
| item18 | I use light therapy applying a white light box. | 1.1 | 0.5 | 0.27* | | | 92.90% (641) | 3.48% (24) | 2.75% (19) | 0.58% (4) | 0.29% (2) |
| item19 | I use light therapy applying a blue light box. | 1.0 | 0.3 | 0.12* | | | 97.68% (674) | 0.87% (6) | 0.72% (5) | 0.72% (5) | 0.00% (0) |
| item20 | I use light therapy applying a light visor. | 1.0 | 0.3 | 0.08* | | | 98.70% (681) | 0.14% (1) | 0.58% (4) | 0.43% (3) | 0.14% (1) |
| item21 | I use light therapy applying another form of light device. | 1.1 | 0.6 | 0.24* | | | 94.06% (649) | 1.45% (10) | 3.04% (21) | 0.58% (4) | 0.87% (6) |
| item22 | I spend most of my daytime in a brightly lit environment. | 3.5 | 1.1 | 0.88* | | | 5.36% (37) | 13.33% (92) | 21.74% (150) | 41.59% (287) | 17.97% (124) |
| item23 | I close the curtains or blinds during the day if the light from outside is bright. | 2.6 | 1.3 | 0.89* | | | 26.38% (182) | 24.93% (172) | 23.33% (161) | 17.25% (119) | 8.12% (56) |
| item24 | I spend most of my indoor time within 3 meters from a window. | 4.1 | 1.0 | 0.79* | | | 2.90% (20) | 5.65% (39) | 11.45% (79) | 37.83% (261) | 42.17% (291) |

[1] **Shapiro–Wilk test**

Figure3-screenshot.png

Comment: manuscript Figure 3



Summary Descriptives (n=690)

Items 25-48

| LEBA Items | Stem | Summary Statistics | | | Graphics | | Response Pattern | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Mean | SD | SW† | Histogram | Density | Never | Rarely | Sometimes | Often | Always |
| item25 | I use a desk lamp when I do focused work. | 2.6 | 1.4 | 0.86* | | | 33.77% (233) | 15.51% (107) | 22.03% (152) | 17.54% (121) | 11.16% (77) |
| item26 | I turn on my ceiling room light when it is light outside. | 3.7 | 1.3 | 0.85* | | | 37.54% (259) | 22.03% (152) | 20.58% (142) | 12.17% (84) | 7.68% (53) |
| item27 | I use my mobile phone within 1 hour before attempting to fall asleep. | 3.9 | 1.3 | 0.80* | | | 7.54% (52) | 9.71% (67) | 10.00% (69) | 31.59% (218) | 41.16% (284) |
| item28 | I use my computer/laptop /tablet within 1 hour before attempting to fall asleep. | 3.7 | 1.2 | 0.87* | | | 5.07% (35) | 13.19% (91) | 17.39% (120) | 35.36% (244) | 28.99% (200) |
| item29 | I watch television within 1 hour before attempting to fall asleep. | 2.5 | 1.3 | 0.87* | | | 33.04% (228) | 18.12% (125) | 20.29% (140) | 20.72% (143) | 7.83% (54) |
| item30 | I look at my smartwatch within 1 hour before attempting to fall asleep. | 1.5 | 1.1 | 0.47* | | | 82.46% (569) | 3.04% (21) | 4.64% (32) | 5.65% (39) | 4.20% (29) |
| item31 | I dim my room light within 1 hour before attempting to fall asleep. | 3.0 | 1.6 | 0.83* | | | 31.30% (216) | 10.43% (72) | 12.03% (83) | 20.14% (139) | 26.09% (180) |
| item32 | I dim my mobile phone screen within 1 hour before attempting to fall asleep. | 3.5 | 1.6 | 0.76* | | | 24.20% (167) | 5.94% (41) | 9.42% (65) | 15.65% (108) | 44.78% (309) |
| item33 | I dim my computer screen within 1 hour before attempting to fall asleep. | 3.4 | 1.7 | 0.77* | | | 25.94% (179) | 6.67% (46) | 8.99% (62) | 14.35% (99) | 44.06% (304) |
| item34 | I use a blue-filter app on my mobile phone screen within 1 hour before attempting to fall asleep. | 3.4 | 1.8 | 0.70* | | | 34.06% (235) | 2.90% (20) | 4.20% (29) | 7.83% (54) | 51.01% (352) |
| item35 | I use a blue-filter app on my computer screen within 1 hour before attempting to fall asleep. | 3.8 | 1.7 | 0.67* | | | 24.64% (170) | 2.17% (15) | 5.07% (35) | 8.26% (57) | 59.86% (413) |
| item36 | I wear blue-filtering, orange-tinted, and/or red-tinted glasses within 1 hour before attempting to fall asleep. | 1.6 | 1.3 | 0.47* | | | 81.59% (563) | 3.19% (22) | 3.04% (21) | 2.75% (19) | 9.42% (65) |
| item37 | I purposely leave a light on in my sleep environment while sleeping. | 2.3 | 1.3 | 0.44* | | | 37.54% (259) | 22.03% (152) | 20.58% (142) | 12.17% (84) | 7.68% (53) |
| item38 | I use as little light as possible when I get up during the night. | 4.3 | 1.1 | 0.68* | | | 4.93% (34) | 5.07% (35) | 5.80% (40) | 25.22% (174) | 58.99% (407) |
| item39 | I turn on the lights when I get up during the night. | 2.0 | 1.1 | 0.82* | | | 37.97% (262) | 37.10% (256) | 14.78% (102) | 6.52% (45) | 3.62% (25) |
| item40 | I check my phone when I wake up at night. | 2.3 | 1.3 | 0.85* | | | 36.23% (250) | 25.80% (178) | 19.28% (133) | 11.74% (81) | 6.96% (48) |
| item41 | I look at my smartwatch when I wake up at night. | 1.3 | 0.8 | 0.39* | | | 86.96% (600) | 4.35% (30) | 4.64% (32) | 2.90% (20) | 1.16% (8) |
| item42 | I close curtains or blinds to prevent light from entering the bedroom if I want to sleep. | 4.0 | 1.4 | 0.70* | | | 13.62% (94) | 5.07% (35) | 8.41% (58) | 15.51% (107) | 57.39% (396) |
| item43 | I use a sleep mask that covers my eyes. | 1.7 | 1.2 | 0.62* | | | 69.86% (482) | 9.28% (64) | 10.00% (69) | 4.20% (29) | 6.67% (46) |
| item44 | I modify my light environment to match my current needs. | 3.4 | 1.3 | 0.86* | | | 14.49% (100) | 7.68% (53) | 20.29% (140) | 34.93% (241) | 22.61% (156) |
| item45 | I use LEDs to create a healthy light environment. | 2.1 | 1.5 | 0.74* | | | 57.25% (395) | 6.38% (44) | 13.77% (95) | 11.88% (82) | 10.72% (74) |
| item46 | I use tunable lights to create a healthy light environment. | 1.7 | 1.2 | 0.63* | | | 70.29% (485) | 5.80% (40) | 10.29% (71) | 9.13% (63) | 4.49% (31) |
| item47 | I discuss the effects of light on my body with other people. | 2.1 | 1.2 | 0.84* | | | 40.43% (279) | 24.06% (166) | 21.30% (147) | 9.57% (66) | 4.64% (32) |
| item48 | I seek out knowledge on how to improve my light exposure. | 2.5 | 1.3 | 0.89* | | | 26.81% (185) | 23.33% (161) | 28.12% (194) | 12.46% (86) | 9.28% (64) |

† Shapiro–Wilk test

Figure4.png

Comment: manuscript Figure 4

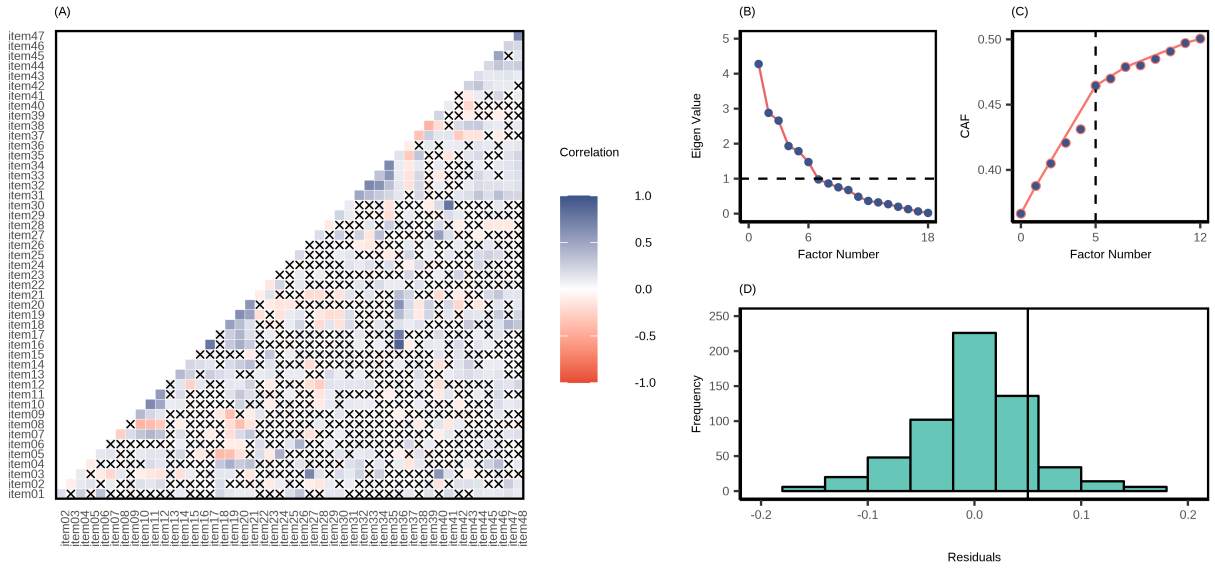
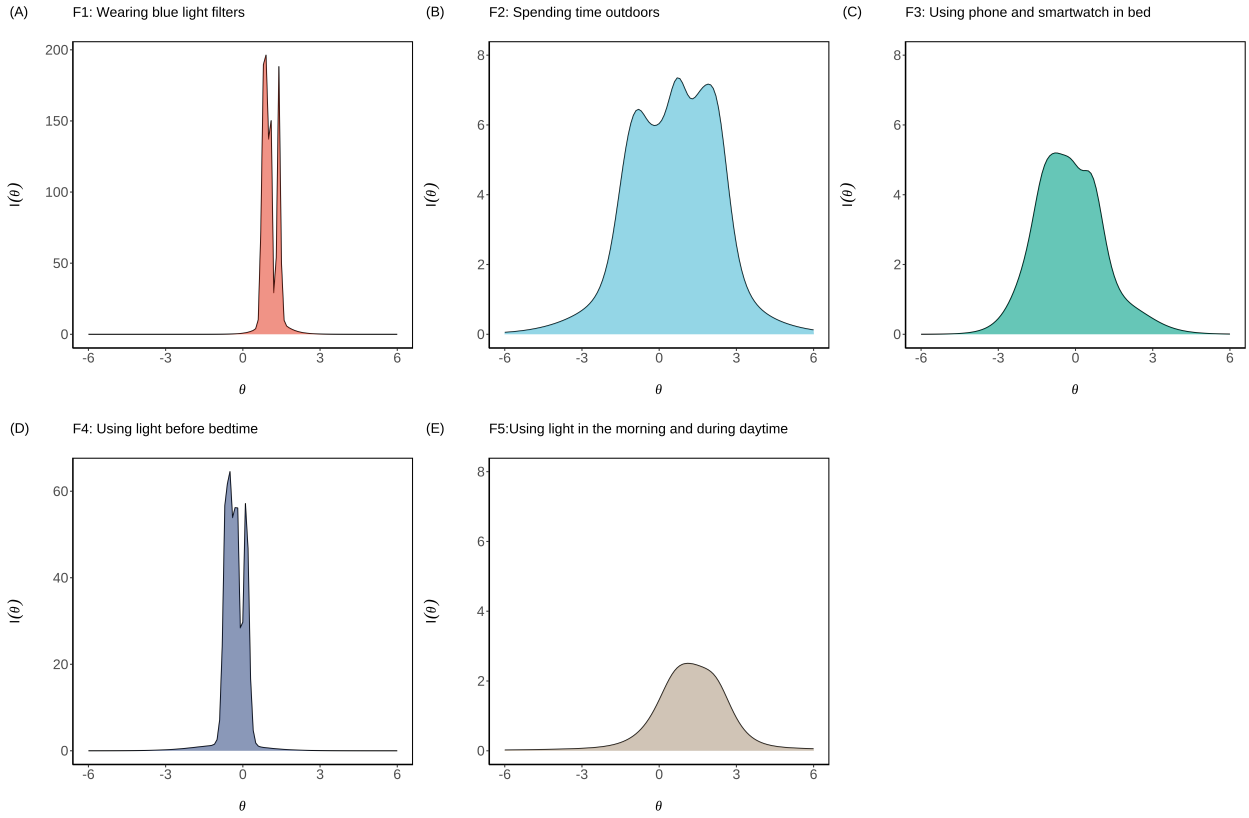


Figure6.png

Comment: manuscript Figure 6



S1_Fig-screenshot.png

Comment: manuscript Figure S1

**Light Exposure Behaviour Assessment**

Summary Descriptives EFA Sample (n=428)

| Items | Summary Statistics | | | | | | Graphics | | Response Pattern | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Item | Mean | SD | Skew | Kurtosis | SW[1] | Item Total Correlation | Histogram | Density | Never | Rarely | Sometimes | Often | Always |
| item01 | 2.27 | 1.39 | 0.74 | -0.81 | 0.81* | 0.19 | | | 42.29% (181) | 22.20% (95) | 12.62% (54) | 12.38% (53) | 10.51% (45) |
| item02 | 2.87 | 1.59 | 0.08 | -1.60 | 0.83* | 0.28 | | | 31.78% (136) | 15.65% (67) | 9.35% (40) | 20.09% (86) | 23.13% (99) |
| item03 | 3.36 | 1.38 | -0.48 | -1.03 | 0.87* | 0.23 | | | 15.89% (68) | 11.45% (49) | 17.29% (74) | 31.07% (133) | 24.30% (104) |
| item04 | 1.47 | 1.18 | 2.38 | 4.00 | 0.43* | 0.24 | | | 84.11% (360) | 3.50% (15) | 2.10% (9) | 2.10% (9) | 8.18% (35) |
| item05 | 4.01 | 1.40 | -1.22 | 0.07 | 0.70* | 0.17 | | | 12.85% (55) | 3.50% (15) | 9.58% (41) | 17.52% (75) | 56.54% (242) |
| item06 | 2.79 | 1.55 | 0.19 | -1.48 | 0.85* | 0.13 | | | 32.01% (137) | 15.42% (66) | 15.89% (68) | 15.42% (66) | 21.26% (91) |
| item07 | 2.26 | 1.25 | 0.70 | -0.60 | 0.85* | 0.32 | | | 35.98% (154) | 27.80% (119) | 17.29% (74) | 12.38% (53) | 6.54% (28) |
| item08 | 2.97 | 1.20 | -0.06 | -0.94 | 0.91* | 0.25 | | | 13.79% (59) | 22.20% (95) | 27.80% (119) | 25.93% (111) | 10.28% (44) |
| item09 | 2.94 | 1.03 | -0.12 | -0.40 | 0.91* | 0.08 | | | 10.28% (44) | 19.63% (84) | 41.82% (179) | 22.43% (96) | 5.84% (25) |
| item10 | 2.74 | 1.04 | 0.09 | -0.74 | 0.91* | 0.42 | | | 11.92% (51) | 31.31% (134) | 31.31% (134) | 21.96% (94) | 3.50% (15) |
| item11 | 2.18 | 0.90 | 0.60 | 0.12 | 0.86* | 0.41 | | | 22.43% (96) | 46.26% (198) | 23.13% (99) | 7.01% (30) | 1.17% (5) |
| item12 | 2.36 | 1.22 | 0.59 | -0.62 | 0.87* | 0.48 | | | 29.91% (128) | 29.67% (127) | 21.50% (92) | 12.15% (52) | 6.78% (29) |
| item13 | 2.73 | 1.46 | 0.20 | -1.36 | 0.87* | 0.25 | | | 30.14% (129) | 17.52% (75) | 17.76% (76) | 18.69% (80) | 15.89% (68) |
| item14 | 2.14 | 1.31 | 0.77 | -0.78 | 0.80* | 0.28 | | | 47.20% (202) | 18.93% (81) | 12.62% (54) | 15.65% (67) | 5.61% (24) |
| item15 | 3.26 | 1.09 | -0.26 | -0.45 | 0.91* | 0.03 | | | 7.48% (32) | 13.79% (59) | 37.15% (159) | 28.04% (120) | 13.55% (58) |
| item16 | 1.56 | 1.23 | 2.00 | 2.45 | 0.50* | 0.28 | | | 79.67% (341) | 4.21% (18) | 3.97% (17) | 4.67% (20) | 7.48% (32) |
| item17 | 1.54 | 1.21 | 2.07 | 2.75 | 0.49* | 0.21 | | | 80.61% (345) | 3.27% (14) | 5.14% (22) | 3.27% (14) | 7.71% (33) |
| item18 | 1.12 | 0.49 | 5.02 | 27.80 | 0.25* | 0.18 | | | 93.22% (399) | 3.50% (15) | 2.10% (9) | 0.70% (3) | 0.47% (2) |
| item19 | 1.05 | 0.36 | 7.23 | 52.98 | 0.13* | 0.17 | | | 97.43% (417) | 0.93% (4) | 0.47% (2) | 1.17% (5) | 0.00% (0) |
| item20 | 1.04 | 0.33 | 8.99 | 85.28 | 0.10* | 0.16 | | | 98.36% (421) | 0.23% (1) | 0.70% (3) | 0.47% (2) | 0.23% (1) |
| item21 | 1.14 | 0.59 | 4.79 | 24.05 | 0.25* | 0.21 | | | 93.69% (401) | 1.64% (7) | 3.04% (13) | 0.47% (2) | 1.17% (5) |
| item22 | 3.57 | 1.07 | -0.65 | -0.17 | 0.88* | 0.20 | | | 4.91% (21) | 11.92% (51) | 21.96% (94) | 43.22% (185) | 17.99% (77) |
| item23 | 2.56 | 1.27 | 0.33 | -1.00 | 0.89* | 0.08 | | | 26.40% (113) | 25.23% (108) | 22.66% (97) | 17.76% (76) | 7.94% (34) |
| item24 | 4.14 | 0.99 | -1.23 | 1.14 | 0.79* | 0.22 | | | 2.34% (10) | 5.84% (25) | 10.98% (47) | 37.38% (160) | 43.46% (186) |
| item25 | 2.59 | 1.41 | 0.27 | -1.27 | 0.86* | 0.15 | | | 34.35% (147) | 13.79% (59) | 22.20% (95) | 17.99% (77) | 11.68% (50) |
| item26 | 2.25 | 1.27 | 0.69 | -0.64 | 0.84* | 0.08 | | | 38.32% (164) | 23.36% (100) | 20.09% (86) | 10.98% (47) | 7.24% (31) |
| item27 | 3.80 | 1.29 | -0.87 | -0.42 | 0.82* | 0.17 | | | 8.41% (36) | 11.21% (48) | 11.21% (48) | 30.37% (130) | 38.79% (166) |
| item28 | 3.76 | 1.14 | -0.68 | -0.45 | 0.86* | 0.18 | | | 3.97% (17) | 13.08% (56) | 17.06% (73) | 34.81% (149) | 31.07% (133) |
| item29 | 2.44 | 1.31 | 0.38 | -1.14 | 0.86* | 0.13 | | | 34.35% (147) | 20.33% (87) | 19.39% (83) | 19.16% (82) | 6.78% (29) |
| item30 | 1.48 | 1.11 | 2.18 | 3.35 | 0.48* | 0.13 | | | 81.78% (350) | 3.27% (14) | 4.91% (21) | 5.37% (23) | 4.67% (20) |
| item31 | 3.00 | 1.62 | -0.08 | -1.61 | 0.83* | 0.39 | | | 31.31% (134) | 10.05% (43) | 11.68% (50) | 20.79% (89) | 26.17% (112) |
| item32 | 3.55 | 1.65 | -0.60 | -1.34 | 0.76* | 0.33 | | | 23.13% (99) | 7.01% (30) | 8.18% (35) | 14.95% (64) | 46.73% (200) |
| item33 | 3.62 | 1.64 | -0.68 | -1.25 | 0.74* | 0.37 | | | 21.96% (94) | 7.01% (30) | 7.24% (31) | 14.49% (62) | 49.30% (211) |
| item34 | 3.42 | 1.83 | -0.45 | -1.69 | 0.69* | 0.20 | | | 33.64% (144) | 3.04% (13) | 3.04% (13) | 8.64% (37) | 51.64% (221) |
| item35 | 3.86 | 1.67 | -0.99 | -0.85 | 0.65* | 0.20 | | | 22.90% (98) | 1.87% (8) | 3.74% (16) | 9.35% (40) | 62.15% (266) |
| item36 | 1.54 | 1.25 | 2.13 | 2.86 | 0.46* | 0.35 | | | 82.24% (352) | 3.04% (13) | 3.04% (13) | 2.34% (10) | 9.35% (40) |
| item37 | 1.33 | 0.91 | 3.03 | 8.43 | 0.41* | 0.09 | | | 84.58% (362) | 7.01% (30) | 3.04% (13) | 1.64% (7) | 3.74% (16) |
| item38 | 4.30 | 1.08 | -1.79 | 2.53 | 0.67* | 0.32 | | | 5.37% (23) | 3.50% (15) | 5.37% (23) | 27.57% (118) | 58.18% (249) |
| item39 | 1.96 | 0.98 | 1.02 | 0.69 | 0.82* | 0.07 | | | 37.62% (161) | 38.79% (166) | 15.65% (67) | 5.61% (24) | 2.34% (10) |
| item40 | 2.16 | 1.19 | 0.71 | -0.54 | 0.84* | 0.25 | | | 39.49% (169) | 25.00% (107) | 19.63% (84) | 11.45% (49) | 4.44% (19) |
| item41 | 1.31 | 0.81 | 2.75 | 6.92 | 0.43* | 0.14 | | | 85.05% (364) | 4.67% (20) | 6.07% (26) | 3.04% (13) | 1.17% (5) |
| item42 | 3.93 | 1.48 | -1.06 | -0.44 | 0.71* | 0.15 | | | 14.72% (63) | 5.84% (25) | 7.94% (34) | 14.95% (64) | 56.54% (242) |
| item43 | 1.64 | 1.18 | 1.79 | 2.02 | 0.60* | 0.22 | | | 71.26% (305) | 9.35% (40) | 10.05% (43) | 2.80% (12) | 6.54% (28) |
| item44 | 3.51 | 1.30 | -0.70 | -0.59 | 0.85* | 0.40 | | | 13.55% (58) | 7.24% (31) | 18.69% (80) | 35.98% (154) | 24.53% (105) |
| item45 | 2.22 | 1.48 | 0.71 | -1.02 | 0.76* | 0.29 | | | 53.04% (227) | 7.01% (30) | 16.36% (70) | 11.92% (51) | 11.68% (50) |
| item46 | 1.76 | 1.23 | 1.35 | 0.44 | 0.66* | 0.39 | | | 67.06% (287) | 7.71% (33) | 11.68% (50) | 8.88% (38) | 4.67% (20) |
| item47 | 2.11 | 1.17 | 0.77 | -0.39 | 0.83* | 0.37 | | | 41.12% (176) | 24.77% (106) | 20.09% (86) | 9.81% (42) | 4.21% (18) |
| item48 | 2.60 | 1.25 | 0.29 | -0.86 | 0.89* | 0.36 | | | 25.00% (107) | 21.50% (92) | 30.84% (132) | 13.79% (59) | 8.88% (38) |

[1] Shapiro–Wilk test

S2_Fig-screenshot.png

Comment: manuscript Figure S2

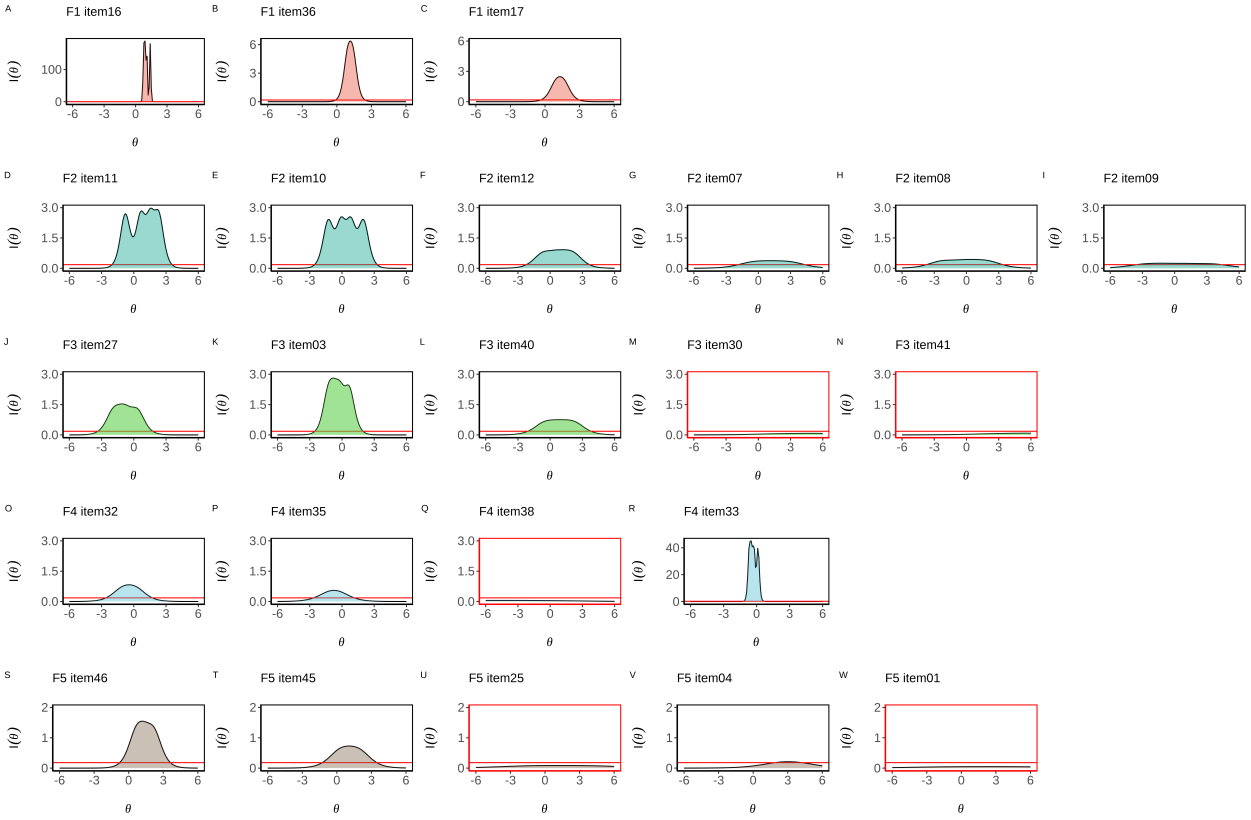
**Light Exposure Behaviour Assessment**

Summary Descriptives CFA Sample (n=262)

| | Summary Statistics | | | | Graphics | | Response Pattern | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | n | Mean | Median | SD | Histogram | Density | Never | Rarely | Sometimes | Often | Always |
| **F1: Wearing blue light filters** | | | | | | | | | | | |
| item16 | 262 | 1.6 | 1.0 | 1.3 | | | 78.24% (205) | 3.44% (9) | 4.20% (11) | 5.73% (15) | 8.40% (22) |
| item17 | 262 | 1.6 | 1.0 | 1.2 | | | 80.15% (210) | 3.44% (9) | 5.34% (14) | 2.67% (7) | 8.40% (22) |
| item36 | 262 | 1.6 | 1.0 | 1.3 | | | 80.53% (211) | 3.44% (9) | 3.05% (8) | 3.44% (9) | 9.54% (25) |
| **F2: Spending time outdoors** | | | | | | | | | | | |
| item07 | 262 | 2.1 | 2.0 | 1.2 | | | 43.13% (113) | 23.66% (62) | 14.50% (38) | 14.12% (37) | 4.58% (12) |
| item08 | 262 | 3.0 | 3.0 | 1.2 | | | 14.12% (37) | 22.90% (60) | 20.99% (55) | 32.06% (84) | 9.92% (26) |
| item09 | 262 | 2.9 | 3.0 | 1.1 | | | 12.98% (34) | 22.14% (58) | 34.35% (90) | 26.34% (69) | 4.20% (11) |
| item10 | 262 | 2.6 | 3.0 | 1.1 | | | 17.56% (46) | 29.39% (77) | 29.01% (76) | 21.37% (56) | 2.67% (7) |
| item11 | 262 | 2.1 | 2.0 | 0.9 | | | 25.95% (68) | 46.56% (122) | 20.23% (53) | 5.34% (14) | 1.91% (5) |
| item12 | 262 | 2.3 | 2.0 | 1.2 | | | 32.06% (84) | 30.92% (81) | 19.08% (50) | 11.45% (30) | 6.49% (17) |
| **F3: Using phone and smartwatch in bed** | | | | | | | | | | | |
| item03 | 262 | 3.7 | 4.0 | 1.3 | | | 11.83% (31) | 7.25% (19) | 17.56% (46) | 28.24% (74) | 35.11% (92) |
| item27 | 262 | 4.0 | 4.0 | 1.2 | | | 6.11% (16) | 7.25% (19) | 8.02% (21) | 33.59% (88) | 45.04% (118) |
| item30 | 262 | 1.4 | 1.0 | 1.1 | | | 83.59% (219) | 2.67% (7) | 4.20% (11) | 6.11% (16) | 3.44% (9) |
| item40 | 262 | 2.5 | 2.0 | 1.3 | | | 30.92% (81) | 27.10% (71) | 18.70% (49) | 12.21% (32) | 11.07% (29) |
| item41 | 262 | 1.2 | 1.0 | 0.7 | | | 90.08% (236) | 3.82% (10) | 2.29% (6) | 2.67% (7) | 1.15% (3) |
| **F4: Using light before bedtime** | | | | | | | | | | | |
| item32 | 262 | 3.4 | 4.0 | 1.7 | | | 25.95% (68) | 4.20% (11) | 11.45% (30) | 16.79% (44) | 41.60% (109) |
| item33 | 262 | 3.1 | 3.0 | 1.7 | | | 32.44% (85) | 6.11% (16) | 11.83% (31) | 14.12% (37) | 35.50% (93) |
| item35 | 262 | 3.6 | 5.0 | 1.8 | | | 27.48% (72) | 2.67% (7) | 7.25% (19) | 6.49% (17) | 56.11% (147) |
| item38 | 262 | 4.3 | 5.0 | 1.1 | | | 4.20% (11) | 7.63% (20) | 6.49% (17) | 21.37% (56) | 60.31% (158) |
| **F5: Using light in the morning and during daytime** | | | | | | | | | | | |
| item01 | 262 | 2.3 | 2.0 | 1.4 | | | 40.46% (106) | 22.52% (59) | 14.50% (38) | 10.69% (28) | 11.83% (31) |
| item04 | 262 | 1.3 | 1.0 | 0.8 | | | 89.31% (234) | 2.29% (6) | 3.44% (9) | 3.05% (8) | 1.91% (5) |
| item25 | 262 | 2.5 | 2.0 | 1.4 | | | 32.82% (86) | 18.32% (48) | 21.76% (57) | 16.79% (44) | 10.31% (27) |
| item45 | 262 | 2.0 | 1.0 | 1.4 | | | 64.12% (168) | 5.34% (14) | 9.54% (25) | 11.83% (31) | 9.16% (24) |
| item46 | 262 | 1.6 | 1.0 | 1.2 | | | 75.57% (198) | 2.67% (7) | 8.02% (21) | 9.54% (25) | 4.20% (11) |

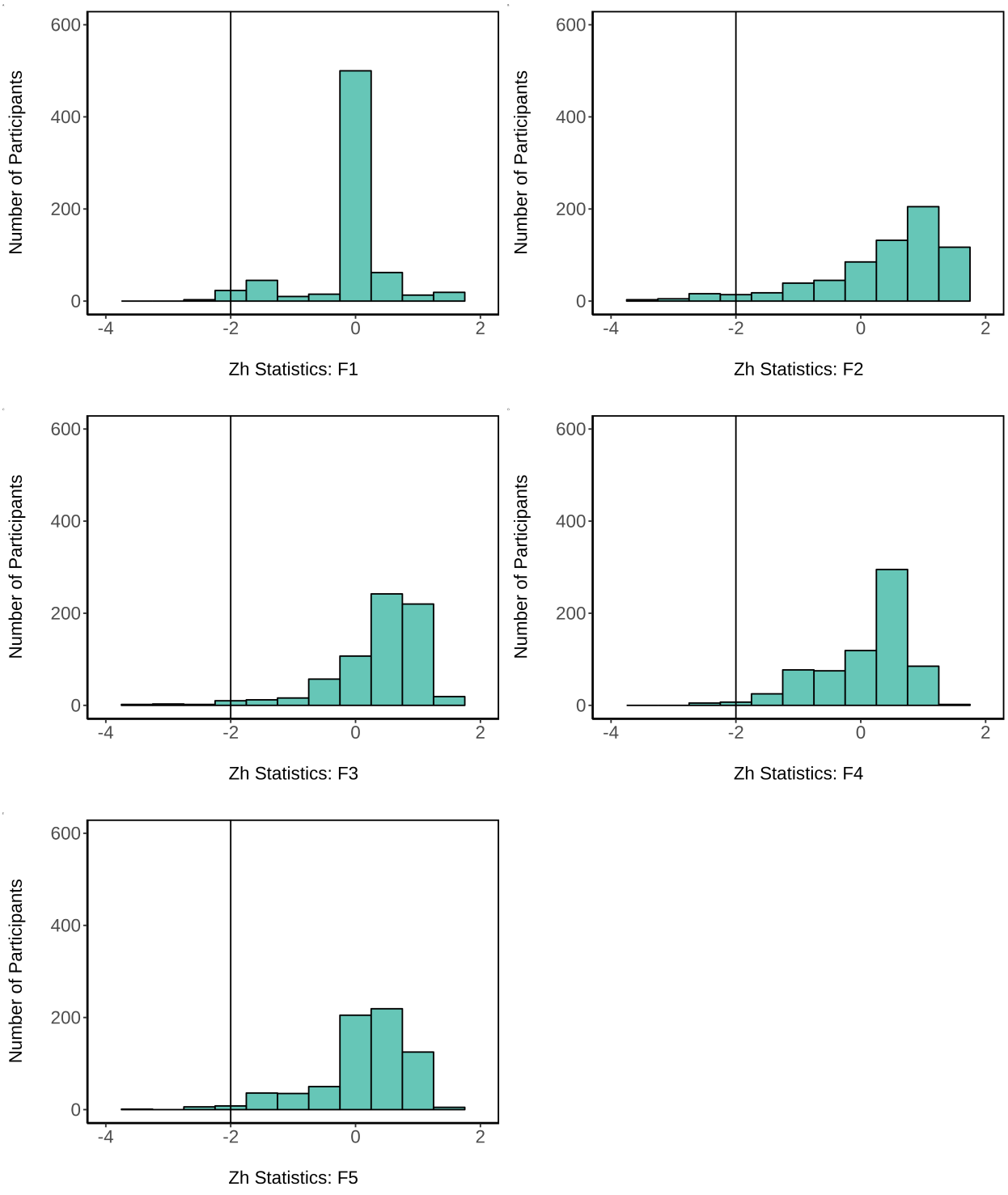
S3_Fig.png

Comment: manuscript Figure S3



S4_Fig.png

Comment: manuscript Figure S4



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I would like to thank Dr Spitschan and his team for promptly answering any queries I had with this reproduction. CODECHECK is financially supported by the Mozilla foundation.

## Citing this document

Stephen J. Eglen (2023). CODECHECK Certificate 2023-012. Zenodo. https://doi.org/10.5281/zenodo.10213244

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## About this document

This document was created using R Markdown using the `codecheck` R package. `make codecheck.pdf` will regenerate the report file.

```
sessionInfo()
```

```
## R version 4.3.1 (2023-06-16)
## Platform: x86_64-pc-linux-gnu (64-bit)
## Running under: Ubuntu 23.10
##
## Matrix products: default
## BLAS:   /usr/lib/x86_64-linux-gnu/blas/libblas.so.3.11.0
## LAPACK: /usr/lib/x86_64-linux-gnu/lapack/liblapack.so.3.11.0
##
## locale:
##  [1] LC_CTYPE=en_US.UTF-8       LC_NUMERIC=C
##  [3] LC_TIME=en_US.UTF-8        LC_COLLATE=en_US.UTF-8
##  [5] LC_MONETARY=en_US.UTF-8    LC_MESSAGES=en_US.UTF-8
##  [7] LC_PAPER=en_US.UTF-8       LC_NAME=C
##  [9] LC_ADDRESS=C               LC_TELEPHONE=C
## [11] LC_MEASUREMENT=en_US.UTF-8 LC_IDENTIFICATION=C
##
## time zone: Europe/London
## tzcode source: system (glibc)
##
## attached base packages:
## [1] stats     graphics  grDevices utils     datasets
## [6] methods   base
##
## other attached packages:
##  [1] readr_2.1.4          tibble_3.2.1
##  [3] xtable_1.8-4         yaml_2.3.7
##  [5] rprojroot_2.0.4      knitr_1.45
##  [7] codecheck_0.1.0.9005 parsedate_1.3.1
##  [9] R.cache_0.16.0       gh_1.4.0
##
```

```
## loaded via a namespace (and not attached):
##  [1] tidyr_1.3.0       utf8_1.2.4        generics_0.1.3
##  [4] xml2_1.3.5        stringi_1.8.2     zen4R_0.9
##  [7] httpcode_0.3.0    hms_1.1.3         digest_0.6.33
## [10] magrittr_2.0.3    evaluate_0.23     fastmap_1.1.1
## [13] R.oo_1.25.0       jsonlite_1.8.7    zip_2.3.0
## [16] R.utils_2.12.3    whisker_0.4.1     crul_1.4.0
## [19] httr_1.4.7        purrr_1.0.2       fansi_1.0.5
## [22] rdflib_0.2.7      XML_3.99-0.15     cli_3.6.1
## [25] crayon_1.5.2      rlang_1.1.2       R.methodsS3_1.8.2
## [28] bit64_4.0.5       withr_2.5.2       cachem_1.0.8
## [31] parallel_4.3.1    tools_4.3.1       tzdb_0.4.0
## [34] memoise_2.0.1     dplyr_1.1.4       curl_5.1.0
## [37] assertthat_0.2.1  vctrs_0.6.4       R6_2.5.1
## [40] lifecycle_1.0.4   stringr_1.5.1     bit_4.0.5
## [43] fs_1.6.3          vroom_1.6.4       pkgconfig_2.0.3
## [46] rorcid_0.7.0      osfr_0.2.9        pillar_1.9.0
## [49] glue_1.6.2        atom4R_0.3-3      xfun_0.41
## [52] tidyselect_1.2.0  keyring_1.3.1     htmltools_0.5.7
## [55] rmarkdown_2.25    compiler_4.3.1    roxygen2_7.2.3
## [58] fauxpas_0.5.2     redland_1.0.17-17
```