

Associations between use patterns for inhaled nicotine and cannabis products among adults who vape both substances

Danielle M. Smith^{1,2}, Andrew Hyland², Lynn Kozlowski¹, Richard J. O'Connor², Maciej L. Goniewicz², R. Lorraine Collins¹

¹ Department of Community Health and Health Behavior, State University of New York at Buffalo, Buffalo NY, 14214

² Department of Health Behavior, Roswell Park Comprehensive Cancer Center, Buffalo NY 14263



Introduction

Co-occurring use (co-use) of nicotine and cannabis is common, and represents a broad range of use behaviors, including *concurrent use*, *sequential use*, and *co-administration*. Co-use has primarily been examined through the lens of smoked tobacco and cannabis. Little is known about characteristics of those who co-use vaped nicotine and cannabis, and the degree to which specific co-use behaviors are associated, based on mode of use and/or substance.

Methods

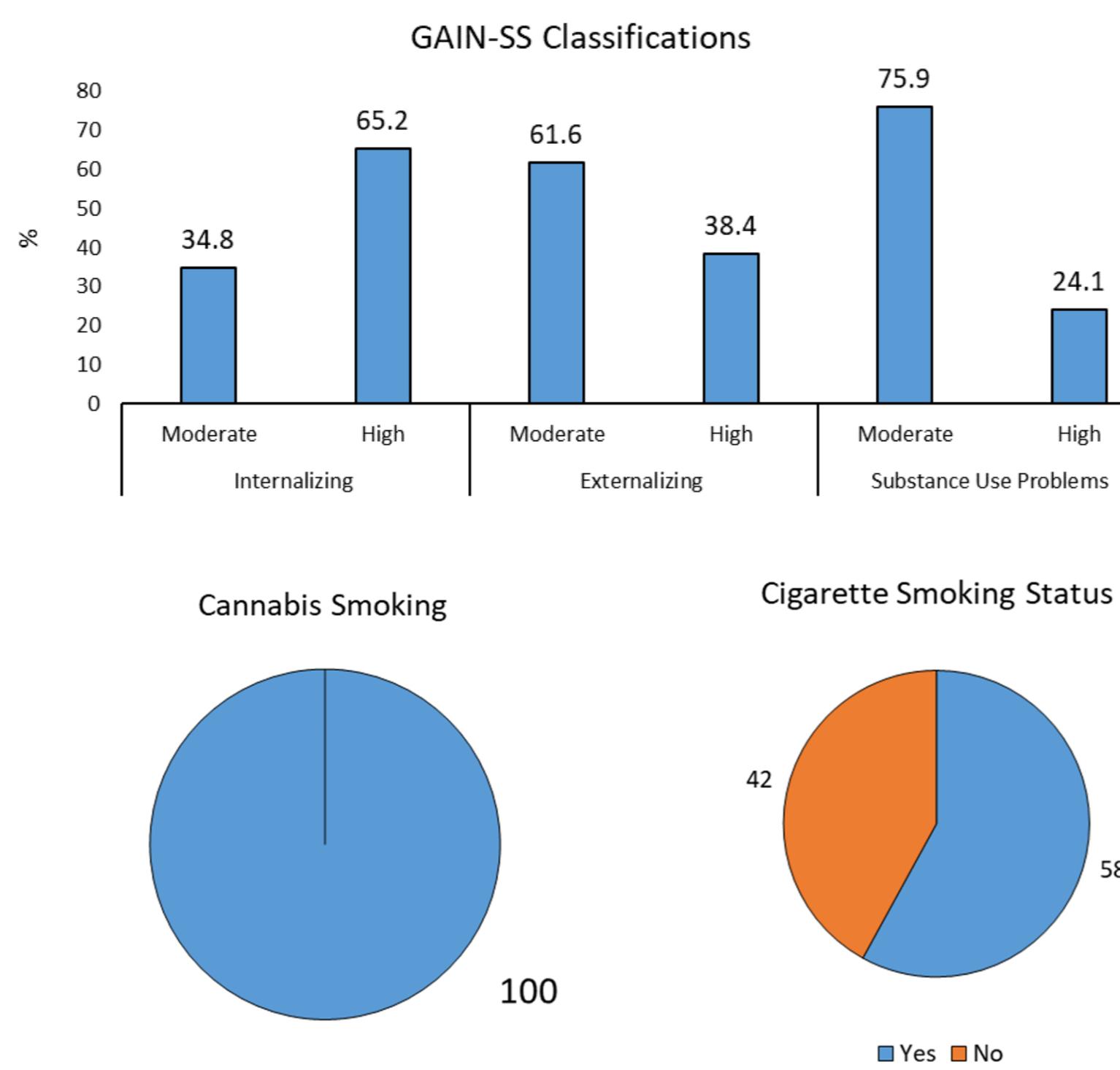
One hundred twelve concurrent users of vaped nicotine and cannabis were recruited from Amazon Mechanical Turk and responded to a survey on inhaled nicotine and cannabis use behaviors.

- Eligible participants were aged 18 or older, residents of the country of Canada or a U.S. state with medical or recreationally-legal cannabis, reported past 30-day use of vaped nicotine *and* vaped cannabis, and usually used their vaping products at least monthly.
- All participants responded to questions about nicotine and cannabis vaping behaviors, while participants who reported smoking cannabis or tobacco cigarettes answered additional questions about use of those products.
- The survey took 25-30 minutes to complete, and participants were paid a total of \$5.00 for their time.

Survey Measures & Data Analysis

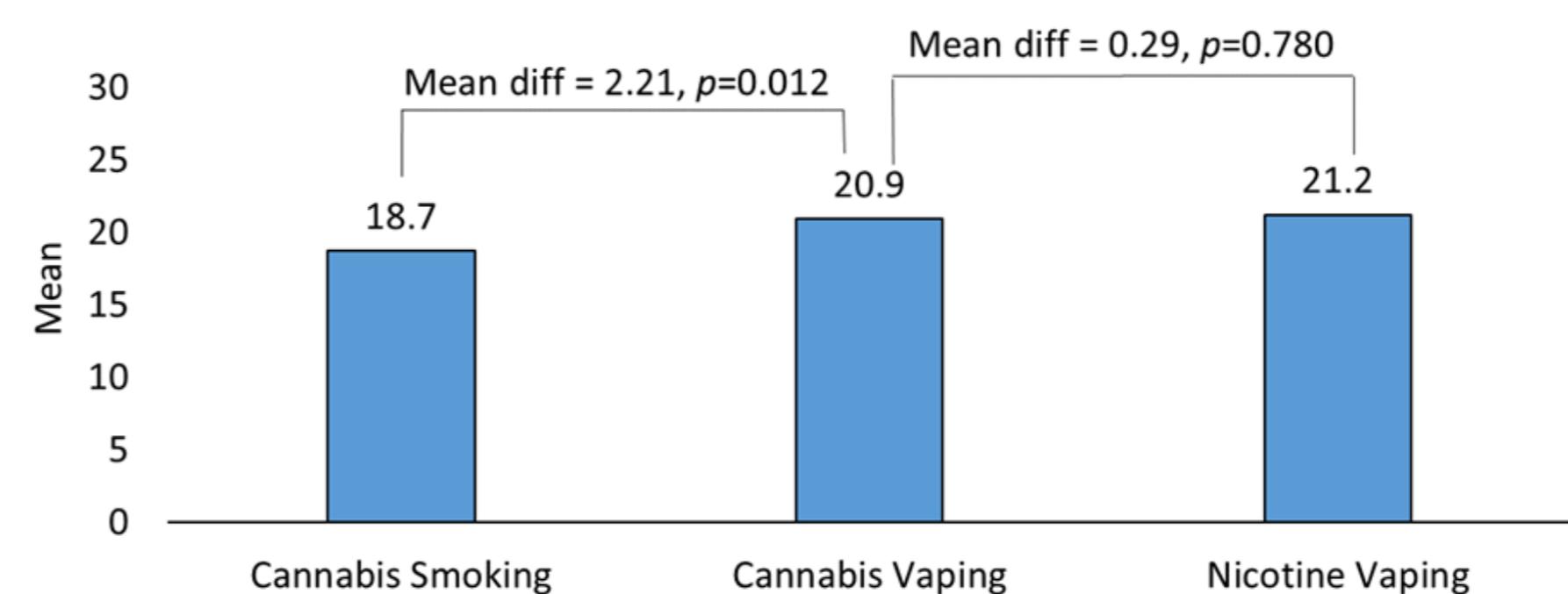
- Time Line Follow-Back measures were used to examine inhaled nicotine and cannabis product use frequency. Specific measures were included assessing sequential use and co-administration practices.
- Sociodemographic characteristics as well as internalizing, externalizing, and substance use problem behaviors using the GAIN-SS were measured.
- Univariate and bivariate statistics were used to examine sample characteristics and associations between inhaled products.
- Binary logistic regression was used to examine the association between days of inhaled product use and odds of sequential use and co-administration practices.

Results

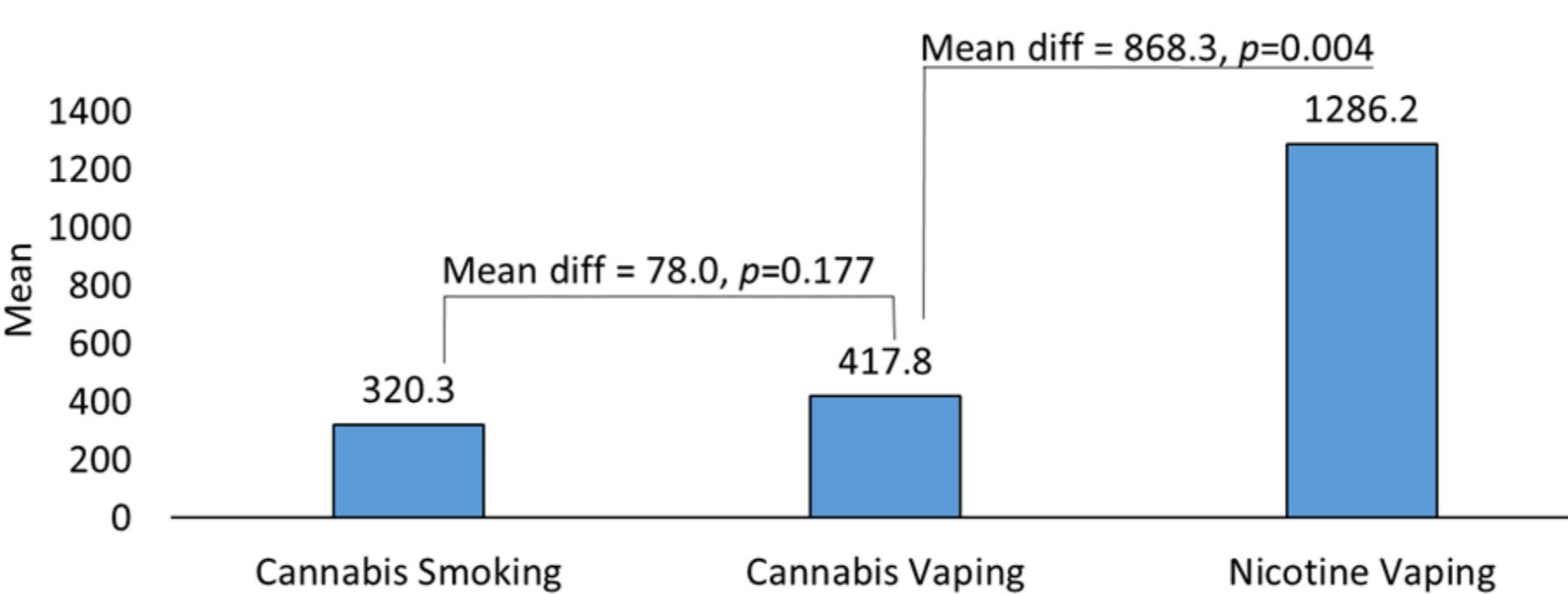


Results

Average Days of Use Per Month



Average Quantity-Frequency Per Month



Adjusted odds of engaging in sequential use practices (n=112)

	No vs. any chasing	Chasing cannabis smoking with cigarette smoking	Chasing cannabis vaping with nicotine vaping	Chasing cannabis smoking with nicotine vaping	Chasing cannabis vaping with cigarette smoking
Cigarette smoking days/month	0.99	1.13***	0.96	1.00	1.10***
Cannabis vaping days/month	1.04	1.04	1.03	0.97	1.06
Cannabis smoking days/month	0.92	0.99	0.95	0.99	0.95
Nicotine vaping days/month	0.96	0.99	1.08**	1.11***	1.02

Adjusted for age, sex, and GAIN-SS subscales. Confidence intervals suppressed for clarity. Bold & red values are statistically significant at $p<0.05$.

	No vs. any co-admin	Mix nicotine & cannabis oil in an e-cigarette	Mix tobacco & cannabis in dry herb vaporizer	Mix tobacco and cannabis in a joint, bong, bowl, or blunt	Smoke cigarettes dipped in hash oil
Cigarette smoking days/month	0.99	1.05*	1.04	0.97	1.01
Cannabis vaping days/month	0.95	1.01	1.05	0.98	0.99
Cannabis smoking days/month	1.05	1.04	1.06	1.08**	1.07*
Nicotine vaping days/month	1.02	0.98	1.00	1.03	1.03

Adjusted for age, sex, and GAIN-SS subscales. Confidence intervals suppressed for clarity. Bold & red values are statistically significant at $p<0.05$.

Conclusion

- Those who regularly vape nicotine and cannabis tend to exhibit moderate-to-high mental health and substance use problems, and regularly engage in some form of smoking
- Different co-use practices showed different associations with patterns of use and modes of drug delivery

Concurrent = monthly patterns of use more closely related by substance
Sequential = more frequent sequential use = more frequent overall nicotine use per month
Co-administration = mostly associated with level of smoking

Acknowledgements

Funding for this project was provided by The Mark Diamond Research Fund of the Graduate Student Association at the University at Buffalo, the State University of New York (Grant No. SU-19-16).

Disclosures

Maciej L. Goniewicz has served on an advisory board to Johnson & Johnson, and has received funding from Pfizer, a manufacturer of smoking cessation medications. The other authors have no conflicts to declare.