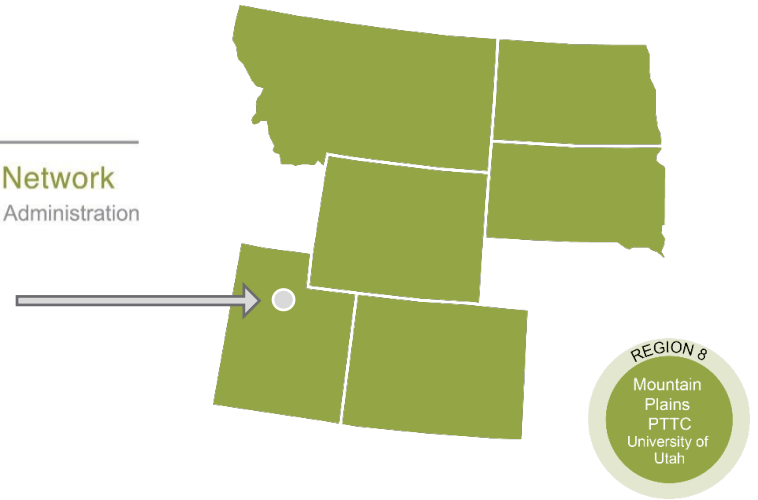




Mountain Plains (HHS Region 8)

**PTTC**

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## 3-Part Series – An Update on Adolescent Vaping Prevention: Prevalence, Adverse Behavioral Health Effects, and Prevention Practices

### Part 2: Vaping and Adolescent Behavioral Health: Understanding the Relationship Between the Two February 27, 2024



**Michael Chaiton, Ph.D.**

Senior Scientist, Center for Addiction and Mental Health (CAMH) Institute for Mental Health Policy Research  
Director of Research, Ontario Tobacco Research Unit,  
Associate Professor, Dalla Lana School of Public Health,  
University of Toronto

***SAMHSA***  
Substance Abuse and Mental Health  
Services Administration

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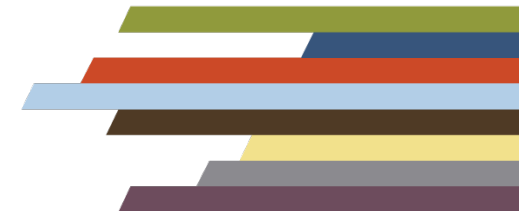


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Services Administration





# Nicotine and Mental Illness

Michael Chaiton

Ontario Tobacco Research Unit, CAMH, University of Toronto

# Smoking is more common among people with mental illness

| Diagnosis in Past Month                         | Ratio Current Smokers compared to no MI |
|---|---|
| Social Phobia                                   | 1.4                                     |
| Panic Disorder                                  | 1.9                                     |
| Major Depression                                | 2.0                                     |
| Non-Affective Psychosis<br>(e.g. Schizophrenia) | 2.0                                     |
| PTSD  | 2.0                                     |
| Alcoholism                                      | 2.5                                     |
| Bipolar Disorder                                | 2.7                                     |
| Drug Addiction                                  | 3.0                                     |

# Reasons Why Individuals with Mental Illness May Have Higher Rates of Smoking

- **Self-medication:**  
Individuals with MI are self-medicating affective and cognitive symptoms
- **Common Factors:**  
Social factors common to both MI and smoking (e.g., peer modeling, poverty, stress, availability)
- **Causal:**  
Smoking causes MI



# The evidence for self-medication

- Vast amounts of anecdotal evidence
  - Most reported reason to vape or smoke is to address stress
  - “Yes, in my case it’s helped me with my depression and anxiety...I felt really bad those months and then I started to smoke and I noticed that I felt good again, Maybe it’s not the best solution but it helps a lot, and I really enjoy smoking”

↑ Posted by **Camel** u/LuxTheKarma 1 year ago

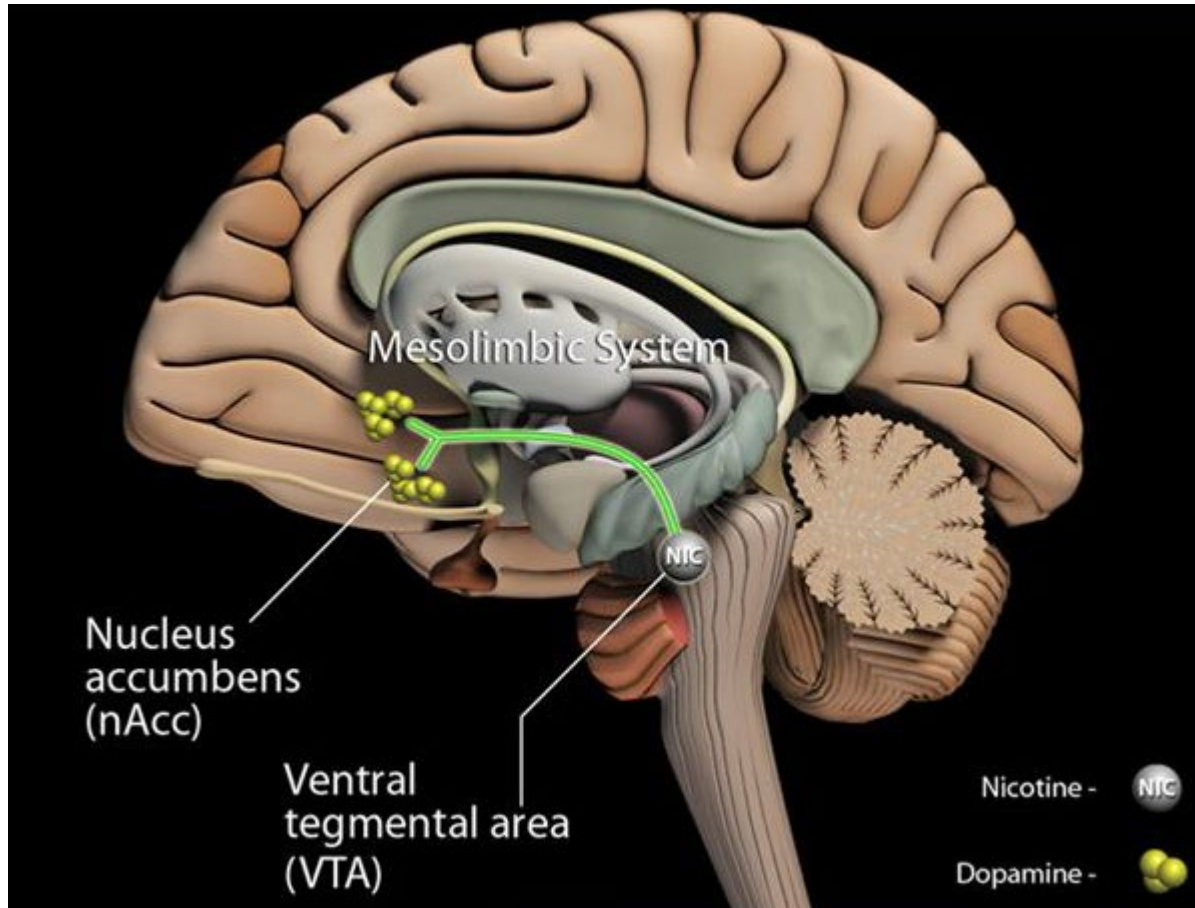
24 ↓ **People who have started Smoking because Stress / Anxiety / Depressed did it help?**

Discussion nsfw

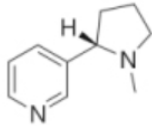
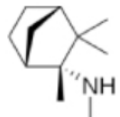
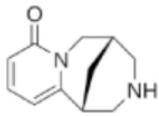
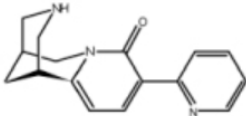
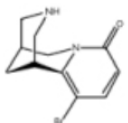
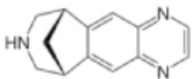




# Nicotine may be an anti-depressant drug



# Nicotine may be an anti-depressant drug

| Common name        | Systematic name (IUPAC)   | Structure   |
|--------------------|---|---|
| Nicotine           | 3-[(2S)-1-methylpyrrolidin-2-yl]pyridine  |    |
| Mecamylamine       | (2R)-N,2,3,3-tetramethylbicyclo[2.2.1]heptan-2-amine  |    |
| Cytisine           | (1R,5S)-1,2,3,4,5,6-hexahydro-1,5-methano-8H-pyrido[1,2a][1,5]diazocin-8-one                  |    |
| 3-pyridyl-cytisine | (1R,5S)-1,2,3,4,5,6-hexahydro-9-(3-pyridinyl)-1,5-methano-8H-pyrido[1,2-a][1,5]diazocin-8-one |    |
| 5-bromo-cytisine   | (1R,5S)-11-bromo-1,2,3,4,5,6-hexahydro-1,5-methano-8H-pyrido[1,2-a][1,5]diazocin-8-one        |  |
| Varenicline        | 7,8,9,10-tetrahydro-6,10-methano-6H-pyrazino(2,3-h)(3)benzazepine                             |  |





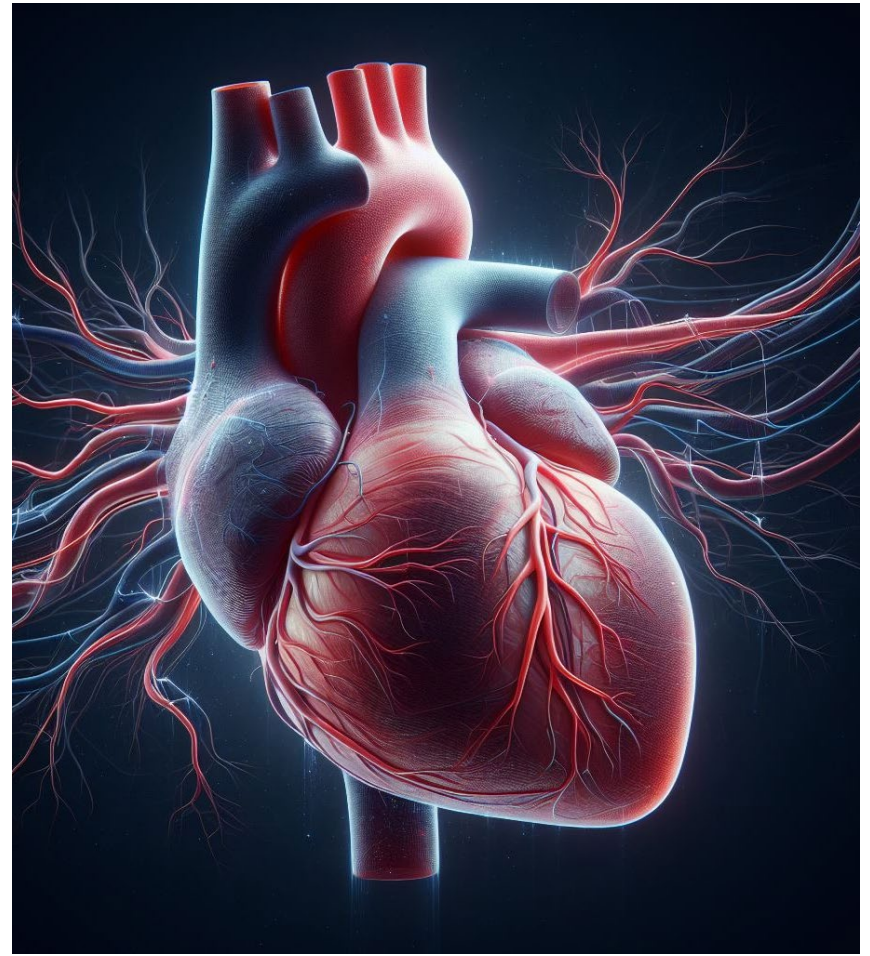
## Healing With Tobacco: Rapé Tribal Snuff

Posted by Psychedelic Times Staff | Oct 4, 2017 | [Articles](#), [Sacred Tobacco](#) | 4 ●



# Nicotine is a stimulant

- Increased heart rate
- Increased cortisol
- Increased blood pressure

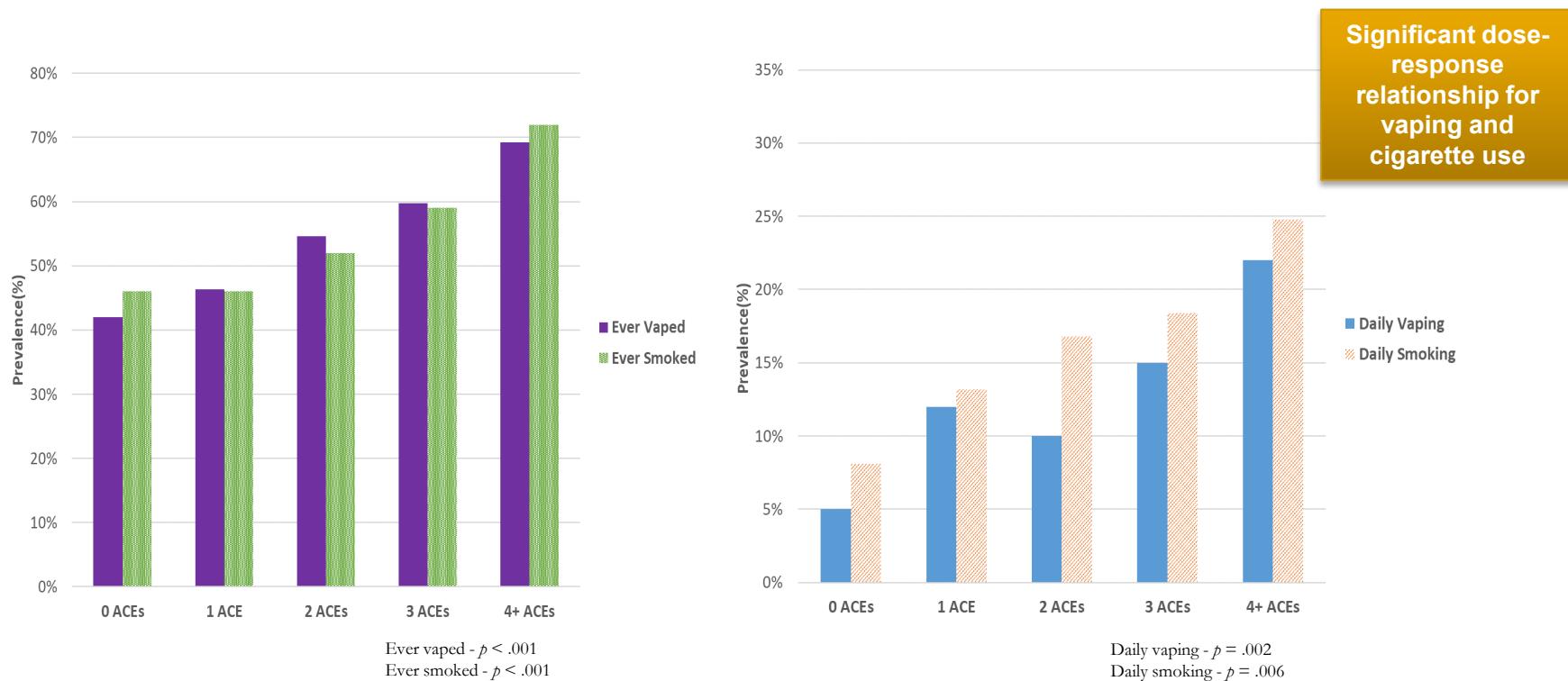


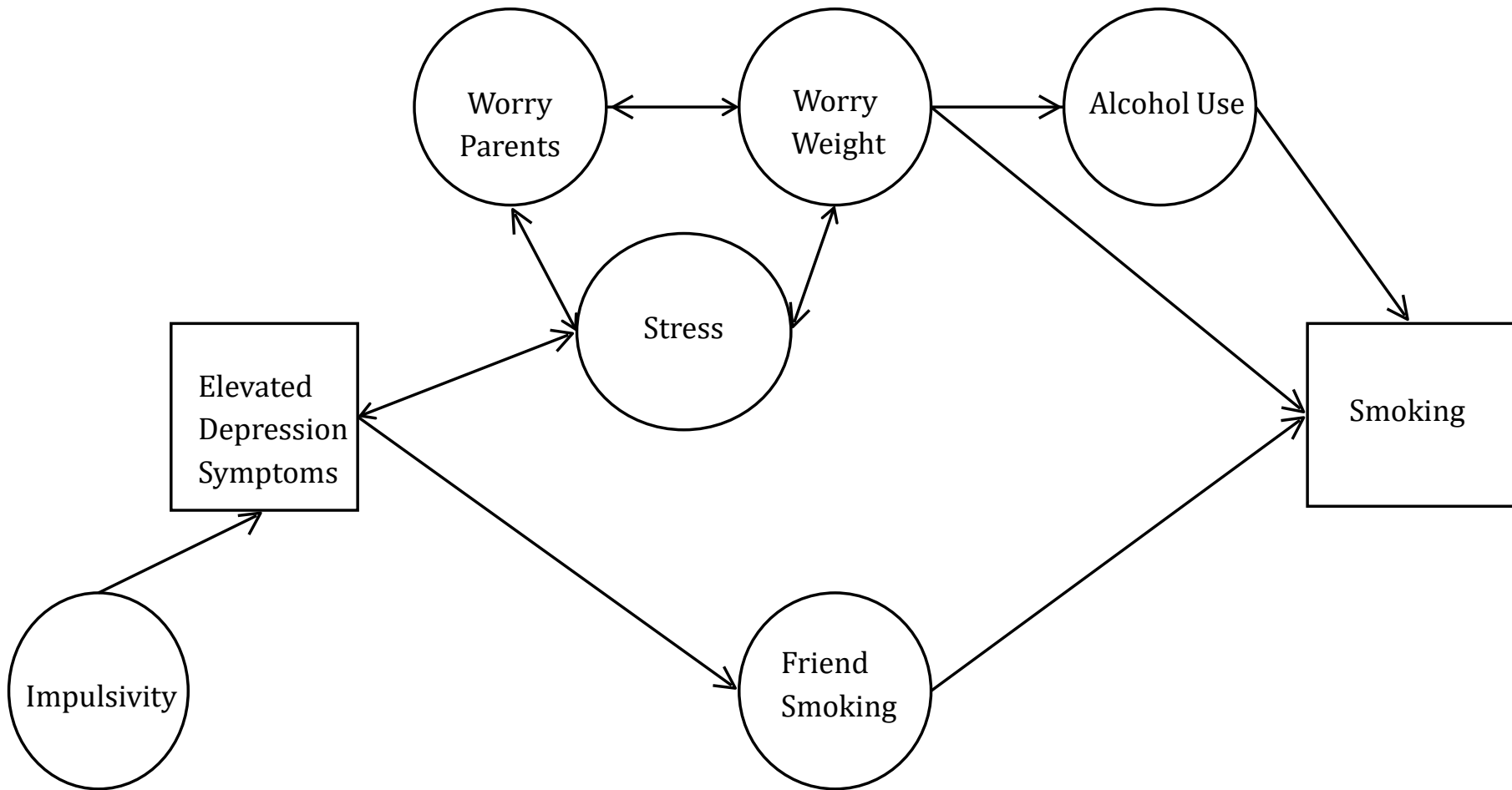
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# Evidence for common cause

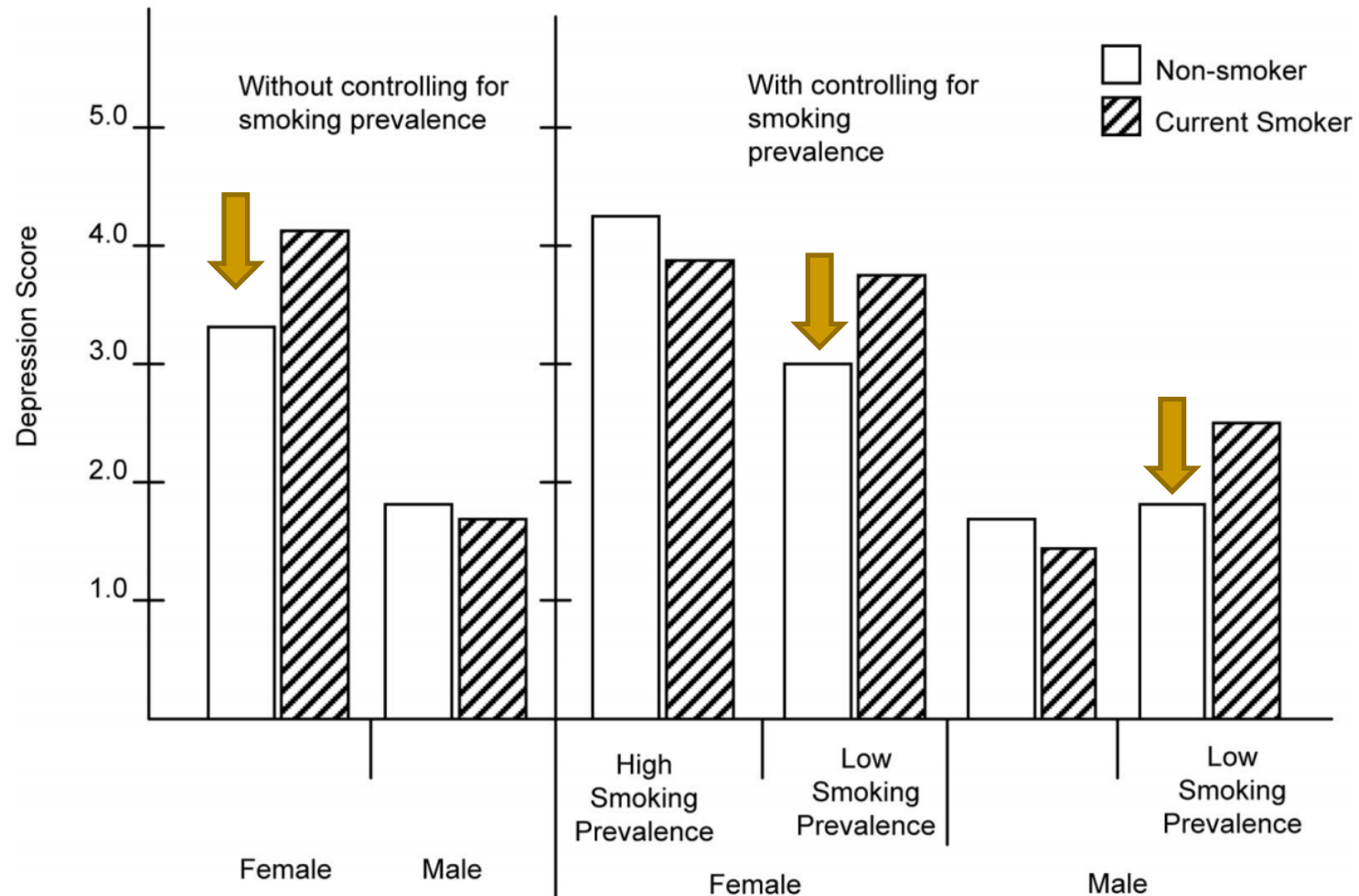
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**Figure 3:** Prevalence of Ever Having Smoked and Ever Having Vaped, Daily Smoking and Daily Vaping by ACEs Score Among 2SLGBTQI+ Young Adults





# Prevalence matters



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# Evidence that nicotine causes mental illness

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# Mendelian Randomization Studies— The Strongest Causal Case

|                                  |      |
|----------------------------------|------|
| ■ Post-traumatic stress disorder | 1.69 |
| ■ Major depressive disorder      | 1.38 |
| ■ Insomnia                       | 1.20 |
| ■ Schizophrenia                  | 1.54 |
| ■ Suicide Attempts               | 1.96 |
| ■ Bipolar disorder               | 1.41 |
| ■ Anxiety                        | 1.17 |

# What happens when a person quits?



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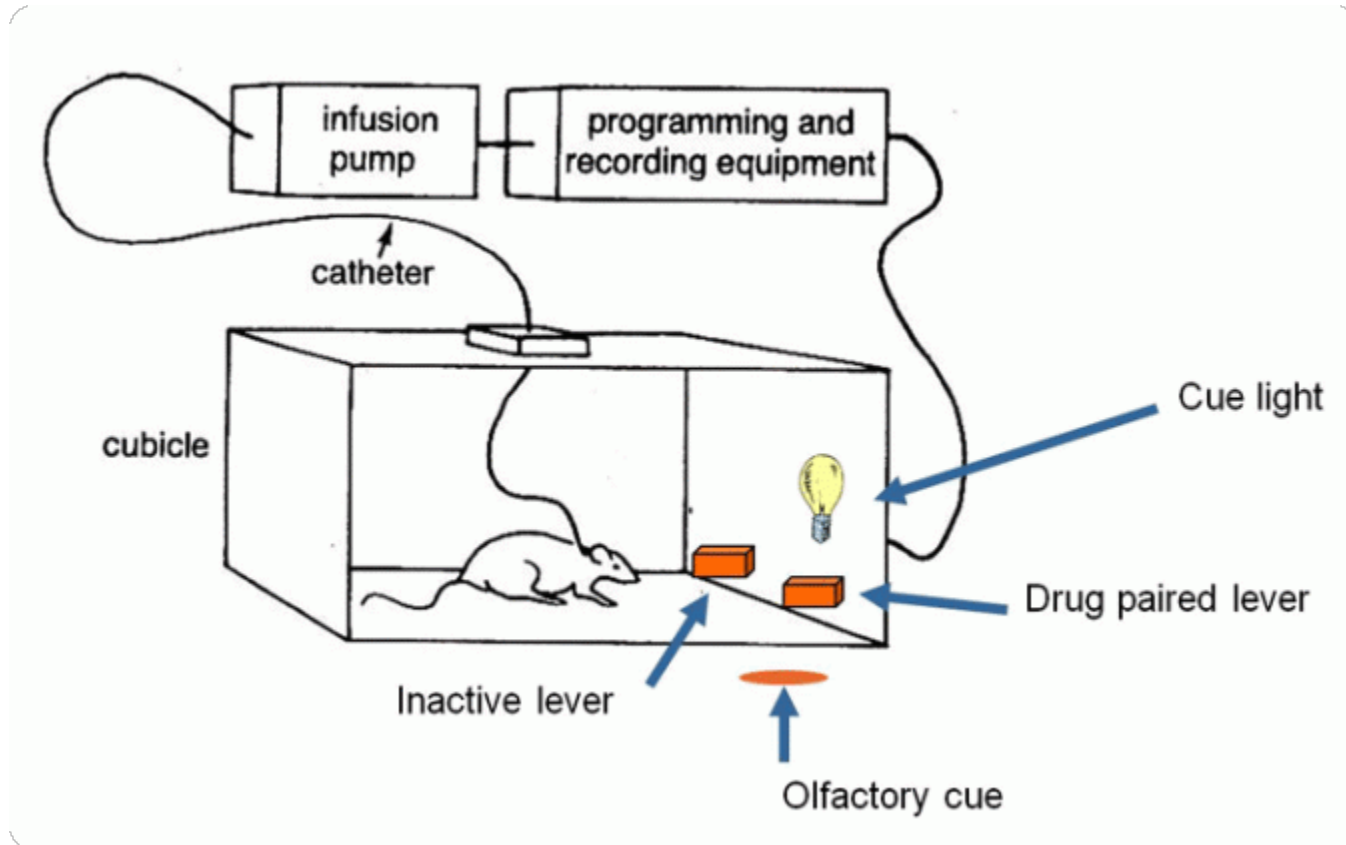
# The Diathesis Stress Theory

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Making sense of the evidence



# Nicotine Cue Reinforcement



Urge to smoke  
"I need a cigarette"  
"I'll feel better if I go for a cigarette"

Smoke cigarette

Feelings of relief

Psychological and physical withdrawal symptoms

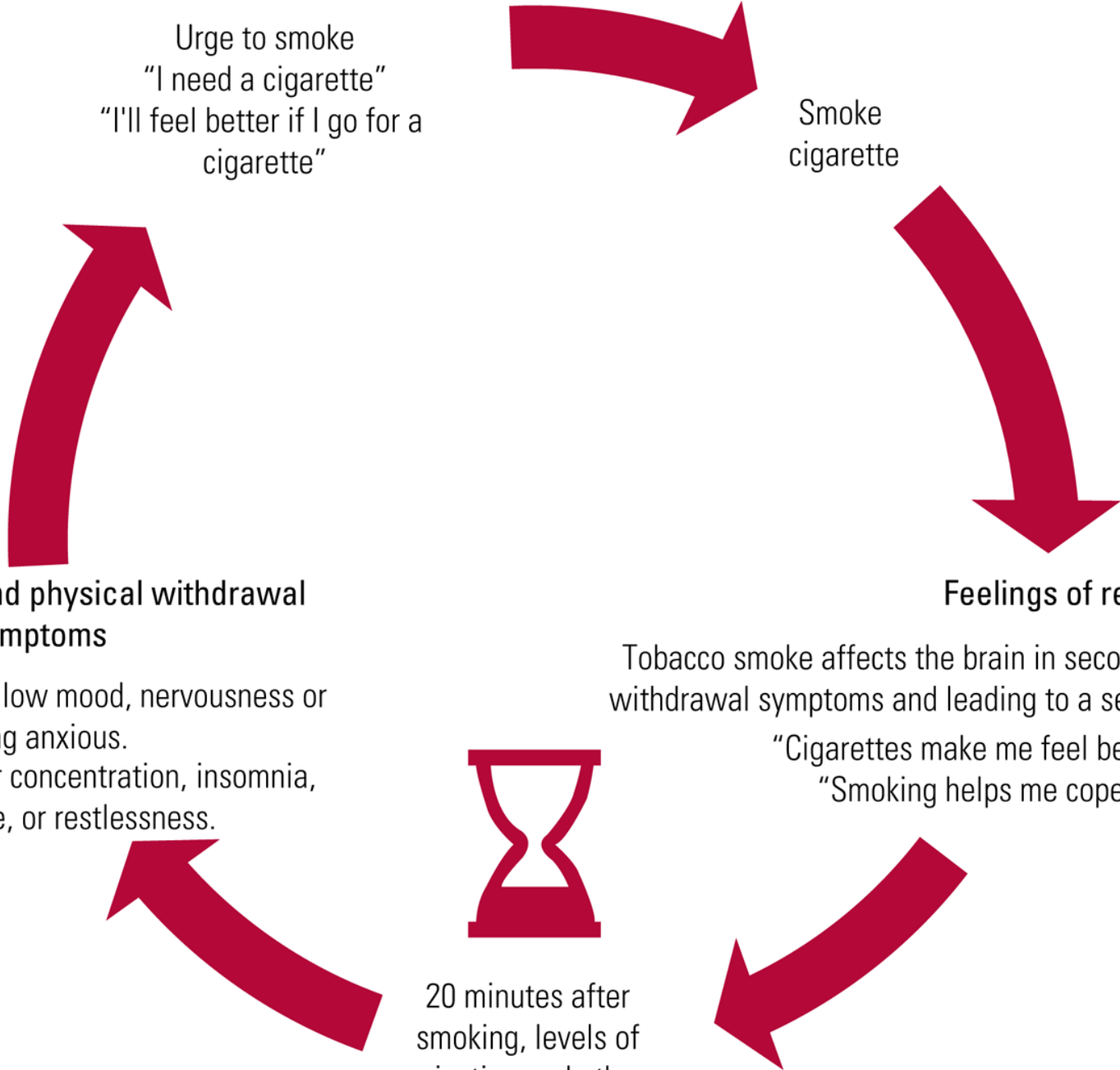
Psychological effects: low mood, nervousness or feeling anxious.  
Physical effects: poor concentration, insomnia, feeling tense, or restlessness.

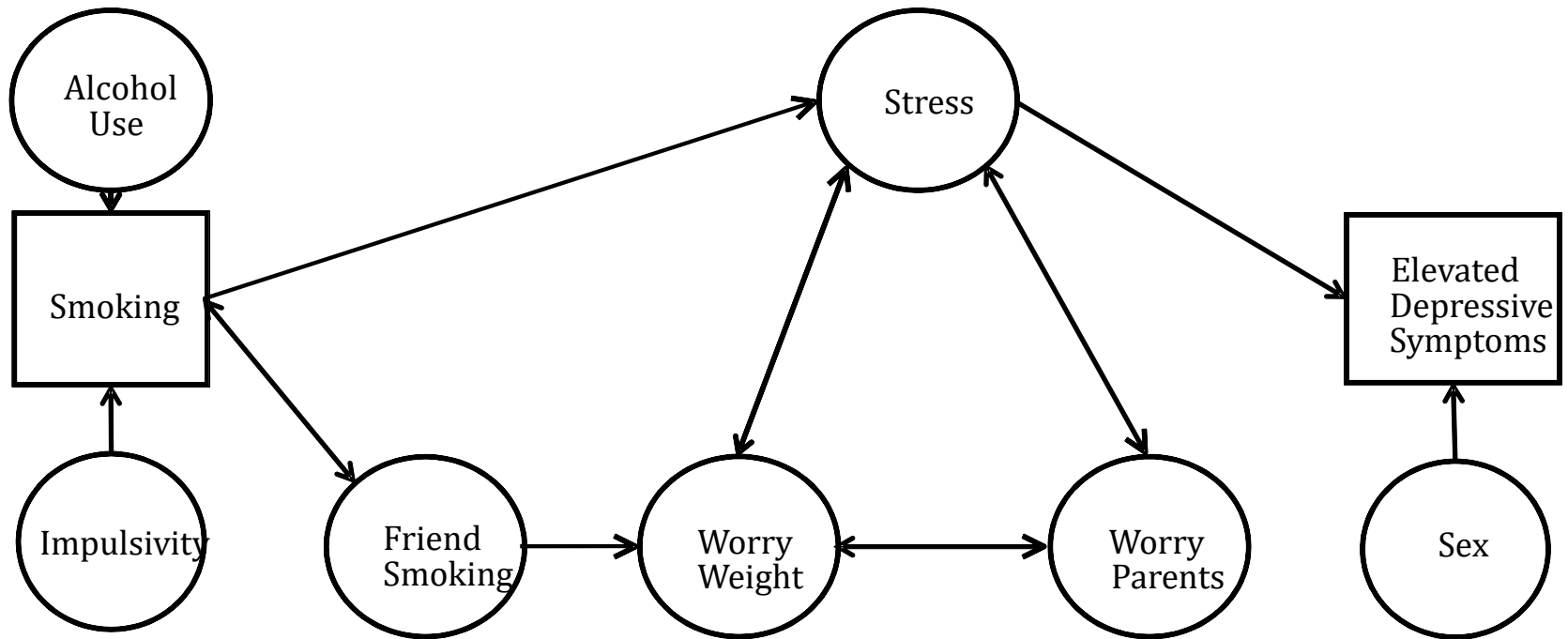
Tobacco smoke affects the brain in seconds, stopping withdrawal symptoms and leading to a sense of relief.

"Cigarettes make me feel better"  
"Smoking helps me cope"



20 minutes after smoking, levels of nicotine and other chemicals start to reduce.







# Onset of depression after initiation

| <b>Onset of elevated depressive symptom score (&gt; 3.4)</b> | <b>Hazard ratio<sup>a</sup></b> | <b>95% CI</b> |
|--|---------------------------------|---------------|
| Non-smoker (reference group)                                 | 1.00                            | –             |
| Smoking initiation with low self-medication score            | 1.38                            | (1.00, 1.70)  |
| Smoking initiation with high self-medication score           | 2.38                            | (1.73, 3.28)  |

---

# Diathesis-Stress Theory

- Link between smoking and depression is caused by nicotine dependence among those vulnerable
  - Acute use may indeed have anti-depressant effects
  - Spirals of withdrawal and relief worsen mood and stress, worsen nicotine dependence, which make the spirals worse in particular for those who are smoking to self-medicate
-

# What about vaping?



**Table 1. GEE model summary table of rate ratios for the association between vaping dependence, vaping dose, and depression after 3 months (n=1226)**

|                                   | Depression symptoms+ | Dependence Level+ | Depression symptoms+ | Depression symptoms+ |
|-----------------------------------|----------------------|-------------------|----------------------|----------------------|
| Vaping Frequency Level (lagged)++ |                      | 0.75*             | -0.33                | -0.84                |
|                                   |                      | [0.16,1.34]       | [-1.21,0.54]         | [-1.83,0.15]         |
| Depression symptoms (lagged)      | 0.76***              | 0.00              | 0.76***              | 0.76***              |
|                                   | [0.73,0.78]          | [-0.00,0.01]      | [0.73,0.79]          | [0.73,0.78]          |
| Vaping Dependence Level (lagged)  | 0.08*                | 0.72***           |                      | 0.11**               |
|                                   | [0.01,0.15]          | [0.67,0.78]       |                      | [0.04,0.19]          |

95% confidence intervals in brackets

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

+ Controlling for age, sex, level of education, race, Province, use of alcohol, use of cannabis, and time in survey

++Vaping frequency was calculated as cigarette pack-equivalent monthly dose of nicotine.

**Vaping dependence but not vaping frequency predicts increases in depressive symptoms among never smoking youth.**

**There was no bidirectional relationship.**

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# Vaping and Mental Health

Depression and  
Anxiety:

Becker 2021 40  
studies

Suicidality:

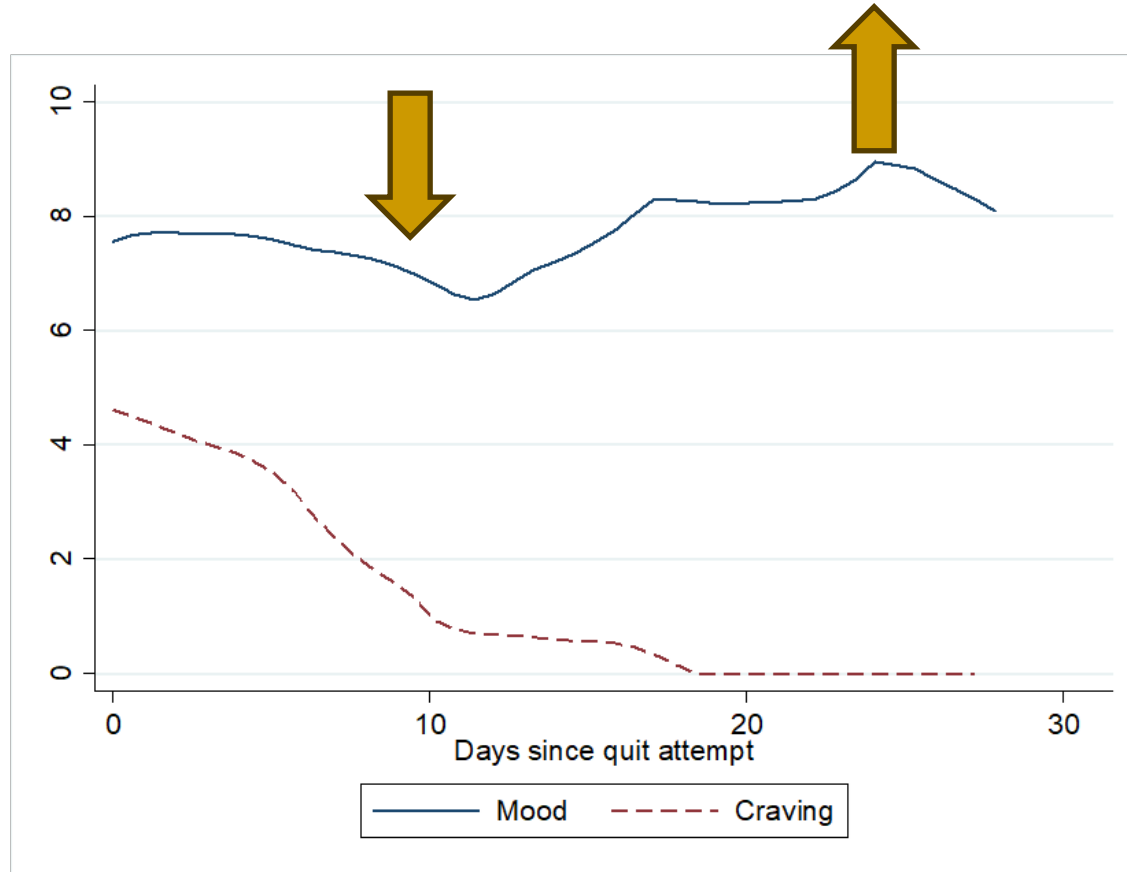
Javad 2022  
review 6 studies

Sleep Issues:

OTRU review 13  
studies

---

# #stopvapingchallenge



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# Conclusions

- Results suggests bidirectional pathways between nicotine and depression
  - The anti-depressant effect may be real but quitting is the best way to improve symptoms
-



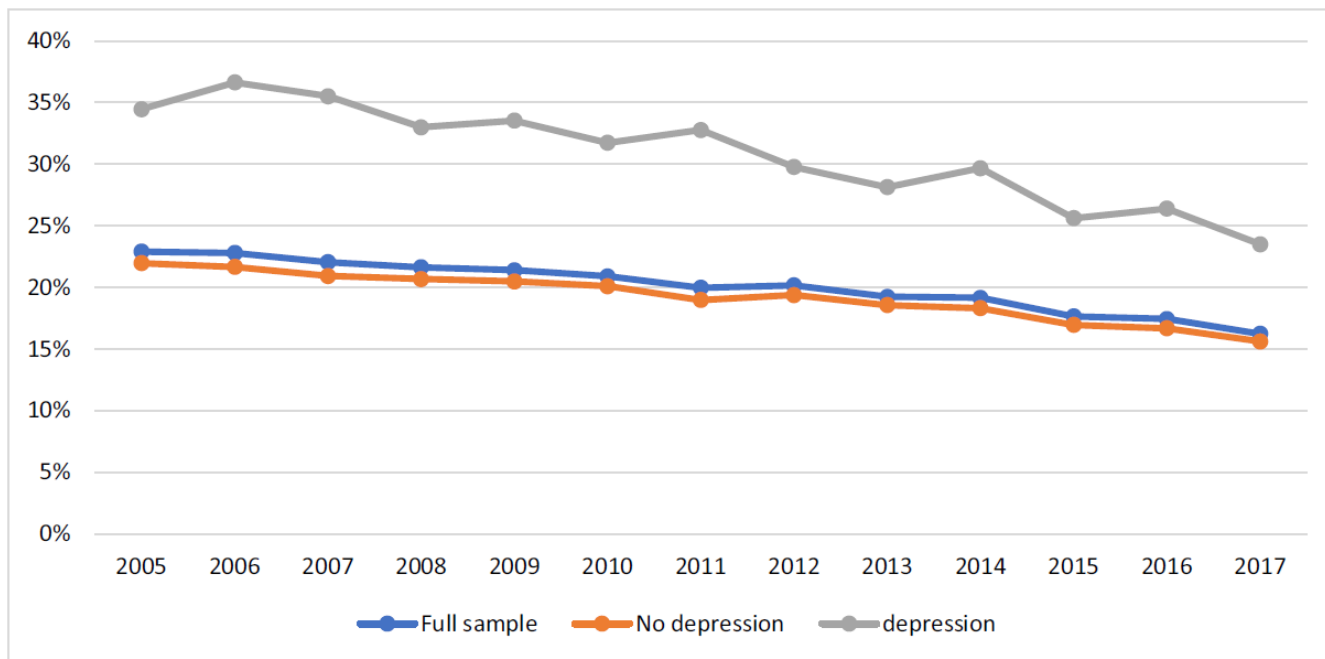
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# Quitting among people with mental illness

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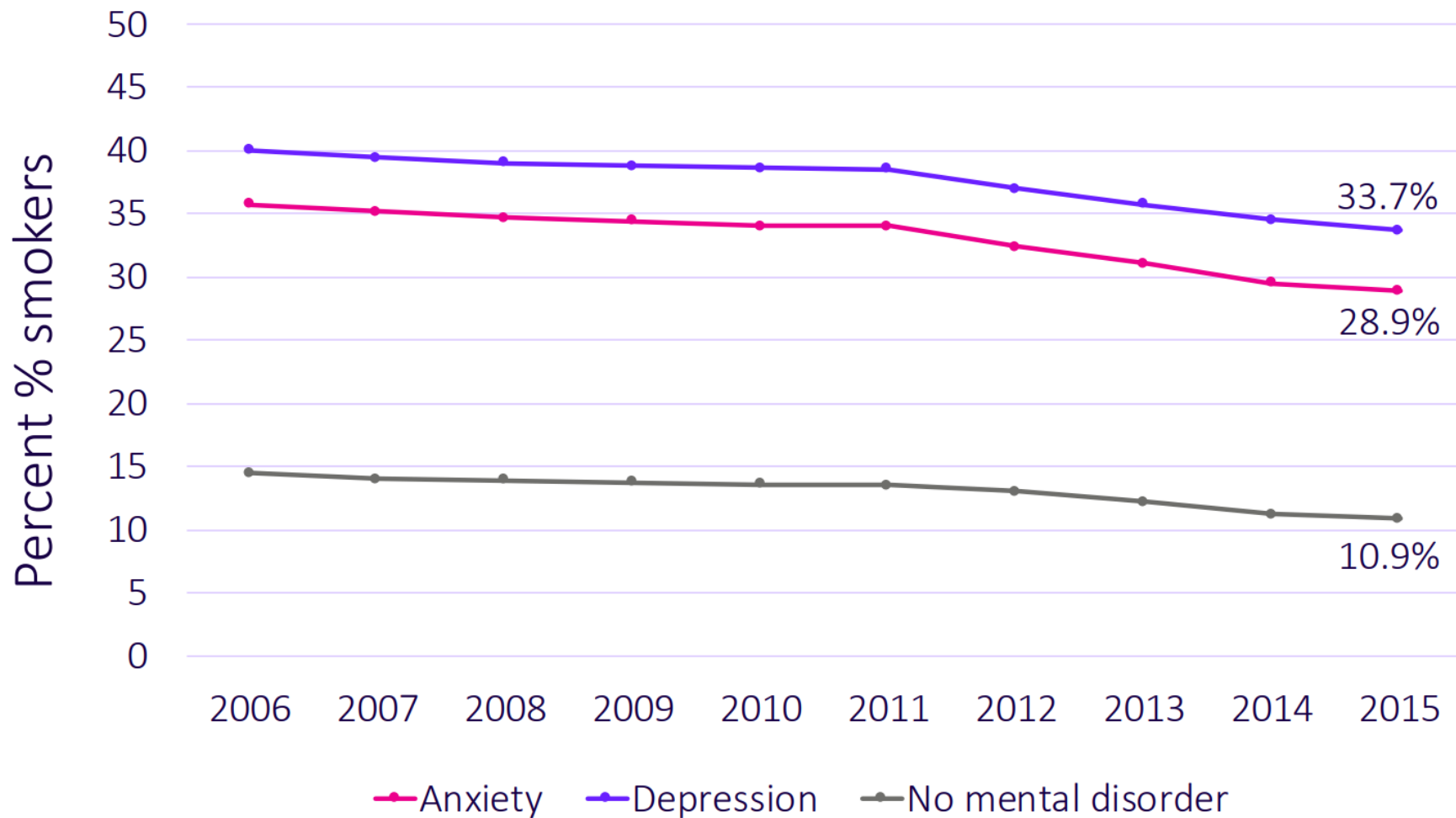
# Can people with mental illness quit smoking?

- Smokers with a history of MDD are 2–3 times more likely to have failed quit attempts compared with non-depressed smokers
- Prevalence of smoking and nicotine dependence declining more rapidly among those with MDD



**Figure 1.** Current cigarette smoking among the full sample and among those with and without past-year depression (National Survey on Drug Use and Health, respondents aged  $\geq 12$  years, 2005–2017).

# UK SMOKING PREVALENCE IN PEOPLE WITH AND WITHOUT MENTAL DISORDERS, YEARS 2006 TO 2015



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# Assessment of Tobacco Dependence in Mentally Ill Smokers

- Onset of tobacco use in relation to onset of mental illness or substance abuse
  - Do smoking patterns change during periods of symptom remission versus exacerbation?
  - Do symptoms change during attempts at cessation?
  - Daily smoking? – Use of timeline follow-back methods
  - Level of dependence? – Fagerstrom Test for Nicotine Dependence (FTND; *Heatherton et al., 1991*)
-

# THANK YOU!

## Michael Chaiton, Ph.D.

Questions?: [mountainplains\\_pttc@utah.edu](mailto:mountainplains_pttc@utah.edu)



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