STAI Stability Analysis

Franziska Werner

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# Methods

@spielberger2010

## Participants

* trial 1: 105 participants
* trial 2: 87 participants

-> add: age, sex and education?

## Material

* description of context in which data was collected

## Data analysis

Analysis was conducted in R (R Core Team, 2017) and figures were produced using the package ggplot2 (Wickham, 2009).

# Results

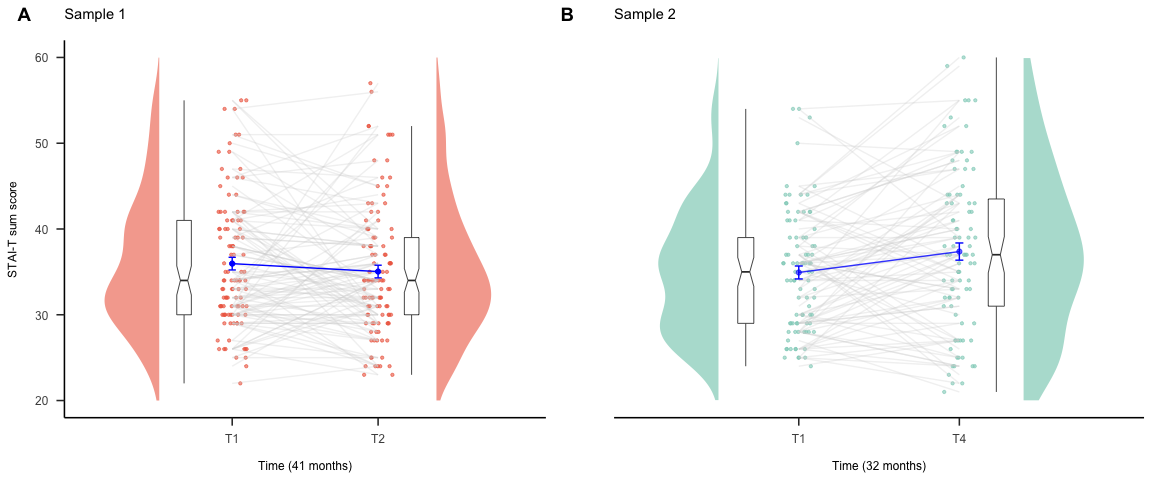


Illustration of STAI-T scores for (A) Study 1 in red and (B) Study 2 in green which depicts the sample average (blue) at both time-points (A: 41 month apart; B: 32 month apart), individual data points (A: red dots, B: green dots) as well as box and density plots at both time points. Note that the STAI-T scores of the same individual at both measurement time points are connected through a grey line.

(#tab:unnamed-chunk-8)

*Item Analysis and item stability.*

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Item | Discrimination | Difficulty | Discrimination | Difficulty | ICC(2,1) | LL | UL |
| 1 | .33 | .46 | .58 | .47 | .26\*\* | .10 | .40 |
| 2 | .39 | .54 | .44 | .53 | .43\*\* | .29 | .56 |
| 3 | .57 | .40 | .41 | .37 | .26\*\* | .10 | .40 |
| 4 | .52 | .30 | .57 | .30 | .14 | -.02 | .30 |
| 5 | .37 | .45 | .36 | .43 | .40\*\* | .25 | .52 |
| 6 | .44 | .57 | .43 | .56 | .04 | -.12 | .20 |
| 7 | .45 | .53 | .45 | .52 | .32\*\* | .17 | .46 |
| 8 | .46 | .39 | .60 | .39 | .29\*\* | .14 | .43 |
| 9 | .49 | .55 | .53 | .51 | .36\*\* | .21 | .49 |
| 10 | .63 | .41 | .57 | .41 | .28\*\* | .12 | .42 |
| 11 | .60 | .42 | .67 | .40 | .41\*\* | .27 | .54 |
| 12 | .43 | .47 | .49 | .45 | .52\*\* | .39 | .63 |
| 13 | .35 | .47 | .47 | .45 | .35\*\* | .20 | .48 |
| 14 | .46 | .45 | .49 | .44 | .32\*\* | .17 | .46 |
| 15 | .43 | .37 | .55 | .39 | .35\*\* | .20 | .48 |
| 16 | .53 | .42 | .63 | .40 | .29\*\* | .14 | .43 |
| 17 | .45 | .45 | .50 | .44 | .29\*\* | .14 | .43 |
| 18 | .55 | .41 | .51 | .40 | .23\*\* | .07 | .38 |
| 19 | .67 | .48 | .62 | .44 | .39\*\* | .25 | .52 |
| 20 | .46 | .46 | .43 | .46 | .39\*\* | .24 | .52 |

*Note.* Total number of participants was . Cronbach’s resulted in .87 and .89 for the first and the second measurement. \ The definition choice was absolute agreement. \ \* < .05 \*\* < .01

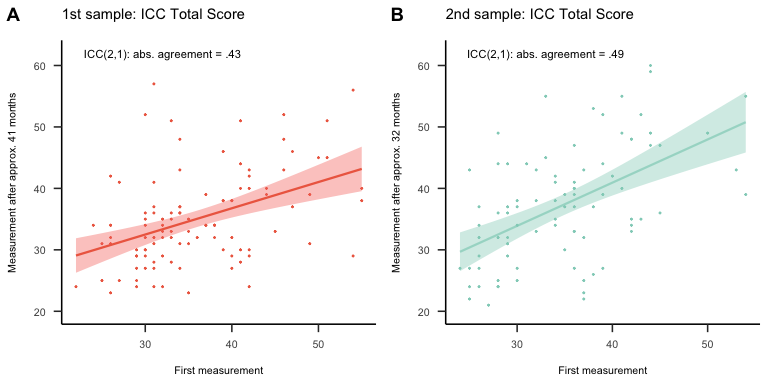
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*Item Analysis and item stability.*

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Item | Discrimination | Difficulty | Discrimination | Difficulty | ICC(2,1) | LL | UL |
| 1 | .54 | .47 | .63 | .49 | .48\*\* | .33 | .61 |
| 2 | .46 | .57 | .39 | .56 | .37\*\* | .21 | .51 |
| 3 | .40 | .34 | .54 | .37 | .30\*\* | .13 | .45 |
| 4 | .34 | .31 | .58 | .32 | .10 | -.08 | .27 |
| 5 | .35 | .43 | .49 | .41 | .45\*\* | .29 | .58 |
| 6 | .50 | .57 | .41 | .58 | .22\* | .05 | .38 |
| 7 | .35 | .45 | .58 | .52 | .38\*\* | .22 | .52 |
| 8 | .50 | .39 | .57 | .41 | .30\*\* | .14 | .46 |
| 9 | .51 | .51 | .67 | .56 | .35\*\* | .19 | .49 |
| 10 | .66 | .41 | .67 | .46 | .49\*\* | .34 | .62 |
| 11 | .66 | .43 | .61 | .44 | .52\*\* | .38 | .64 |
| 12 | .44 | .43 | .59 | .47 | .47\*\* | .33 | .60 |
| 13 | .26 | .45 | .60 | .46 | .48\*\* | .34 | .61 |
| 14 | .33 | .46 | .47 | .49 | .13 | -.05 | .30 |
| 15 | .39 | .37 | .64 | .42 | .18\* | .01 | .34 |
| 16 | .64 | .40 | .73 | .46 | .37\*\* | .21 | .51 |
| 17 | .48 | .42 | .60 | .48 | .37\*\* | .21 | .52 |
| 18 | .48 | .46 | .58 | .43 | .44\*\* | .29 | .58 |
| 19 | .57 | .45 | .73 | .50 | .49\*\* | .34 | .61 |
| 20 | .44 | .42 | .56 | .52 | .23\*\* | .06 | .38 |

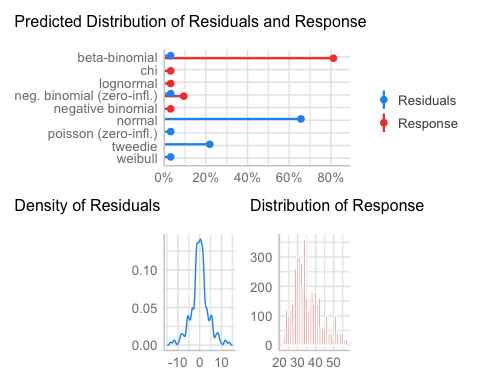
*Note.* Total number of participants was . Cronbach’s resulted in .87 and .92 for the first and the fourth measurement. \ The definition choice was absolute agreement. \ \* < .05 \*\* < .01

## `geom\_smooth()` using formula 'y ~ x'  
## `geom\_smooth()` using formula 'y ~ x'



Retest Reliability. Shown are correlations in achieved total score between two measurements for sample one (A) and sample two (B). Single points represent individual participants.

The twofactorial ANOVA showed a temporal effect on the total score (, , , ), whereas the individual items had no effect (, , , ).



## Note: D.f. calculations have been disabled because the number of observations exceeds 3000.  
## To enable adjustments, add the argument 'pbkrtest.limit = 4200' (or larger)  
## [or, globally, 'set emm\_options(pbkrtest.limit = 4200)' or larger];  
## but be warned that this may result in large computation time and memory use.

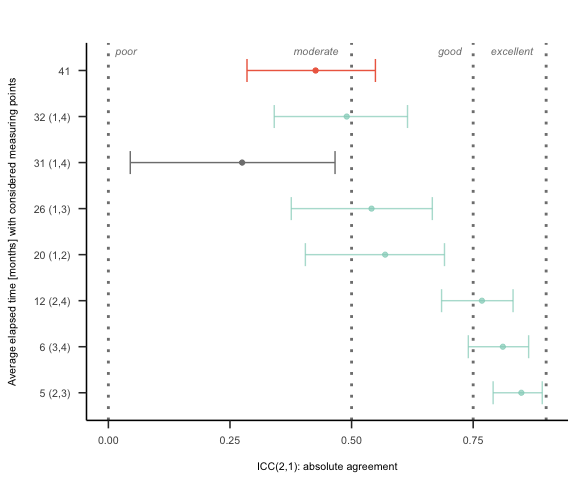
## Note: D.f. calculations have been disabled because the number of observations exceeds 3000.  
## To enable adjustments, add the argument 'lmerTest.limit = 4200' (or larger)  
## [or, globally, 'set emm\_options(lmerTest.limit = 4200)' or larger];  
## but be warned that this may result in large computation time and memory use.

The twofactorial ANOVA showed that it made no difference in terms of total score whether participants completed the STAI-T before, during, or after lockdown (, , , ). Therefore, further analysis is done without differentiating between the three subgroups. Instead, we consider the complete data set.

## Analysis of Variance Table  
## npar Sum Sq Mean Sq F value  
## timePoint 1 258.299 258.299 7.5762  
## partLockdown 2 27.061 13.530 0.3969  
## timePoint:partLockdown 2 31.838 15.919 0.4669

## # Effect Size for ANOVA (Type III)  
##   
## Parameter | Omega2 (partial) | 90% CI  
## --------------------------------------------------------  
## timePoint | 0.05 | [0.00, 0.14]  
## partLockdown | -0.01 | [0.00, 0.00]  
## timePoint:partLockdown | -0.01 | [0.00, 0.00]

## $lsmeans  
## timePoint partLockdown lsmean SE df lower.CL upper.CL  
## 1 after 35.4 1.78 133 31.8 38.9  
## 4 after 36.5 1.78 133 33.0 40.0  
## 1 before 34.1 1.23 133 31.7 36.6  
## 4 before 37.3 1.23 133 34.9 39.7  
## 1 within 36.4 1.91 133 32.6 40.2  
## 4 within 38.5 1.91 133 34.7 42.3  
##   
## Degrees-of-freedom method: kenward-roger   
## Confidence level used: 0.95   
##   
## $contrasts  
## contrast estimate SE df t.ratio p.value  
## 1 after - 4 after -1.136 1.76 84 -0.645 0.9871  
## 1 after - 1 before 1.233 2.16 133 0.571 0.9928  
## 1 after - 4 before -1.941 2.16 133 -0.898 0.9464  
## 1 after - 1 within -1.005 2.61 133 -0.385 0.9989  
## 1 after - 4 within -3.163 2.61 133 -1.211 0.8307  
## 4 after - 1 before 2.370 2.16 133 1.096 0.8820  
## 4 after - 4 before -0.804 2.16 133 -0.372 0.9991  
## 4 after - 1 within 0.132 2.61 133 0.050 1.0000  
## 4 after - 4 within -2.026 2.61 133 -0.776 0.9711  
## 1 before - 4 before -3.174 1.22 84 -2.607 0.1069  
## 1 before - 1 within -2.238 2.27 133 -0.984 0.9222  
## 1 before - 4 within -4.396 2.27 133 -1.933 0.3866  
## 4 before - 1 within 0.936 2.27 133 0.412 0.9985  
## 4 before - 4 within -1.222 2.27 133 -0.537 0.9945  
## 1 within - 4 within -2.158 1.89 84 -1.139 0.8636  
##   
## Degrees-of-freedom method: kenward-roger   
## P value adjustment: tukey method for comparing a family of 6 estimates



ICC for different samples and different time intervals with 95 % confidence intervals. The gray entry indicates the results for the STAI-S, the red one represents the results for the first sample (STAI-T) and the turquoise one represents the results for the second sample (STAI-T) with its different time intervals. Missing data in brackets indicate that there were only two mesaurements in total.