

US CANNABIS LEGALIZATION 2015–2022: IMPLICATIONS FOR USE AND AVAILABILITY AMONG ADOLESCENTS

The American Society of Criminology | Fall 2024

- Christian P Maynard
 - Doctoral Candidate
 - Department of Sociology
 - Washington State University

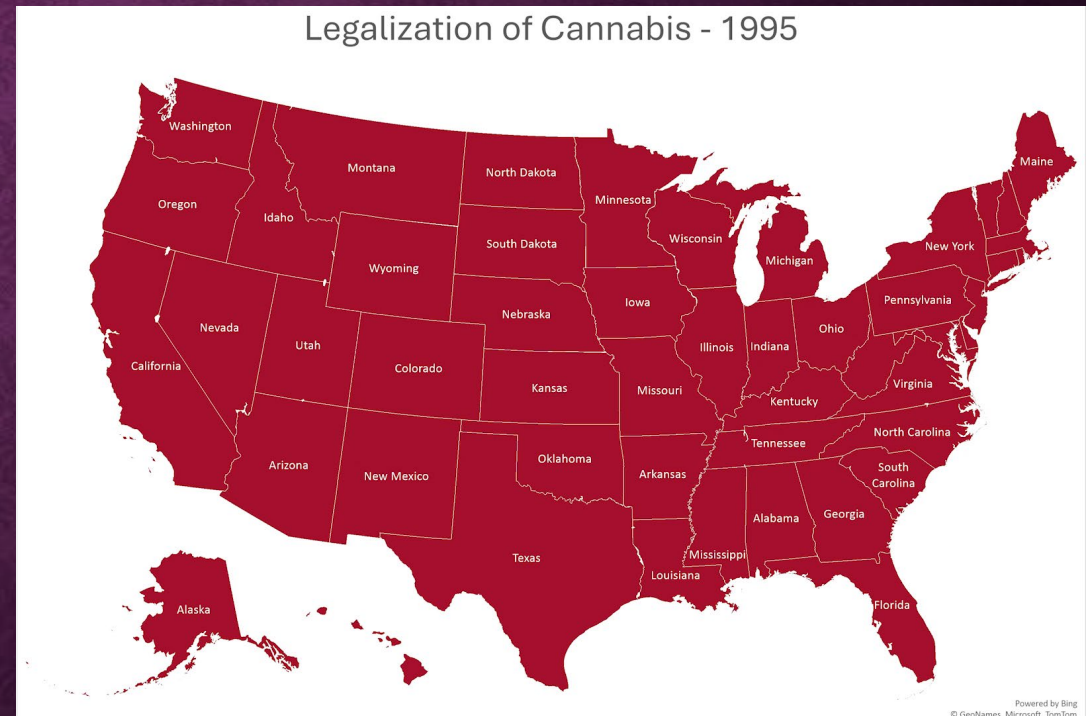


Cannabis strain – LSD – growing in Illinois

INTRODUCTION [1/3]

Legal Contexts

- **Medical-only** [14]
 - **Medical patients** can possess cannabis
- **Adult use** [24]
 - Adults (**21+**) can possess cannabis



INTRODUCTION [2/3]

Cannabis Techniques

- Edibles
- Smoking
- Vaping
- Combination of two+

US National Trends for Cannabis Consumption by Technique among 12th Grade Students, 2015-2021

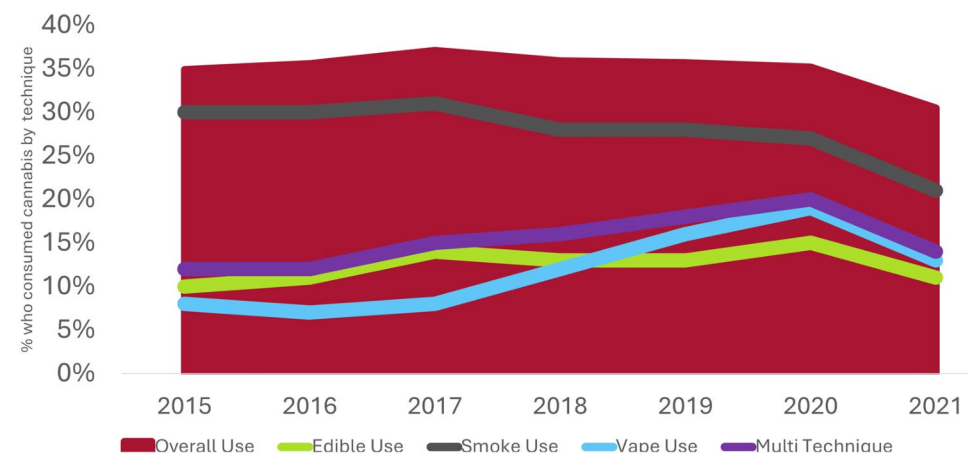
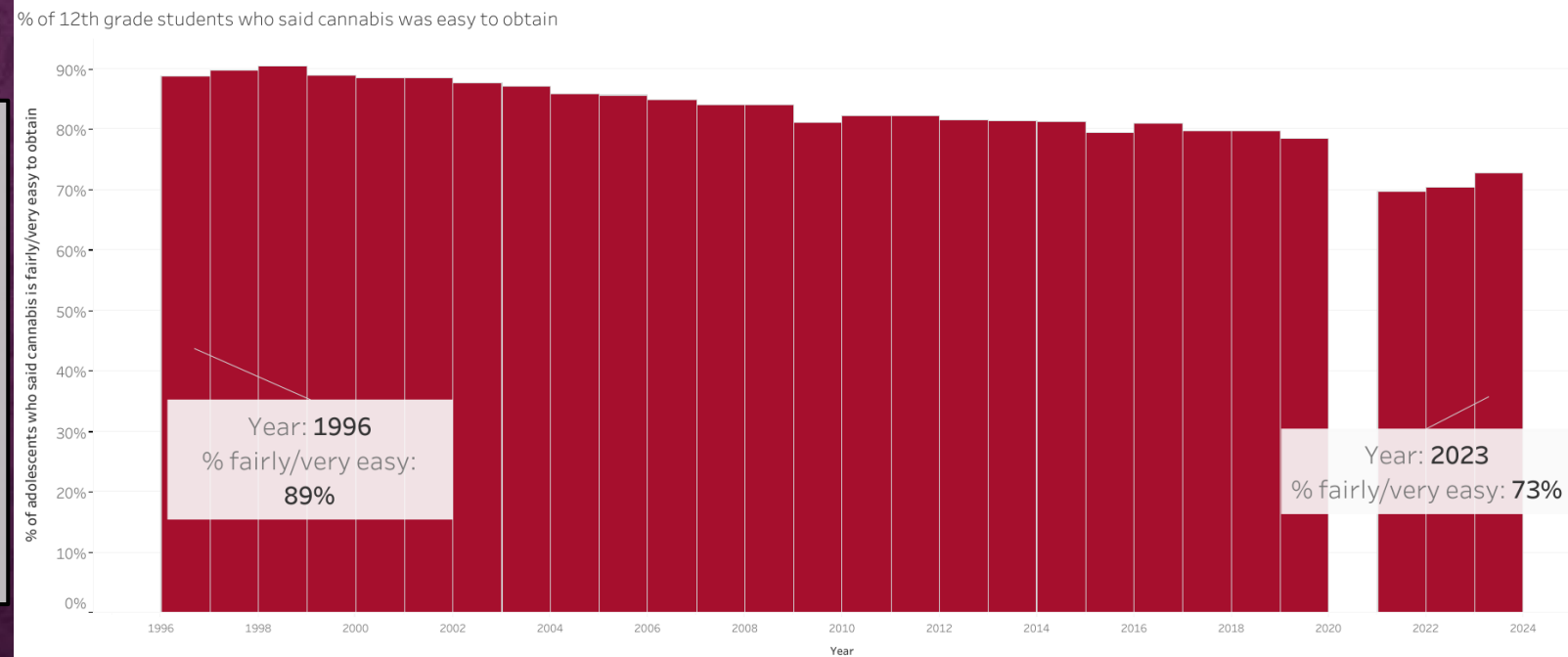


Figure based on data from *Monitoring the Future*

INTRODUCTION [3/3]

Legalization and Availability

- Compared to their earlier counterparts, adolescents reported cannabis as **less available**¹
- Legalized states may **induce difficulties** for adolescents to obtain cannabis²



Miech, R. A., Johnston, L. D., Patrick, M. E., O'Malley, P. M. (2024). [Monitoring the Future national survey results on drug use, 1975-2023: Overview and detailed results for secondary school students \(PDF\)](#). Monitoring the Future Monograph Series. Ann Arbor, MI: Institute for Social Research, University of Michigan.

¹ Sales-Wright et al. (2017); Miech et al. (2024)

² Adinoff (2021); Kerr et al. (2023); Cantor et al. (2024)

LITERATURE REVIEW [1/2]

Medical Legalization and Adolescent Use

- **Little to no change** in the prevalence of cannabis use ³
- **Decreased** prevalence of use for **younger**, rather than older, adolescents (e.g., 8th versus 12th graders) ⁴

Adult Use Legalization and Adolescent Use

- **No difference** in prevalence of use ⁵
- **Decrease** in prevalence of use ⁶
 - **But see** ⁷

³ Coley et al. 2019; Johnson et al. 2021; Keyes et al. 2016; Sarvet, Wall, Fink, et al. 2018

⁴ Johnson et al. 2021; Keyes et al. 2016

⁵ Cerdá et al. 2017; Goodman et al. 2020; Midgette and Reuter 2020; Smart and Pacula 2019

⁶ Anderson et al. 2019; Dilley et al. 2019; Midgette and Reuter 2020

⁷ Borodovsky et al. 2017; Cerdá et al. 2017

LITERATURE REVIEW [2/2]

Legal Contexts and Consumption Techniques

- Legal contexts were associated with an **increase** in the prevalence of **edible** and **vape use**.
 - in one's lifetime ⁸
 - in the past year ⁹

⁸ Borodovsky et al. 2017; Nicksic et al. 2020

⁹ Maynard and Schwartz 2023

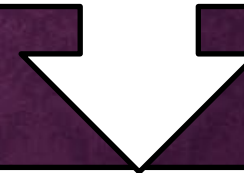


Cannabis-Infused Turkey Gravy, containing a single 'dose' of THC; Just in time for Thanksgiving



Research Question:

What is the relationship between legal contexts and cannabis use, by technique, among adolescents?



State-years with legalized cannabis contexts are expected to have a larger proportion of adolescents who

H1: used **edibles**

H2: **vaped**
cannabis

H3: used **two+**
techniques

H4: said it was
very easy to
acquire cannabis

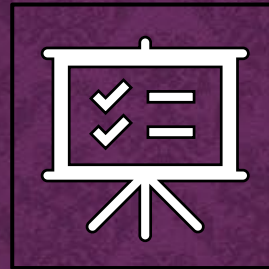
METHODOLOGY [1/2]



Data

Monitoring the Future (MTF): A Continuing Study of American Youth

- **Nationally representative** survey on youth
- Sampling and strata weights



Survey Structure

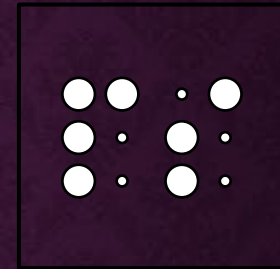
Core

- Questions included were asked of all adolescents

Forms One, Two, and Six

One of six possible forms **appended** to the core questionnaire

- Each form contains a subset of additional questions
- Randomly distributed



Current Study

Examined responses from restricted use version between years **2015-2022**

Population: **US 12th graders** (90,458)

Sample: **267 state-years**, based on aggregated responses grouped by state and year

METHODOLOGY [2/2]

Dependent Variables

- **Consumption Techniques**

- % Consumed edible
- % Smoked
- % Vape
- % Multiple (2+)

(in the past-year)

Independent Variables

- **Legal Context**

- Prohibited, Medical-only, Adult use

- **Availability**

- % of respondents that said cannabis was very easy acquire

Control Variables

- **Demographics**

- % Male
- **Race/Ethnicity:**
 - % Black
 - % Latine
 - % White

- **Sales Operational**

- Medical*
- Adult use (state)*
- % in county with adult use sales (local)

- **First-year of legalization***

- Medical
- Adult use
- **Years since legalization**
 - Medical
 - Adult use

* indicate dichotomized (0,1)

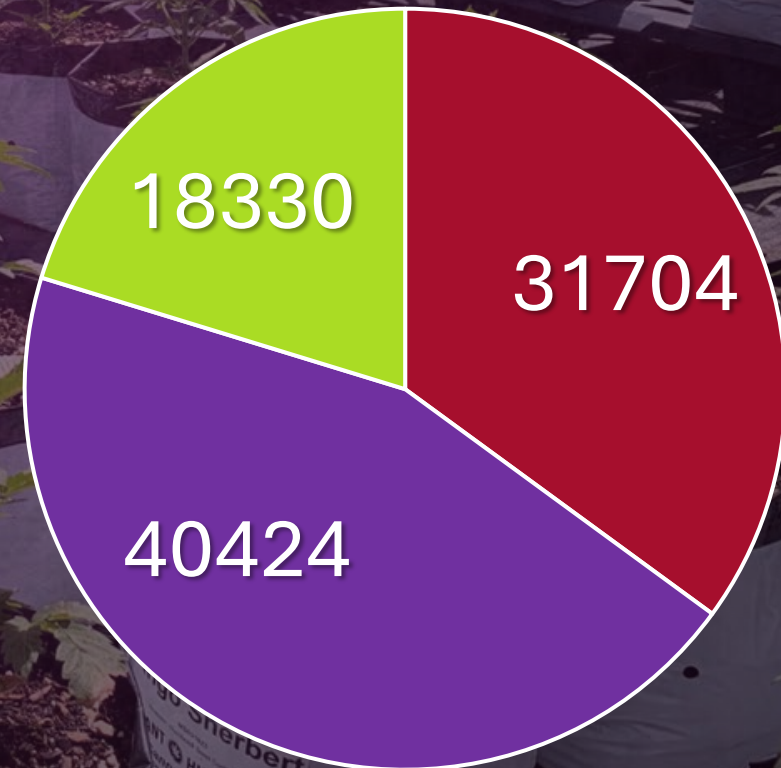
DATA ANALYSIS

Descriptive statistics

- **Frequencies and crosstabulations, employing z-tests to identify significant differences across legal contexts in adolescents' reported availability.**

Count of 12th grade students by Legal Status (state-years)

■ Prohibited (102) ■ Medical-only (116) ■ Adult Use (49)





DATA ANALYSIS

Variables Included by Model

* = included M1 M2 M3

	M1	M2	M3
Legal Context (ref. Prohibited)			
Medical	*	*	*
Adult use			
Years Since Legalization	*	*	*
First-year Legalization Indicators	*	*	*
% with [M/Au/L] Sales Operational:		*	*
% said Very Easy			*
% Male	*	*	*
%Black [^]	*	*	*
%Latine [^]	*	*	*
%White [^]	*	*	*
n	267	267	267

[^] not shown in results; lack of statistical significance

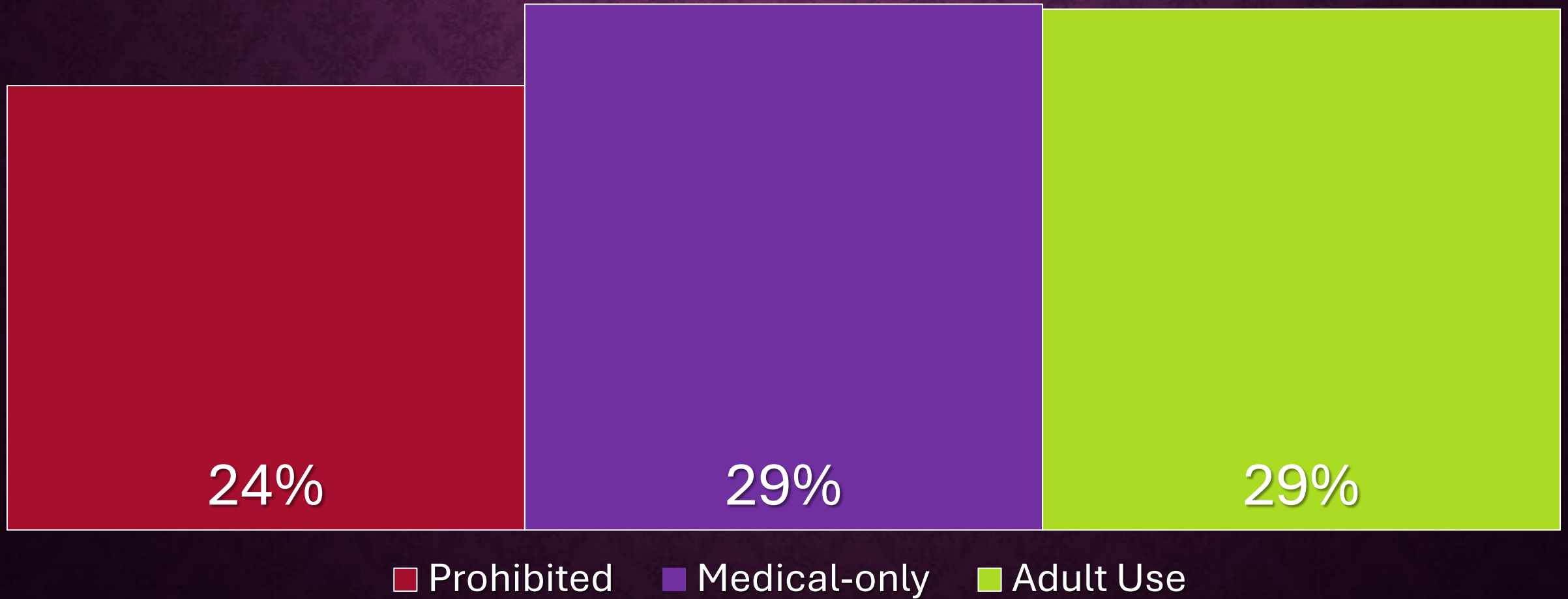
Multivariate linear regressions

- **Understand the association between legalization and consumption techniques**, while **accounting for potential confounding factors**.
- **Justified** by its ability to **model outcomes** and **control** for covariates simultaneously.



REFERENCE:

CANNABIS SMOKING BY LEGAL CONTEXT



REFERENCE:

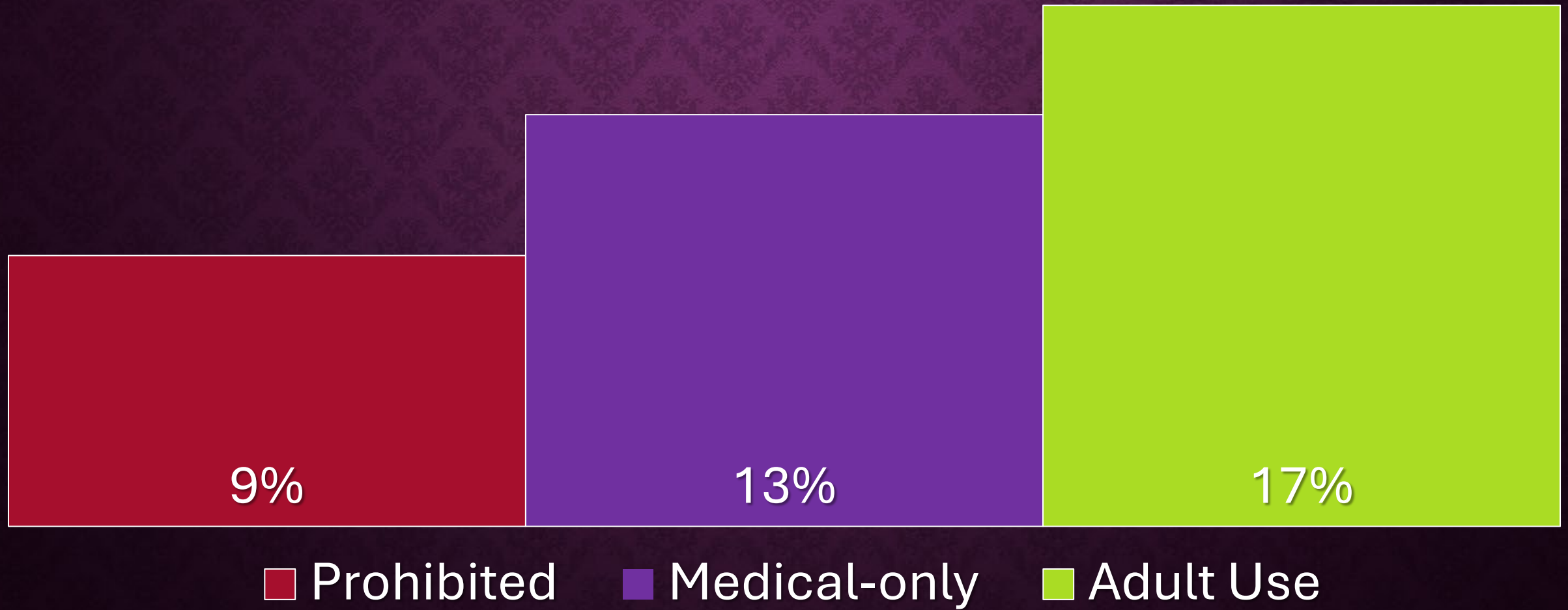
LEGAL CONTEXT NOT ASSOCIATED WITH SMOKE USE





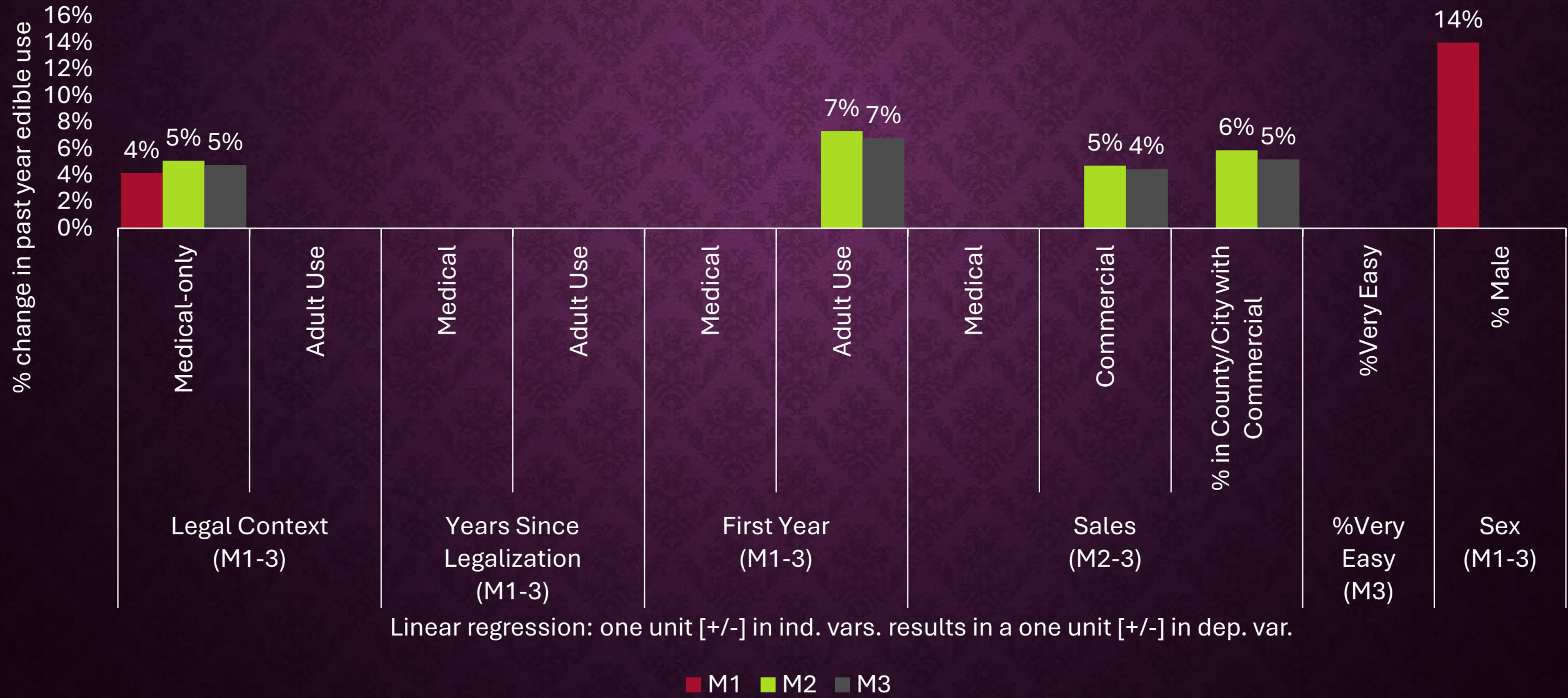
RESULTS | HYPOTHESIS 1

EDIBLE USE BY LEGAL CONTEXT



RESULTS | HYPOTHESIS 1

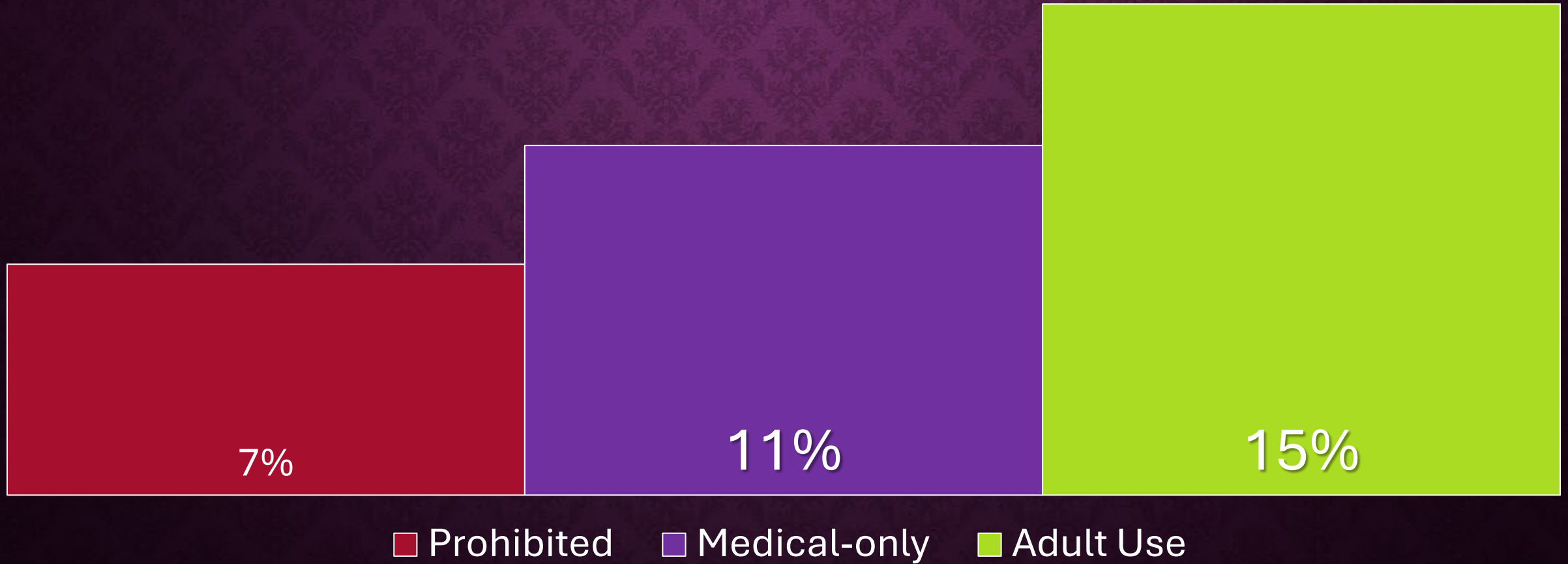
COMPARED TO PROHIBITED STATES, IN MEDICAL STATES, ADOLESCENTS WERE MORE LIKELY TO HAVE USED EDIBLES IN THE PREVIOUS YEAR





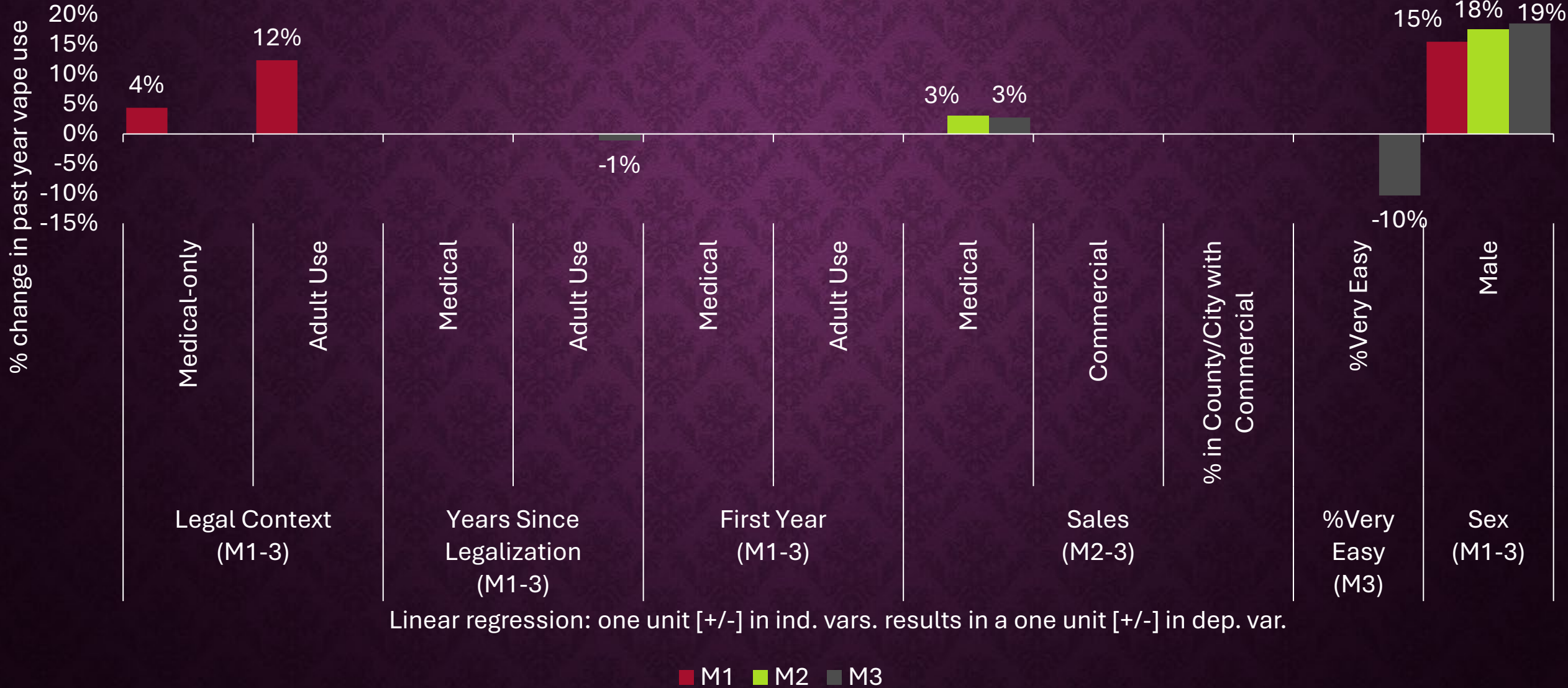
RESULTS | HYPOTHESIS 2

VAPED CANNABIS BY LEGAL CONTEXT



RESULTS | HYPOTHESIS 2

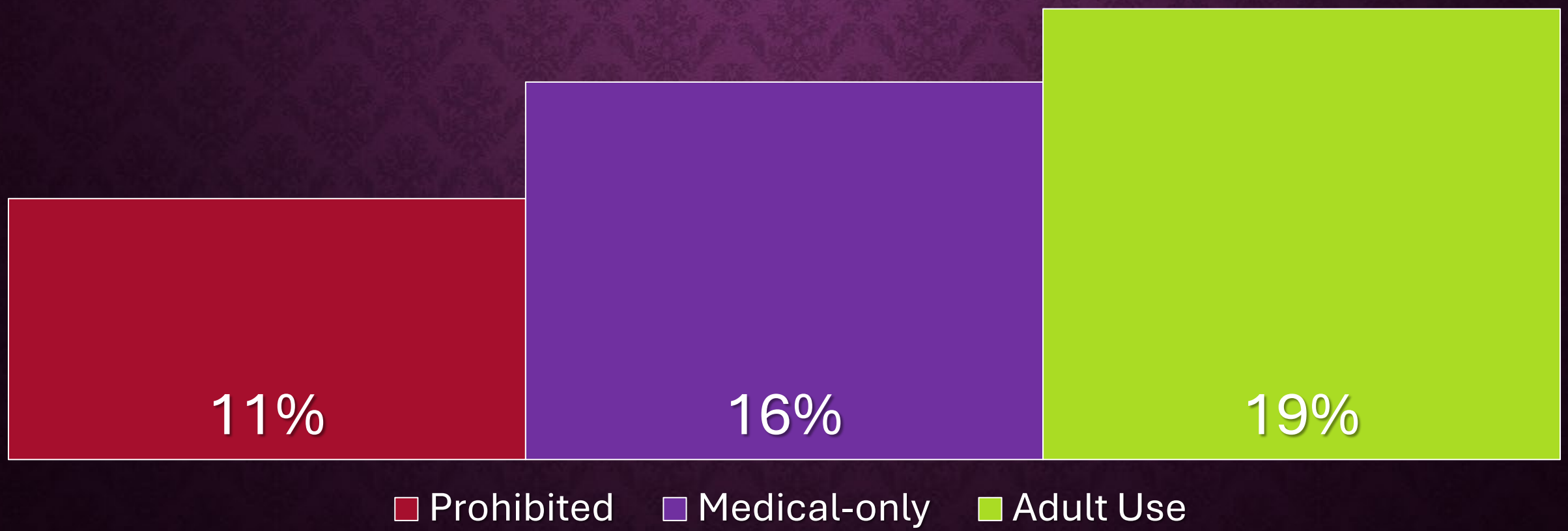
LEGAL CONTEXTS NOT ASSOCIATED WITH VAPING CANNABIS IN THE PREVIOUS YEAR





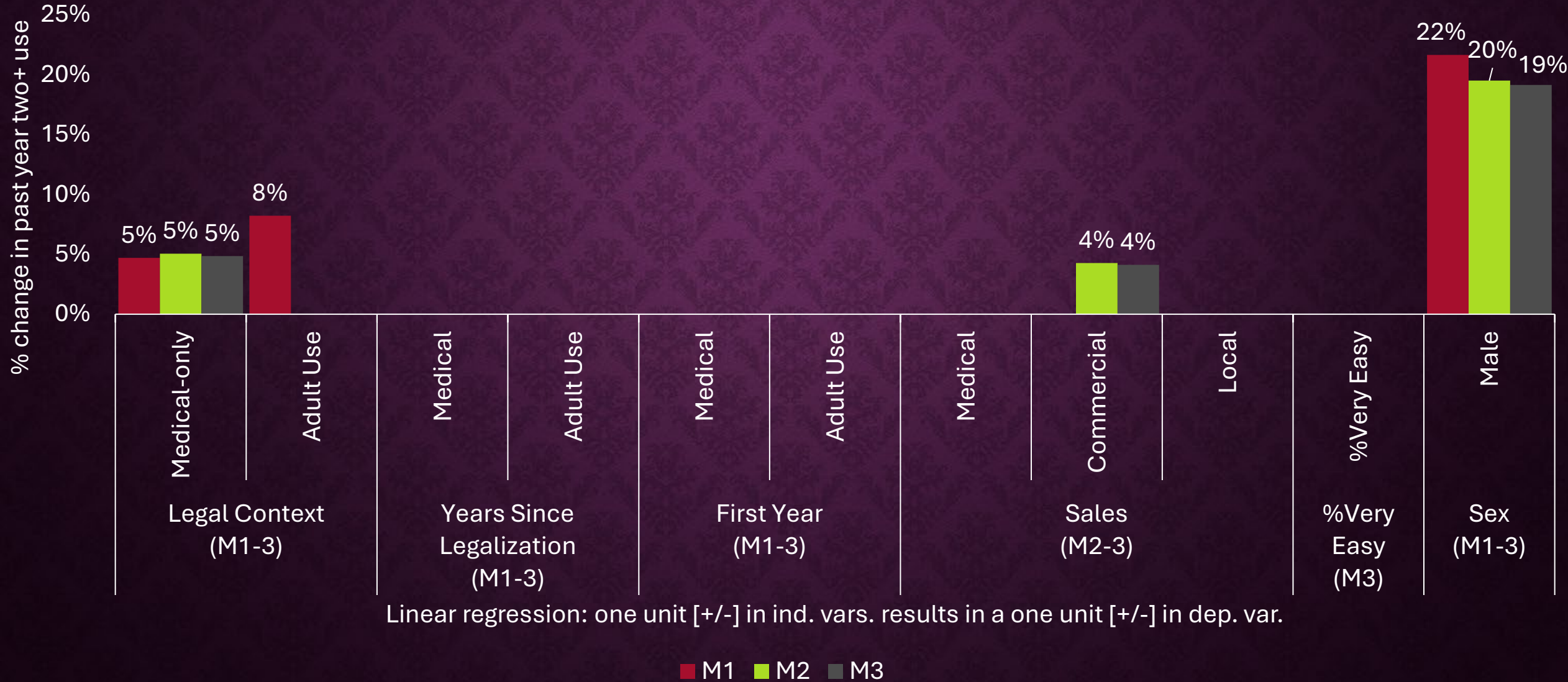
RESULTS | HYPOTHESIS 3

USED TWO+ TECHNIQUES BY LEGAL CONTEXT



RESULTS | HYPOTHESIS 3

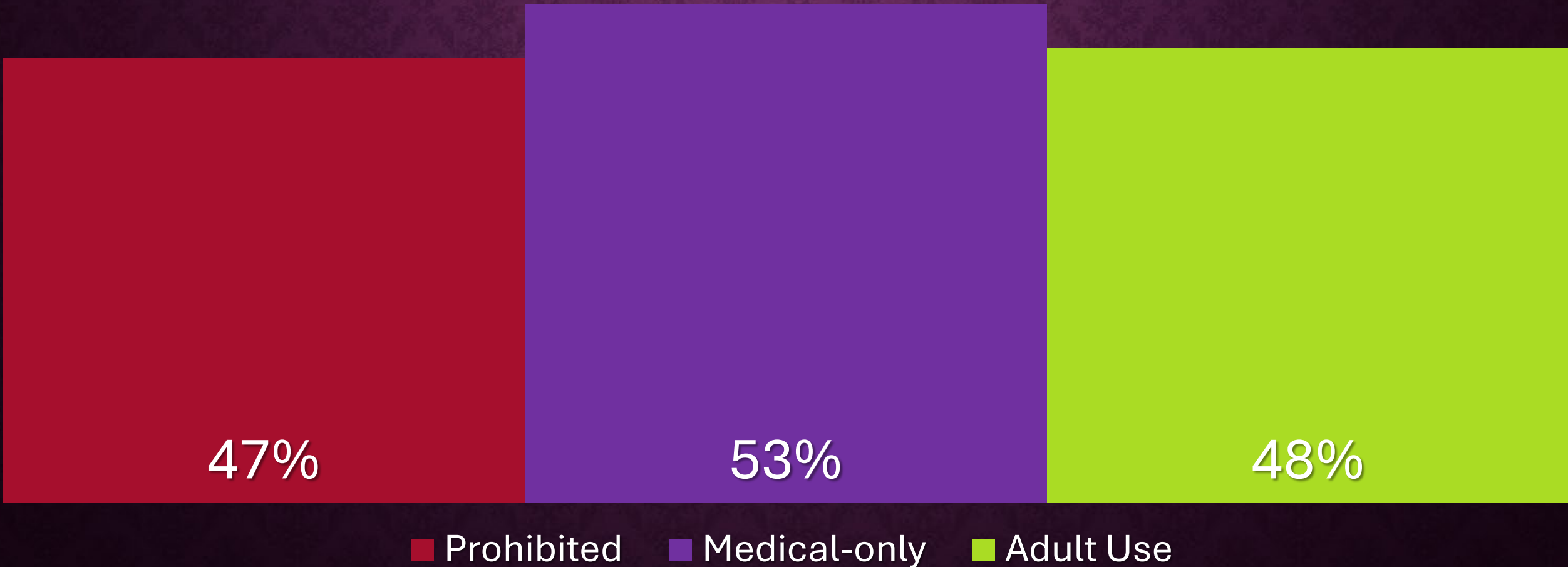
COMPARED TO PROHIBITED STATES, IN MEDICAL STATES, MORE ADOLESCENTS USED TWO+ TECHNIQUES





RESULTS | HYPOTHESIS 4

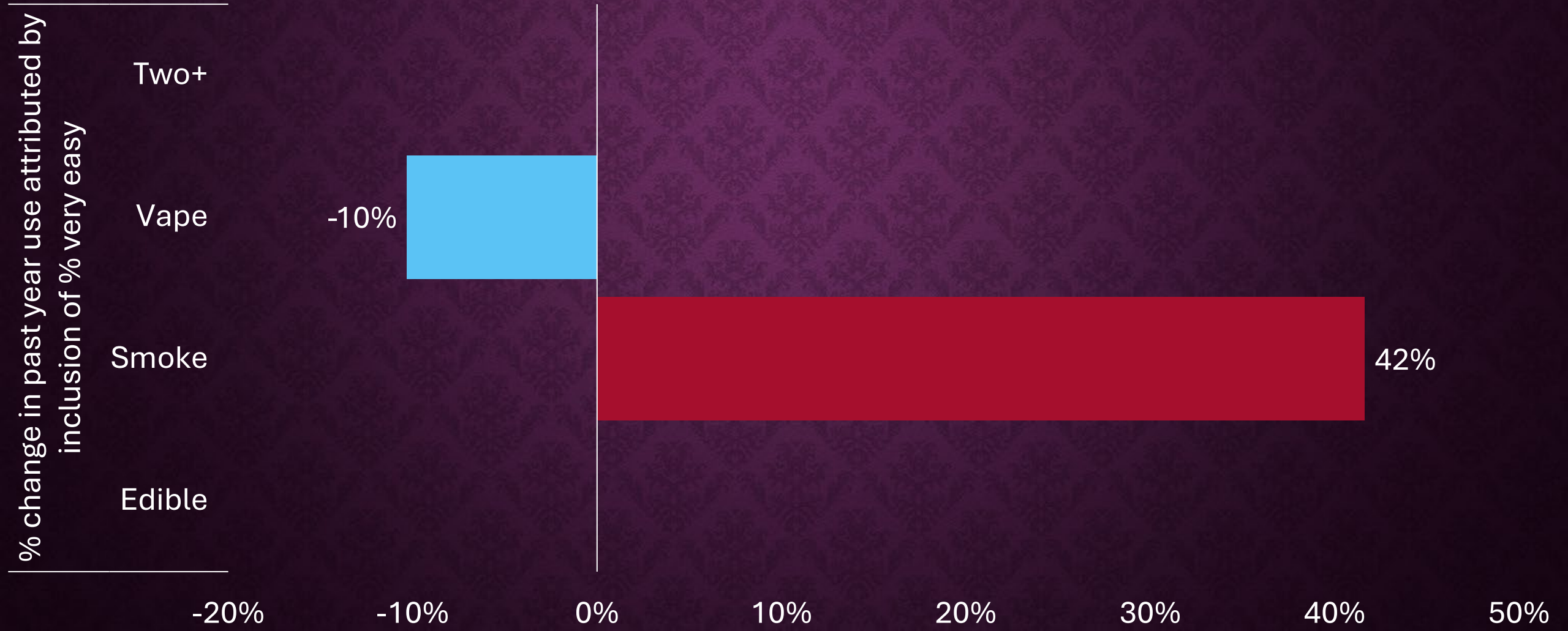
COMPARED TO PROHIBITED AND ADULT USE STATES, IN MEDICAL-ONLY STATES, ADOLESCENTS WERE MORE LIKELY TO REPORT THAT CANNABIS WAS VERY EASY TO GET





RESULTS | HYPOTHESIS 4

THE INCLUSION OF %VERY EASY WAS ASSOCIATED WITH LOWER VAPE USE, BUT HIGHER SMOKE USE



Linear regression: one unit [+/-] in ind. vars. results in a one unit [+/-] in dep. var.

DISCUSSION AND CONCLUSION [1/2]

Legal Contexts

- In the previous year, compared to 12th grade students in prohibited contexts,
 - In **medical** states, students were more likely to have:
 - Used **edibles**¹⁰
 - Used **two+** techniques¹¹
 - In **adult use** states, students were no more likely to use cannabis (via any technique)

Sales¹²

- Medical sales associated with higher **vape** use
- Adult use sales associated with higher **edible** and **two+** use
- Local sales associated with higher **edible** and **smoke** use

First Year Legalization

- Initial year of **adult use** legalization associated with higher **edible** use

Availability

- Legal states diverged starkly from, both, one another, and prohibited states.
 - **Medical states** associated with more adolescents reporting **very easy**¹³
 - % **very easy** associated with **decreased vape use**, but **increased smoke use**

¹⁰ Borodovsky et al. 2017; Nicksic et al. 2020

¹¹ Maynard and Schwartz 2023; Rubin-Kahana et al. 2022

¹² Albers et al. 2024; Cantor et al. 2024; Kerr et al. 2023; Paschall and Grube 2021; Rogers et al. 2022; Shi et al. 2018

¹³ Elliott and Adinoff 2021



DISCUSSION AND CONCLUSION [2/2]

Limitations

- **Generalizability:** US 12th graders in the US from 2015-2022
- Cross-sectional **survey design:** Causal inferences cannot be made
- Question on **availability** does not distinguish procurement by **technique**

Future Research

- **Extend timeframe;** add recently received 2023 data
- **Examine** differences in **other provisions** of the fragmented landscape:
 - Cultivation Allowances, Possession Limits, Price of cannabis, # of dispensaries per capita
- **Additional statistical tests**
 - Fixed-effects models

THANK YOU FOR YOUR TIME!

Scan QR Code for:

- Paper
 - Abstract
 - References
 - Figures / Charts
- Contact Information
 - LinkedIn
 - Email (christian.maynard@wsu.edu)
 - Website

