**Supplemental Table 1:** Descriptives of continuous screening measures(N=4,002)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Number of items | Response levels per item | Mean (SD) | range | alpha |
| **Problematic substance use**a | | Six items with different scoring: |  |  |  |
| Tobacco | 5 | 1. Use = 0 (never),2,3,4,6 (daily)  2. Craving = 0 (never),3,4,5,6 (daily)  3. Problemsb = 0 (never), 4,5,6,7 (daily)  4. Interferenceb=0 (never),5,6,7,8 (daily)  5. Concern and 6. control = 0 (never),3 (lifetime),6 (current) | 5.2 (8.1) | 0-31 | 0.87 |
| Alcohol | 6 | 5.0 (6.1) | 0-39 | 0.77 |
| Cannabis | 6 | 1.5 (4.8) | 0-39 | 0.87 |
| Sedatives | 6 | 1.4 (4.7) | 0-39 | 0.87 |
| Prescription stimulants | 6 | 0.7 (3.5) | 0-39 | 0.88 |
| Prescription opioid painkillers | 6 | 0.6 (3.3) | 0-39 | 0.89 |
| **Problematic addictive behaviors** | |  |  |  |  |
| Gamblingc | 9 | 0-3 (Never-almost always) | 0.9 (2.5) | 0-27 | 0.91 |
| Gamingd | 7 | 1-5 (Never-very frequently) | 10.8 (5.1) | 7-35 | 0.91 |
| Compulsive sexual behaviore | 6 | 0-4 (Never/very infrequently – very frequently) | 4.1 (4.7) | 0-24 | 0.88 |
| Pornographyf | 12 | 0-5 (Never true – true almost always) | 5.1 (9.0) | 0-60 | 0.95 |
| Internetg | 20 | 0-5 (Not relevant/never – all the time) | 24.2 (16.3) | 0-100 | 0.95 |
| Smartphoneh | 10 | 1-6 (Completely disagree-completely agree) | 24.9 (11.4) | 10-60 | 0.91 |
| Social mediai | 6 | 1-5 (Very infrequently – very frequently) | 12.1 (5.8) | 6-30 | 0.91 |
| **Mental Health Issues** |  |  |  |  |  |
| Post-traumatic stressj | 20 | 0-4 (never-very much) | 21.2 (17.5) | 0-80 | 0.96 |
| Anxietyk | 7 | 0-3 (never-almost every day) | 5.1 (5.2) | 0-21 | 0.93 |
| Depressionl | 9 | 0-3 (never-almost every day) | 5.9 (5.6) | 0-27 | 0.90 |

a Alcohol, Smoking and Substance Involvement Screening Test (ASSIST) 3.1 score; the "problems" and "interference" items were only asked to those with use in the past three months

b not included for tobacco

c Problem Gambling Severity Index (PGSI)

d Game Addiction Scale (GAS)

e Bergen-Yale Sex Addiction Scale (BYSAS)

f Problematic Pornography Use Scale (PPUS)

g Internet Addiction Test (IAT)

h Smartphone Addiction Scale-short version (SAS-SV)

i Bergen Social Media Addiction Scale (BSMAS)

j Post-traumatic stress disorder (PTSD) DSM-5 version Checklist (PCL-5)

k Generalized Anxiety Disorder 7 (GAD-7)

l Patient Health Questionnaire 9 (PHQ-9)

**Supplemental Table 2.** Zero-order correlation between problematic substance use, other addictive behaviors, and PTSD, anxiety, and depression scores

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Tobacco | Alcohol | Cannabis | Prescription sedatives | Prescription stimulants | Prescription opioids | Gambling | Sexual behavior | Pornography | Internet | Electronic gaming | Smartphone | Social media | PTSD | Anxiety |
| Alcohol | 0.38 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Cannabis | 0.33 | 0.30 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Prescription sedatives | 0.16 | 0.25 | 0.22 |  |  |  |  |  |  |  |  |  |  |  |  |
| Prescription stimulants | 0.13 | 0.20 | 0.21 | 0.29 |  |  |  |  |  |  |  |  |  |  |  |
| Prescription opioids | 0.11 | 0.24 | 0.23 | 0.35 | 0.25 |  |  |  |  |  |  |  |  |  |  |
| Gambling | 0.25 | 0.36 | 0.23 | 0.24 | 0.28 | 0.28 |  |  |  |  |  |  |  |  |  |
| Sexual behavior | 0.21 | 0.33 | 0.25 | 0.18 | 0.15 | 0.13 | 0.33 |  |  |  |  |  |  |  |  |
| Pornography | 0.19 | 0.29 | 0.25 | 0.17 | 0.17 | 0.14 | 0.40 | 0.73 |  |  |  |  |  |  |  |
| Internet | 0.15 | 0.27 | 0.19 | 0.19 | 0.18 | 0.15 | 0.34 | 0.44 | 0.43 |  |  |  |  |  |  |
| Electronic gaming | 0.15 | 0.28 | 0.17 | 0.19 | 0.18 | 0.18 | 0.37 | 0.34 | 0.34 | 0.47 |  |  |  |  |  |
| Smartphone | 0.16 | 0.23 | 0.18 | 0.18 | 0.15 | 0.12 | 0.27 | 0.36 | 0.30 | 0.69 | 0.37 |  |  |  |  |
| Social media | 0.16 | 0.24 | 0.18 | 0.17 | 0.16 | 0.12 | 0.29 | 0.35 | 0.31 | 0.71 | 0.37 | 0.74 |  |  |  |
| PTSD | 0.16 | 0.22 | 0.19 | 0.26 | 0.20 | 0.18 | 0.26 | 0.28 | 0.22 | 0.49 | 0.34 | 0.52 | 0.53 |  |  |
| Anxiety | 0.15 | 0.19 | 0.17 | 0.25 | 0.16 | 0.16 | 0.21 | 0.19 | 0.19 | 0.44 | 0.33 | 0.47 | 0.47 | 0.72 |  |
| Depression | 0.16 | 0.21 | 0.20 | 0.27 | 0.19 | 0.19 | 0.23 | 0.23 | 0.25 | 0.48 | 0.35 | 0.46 | 0.47 | 0.70 | 0.80 |

**Supplemental Figure 1.** Networks of *Model 1*: problematic substance use and anxiety, depression, and PTSD

B. Cross-category edges, connecting substances and other mental health problems

תמונה שמכילה טקסט, צילום מסך, תרשים, קו

התיאור נוצר באופן אוטומטי

A. All edges

תמונה שמכילה קו, טקסט, תרשים, צילום מסך

התיאור נוצר באופן אוטומטי

**Supplemental Table 3.** Cross-category edge strengths for *Model 1*: between problematic substance use and PTSD, anxiety, and depression scores

|  |  |  |  |
| --- | --- | --- | --- |
|  | *PTSD* | *Anxiety* | *Depression* |
| Tobacco | 0.015 | 0.014 | 0.007 |
| Alcohol | 0.060 | 0.000 | 0.016 |
| Cannabis | 0.015 | 0.000 | 0.045 |
| Prescription sedatives | 0.041 | 0.021 | 0.062 |
| Prescription stimulants | 0.059 | 0.000 | 0.012 |
| Prescription opioid painkillers | 0.014 | 0.000 | 0.025 |

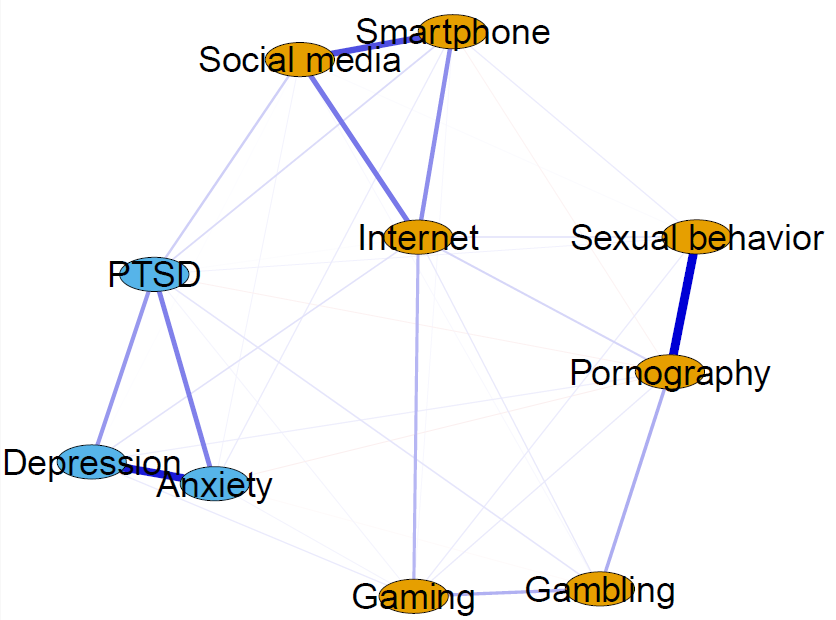
**Supplemental Figure 2.** Networks of *Model 2*: problematic addictive behaviors and anxiety, depression, and PTSD

B. Cross-category edges, connecting behaviors and other mental health problems

תמונה שמכילה תרשים, צילום מסך, קו, עיגול

התיאור נוצר באופן אוטומטי

A. All edges



**Supplemental Table 4.** Cross-category edge strengths for *Model 2*: between problematic addictive behaviors and PTSD, anxiety, and depression scores

|  |  |  |  |
| --- | --- | --- | --- |
|  | *PTSD* | *Anxiety* | *Depression* |
| Gambling | 0.066 | -0.013 | 0.000 |
| Compulsive sexual behavior | 0.035 | 0.000 | 0.000 |
| Pornography | -0.034 | -0.040 | 0.043 |
| Internet | 0.008 | 0.000 | 0.071 |
| Electronic gaming | 0.028 | 0.029 | 0.052 |
| Smartphone | 0.090 | 0.049 | 0.000 |
| Social media | 0.121 | 0.030 | 0.006 |

**Supplemental Figure 3.** Networks of *Model 3A*: problematic substance use and other addictive behaviors

B. Cross-category edges, connecting substances and other behaviors

תמונה שמכילה צילום מסך, תרשים, טקסט, עיצוב

התיאור נוצר באופן אוטומטי

A. All edges

תמונה שמכילה תרשים, קו

התיאור נוצר באופן אוטומטי

**Supplemental Table 5.** Cross-category edge strengths for *Model 3A*: between problematic substance use and other addictive behavior scores

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | *Tobacco* | *Alcohol* | *Cannabis* | *Prescription sedatives* | *Prescription stimulants* | *Prescription opioids* |
| Gambling | 0.080 | 0.140 | 0.008 | 0.038 | 0.135 | 0.120 |
| Compulsive sexual behavior | 0.016 | 0.101 | 0.043 | 0.014 | 0.000 | 0.000 |
| Pornography | 0.000 | 0.000 | 0.052 | 0.000 | 0.000 | 0.000 |
| Internet | 0.000 | 0.013 | 0.000 | 0.008 | 0.009 | 0.000 |
| Electronic gaming | 0.000 | 0.070 | 0.000 | 0.032 | 0.025 | 0.029 |
| Smartphone | 0.018 | 0.000 | 0.013 | 0.030 | 0.000 | 0.000 |
| Social media | 0.000 | 0.026 | 0.013 | 0.000 | 0.017 | 0.000 |

**Supplemental Table 6.** Cross-category edge strengths for *Model 3B*: between problematic substance use, other addictive behaviors, and PTSD, anxiety, and depression scores

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Tobacco | Alcohol | Cannabis | Prescription sedatives | Prescription stimulants | Prescription opioids | PTSD | Anxiety | depression |
| Gambling | 0.079 | 0.141 | 0.006 | 0.034 | 0.134 | 0.120 | 0.017 | 0.000 | 0.000 |
| Compulsive sexual behavior | 0.015 | 0.102 | 0.042 | 0.010 | 0.000 | 0.000 | 0.009 | 0.000 | 0.002 |
| Pornography | 0.000 | 0.000 | 0.053 | 0.000 | 0.000 | 0.000 | 0.000 | -0.019 | 0.003 |
| Internet | 0.000 | 0.010 | 0.000 | 0.000 | 0.000 | 0.000 | 0.007 | 0.000 | 0.074 |
| Electronic gaming | 0.000 | 0.069 | 0.000 | 0.008 | 0.020 | 0.024 | 0.029 | 0.018 | 0.053 |
| Smartphone | 0.011 | 0.000 | 0.004 | 0.000 | 0.000 | 0.000 | 0.092 | 0.049 | 0.000 |
| Social media | 0.000 | 0.023 | 0.002 | 0.000 | 0.000 | -0.009 | 0.120 | 0.027 | 0.011 |
| PTSD | 0.006 | 0.006 | 0.004 | 0.037 | 0.044 | 0.006 |  | | |
| Anxiety | 0.008 | 0.000 | 0.000 | 0.019 | 0.000 | 0.000 |
| Depression | 0.000 | 0.000 | 0.034 | 0.059 | 0.004 | 0.017 |