

Theory about the internal structure of the test:

I identified the following subconstructs:

1. (HAL) - Health Anxiety Levels

- x2: "...were you afraid because of your health?"
- x5: "...were you frustrated about your health?"
- x15: "...was your health a worry in your life?"

2. (CPL) Cognitive Performance Levels

- x3: "...did you react slowly to things that were said or done?"
- x9: "...did you become confused and start several actions at a time?"
- x11: "...did you forget where you put things or appointments?"
- x14: "...did you have difficulty reasoning and solving problems?"
- x16: "...did you have difficulty concentrating?"

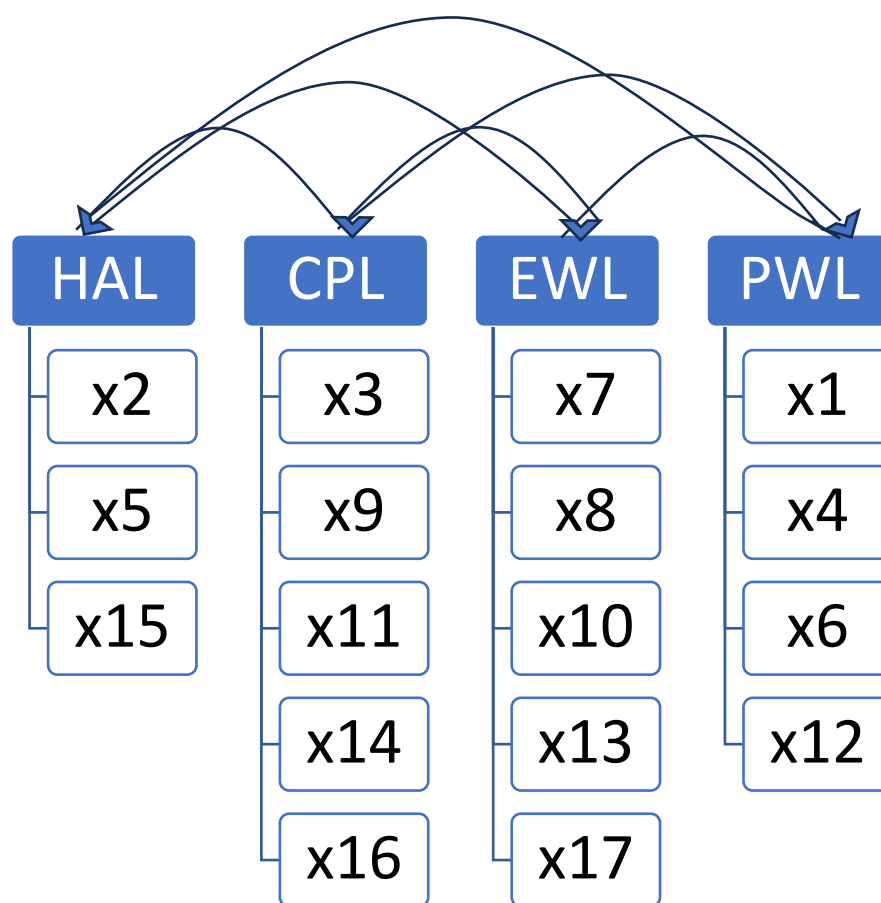
3. (EWL) Emotional Well-being Levels

- x7: "...did you feel unhappy?"
- x8: "...did you feel nervous?"
- x10: "...did you feel so down in the dumps nothing could cheer you up?"
- x13: "...did you feel anxious or distressed?"
- x17: "...did you feel downhearted and blue?"

4. (PWL) Physiological Wellness Levels

- x1: "...did you feel tired?"
- x4: "...did you feel lazy?"
- x6: "...did you feel worn out?"
- x12: "...did you feel like you have low energy?"

1. Draw a factor analytic diagram that represents your theory. You can draw this by hand and take a picture, or you can create the diagram on your computer (e.g., using PowerPoint).



2. $\chi^2 = 278.532$; $df = 113$; $p = 0.000$

CFI = 0.961

TLI = 0.953

RMSEA = 0.060

90 Percent confidence interval (0.051 - 0.069)

The Chi-square statistic tests the null hypothesis that the specified model is a good fit for the data. In this case, the p-value of 0.000 suggests that the model does not fit the data perfectly.

Model Test User Model:

Test statistic	278.532
Degrees of freedom	113
P-value (Chi-square)	0.000

User Model versus Baseline Model:

Comparative Fit Index (CFI)	0.961
Tucker-Lewis Index (TLI)	0.953

RMSEA	0.060
90 Percent confidence interval - lower	0.051
90 Percent confidence interval - upper	0.069
P-value H ₀ : RMSEA ≤ 0.050	0.029
P-value H ₀ : RMSEA ≥ 0.080	0.000

3. table of the factor loadings with their standard errors (n=403)

	<i>HAL</i>	<i>CPL</i>	<i>EWL</i>	<i>PWL</i>
<i>Item 2</i>	0.858 (0.02)			
<i>Item 5</i>	0.826 (0.02)			
<i>Item 15</i>	0.804 (0.02)			
<i>Item 3</i>		0.664 (0.03)		
<i>Item 9</i>		0.839 (0.02)		
<i>Item 11</i>		0.785 (0.02)		
<i>Item 14</i>		0.854 (0.02)		
<i>Item 16</i>		0.841 (0.02)		
<i>Item 7</i>			0.695 (0.03)	
<i>Item 8</i>			0.699 (0.03)	
<i>Item 10</i>			0.784 (0.02)	
<i>Item 13</i>			0.766 (0.02)	
<i>Item 17</i>			0.827 (0.02)	
<i>Item 1</i>				0.844 (0.02)
<i>Item 4</i>				0.786 (0.02)
<i>Item 6</i>				0.843 (0.02)
<i>Item 12</i>				0.679 (0.03)

Note: Health Anxiety Levels was positively correlated with all factors - Cognitive Performance Levels, Emotional Well-being Levels and Physiological Wellness Levels with the respective correlations $r = 0.51$ $r = 0.76$ $r = 0.63$. Cognitive Performance Levels were positively correlated with Emotional Well-being Levels and Physiological Wellness levels, respectively $r = 0.65$ $r = 0.56$, finally Emotional Well-being Levels were also positively correlated with Physiological Wellness levels $r = 0.76$

Covariances:

	Estimate	Std.Err	z-value	P(> z)	Std.lv	Std.all
HAL ~~						
CPL	0.225	0.030	7.391	0.000	0.514	0.514
EWL	0.355	0.038	9.353	0.000	0.760	0.760
PWL	0.336	0.037	9.127	0.000	0.636	0.636
CPL ~~						
EWL	0.191	0.024	7.945	0.000	0.645	0.645
PWL	0.188	0.024	7.793	0.000	0.559	0.559
EWL ~~						
PWL	0.274	0.029	9.350	0.000	0.764	0.764

5. APA Write up.

The confirmatory factor analysis indicates a good fit of the proposed model to the data, as supported by several fit indices. The Comparative Fit Index (CFI) of 0.961 and the Tucker-Lewis Index (TLI) of 0.953 surpass the commonly accepted threshold of 0.95, suggesting a favorable fit. Additionally, the Root Mean Square Error of Approximation (RMSEA) is 0.060, with a 90% confidence interval between 0.051 and 0.069. While slightly above the ideal threshold of 0.05, this value is within an acceptable range. The Standardized Root Mean Square Residual (SRMR) is 0.042, indicating a reasonable fit.

Examining the parameter estimates, factor loadings for each indicator on their respective factors are generally high, ranging from 0.664 to 0.858, suggesting strong relationships. Notably, all factor loadings are statistically significant ($p < 0.05$). The latent variables (HAL, CPL, EWL, PWL) have variances of 0.687, 0.279, 0.317, and 0.406, respectively.

Overall, the CFA results support the validity of the proposed model in capturing the underlying structure of the observed variables related to physiological wellness levels, emotional well-being levels, cognitive performance levels, and health anxiety levels.

Most Salient indicators of each factor:

1. Physiological Wellness Levels (PWL):

- Most Salient Indicator: x1 ("...did you feel tired?") with a factor loading of 0.844.
- Other Indicators: x4, x6, and x12 also contribute substantially with loadings of 0.786, 0.843, and 0.679, respectively.
- Low Loading: All factor loadings for PWL are above 0.5, indicating a robust representation of this latent construct.

2. Emotional Well-being Levels (EWL):

- Most Salient Indicator: x17 ("...did you feel downhearted and blue?") with a factor loading of 0.827.
- Other Indicators: x7, x8, x10, and x13 also contribute significantly with loadings ranging from 0.695 to 0.784.
- Low Loading: No factor loading for EWL is below 0.5, indicating a robust representation of this latent construct.

3. Cognitive Performance Levels (CPL):

- Most Salient Indicator: x14 ("...did you have difficulty reasoning and solving problems?") with a factor loading of 0.854.
- Other Indicators: x3, x9, x11, and x14 also have substantial loadings, ranging from 0.664 to 0.839.
- Low Loading: No factor loading for CPL is below 0.5, indicating a robust representation of this latent construct.

4. Health Anxiety Levels (HAL):
 - Most Salient Indicator: x2 ("...were you afraid because of your health?") with a factor loading of 0.858.
 - Other Indicators: x5 and x15 contribute significantly with loadings of 0.826 and 0.804, respectively.
 - Low Loading: No factor loading for HAL is below 0.5, demonstrating a robust representation of health anxiety.

Correlations between factors, their direction and magnitude

1. Correlation between HAL and CPL (Health Anxiety Levels and Cognitive Performance Levels):
 - $r = 0.514$
 - Interpretation: The positive correlation of 0.514 suggests a moderate association between health anxiety and cognitive performance. Individuals with higher levels of health anxiety will experience noticeable impact on cognitive functioning.
2. Correlation between HAL and EWL (Health Anxiety Levels and Emotional Well-being Levels):
 - $r = 0.76$
 - Interpretation: The positive correlation of 0.76 suggests a strong association between health anxiety and emotional well-being. When health anxiety increases, overall emotional well-being increases too.
3. Correlation between HAL and PWL (Health Anxiety Levels and Physiological Wellness Levels):
 - $r = 0.63$
 - Interpretation: The positive correlation of 0.63 suggests moderate to strong association between health anxiety and physiological well-being. Low physiological wellness levels will increase health anxiety levels.
4. Correlation between CPL and EWL (Cognitive Performance Levels and Emotional Well-being Levels):
 - $r = 0.65$
 - Interpretation: The positive correlation of 0.65 suggests moderate to strong association between cognitive performance and emotional well-being.

5. Correlation between CPL and PWL (Cognitive Performance Levels and Physiological Wellness Levels):
 - $r = 0.56$
 - Interpretation: The positive correlation of 0.56 suggests a moderate association between cognitive performance and physiological wellness.
6. Correlation between EWL and PWL (Emotional Well-being Levels and Physiological Wellness Levels):
 - $r = 0.764$
 - Interpretation: The positive correlation of 0.764 suggests a strong association between emotional well-being and physiological wellness.

Appendix 1. Questionnaire

During the last two week, how often....

- x1) "...did you feel tired?"
- x2) "...were you afraid because of your health?"
- x3) "...did you react slowly to things that were said or done?"
- x4) "...did you feel lazy?"
- x5) "...were you frustrated about your health?"
- x6) "...did you feel worn out?"
- x7) "...did you feel unhappy?"
- x8) "...did you feel nervous?"
- x9) "...did you become confused and start several actions at a time?"
- x10) "...did you feel so down in the dumps nothing could cheer you up?"
- x11) "...did you forget where you put things or appointments?"
- x12) "...did you feel like you have low energy?"
- x13) "...did you feel anxious or distressed?"
- x14) "...did you have difficulty reasoning and solving problems?"
- x15) "...was your health a worry in your life?"
- x16) "...did you have difficulty concentrating?"
- x17) "...did you feel downhearted and blue?"

Appendix 2. R Script

```
library(lavaan)
library(semTools)
library(psych)
```

```
describe(assign4)
```

```
#CFA model specification
```

```
HSmodel <- "HAL =~ x2 + x5 + x15  
          CPL =~ x3 + x9 + x11 + x14 + x16  
          EWL =~ x7 + x8 + x10 + x13 + x17  
          PWL =~ x1 + x4 + x6 + x12"
```

```
# Model Estimation ----
```

```
fit1 <- cfa(model = HSmodel, data = assign4)
```

```
##Model Fit and Parameter Estimate Interpretation
```

```
#Summary of output, including fit indices
```

```
#and standardized parameter estimates ("std.all" column)
```

```
summary(fit1, fit.measures=TRUE, standardized = TRUE, rsquare = TRUE)
```

```
# Looking at just the fit indices
```

```
fitMeasures(fit1)
```

```
##Parameter Estimates
```

```
standardizedSolution(fit1, zstat = FALSE, pvalue = FALSE)
```