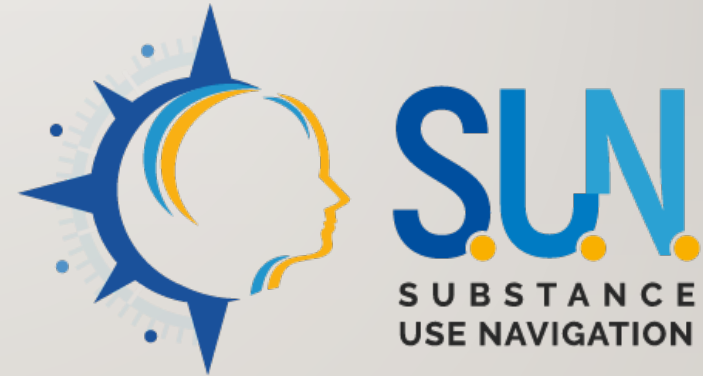


DEVELOPING SUBSTANCE USE NAVIGATION: INTEGRATED EDUCATION AND MOBILE HEALTH TRACKING FOR COLLEGE STUDENTS

METHODOLOGICAL APPENDIX

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Starting point: Existing Scales

A) Child Health Utility instrument (CHU9D)

[each is Likert 1-5 (e.g. don't feel worried, feel a little bit worried, feel a bit worried, feel quite worried, feel very worried)]

1. How worried are you today?
2. How sad are you today?
3. How much pain do you have today?
4. How tired are you today?
5. How annoyed are you today?
6. How are you doing with your schoolwork/homework today?
7. How did you sleep last night?
8. How are you doing with your daily routine today? |
9. To what extent can you join in with activities today?

Starting point: Existing Scales

B) Warwick-Edinburgh Well-Being Scale (5 point Likert) – Ringdal et al.

1. I've been feeling optimistic about the future.
2. I've been feeling useful.
3. I've been feeling relaxed.
4. I've been dealing with problems well.
5. I've been thinking clearly.
6. I've been feeling close to other people.
7. I've been able to make up my own mind about things.
8. I've been interested in other people.
9. I've had energy to spare.
10. I've been feeling good about myself.
11. I've been feeling confident.
12. I've been feeling loved.
13. I've been interested in new things.
14. I've been feeling cheerful.

Starting point: Existing Scales

C) Hybrid of CHU and Edinburgh:

1. How are you doing? Mark all that apply.
 - a. Worried
 - i. [If selected worried] How worried are you?
 - ii. [If selected worried] Why?
 - b. Sad
 - i. [If selected sad] How sad are you?
 - ii. [If selected sad] Why? (classes, significant, other)
 - c. Pain
 - i. [If selected pain] How much pain are you in?
 - ii. [If selected pain] Why? (classes, significant, other)

Starting point: Existing Scales

D) Penn Alcohol Craving Scale 1

1. During the past week how often have you thought about drinking or how good a drink would make you feel?

- a. Never
- b. Rarely
- c. Occasionally
- d. Sometimes
- e. Often
- f. Most of the time
- g. Nearly all of the time

2. At its most severe point, how strong was your craving during the past week?

- a. None at all
- b. Slight, that is a very mild urge
- c. Mild urge
- d. Moderate urge
- e. Strong urge, but easily controlled
- f. Strong urge and difficult to control
- g. Strong urge and would have drunk alcohol if it were available

3. During the past week how much time have you spent thinking about drinking or about how good a drink would make you feel?

- a. None at all
- b. Less than 20 minutes
- c. 21 to 45 minutes
- d. 46 to 90 minutes
- e. 90 minutes to 3 hours
- f. Between 3 to 6 hours
- g. More than 6 hours

4. During the past week, how difficult would it have been to resist taking a drink if you had known

- a bottle was in your house?
- a. Not difficult at all
- b. Very mildly difficult
- c. Mildly difficult
- d. Moderately difficult
- e. Very difficult
- f. Extremely difficult
- g. Would not be able to resist

5. Keeping in mind your responses to the previous questions, please rate your overall average alcohol craving for the past week?

- a. Never thought about drinking and never had the urge to drink
- b. Rarely thought about drinking and rarely had the urge to drink
- c. Occasionally thought about drinking and occasionally had the urge to drink
- d. Sometimes thought about drinking and sometimes had the urge to drink
- e. Often thought about drinking and often had the urge to drink
- f. Thought about drinking most of the time and had the urge to drink most of the time
- g. Thought about drinking nearly all of the time and had the urge to drink nearly all of the Time

Designing New Scale

Block 1: Perceptions/Behaviors

Please indicate how strongly you agree or disagree with the following statements.

Today I feel able to meet my responsibilities (e.g. work, school).

Today I feel optimistic about the future.

Today I feel loved.

Today I feel annoyed/irritable.

Today I feel rested.

Today I feel happy.

Today I feel in physical pain.

Today I feel confident.

Today I feel worried/anxious.

Today I feel that my life has a purpose.

Today I feel sad.

Today I feel useful.

Today I feel energetic.

Today I feel supported.

Today I feel angry.

Today I feel in charge of my life.

Today I woke up feeling well-rested.

Today I ate well.

Today I took good care of myself.

Today I was helpful to others.

I did the following things for myself today (please choose all that apply):

- ☐ Ate healthy foods
- ☐ Got enough sleep
- ☐ Engaged in a physical activity (e.g., walking, sports)
- ☐ Spent time with people I like
- ☐ Engaged in a hobby
- ☐ Meditated or prayed
- ☐ Participating in a spiritual community
- ☐ Volunteered or contributed to a cause I believe in
- ☐ Spent time in nature
- ☐ Quiet time

Strongly Disagree

Disagree

Neither Agree nor Disagree

Agree

Strongly Agree

This statement is confusing/unclear

Block 2: Substance Use

To what extent do you agree with the following statement:

At some point in my life, I was concerned about my use of alcohol, tobacco, or drugs.

- ☐ Strongly disagree
- ☐ Disagree
- ☐ Neither disagree nor agree
- ☐ Agree
- ☐ Strongly agree

To what extent do you agree with the following statement:

With respect to using alcohol, tobacco, or drugs, I have met my goal today.

- ☐ Agree
- ☐ Neither agree nor disagree
- ☐ Disagree

The following activities helped me to meet my goal (please choose all that apply):

- ☐ Medication
- ☐ Support group
- ☐ Counselling
- ☐ Family
- ☐ Friends
- ☐ Significant other
- ☐ Religious/spiritual activity
- ☐ Mindfulness/meditation
- ☐ Avoiding negative patterns of thinking
- ☐ Doing things for others
- ☐ Setting healthy boundaries
- ☐ Doing things I enjoy
- ☐ No access to substance
- ☐ Other:

The following activities contributed to not meeting my goal (please choose all that apply):

- ☐ Family
- ☐ Friends
- ☐ Significant other
- ☐ School
- ☐ Work
- ☐ Stress
- ☐ Depression
- ☐ Boredom
- ☐ Tiredness
- ☐ Social pressure
- ☐ Availability of the substance
- ☐ Unstable Housing
- ☐ Other:

My urge/craving to use tobacco, alcohol, or drugs today has been:

- ☐ None
- ☐ Mild
- ☐ Moderate
- ☐ Strong
- ☐ Very strong

Block 3: Existing Questionnaire

A) Child Health Utility instrument (CHU9D)

[each is Likert 1-5 (e.g. don't feel worried, feel a little bit worried, feel a bit worried, feel quite worried, feel very worried)]

1. How worried are you today?
2. How sad are you today?
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5. How annoyed are you today?
6. How are you doing with your schoolwork/homework today?
7. How did you sleep last night?
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9. To what extent can you join in with activities today?

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11. I've been feeling confident.
12. I've been feeling loved.
13. I've been interested in new things.
14. I've been feeling cheerful.

Block 4: Demographics

What is your gender?

- ☐ Male
- ☐ Female
- ☐ Other

What is your ethnicity?

- ☐ Hispanic
- ☐ Non-Hispanic

What is your race?

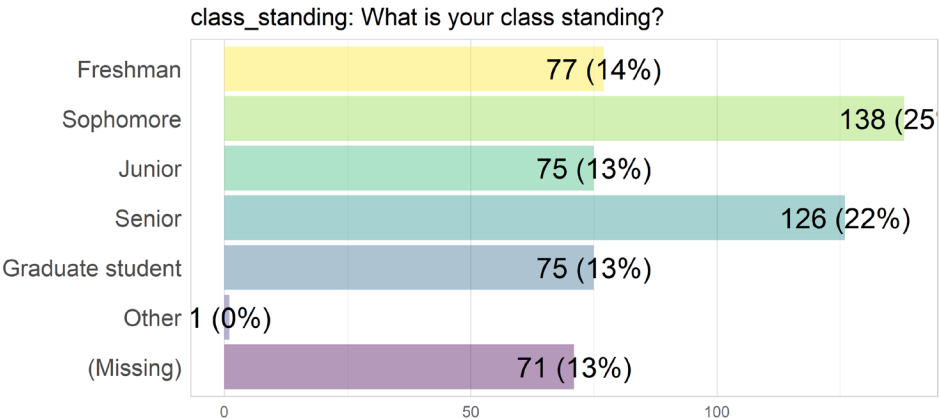
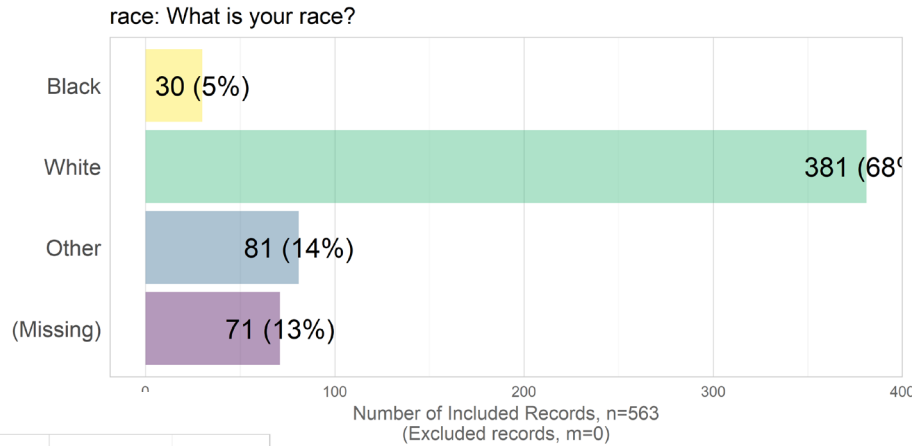
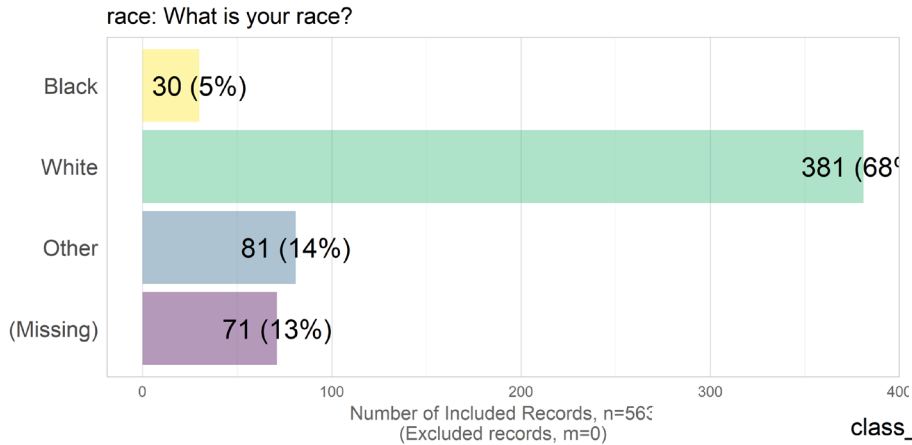
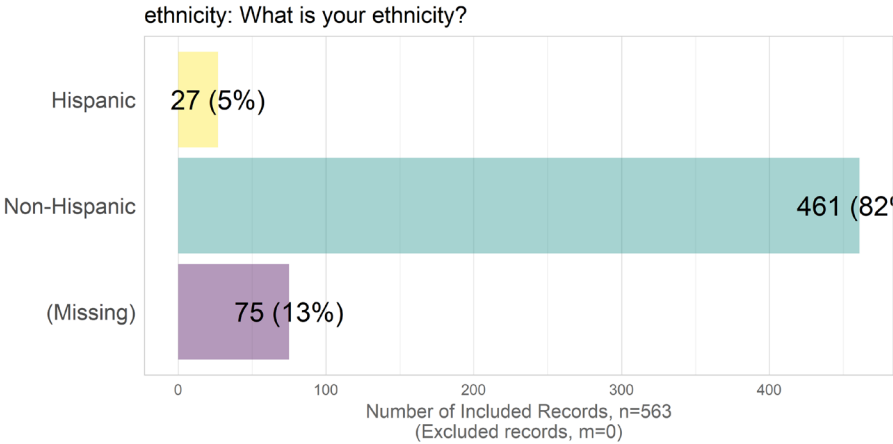
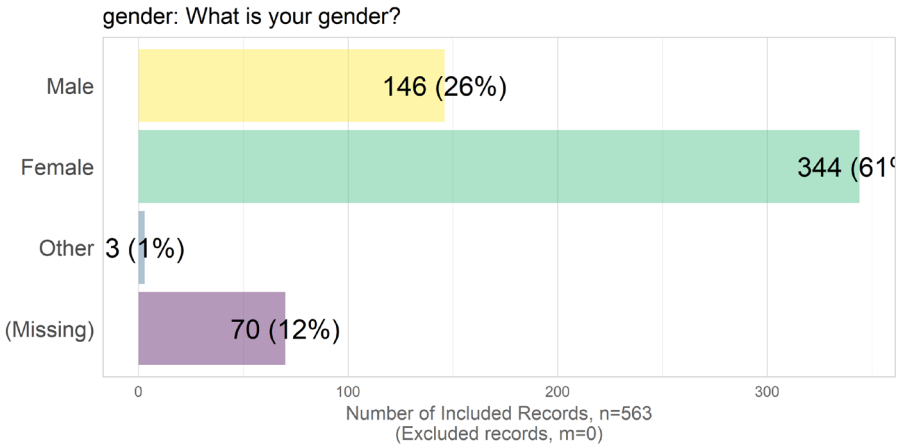
- ☐ Black
- ☐ White
- ☐ Other

What is your class standing?

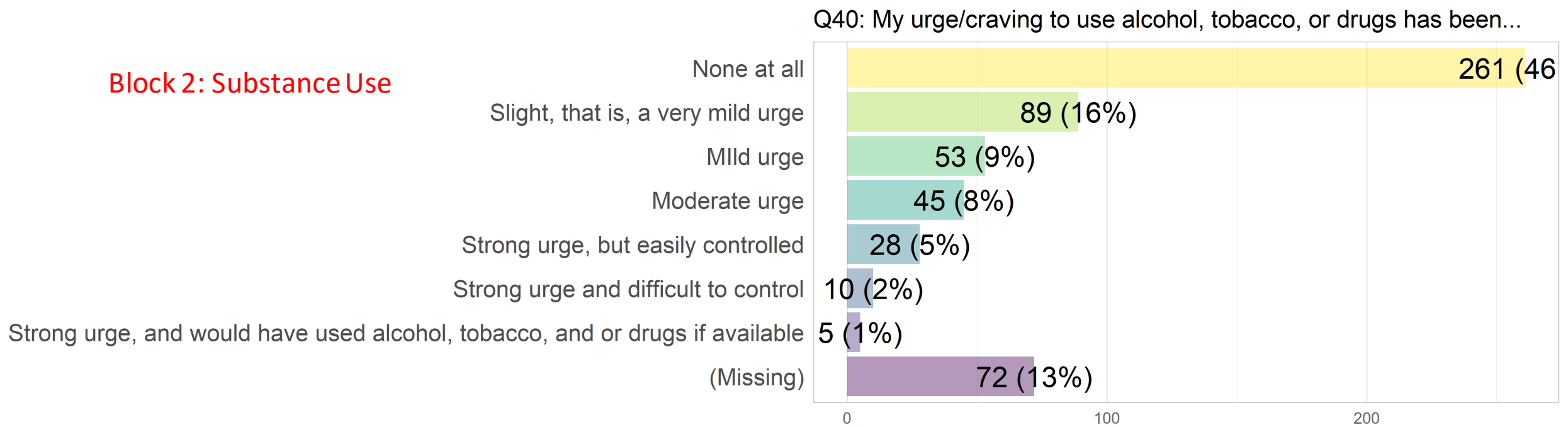
- ☐ Freshman
- ☐ Sophomore
- ☐ Junior
- ☐ Senior
- ☐ Graduate student
- ☐ Other

Results

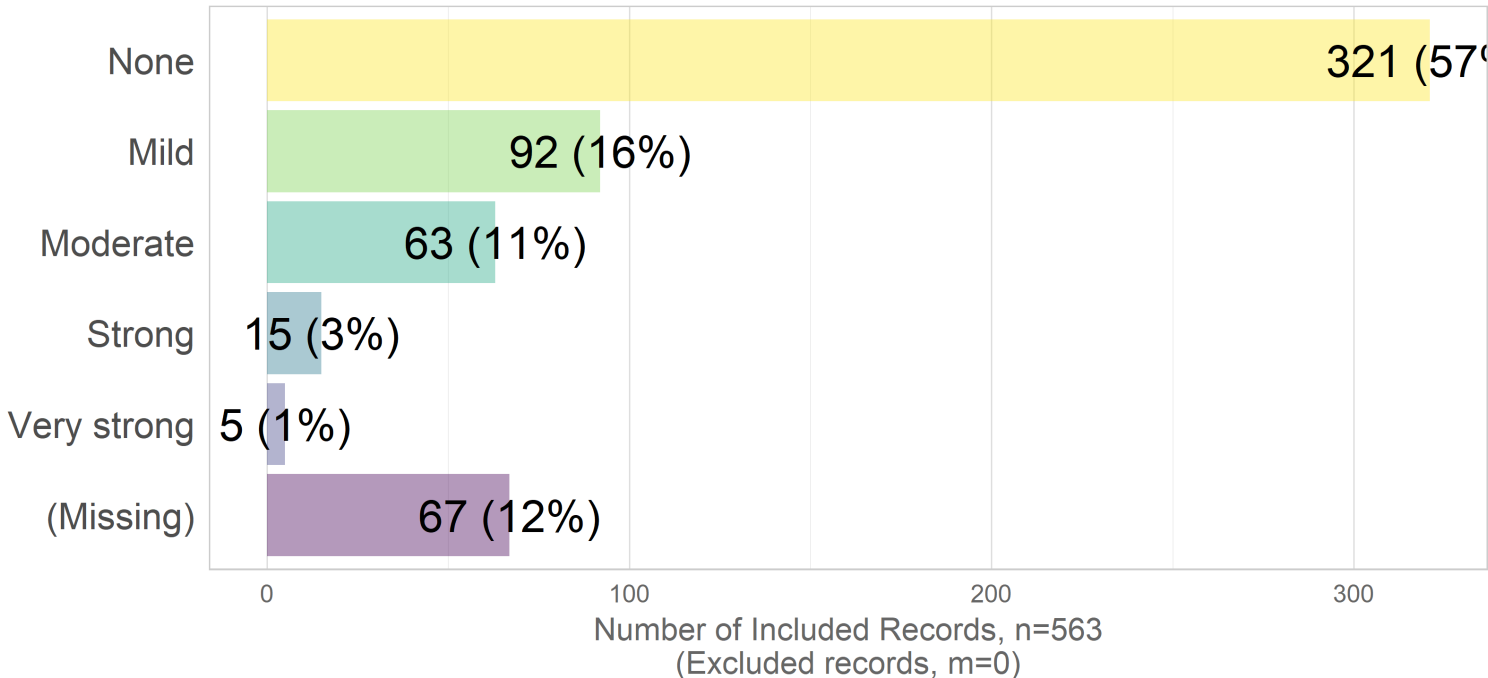
Block 4: Demographics



Block 2: Substance Use

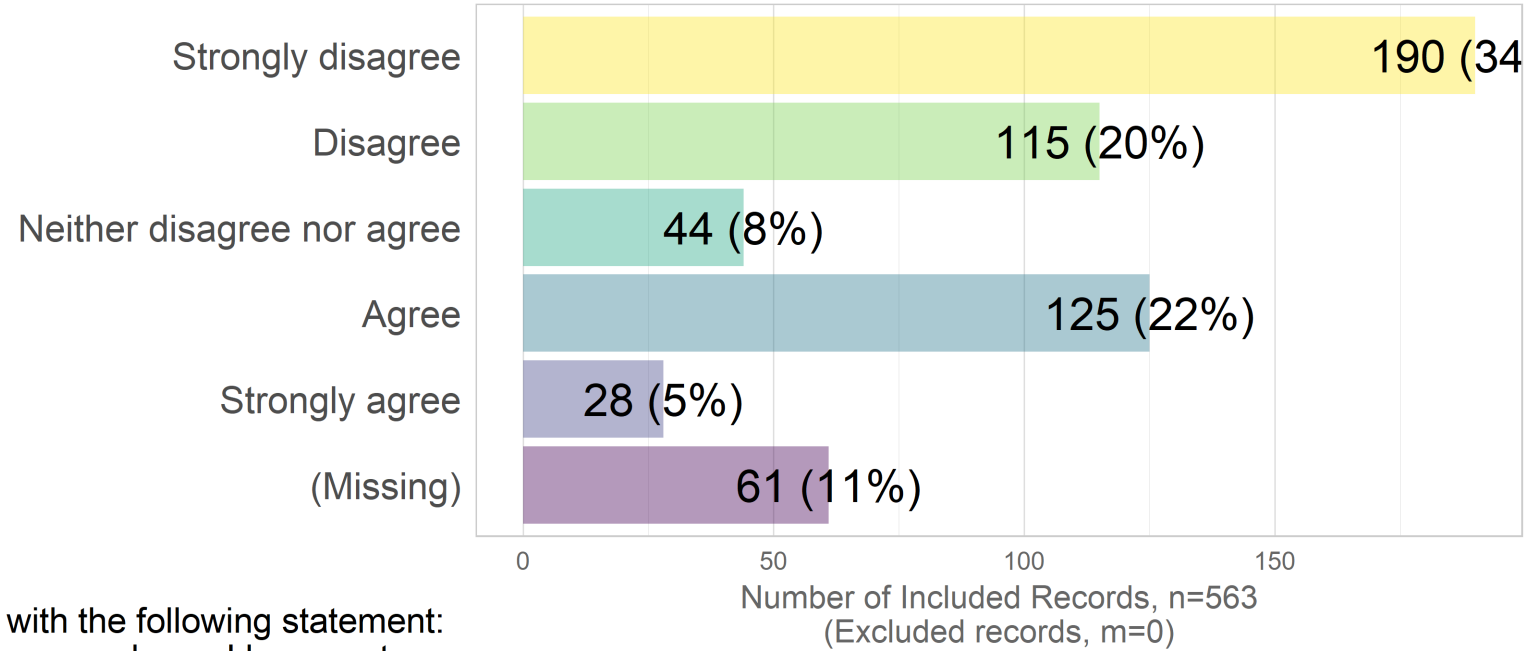


Q16: My urge/craving to use tobacco, alcohol, or drugs today has been:

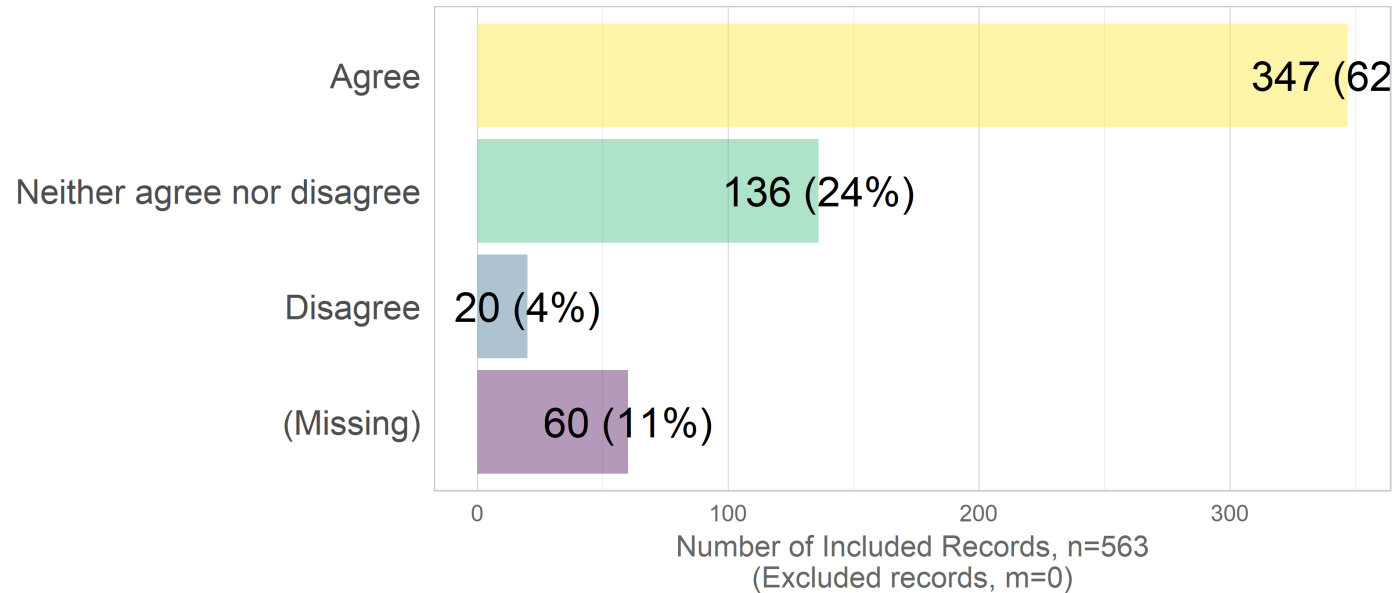


Block 2: Substance Use

Q9: To what extent do you agree with the following statement:
At some point in my life, I was concerned about my use of alcohol

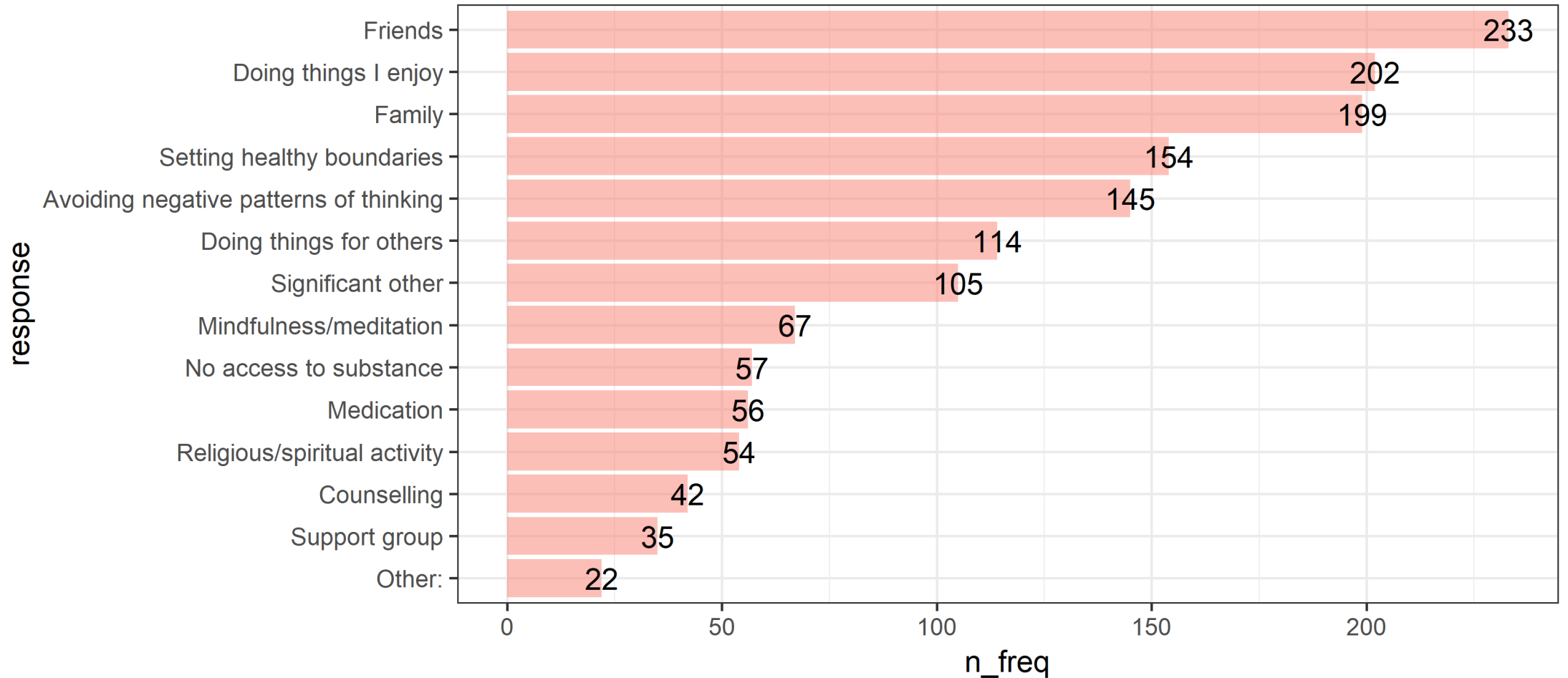


Q11: To what extent do you agree with the following statement:
With respect to using alcohol, tobacco, or drugs, I have met my



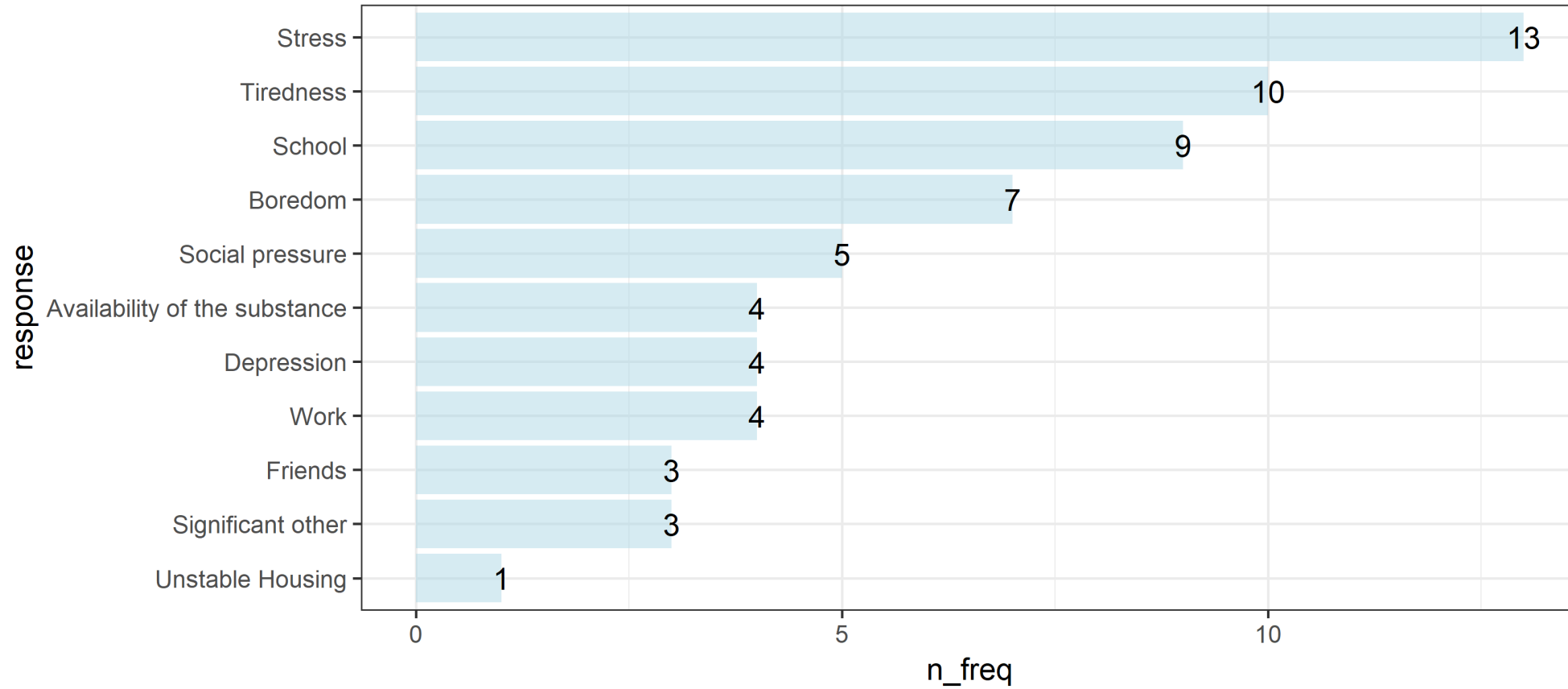
Block 2: Substance Use

Q12: The following activities helped me to meet my goal (please choose)
(frequency of non-unique responses)



Block 2: Substance Use

Q13: The following activities contributed to not meeting my goal (please choose the frequency of non-unique responses)



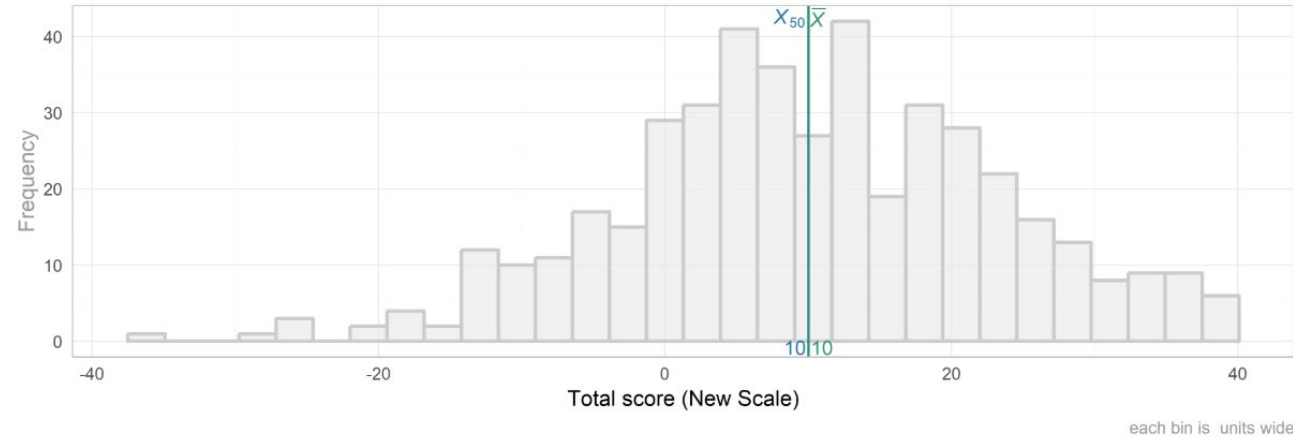
Block 1: Perceptions/Behaviors

Item Analysis: New

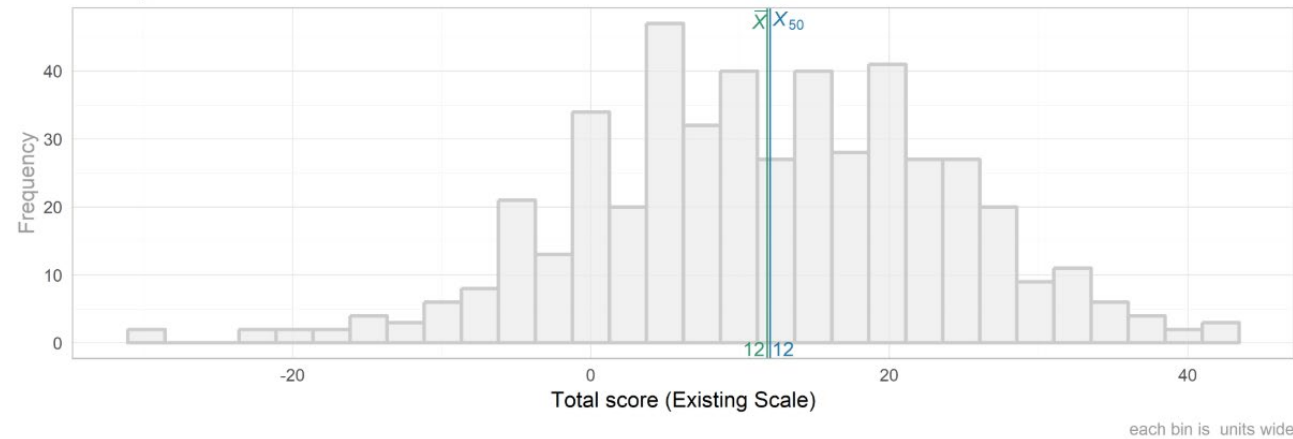
Q4_1 - duties
Q4_2 - optimistic
Q4_3 - loved
Q4_4 - annoyed
Q4_5 - rested
Q4_6 - happy
Q4_7 - pain
Q4_8 - confident
Q4_9 - worried
Q4_10 - purpose
Q4_11 - sad
Q4_12 - useful
Q4_13 - energetic
Q4_14 - supported
Q4_15 - angry
Q4_16 - control
Q6_1 - slept
Q6_2 - ate
Q6_3 - selfcare
Q6_4 - helpful

Total scores

Distribution of total Scores
New Scale

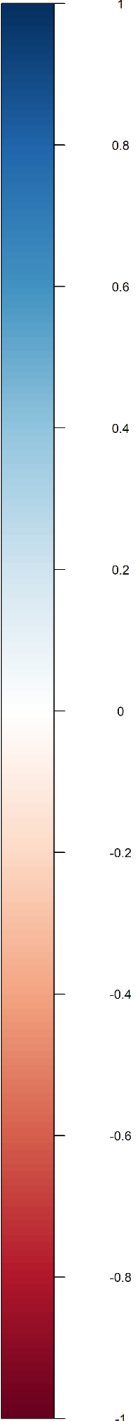
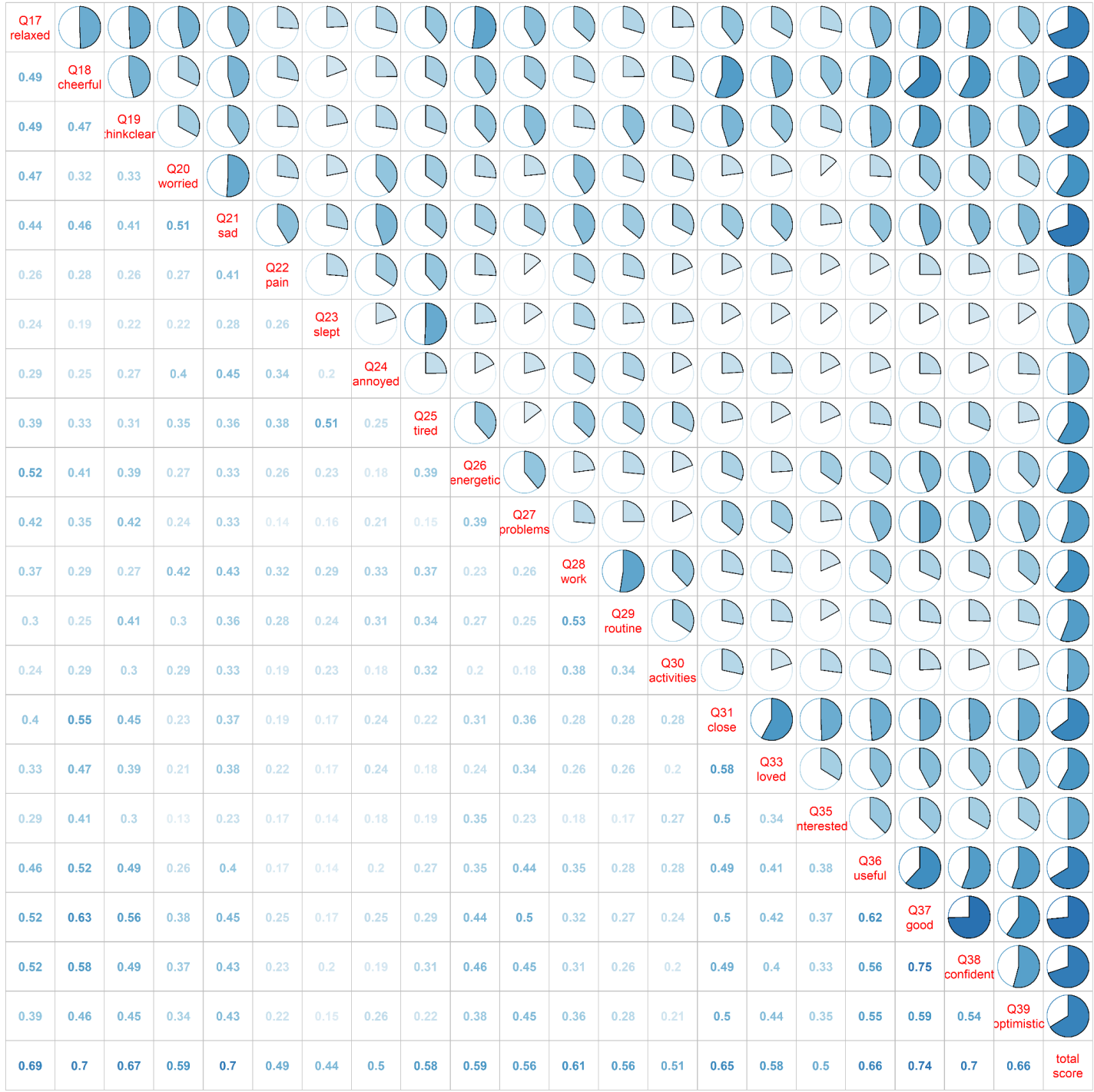


Distribution of total Scores
Existing Scale



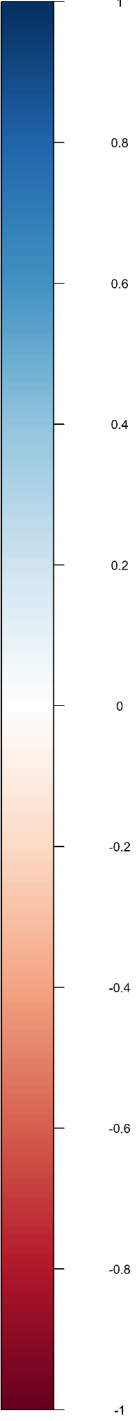
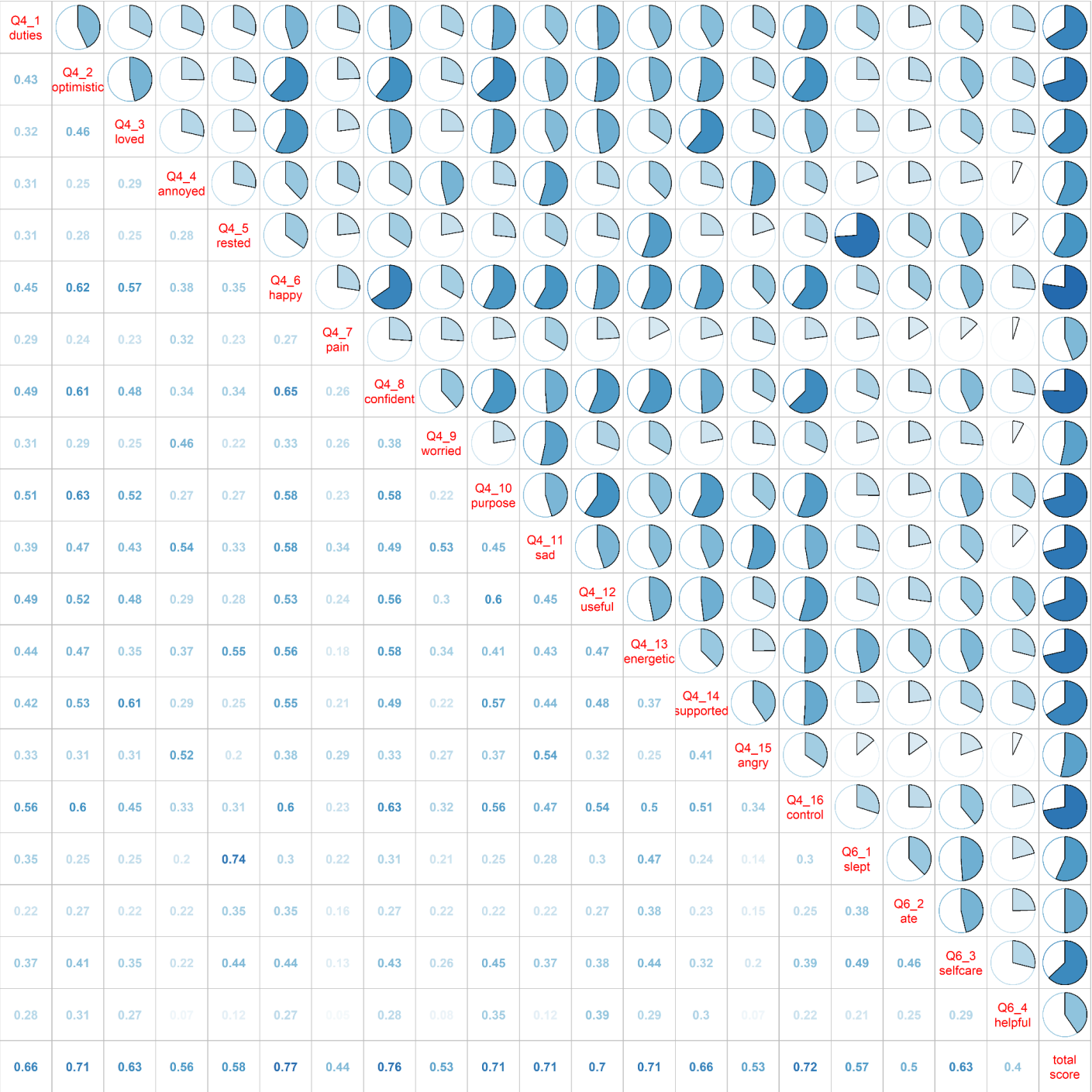
Item Analysis: Existing

Q17 - relaxed
Q18 - cheerful
Q19 - thinkclear
Q20 - worried
Q21 - sad
Q22 - pain
Q23 - slept
Q24 - annoyed
Q25 - tired
Q26 - energetic
Q27 - problems
Q28 - work
Q29 - routine
Q30 - activities
Q31 - close
Q33 - loved
Q35 - interested
Q36 - useful
Q37 - good
Q38 - confident
Q39 - optimistic

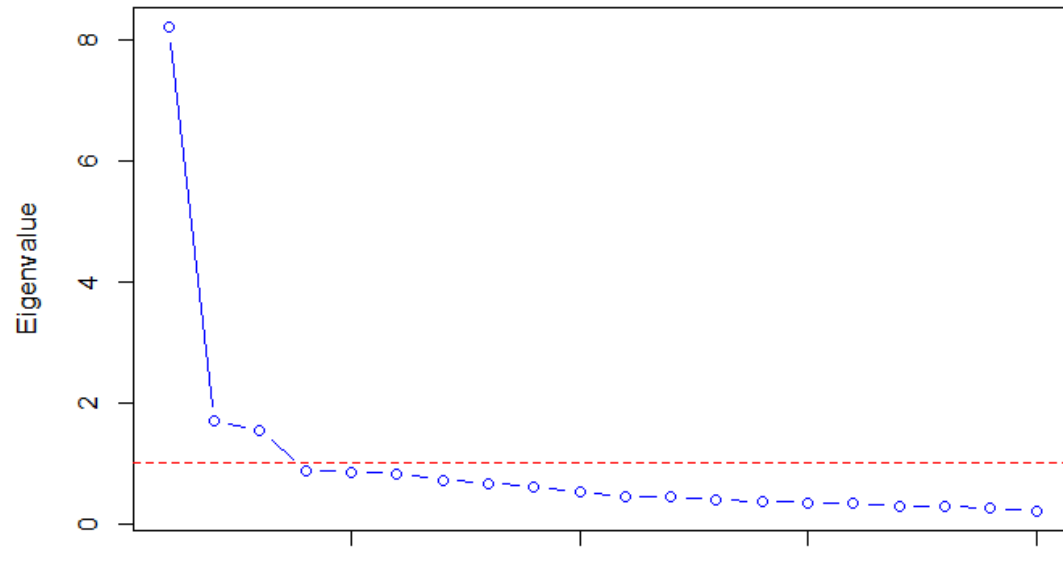


Item Analysis: Existing	
Q17 - relaxed	
Q18 - cheerful	
Q19 - thinkclear	
Q20 - worried	
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Q22 - pain	
Q23 - slept	
Q24 - annoyed	
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Q36 - useful	
Q37 - good	
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Q39 - optimistic	

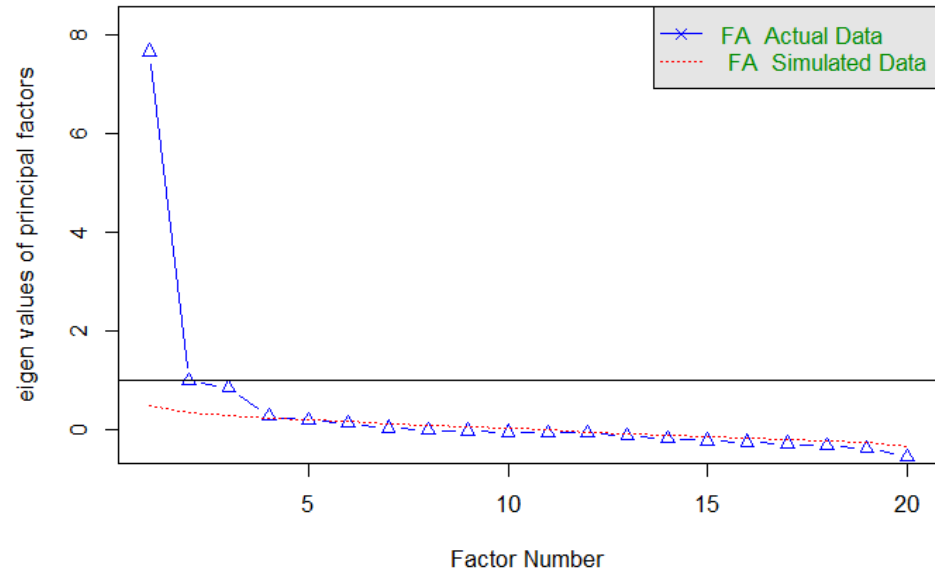
Item Analysis: New
Q4_1 - duties
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Q4_4 - annoyed
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Q4_16 - control
Q6_1 - slept
Q6_2 - ate
Q6_3 - selfcare
Q6_4 - helpful



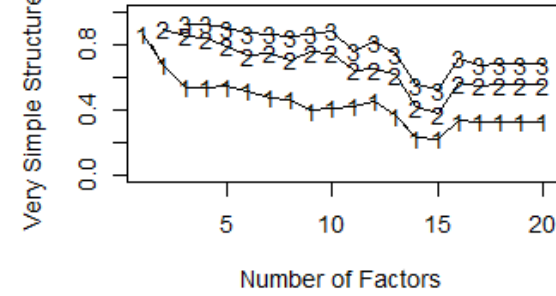
Scree Plot



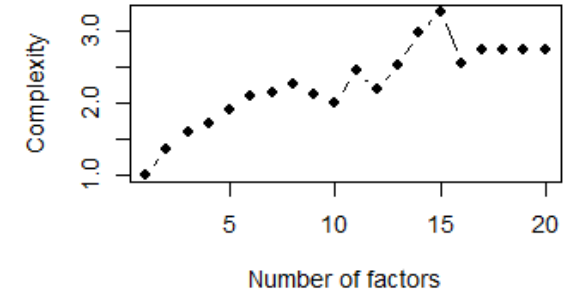
Parallel Analysis Scree Plots



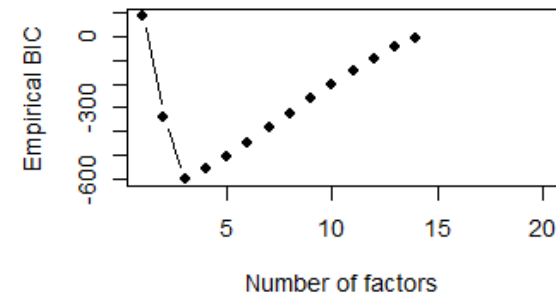
Very Simple Structure



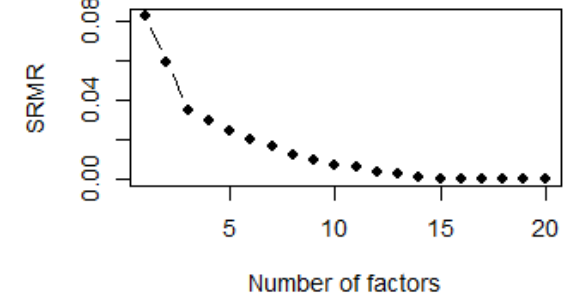
Complexity



Empirical BIC



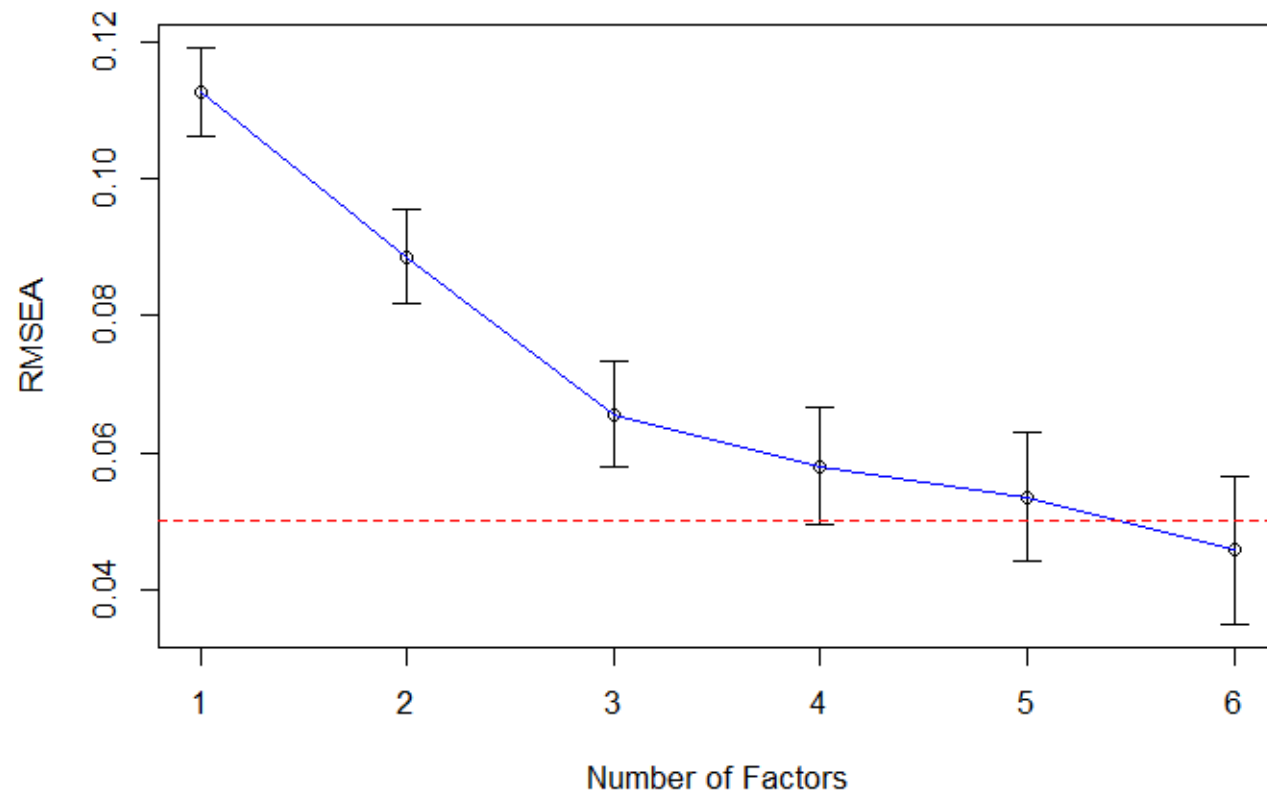
Root Mean Residual



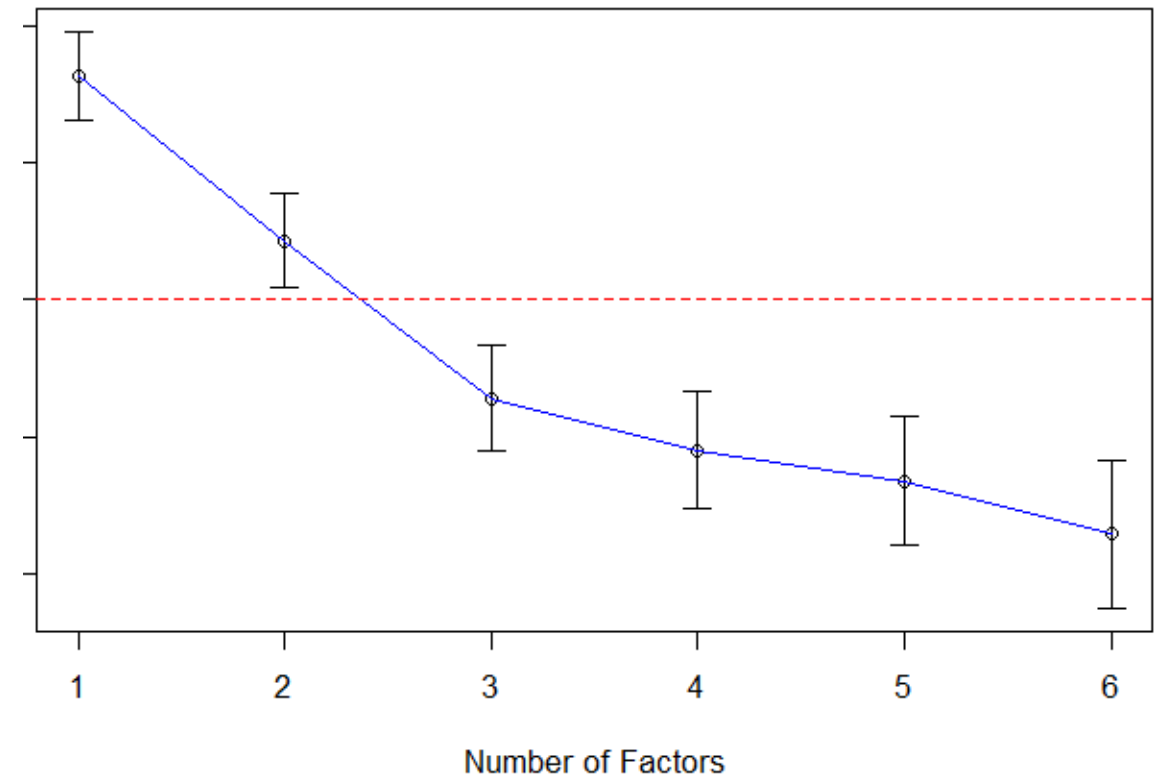
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2	2 1.6938274
3	3 1.5492364
4	4 0.8865132
5	5 0.8534162
6	6 0.8341441
7	7 0.7270440
8	8 0.6757051
9	9 0.6091630
10	10 0.5387882
11	11 0.4550178
12	12 0.4447041
13	13 0.3993914
14	14 0.3738538
15	15 0.3482113

New scale analysis: How many factors?

RMSEA Plot



RMSEA Plot



New scale analysis: How many factors?

Item Analysis: New

Q4_1 - duties
Q4_2 - optimistic
Q4_3 - loved
Q4_4 - annoyed
Q4_5 - rested
Q4_6 - happy
Q4_7 - pain
Q4_8 - confident
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Q4_14 - supported
Q4_15 - angry
Q4_16 - control
Q6_1 - slept
Q6_2 - ate
Q6_3 - selfcare
Q6_4 - helpful

New scale analysis:

What items should be included into the mobile daily questionnaire?

Guidelines for preference:

- High item-total correlation to the new scale
- High item-total correlation to the CHU and Warwick scales
- Items should cover all factors that seem to be present (3)
- Items with more pronounced weights onto a single factor should be preferred



bifactorT, New scale



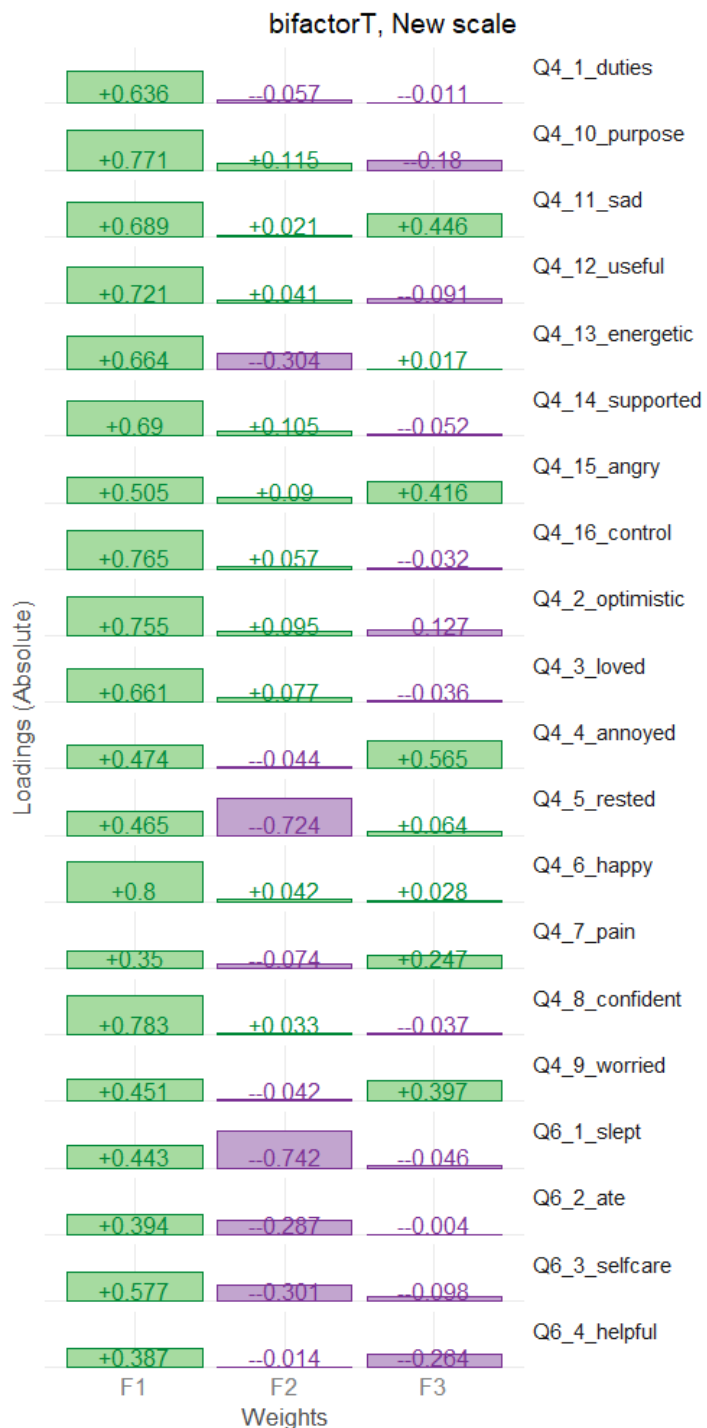
Even though the new scale shows good unidimensionality, diagnostic tests revealed that there appear to be two subfactors:

• “Self-Care”

- Q4_13 (*Today I feel energetic*)
- Q4_5 (*Today I feel rested*)
- Q6_1 (*Today I woke up feeling well-rested*)
- Q6_2 (*Today I ate well*)
- Q6_3 (*Today I took good care of myself*)

• “Distress”

- Q4_11 (*_Today I feel sad_*)
- Q4_15 (*_Today I feel angry_*)
- Q4_4 (*_Today I feel annoyed/irritable_*)
- Q4_7 (*_Today I feel in physical pain_*) (<.30)
- Q4_9 (*_Today I feel worried/anxious_*)



Chosen items

Main Factor

Q4_6 (Today I feel happy) – because it had the highest loading on the general factor and highest item-total correlation on all scales.

Q4_8 (Today I feel confident) - had consistently higher loading on the general factor than other two (Q4_16 and Q4_2) while being similar to them in term of the content

Q4_10 (Today I feel that my life has a purpose) - because this item appears to cover the spiritual/self-actualization domain.

Q4_14 (Today I feel supported) - we chose Q4_14 (Today I feel supported) over Q4_3 (Today I feel loved), because the former had higher loading, and higher item-total correlations.

Subfactors

- **Q6_3 (Today I took good care of myself)** - SELFCARE subfactor - Two other items had the next highest loadings on the “Self-Care” factor: Q4_13 (Today I feel energetic) and Q6_3 (Today I took good care of myself). We felt that Q4_13 was similar to Q4_5, while Q6_3 provided a different facet of well-being. Therefore, choosing between the two we settled on the latter.

- **Q4_5 (Today I feel rested)** - SELFCARE subfactor - Items Q4_5 (Today I feel rested) and Q6_1 (Today I woke up feeling well-rested) had highest loadings on the “Self-Care” factors, consistently across rotations. Deciding between them, we opted for Q4_5 because it had slightly higher item-total correlations with both the new and existing scales.

- **Q4_4 (Today I feel annoyed/irritable)** - DISTRESS subfactor - because it consistently loaded the strongest onto the “Distress” factor

Item Analysis: New	
Q4_1 - duties	
Q4_2 - optimistic	
Q4_3 - loved	
Q4_4 - annoyed	
Q4_5 - rested	
Q4_6 - happy	
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Q4_15 - angry	
Q4_16 - control	
Q6_1 - slept	
Q6_2 - ate	
Q6_3 - selfcare	
Q6_4 - helpful	

