

AT HOME WITH ENGINEERING EDUCATION



JUNE 22 - 26, 2020

Asee's Virtual Conference

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VIRTUAL
CONFERENCE**

JUNE 22 - 26, 2020

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Engineering Education



Validation of an Instrument to Measure
Science, Engineering, and Mathematics
Graduate Students' Mental Health (Work in
Progress)

Sarah Jane Bork and Joi-Lynn Mondisa

- There are no known currently validated instruments to measure the mental health of graduate students
- Using an existing survey that has data collected for graduate students, performing factor analysis to
- Current analysis shows an emerging factor structure that mirrors major themes of the survey instrument being analyzed

Content Warning & Mental Health Resources

I will be discussing mental health measures.

Everyone is free to stop listening and choose how they engage with the material.

In addition, this talk cannot and does NOT constitute as medical advice in any shape or form.

This information and talk **does NOT** substitute for the knowledge, skill, and judgment of qualified psychiatrists, psychologists, physicians and health care professionals.

National Suicide Prevention Lifeline

1-800-273-TALK (8255) [24/7]

1-888-628-9454 (Spanish)

1-800-799-4889 (TTY)

Online Resources

<https://www.mentalhealth.gov/>

<https://www.nami.org>

Other Resources

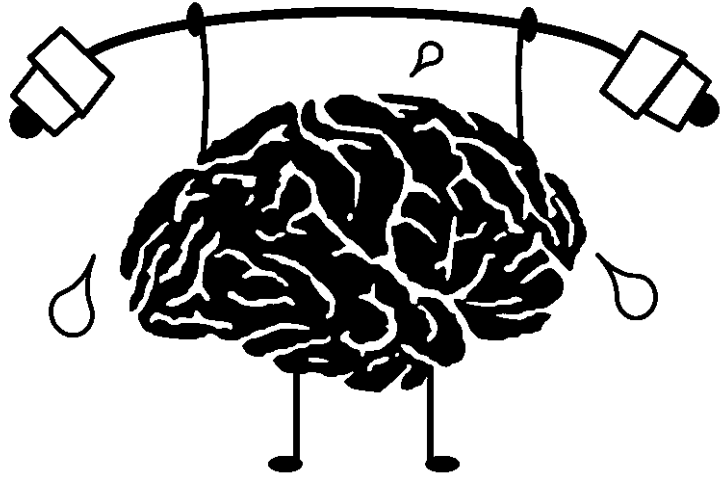
<https://www.nami.org/Find-Support/NAMI-HelpLine/Top-25-HelpLine-Resources>

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Motivation



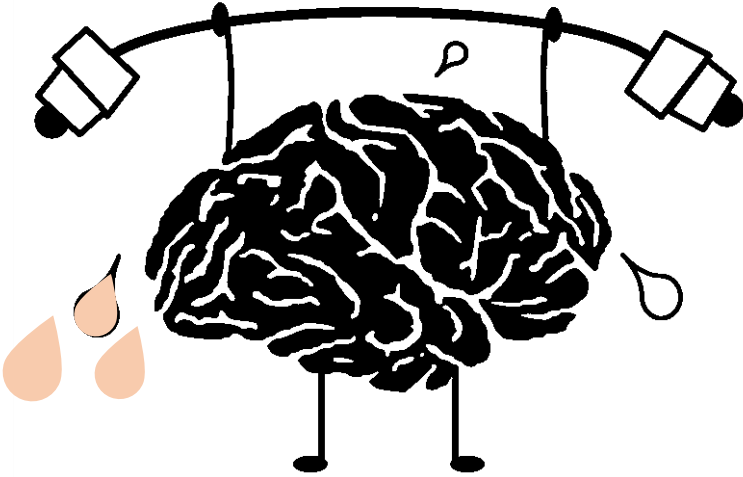
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Motivation

External Pressures

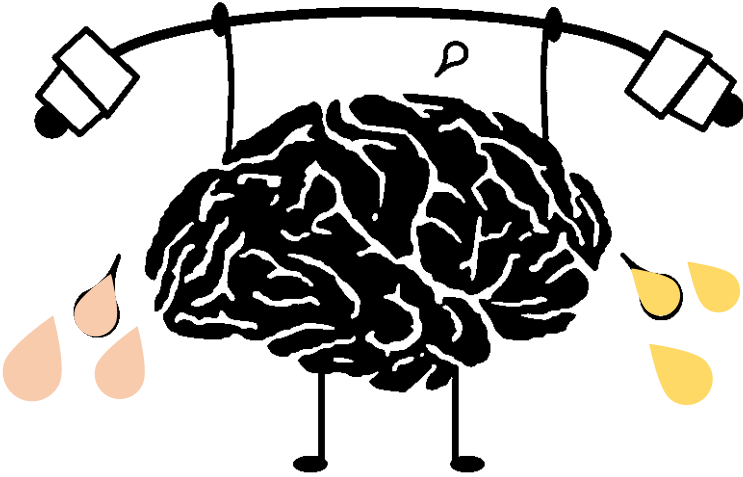


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Motivation



Academic Pressures



External Pressures

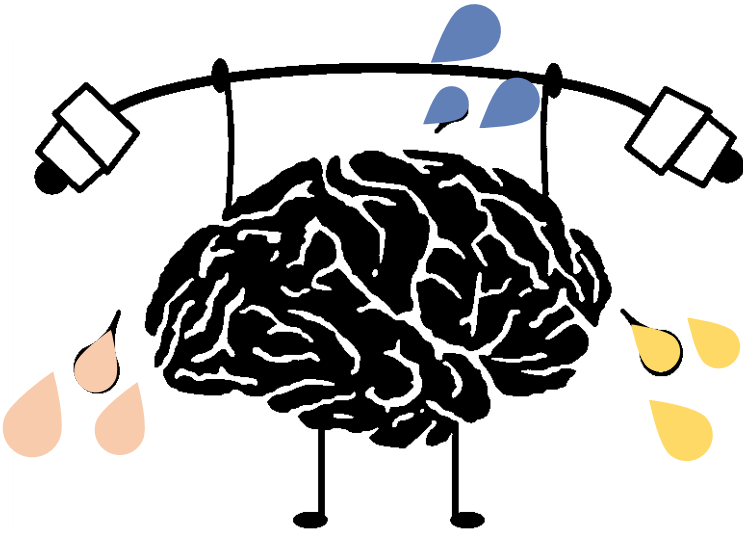


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Motivation



Academic Pressures



External Pressures



Existing Mental Health Conditions

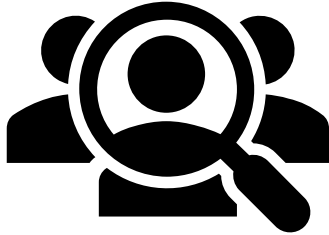


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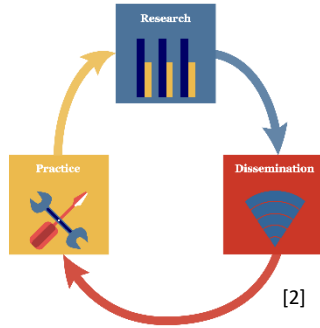
Goal of the Study



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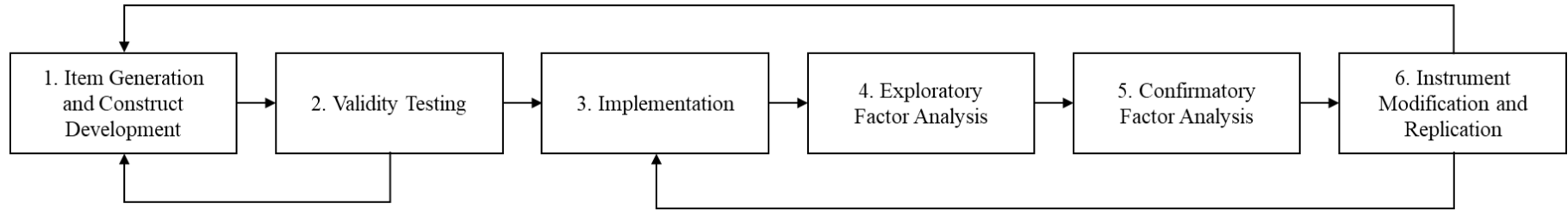
2013 Survey Breakdown

1. Basic survey variables
2. Demographics
3. Academics
4. Positive mental health
5. Depression and anxiety screen
6. Eating and body
7. Self-injurious behavior and suicide
8. Diagnosed mental illness
9. Knowledge and beliefs about mental health services
10. Stigma
11. Mental health service utilization
12. Informal help-seeking/support
13. Reasons for seeking or not seeking help
14. Insurance
15. Substance use
16. Other behaviors/lifestyle
17. Witnessing/experiencing negative things



Methods - Guiding Methodology ^[1,2]

Instrument Development Process

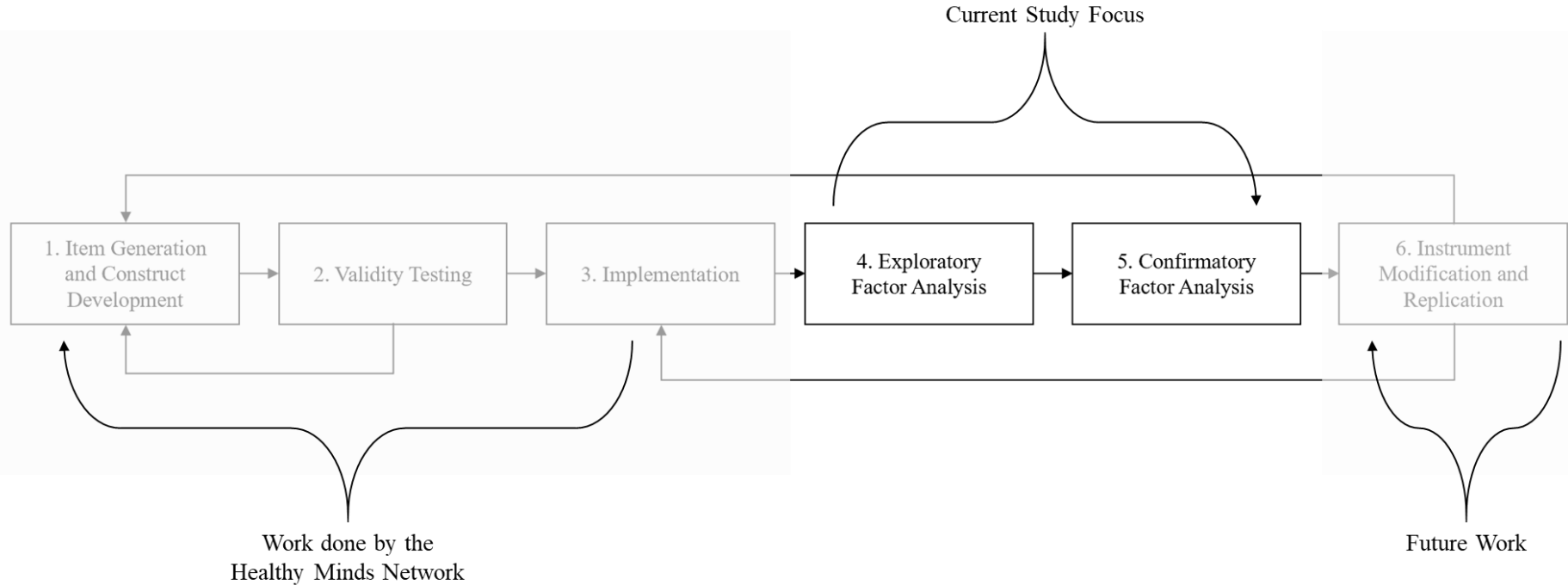


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Methods - Guiding Methodology ^[4,5]



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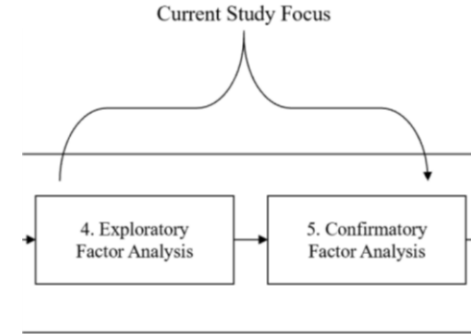


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Our Study

Table 1. Demographic Descriptive Statistics for the Sample (n=1,021)

| Age | |
|--------------------------------------|-----|
| 18-22 | 112 |
| 23-25 | 346 |
| 26-30 | 358 |
| 31-35 | 103 |
| 36(+) | 59 |
| NA | 43 |
| Gender | |
| Male | 575 |
| Female | 403 |
| Other/NA | 43 |
| Race | |
| African American/Black | 12 |
| American Indian/Alaskan Native | 0 |
| Arab/Middle Eastern or Arab American | 35 |
| Asian American/Asian | 297 |
| Hispanic/Latino | 22 |
| Pacific Islander | 3 |
| White or Caucasian | 525 |
| MultiRace | 43 |
| Other/NA | 84 |
| Degree Program | |
| Master's | 311 |
| PhD (can include embedded Master's) | 576 |
| Other/NA | 134 |



Data is randomly split for each analysis.

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Our Study – Work in Progress

| Question | Wording | Scale |
|---|--|---------------------------------------|
| Module 4: Positive Mental Health | | |
| diener1 | I lead a purposeful and meaningful life. | 1=Strongly disagree |
| diener2 | My social relationships are supportive and rewarding. | 2=Disagree |
| diener3 | I am engaged and interested in my daily activities. | 3=Slightly disagree |
| diener4 | I actively contribute to the happiness and well-being of others. | 4=Mixed or neither agree nor disagree |
| diener5 | I am competent and capable in the activities that are important to me. | 5=Slightly agree |
| diener6 | I am a good person and live a good life. | 6=Agree |
| diener7 | I am optimistic about my future. | 7=Strongly agree |
| diener8 | People respect me. | |

Module 5: Depression and Anxiety Screen

| <i>Depression</i> | | |
|--|--|---|
| Over the last 2 weeks, how often have you been bothered by any of the following problems? | | |
| phq9_1 | Little interest or pleasure in doing things | |
| phq9_2 | Feeling down, depressed or hopeless | |
| phq9_3 | Trouble falling or staying asleep, or sleeping too much | |
| phq9_4 | Feeling tired or having little energy | |
| phq9_5 | Poor appetite or overeating | |
| phq9_6 | Feeling bad about yourself—or that you are a failure or have let yourself or your family down | 1=Not at all |
| phq9_7 | Trouble concentrating on things, such as reading the newspaper or watching television | 2=Several days |
| phq9_8 | Moving or speaking so slowly that other people could have noticed; or the opposite—being so fidgety or restless that you have been moving around a lot more than usual | 3=More than half the day |
| phq9_9 | Thoughts that you would be better off dead or of hurting yourself in some way | 4=Nearly every day |
| Think about a two-week period in the past year when you experienced the two problems below the most frequently. During that period, how often were you bothered by these problems? | | |
| phq2_1 | Little interest or pleasure in doing things | |
| phq2_2 | Feeling down, depressed or hopeless | |
| dep_any | PHQ-9 score cut-off for any depression, major or moderate | (+) Screen for any depression (0=No, 1=Yes) |

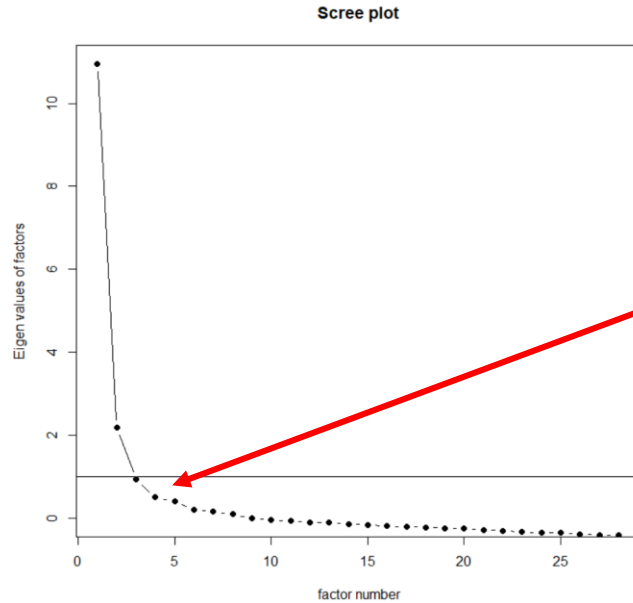
| <i>Anxiety</i> | | |
|--|---|--|
| In the past four weeks, how often have you been bothered by any of the following problems? | | |
| gad7_1 | Feeling nervous, anxious or on edge | |
| gad7_2 | Not being able to stop or control worrying | |
| gad7_3 | Worrying too much about different things | 1=Not at all |
| gad7_4 | Trouble relaxing | 2=Several days |
| gad7_5 | Being so restless that it's hard to sit still | 3=Over half the days |
| gad7_6 | Becoming easily annoyed or irritable | 4=Nearly every day |
| gad7_7 | Feeling afraid as if something awful might happen | |
| anx_any_gad | PHQ algorithm for generalized anxiety disorder screen | (+) Screen for generalized anxiety (0=No, 1=Yes) |

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Initial Factor Analysis Results



Begins leveling off at 4 factors, so must have at least a 3-factor model.

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Initial Factor Analysis Results

| Item | Model with Three Factors | | | Model with 4 Factors | | | | Model with 5 Factors | | | | |
|-------------|--------------------------|-------------|-------------|----------------------|-------------|-------------|-------------|----------------------|-------------|-------------|-------------|-------------|
| | F1 | F2 | F3 | F1 | F2 | F3 | F4 | F1 | F2 | F3 | F4 | F5 |
| diener1 | 0.04 | -0.1 | 0.75 | 0.03 | 0.75 | -0.1 | 0 | 0.74 | 0.01 | -0.13 | 0.04 | -0.01 |
| diener2 | 0.04 | -0.12 | 0.62 | 0.04 | 0.63 | 0.02 | -0.21 | 0.61 | 0.02 | 0 | 0.02 | -0.22 |
| diener3 | 0.08 | -0.27 | 0.64 | 0.07 | 0.65 | -0.22 | -0.07 | 0.65 | 0.04 | -0.21 | -0.01 | -0.09 |
| diener4 | 0.04 | 0.03 | 0.76 | 0.04 | 0.76 | 0.03 | 0.02 | 0.76 | 0.06 | 0.05 | -0.05 | 0.01 |
| diener5 | -0.12 | 0.06 | 0.66 | -0.12 | 0.66 | 0 | 0.1 | 0.65 | -0.13 | -0.03 | 0.03 | 0.1 |
| diener6 | -0.14 | 0.12 | 0.79 | -0.14 | 0.79 | 0.08 | 0.08 | 0.8 | -0.08 | 0.14 | -0.12 | 0.08 |
| diener7 | -0.02 | -0.11 | 0.74 | -0.02 | 0.74 | -0.07 | -0.05 | 0.72 | -0.08 | -0.16 | 0.14 | -0.06 |
| diener8 | -0.05 | 0.03 | 0.67 | -0.04 | 0.67 | 0.06 | -0.06 | 0.67 | -0.01 | 0.1 | -0.08 | -0.06 |
| dep_any | 0.1 | 0.68 | -0.03 | 0.13 | -0.06 | 0.51 | 0.26 | -0.07 | 0.12 | 0.41 | 0.15 | 0.28 |
| phq9_1 | -0.03 | 0.67 | -0.18 | 0 | -0.21 | 0.57 | 0.12 | -0.23 | -0.02 | 0.44 | 0.19 | 0.14 |
| phq9_2 | 0.13 | 0.68 | -0.14 | 0.16 | -0.17 | 0.55 | 0.18 | -0.17 | 0.18 | 0.49 | 0.09 | 0.2 |
| phq9_3 | 0.26 | 0.48 | 0.08 | 0.28 | 0.06 | 0.45 | 0.01 | 0 | 0.07 | 0.13 | 0.63 | 0 |
| phq9_4 | 0.28 | 0.43 | 0.04 | 0.3 | 0.02 | 0.44 | -0.03 | -0.04 | 0.12 | 0.15 | 0.54 | -0.05 |
| phq9_5 | 0.22 | 0.44 | 0.05 | 0.24 | 0.03 | 0.35 | 0.13 | -0.02 | 0.03 | 0.03 | 0.59 | 0.14 |
| phq9_6 | 0.22 | 0.47 | -0.16 | 0.24 | -0.18 | 0.42 | 0.07 | -0.19 | 0.25 | 0.37 | 0.08 | 0.08 |
| phq9_7 | 0.21 | 0.43 | -0.04 | 0.22 | -0.06 | 0.35 | 0.13 | -0.08 | 0.18 | 0.23 | 0.2 | 0.14 |
| phq9_8 | 0.06 | 0.33 | -0.04 | 0.04 | -0.03 | -0.01 | 0.67 | -0.02 | 0.02 | -0.07 | 0.09 | 0.67 |
| phq9_9 | 0 | 0.46 | -0.18 | -0.01 | -0.19 | 0.18 | 0.52 | -0.17 | 0.02 | 0.17 | 0 | 0.54 |
| phq2_1 | -0.09 | 0.81 | -0.02 | -0.07 | -0.03 | 0.86 | -0.06 | -0.05 | -0.06 | 0.79 | 0.13 | -0.04 |
| phq2_2 | 0.05 | 0.72 | 0.03 | 0.07 | 0.02 | 0.74 | -0.02 | 0.03 | 0.13 | 0.78 | -0.01 | -0.02 |
| anx_any_gad | 0.83 | -0.03 | -0.04 | 0.82 | -0.05 | -0.05 | 0.05 | -0.03 | 0.85 | 0 | -0.05 | 0.04 |
| gad7_1 | 0.74 | -0.02 | -0.1 | 0.73 | -0.1 | -0.04 | 0.05 | -0.11 | 0.69 | -0.08 | 0.1 | 0.04 |
| gad7_2 | 0.86 | -0.03 | -0.05 | 0.86 | -0.05 | 0.02 | -0.08 | -0.05 | 0.84 | 0.02 | 0.04 | -0.09 |
| gad7_3 | 0.78 | 0.03 | -0.01 | 0.79 | -0.02 | 0.1 | -0.12 | -0.02 | 0.77 | 0.08 | 0.07 | -0.12 |
| gad7_4 | 0.67 | 0.21 | 0.02 | 0.67 | 0 | 0.19 | 0.03 | -0.02 | 0.6 | 0.07 | 0.23 | 0.03 |
| gad7_5 | 0.56 | 0.18 | 0.16 | 0.56 | 0.16 | -0.01 | 0.32 | 0.17 | 0.53 | -0.04 | 0.09 | 0.31 |
| gad7_6 | 0.36 | 0.27 | -0.06 | 0.37 | -0.07 | 0.2 | 0.11 | -0.1 | 0.27 | 0.04 | 0.29 | 0.11 |
| gad7_7 | 0.68 | 0.05 | 0.02 | 0.68 | 0.01 | -0.02 | 0.13 | 0.04 | 0.74 | 0.06 | -0.12 | 0.13 |

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Initial Factor Analysis Results

| Item | Model with Three Factors | | | Model with 4 Factors | | | | Model with 5 Factors | | | | |
|-------------|--------------------------|-------|-------|----------------------|-------|-------|-------|----------------------|-------|-------|-------|-------|
| | F1 | F2 | F3 | F1 | F2 | F3 | F4 | F1 | F2 | F3 | F4 | F5 |
| diener1 | 0.04 | -0.1 | 0.75 | 0.03 | 0.75 | -0.1 | 0 | 0.74 | 0.01 | -0.13 | 0.04 | -0.01 |
| diener2 | 0.04 | -0.12 | 0.62 | 0.04 | 0.63 | 0.02 | -0.21 | 0.61 | 0.02 | 0 | 0.02 | -0.22 |
| diener3 | 0.08 | -0.27 | 0.64 | 0.07 | 0.65 | -0.22 | -0.07 | 0.65 | 0.04 | -0.21 | -0.01 | -0.09 |
| diener4 | 0.04 | 0.03 | 0.76 | 0.04 | 0.76 | 0.03 | 0.02 | 0.76 | 0.06 | 0.05 | -0.05 | 0.01 |
| diener5 | -0.12 | 0.06 | 0.66 | -0.12 | 0.66 | 0 | 0.1 | 0.65 | -0.13 | -0.03 | 0.03 | 0.1 |
| diener6 | -0.14 | 0.12 | 0.79 | -0.14 | 0.79 | 0.08 | 0.08 | 0.8 | -0.08 | 0.14 | -0.12 | 0.08 |
| diener7 | -0.02 | -0.11 | 0.74 | -0.02 | 0.74 | -0.07 | -0.05 | 0.72 | -0.08 | -0.16 | 0.14 | -0.06 |
| diener8 | -0.05 | 0.03 | 0.67 | -0.04 | 0.67 | 0.06 | -0.06 | 0.67 | -0.01 | 0.1 | -0.08 | -0.06 |
| dep_any | 0.1 | 0.68 | -0.03 | 0.13 | -0.06 | 0.51 | 0.26 | -0.07 | 0.12 | 0.41 | 0.15 | 0.28 |
| phq9_1 | -0.03 | 0.67 | -0.18 | 0 | -0.21 | 0.57 | 0.12 | -0.23 | -0.02 | 0.44 | 0.19 | 0.14 |
| phq9_2 | 0.13 | 0.68 | -0.14 | 0.16 | -0.17 | 0.55 | 0.18 | -0.17 | 0.18 | 0.49 | 0.09 | 0.2 |
| phq9_3 | 0.26 | 0.48 | 0.08 | 0.28 | 0.06 | 0.45 | 0.01 | 0 | 0.07 | 0.13 | 0.63 | 0 |
| phq9_4 | 0.28 | 0.43 | 0.04 | 0.3 | 0.02 | 0.44 | -0.03 | -0.04 | 0.12 | 0.15 | 0.54 | -0.05 |
| phq9_5 | 0.22 | 0.44 | 0.05 | 0.24 | 0.03 | 0.35 | 0.13 | -0.02 | 0.03 | 0.03 | 0.59 | 0.14 |
| phq9_6 | 0.22 | 0.47 | -0.16 | 0.24 | -0.18 | 0.42 | 0.07 | -0.19 | 0.25 | 0.37 | 0.08 | 0.08 |
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| phq9_8 | 0.06 | 0.33 | -0.04 | 0.04 | -0.03 | -0.01 | 0.67 | -0.02 | 0.02 | -0.07 | 0.09 | 0.67 |
| phq9_9 | 0 | 0.46 | -0.18 | -0.01 | -0.19 | 0.18 | 0.52 | -0.17 | 0.02 | 0.17 | 0 | 0.54 |
| phq2_1 | -0.09 | 0.81 | -0.02 | -0.07 | -0.03 | 0.86 | -0.06 | -0.05 | -0.06 | 0.79 | 0.13 | -0.04 |
| phq2_2 | 0.05 | 0.72 | 0.03 | 0.07 | 0.02 | 0.74 | -0.02 | 0.03 | 0.13 | 0.78 | -0.01 | -0.02 |
| anx_any_gad | 0.83 | -0.03 | -0.04 | 0.82 | -0.05 | -0.05 | 0.05 | -0.03 | 0.85 | 0 | -0.05 | 0.04 |
| gad7_1 | 0.74 | -0.02 | -0.1 | 0.73 | -0.1 | -0.04 | 0.05 | -0.11 | 0.69 | -0.08 | 0.1 | 0.04 |
| gad7_2 | 0.86 | -0.03 | -0.05 | 0.86 | -0.05 | 0.02 | -0.08 | -0.05 | 0.84 | 0.02 | 0.04 | -0.09 |
| gad7_3 | 0.78 | 0.03 | -0.01 | 0.79 | -0.02 | 0.1 | -0.12 | -0.02 | 0.77 | 0.08 | 0.07 | -0.12 |
| gad7_4 | 0.67 | 0.21 | 0.02 | 0.67 | 0 | 0.19 | 0.03 | -0.02 | 0.6 | 0.07 | 0.23 | 0.03 |
| gad7_5 | 0.56 | 0.18 | 0.16 | 0.56 | 0.16 | -0.01 | 0.32 | 0.17 | 0.53 | -0.04 | 0.09 | 0.31 |
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Module 4: Positive Mental Health

Module 5: Depression

Module 5: Anxiety

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Initial Factor Analysis Results

| Item | Model with Three Factors | | | Model with 4 Factors | | | | Model with 5 Factors | | | | |
|-------------|--------------------------|-------------|-------------|----------------------|-------------|-------------|-------------|----------------------|-------------|-------------|-------------|-------------|
| | F1 | F2 | F3 | F1 | F2 | F3 | F4 | F1 | F2 | F3 | F4 | F5 |
| diener1 | 0.04 | -0.1 | 0.75 | 0.03 | 0.75 | -0.1 | 0 | 0.74 | 0.01 | -0.13 | 0.04 | -0.01 |
| diener2 | 0.04 | -0.12 | 0.62 | 0.04 | 0.63 | 0.02 | -0.21 | 0.61 | 0.02 | 0 | 0.02 | -0.22 |
| diener3 | 0.08 | -0.27 | 0.64 | 0.07 | 0.65 | -0.22 | -0.07 | 0.65 | 0.04 | -0.21 | -0.01 | -0.09 |
| diener4 | 0.04 | 0.03 | 0.76 | 0.04 | 0.76 | 0.03 | 0.02 | 0.76 | 0.06 | 0.05 | -0.05 | 0.01 |
| diener5 | -0.12 | 0.06 | 0.66 | -0.12 | 0.66 | 0 | 0.1 | 0.65 | -0.13 | -0.03 | 0.03 | 0.1 |
| diener6 | -0.14 | 0.12 | 0.79 | -0.14 | 0.79 | 0.08 | 0.08 | 0.8 | -0.08 | 0.14 | -0.12 | 0.08 |
| diener7 | -0.02 | -0.11 | 0.74 | -0.02 | 0.74 | -0.07 | -0.05 | 0.72 | -0.08 | -0.16 | 0.14 | -0.06 |
| diener8 | -0.05 | 0.03 | 0.67 | -0.04 | 0.67 | 0.06 | -0.06 | 0.67 | -0.01 | 0.1 | -0.08 | -0.06 |
| dep_any | 0.1 | 0.68 | -0.03 | 0.13 | -0.06 | 0.51 | 0.26 | -0.07 | 0.12 | 0.41 | 0.15 | 0.28 |
| phq9_1 | -0.03 | 0.67 | -0.18 | 0 | -0.21 | 0.57 | 0.12 | -0.23 | -0.02 | 0.44 | 0.19 | 0.14 |
| phq9_2 | 0.13 | 0.68 | -0.14 | 0.16 | -0.17 | 0.55 | 0.18 | -0.17 | 0.18 | 0.49 | 0.09 | 0.2 |
| phq9_3 | 0.26 | 0.48 | 0.08 | 0.28 | 0.06 | 0.45 | 0.01 | 0 | 0.07 | 0.13 | 0.63 | 0 |
| phq9_4 | 0.28 | 0.43 | 0.04 | 0.3 | 0.02 | 0.44 | -0.03 | -0.04 | 0.12 | 0.15 | 0.54 | -0.05 |
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| phq9_6 | 0.22 | 0.47 | -0.16 | 0.24 | -0.18 | 0.42 | 0.07 | -0.19 | 0.25 | 0.37 | 0.08 | 0.08 |
| phq9_7 | 0.21 | 0.43 | -0.04 | 0.22 | -0.06 | 0.35 | 0.13 | -0.08 | 0.18 | 0.23 | 0.2 | 0.14 |
| phq9_8 | 0.06 | 0.33 | -0.04 | 0.04 | -0.03 | -0.01 | 0.67 | -0.02 | 0.02 | -0.07 | 0.09 | 0.67 |
| phq9_9 | 0 | 0.46 | -0.18 | -0.01 | -0.19 | 0.18 | 0.52 | -0.17 | 0.02 | 0.17 | 0 | 0.54 |
| phq2_1 | -0.09 | 0.81 | -0.02 | -0.07 | -0.03 | 0.86 | -0.06 | -0.05 | -0.06 | 0.79 | 0.13 | -0.04 |
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| anx_any_gad | 0.83 | -0.03 | -0.04 | 0.82 | -0.05 | -0.05 | 0.05 | -0.03 | 0.85 | 0 | -0.05 | 0.04 |
| gad7_1 | 0.74 | -0.02 | -0.1 | 0.73 | -0.1 | -0.04 | 0.05 | -0.11 | 0.69 | -0.08 | 0.1 | 0.04 |
| gad7_2 | 0.86 | -0.03 | -0.05 | 0.86 | -0.05 | 0.02 | -0.08 | -0.05 | 0.84 | 0.02 | 0.04 | -0.09 |
| gad7_3 | 0.78 | 0.03 | -0.01 | 0.79 | -0.02 | 0.1 | -0.12 | -0.02 | 0.77 | 0.08 | 0.07 | -0.12 |
| gad7_4 | 0.67 | 0.21 | 0.02 | 0.67 | 0 | 0.19 | 0.03 | -0.02 | 0.6 | 0.07 | 0.23 | 0.03 |
| gad7_5 | 0.56 | 0.18 | 0.16 | 0.56 | 0.16 | -0.01 | 0.32 | 0.17 | 0.53 | -0.04 | 0.09 | 0.31 |
| gad7_6 | 0.36 | 0.27 | -0.06 | 0.37 | -0.07 | 0.2 | 0.11 | -0.1 | 0.27 | 0.04 | 0.29 | 0.11 |
| gad7_7 | 0.68 | 0.05 | 0.02 | 0.68 | 0.01 | -0.02 | 0.13 | 0.04 | 0.74 | 0.06 | -0.12 | 0.13 |

cross-loading items emerging



Initial Factor Analysis Results

| Item | Model with Three Factors | | | Model with 4 Factors | | | | Model with 5 Factors | | | | |
|-------------|--------------------------|-------|-------|----------------------|-------|-------|-------|----------------------|-------|-------|-------|-------|
| | F1 | F2 | F3 | F1 | F2 | F3 | F4 | F1 | F2 | F3 | F4 | F5 |
| diener1 | 0.04 | -0.1 | 0.75 | 0.03 | 0.75 | -0.1 | 0 | 0.74 | 0.01 | -0.13 | 0.04 | -0.01 |
| diener2 | 0.04 | -0.12 | 0.62 | 0.04 | 0.63 | 0.02 | -0.21 | 0.61 | 0.02 | 0 | 0.02 | -0.22 |
| diener3 | 0.08 | -0.27 | 0.64 | 0.07 | 0.65 | -0.22 | -0.07 | 0.65 | 0.04 | -0.21 | -0.01 | -0.09 |
| diener4 | 0.04 | 0.03 | 0.76 | 0.04 | 0.76 | 0.03 | 0.02 | 0.76 | 0.06 | 0.05 | -0.05 | 0.01 |
| diener5 | -0.12 | 0.06 | 0.66 | -0.12 | 0.66 | 0 | 0.1 | 0.65 | -0.13 | -0.03 | 0.03 | 0.1 |
| diener6 | -0.14 | 0.12 | 0.79 | -0.14 | 0.79 | 0.08 | 0.08 | 0.8 | -0.08 | 0.14 | -0.12 | 0.08 |
| diener7 | -0.02 | -0.11 | 0.74 | -0.02 | 0.74 | -0.07 | -0.05 | 0.72 | -0.08 | -0.16 | 0.14 | -0.06 |
| diener8 | -0.05 | 0.03 | 0.67 | -0.04 | 0.67 | 0.06 | -0.06 | 0.67 | -0.01 | 0.1 | -0.08 | -0.06 |
| dep_any | 0.1 | 0.68 | -0.03 | 0.13 | -0.06 | 0.51 | 0.26 | -0.07 | 0.12 | 0.41 | 0.15 | 0.28 |
| phq9_1 | -0.03 | 0.67 | -0.18 | 0 | -0.21 | 0.57 | 0.12 | -0.23 | -0.02 | 0.44 | 0.19 | 0.14 |
| phq9_2 | 0.13 | 0.68 | -0.14 | 0.16 | -0.17 | 0.55 | 0.18 | -0.17 | 0.18 | 0.49 | 0.09 | 0.2 |
| phq9_3 | 0.26 | 0.48 | 0.08 | 0.28 | 0.06 | 0.45 | 0.01 | 0 | 0.07 | 0.13 | 0.63 | 0 |
| phq9_4 | 0.28 | 0.43 | 0.04 | 0.3 | 0.02 | 0.44 | -0.03 | -0.04 | 0.12 | 0.15 | 0.54 | -0.05 |
| phq9_5 | 0.22 | 0.44 | 0.05 | 0.24 | 0.03 | 0.35 | 0.13 | -0.02 | 0.03 | 0.03 | 0.59 | 0.14 |
| phq9_6 | 0.22 | 0.47 | -0.16 | 0.24 | -0.18 | 0.42 | 0.07 | -0.19 | 0.25 | 0.37 | 0.08 | 0.08 |
| phq9_7 | 0.21 | 0.43 | -0.04 | 0.22 | -0.06 | 0.35 | 0.13 | -0.08 | 0.18 | 0.23 | 0.2 | 0.14 |
| phq9_8 | 0.06 | 0.33 | -0.04 | 0.04 | -0.03 | -0.01 | 0.67 | -0.02 | 0.02 | -0.07 | 0.09 | 0.67 |
| phq9_9 | 0 | 0.46 | -0.18 | -0.01 | -0.19 | 0.18 | 0.52 | -0.17 | 0.02 | 0.17 | 0 | 0.54 |
| phq2_1 | -0.09 | 0.81 | -0.02 | -0.07 | -0.03 | 0.86 | -0.06 | -0.05 | -0.06 | 0.79 | 0.13 | -0.04 |
| phq2_2 | 0.05 | 0.72 | 0.03 | 0.07 | 0.02 | 0.74 | -0.02 | 0.03 | 0.13 | 0.78 | -0.01 | -0.02 |
| anx_any_gad | 0.83 | -0.03 | -0.04 | 0.82 | -0.05 | -0.05 | 0.05 | -0.03 | 0.85 | 0 | -0.05 | 0.04 |
| gad7_1 | 0.74 | -0.02 | -0.1 | 0.73 | -0.1 | -0.04 | 0.05 | -0.11 | 0.69 | -0.08 | 0.1 | 0.04 |
| gad7_2 | 0.86 | -0.03 | -0.05 | 0.86 | -0.05 | 0.02 | -0.08 | -0.05 | 0.84 | 0.02 | 0.04 | -0.09 |
| gad7_3 | 0.78 | 0.03 | -0.01 | 0.79 | -0.02 | 0.1 | -0.12 | -0.02 | 0.77 | 0.08 | 0.07 | -0.12 |
| gad7_4 | 0.67 | 0.21 | 0.02 | 0.67 | 0 | 0.19 | 0.03 | -0.02 | 0.6 | 0.07 | 0.23 | 0.03 |
| gad7_5 | 0.56 | 0.18 | 0.16 | 0.56 | 0.16 | -0.01 | 0.32 | 0.17 | 0.53 | -0.04 | 0.09 | 0.31 |
| gad7_6 | 0.36 | 0.27 | -0.06 | 0.37 | -0.07 | 0.2 | 0.11 | -0.1 | 0.27 | 0.04 | 0.29 | 0.11 |
| gad7_7 | 0.68 | 0.05 | 0.02 | 0.68 | 0.01 | -0.02 | 0.13 | 0.04 | 0.74 | 0.06 | -0.12 | 0.13 |

Module 4: Positive Mental Health

Module 5: Depression

Module 5: Anxiety

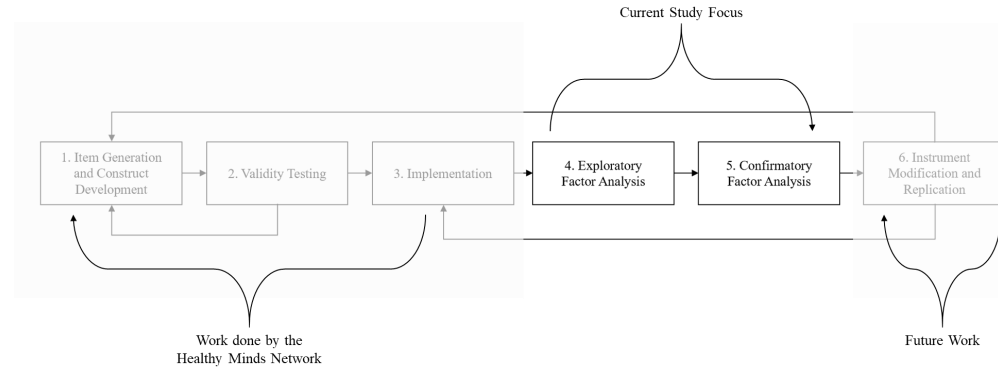
omitted items

cross-loading item



Key Take-Away & Future Work

- Exploratory Factor Analysis following breakdown major themes
- Add in remaining 12 modules to determine resulting factor structure
- Test this structure with second half of data in confirmatory factor analysis



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Acknowledgements

- A very special thanks to
 - the Healthy Minds Network!
 - the MEER Group!
 - UMich EER Community!



[6]



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