

The Promises and Perils of the Gateway Hypothesis in Today's Drug Landscapes

Matt Vogel, Ph.D.

Department of Criminology and Criminal Justice

University of Missouri – St. Louis

OTB – Research for the Built Environment

TU Delft, the Netherlands

Agenda

- What is the gateway hypothesis?
- Taking stock of the empirical evidence
- Addressing “methodological uncertainty”

Background

- **Gateway Hypothesis:** Marijuana use increases the risk for subsequent substance use problems
- Sequential / escalating process – marijuana users will eventually progress onto ***harder drugs*** and display ***greater substance use problems*** in later life
- Mechanisms:
 - Dependency (chasing the dragon)
 - Priming (cross-sensitization)
 - Socialization (normalizing substance use)

Background

- **Brief History:**
 - Origins in post-prohibition America (1930s)
 - Empirical basis in research dating to the 1970s
 - Popularized in anti-drug campaigns in the 1980s and early 1990s
 - Re-emergence in past ~18 months
 - Marijuana as precursor to opioid addiction
 - Marijuana as an early intervention point

Today's Drug Landscape

- *There is ample evidence that early initiation of drug use primes the brain for enhanced later responses to other drugs. These facts underscore the need for effective prevention to reduce adolescent use of alcohol, tobacco and marijuana in order to turn back the heroin and opioid epidemic and to reduce burdens of addiction in this country.*

– Robert DuPont, 2016

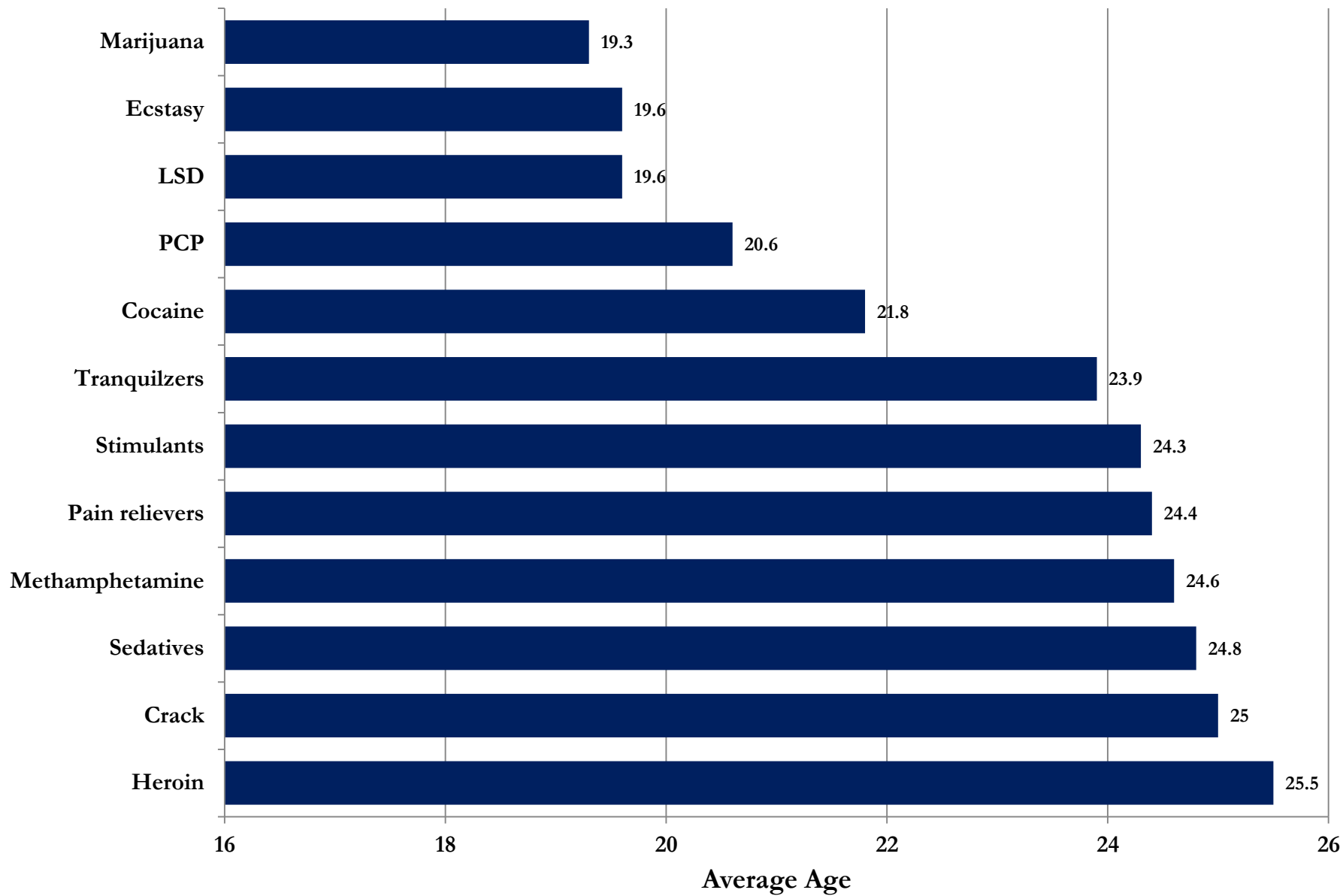
Today's Drug Landscape

- *When you talk to police chiefs, consistently they say much of the addiction starts with marijuana ... It's not a harmless drug.*
— Jeff Sessions, 10/2017
- *The DEA said that a huge percentage of the heroin addiction starts with prescriptions. That may be an exaggerated number; they had it as high as 80 percent... We think a lot of this is starting with marijuana and other drugs*
— Jeff Sessions, 2/2018

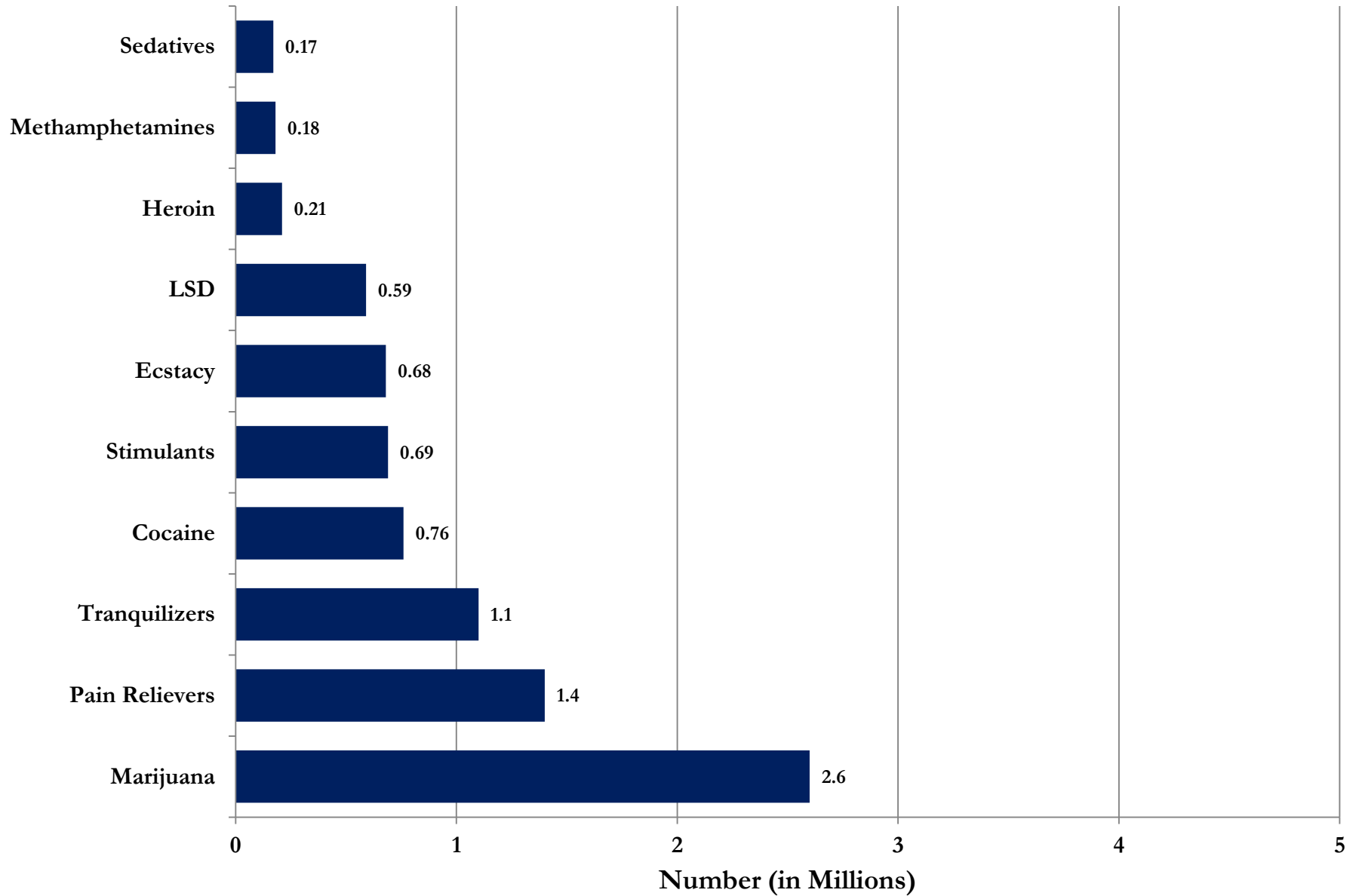
Decades of Evidence

- What does the empirical literature suggest?
 - Most substance users begin with marijuana
 - 2/3 of persons arrested in the United States test positive for marijuana
 - Early marijuana initiation increases risk for subsequent substance use problems

Average Age at Initiation, National Survey on Drug Use Health (2016)

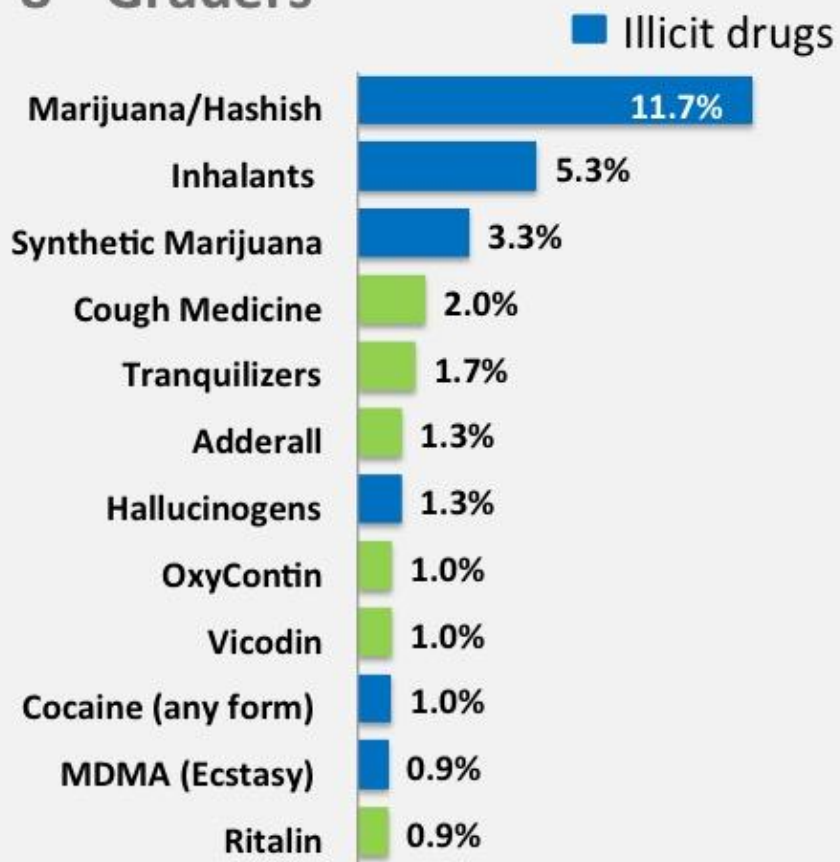


Past Year Initiates, National Survey on Drug use and Health (2016)

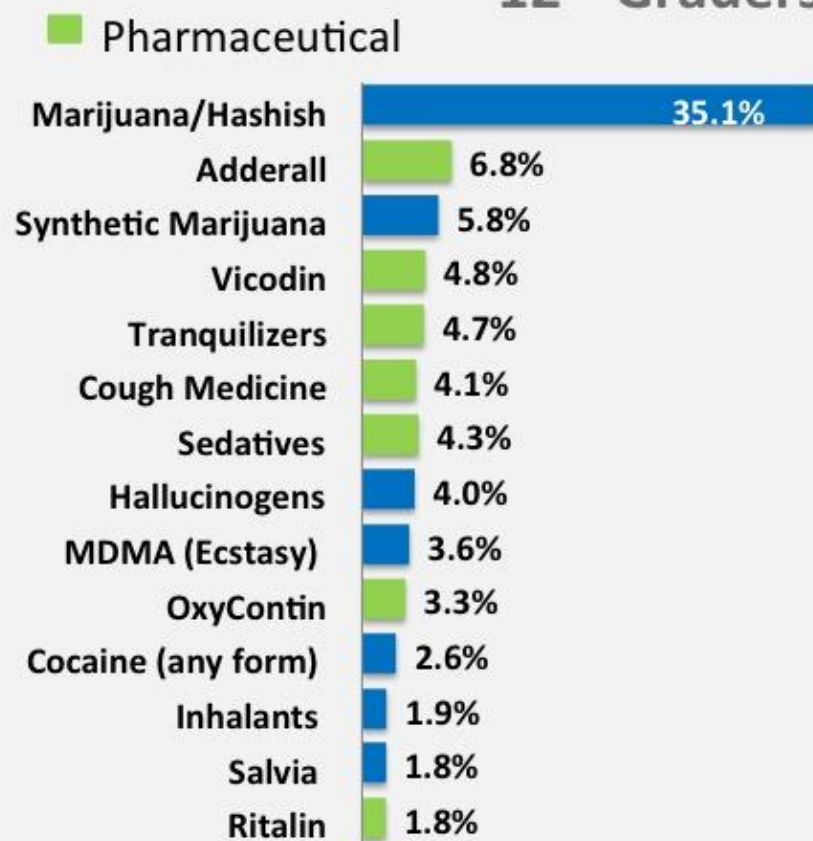


Top Drugs among 8th and 12th Graders, Past Year Use

8th Graders



12th Graders



* Only 12th graders surveyed about sedatives use

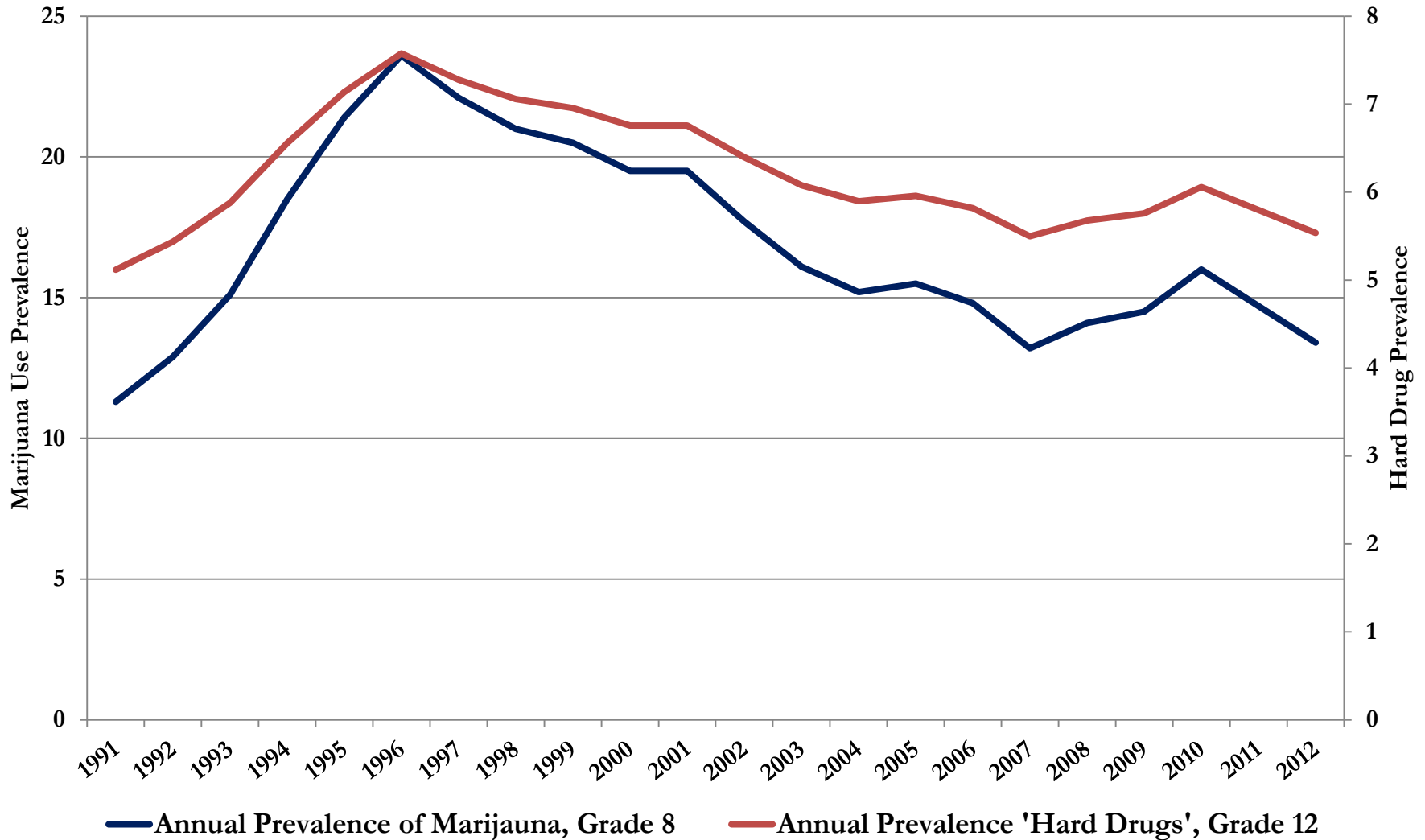
Source: University of Michigan, 2014 Monitoring the Future Study

Counterpoints

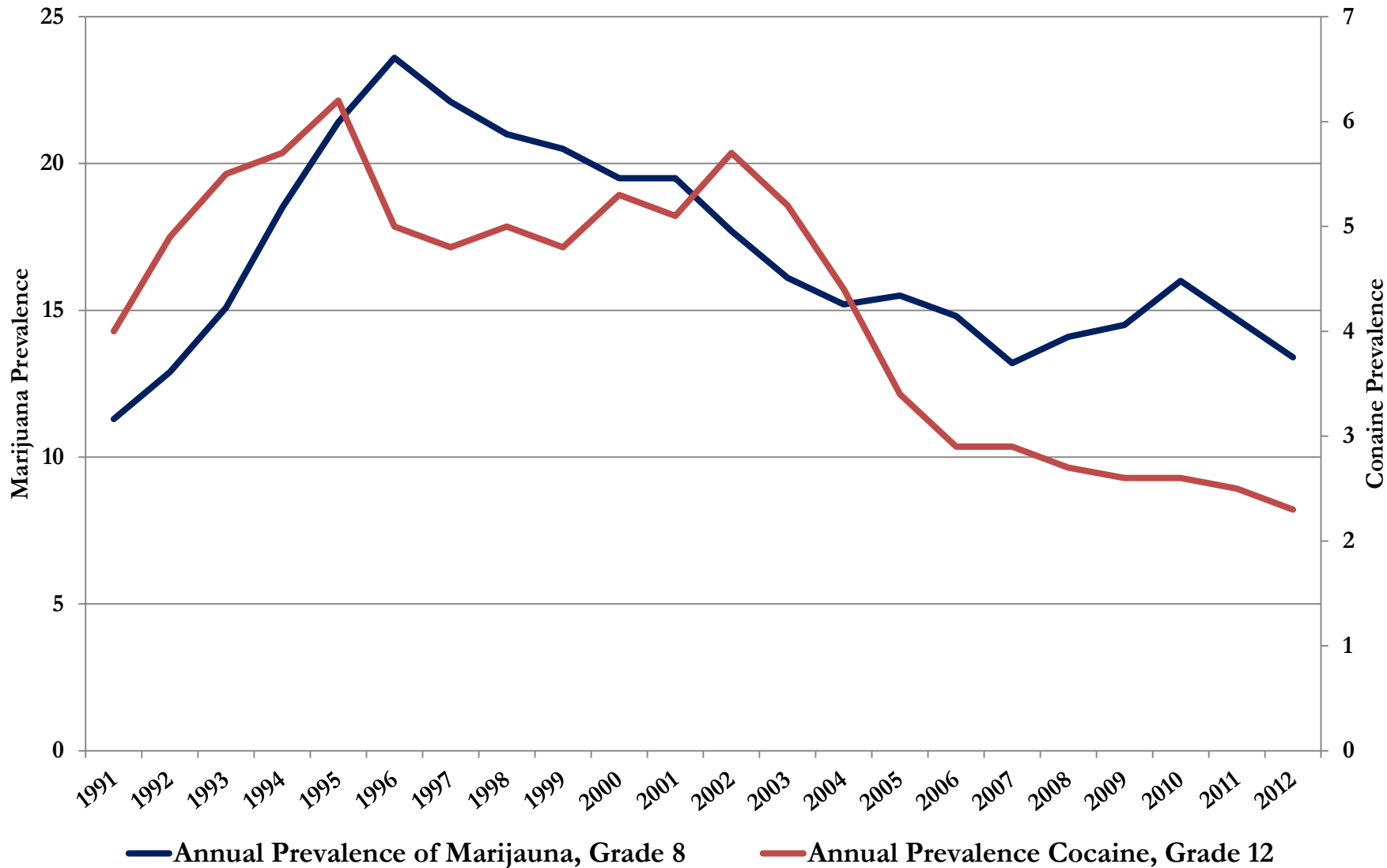
- The evidence is ambiguous, at best
 - Most marijuana users do NOT move on to ‘hard drugs’
 - A sizeable portion of hard drug users do not begin with marijuana
 - Opioid epidemic less pronounced in states with medicinal / recreational marijuana
 - Long-term trends ...

Annual Prevalence of Marijuana and "Hard Drug" Use

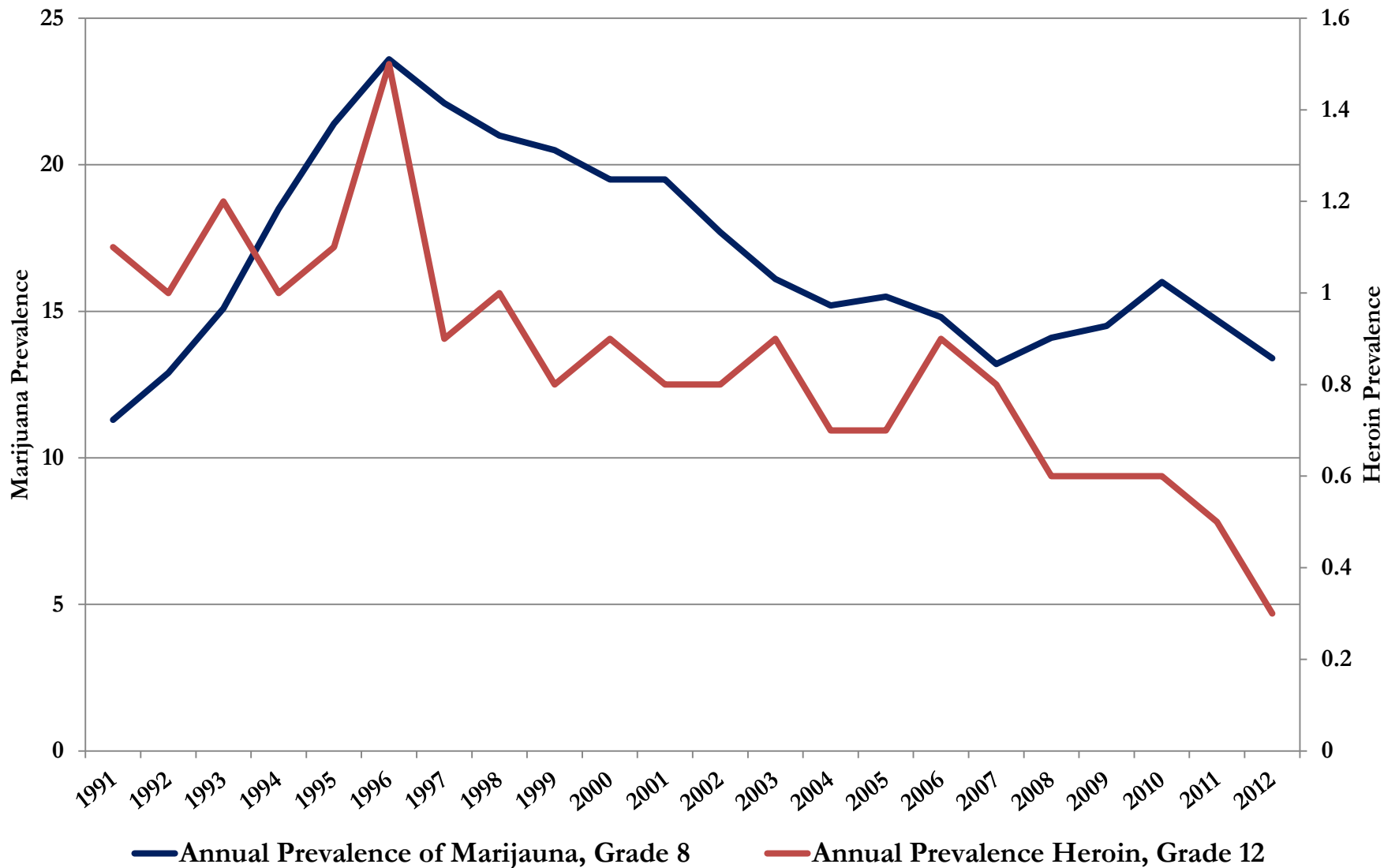
Repeated Cross-Section of 8th Grade Cohorts (Monitoring the Future, 1991 - 2013)



Annual Prevalence of Marijuana and Cocaine Use Repeated Cross-Section of 8th Grade Cohorts (Monitoring the Future, 1991 - 2012)



Annual Prevalence of Marijuana and Heroin Use Repeated Cross-Section of 8th Grade Cohorts (Monitoring the Future, 1991 - 2012)



Methodological Uncertainties

- Gateway hypothesis assumes that there is something unique about marijuana consumption that increases risk for subsequent drug use
 - i.e., marijuana *causes* later substance use problems
- Yet, the empirical evidence remains rather thin
 - Cross-sectional data
 - MTF, YRBS, NSDUH
 - Selection bias
 - Compare long-term outcomes between adolescent marijuana users and non-users often ignores the factors leading kids to initiate in the first place.

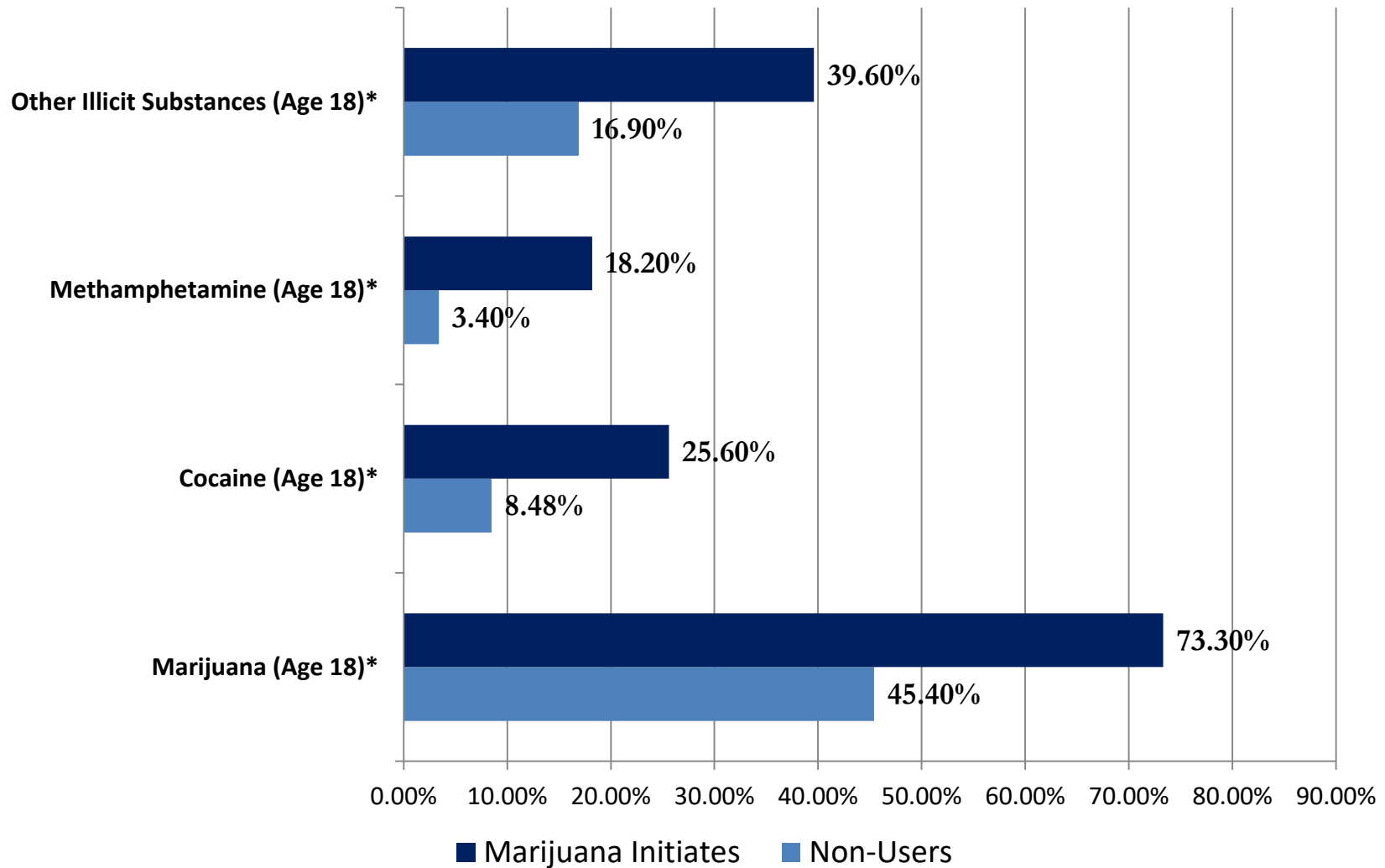
Addressing Uncertainty

- How might we assess the gateway hypothesis?
 - Let's operationalize the concept: ***Precocious marijuana initiation***
 - Focus on adolescents who begin using marijuana at a young age
- Does experimentation at a young age increase the risk of substance use problems later in life?
 - Randomized control trial?

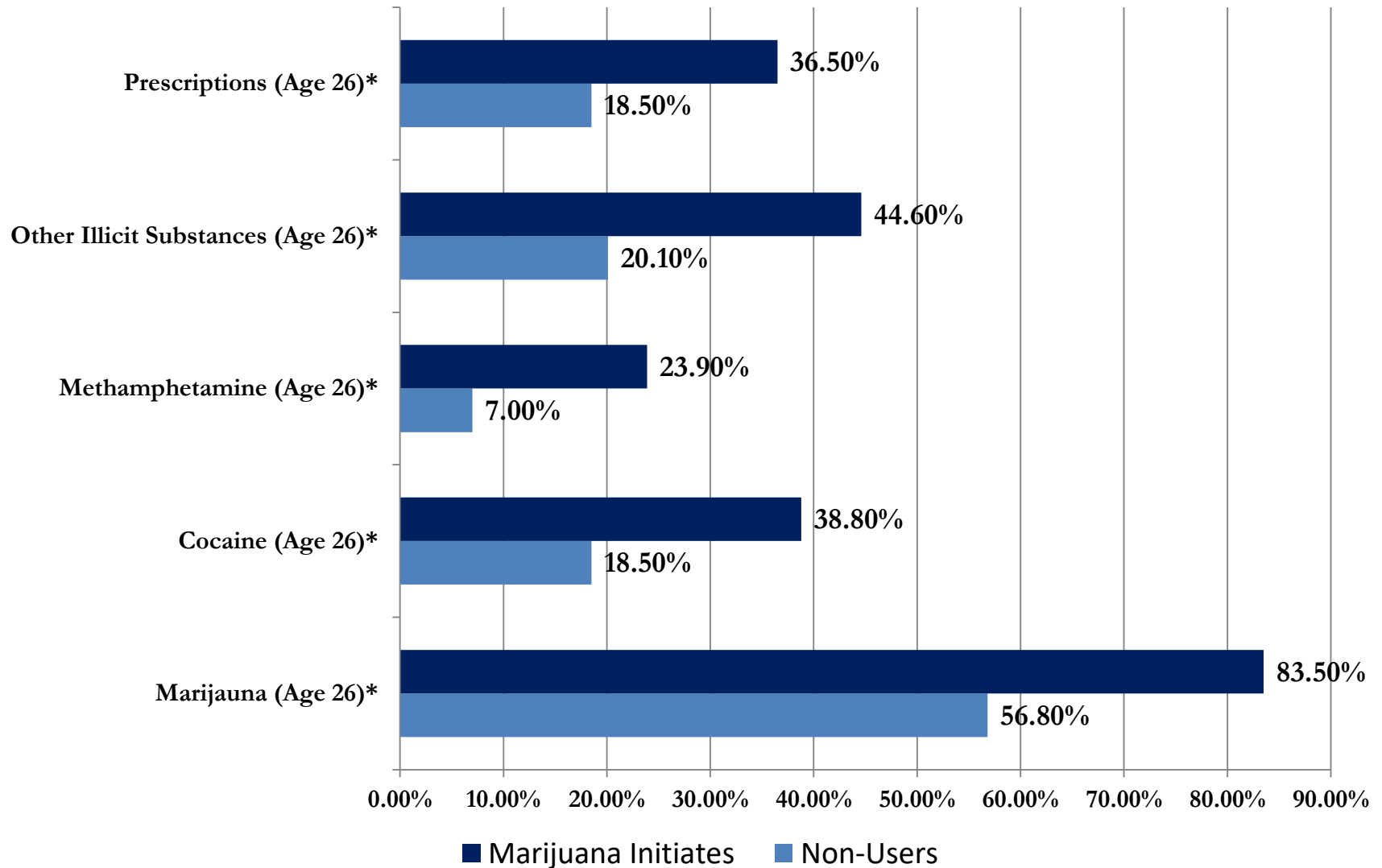
Addressing Uncertainty

- National Longitudinal Study of Adolescent to Adult Health
 - 1994; 1996; 2000; 2008; 2015
- Compare children who start using marijuana with those who abstain across the life course
 - Independent variable: Marijuana initiation at age 12/13
 - Dependent variables: Lifetime prevalence of substance use and self-reported substance use problems at ages 18 and 26.
- Sample:
 - 1,570 middle school students
 - 166 initiates (10.5%)

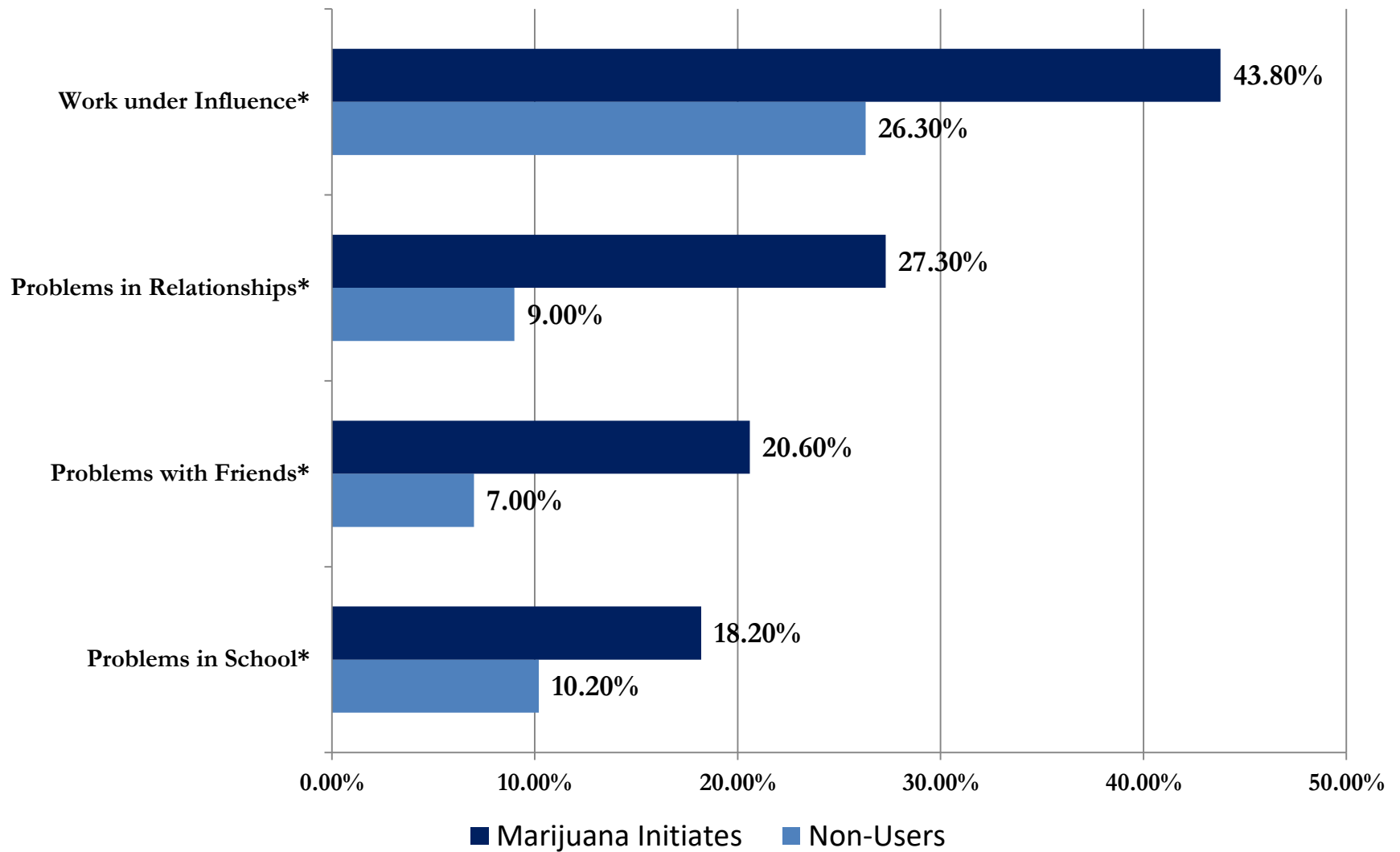
Lifetime Prevalence of Substance Use by Marijuana Initiation: Users vs. Non-Users (Full Sample)



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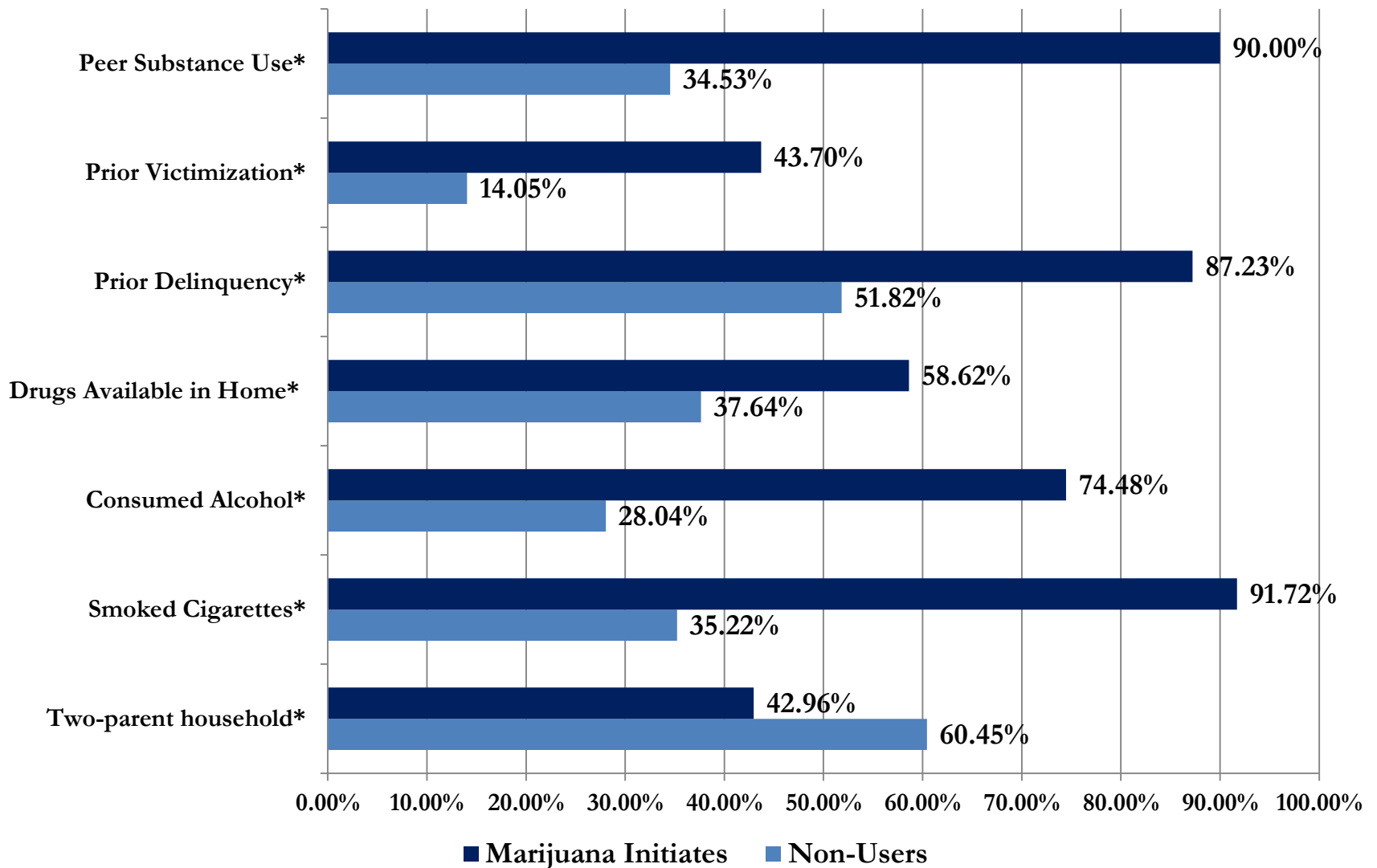
12 - Month Prevalence of Problems across Domains: Users vs. Non-users



Addressing Uncertainty

- At first blush, the evidence is pretty clear
 - Precocious marijuana initiation ***increases the lifetime prevalence of cocaine, methamphetamine, prescription, and other drug use***
 - Perhaps not surprisingly, early initiates are considerably more likely to continue using marijuana later in life
 - Marijuana use ***increases the likelihood that substance use interferes with employment, school, and interpersonal relationships*** in early adulthood

Difference in Select Background Characteristics: Users vs. Non-users

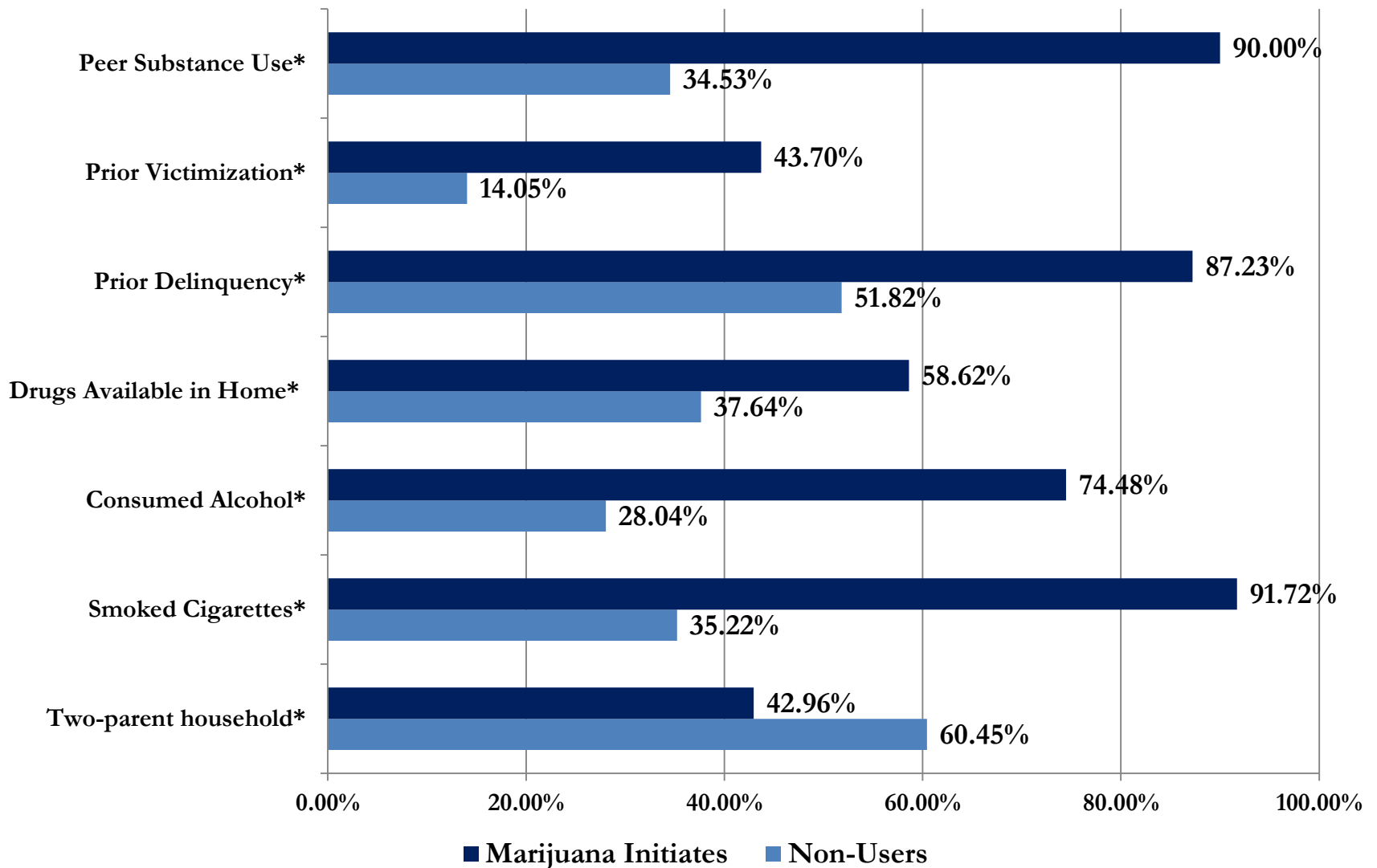




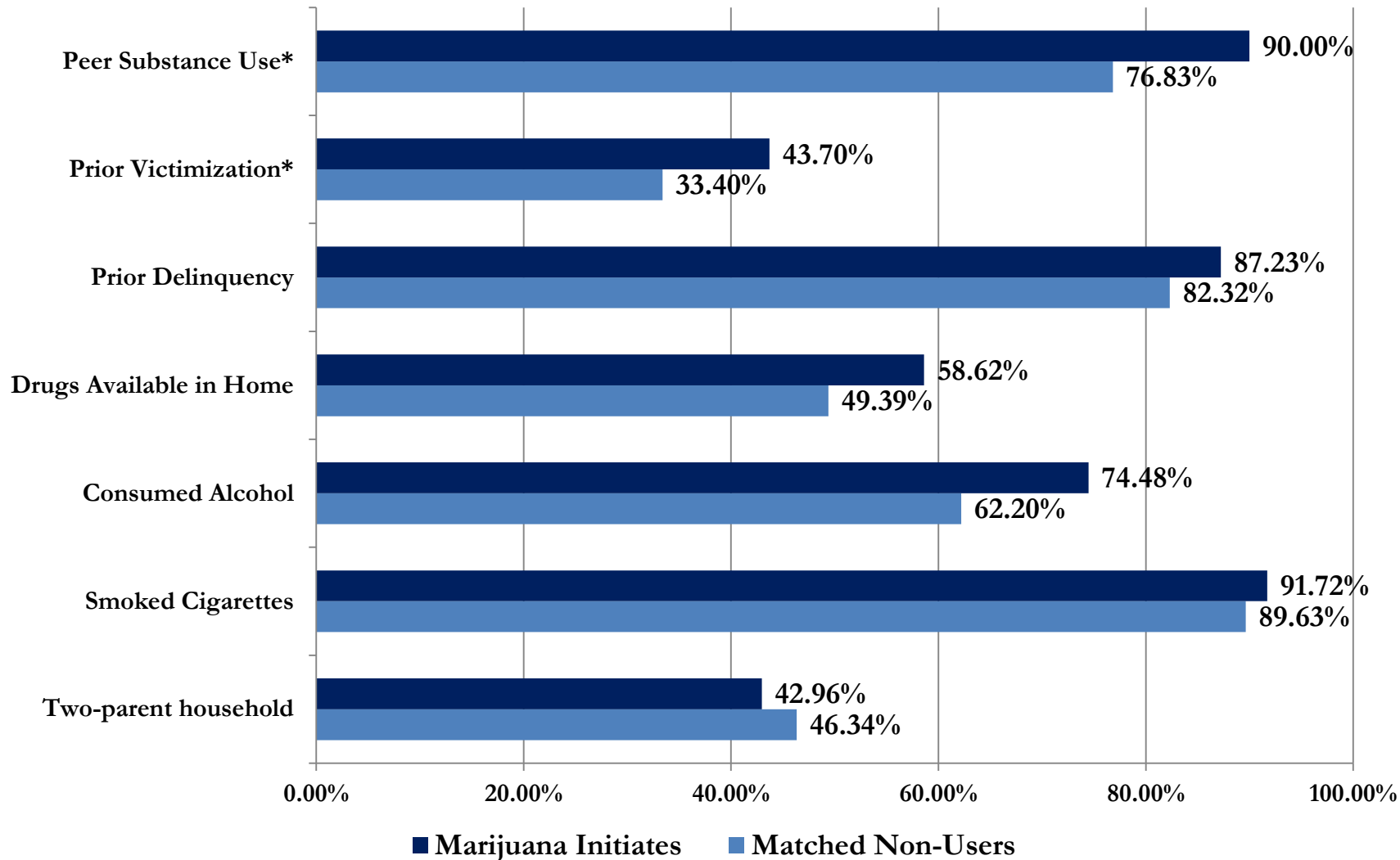
Addressing Uncertainty

- Propensity Score Model
 - Predict precocious marijuana initiation as a function of a variety of risk factors
 - We'll use this prediction to 'match' marijuana initiates to similar non-initiates
 - If successful, this approach will minimize baseline differences and generate a more meaningful comparison group
 - This will allow for a less biased assessment of the 'gateway' effect

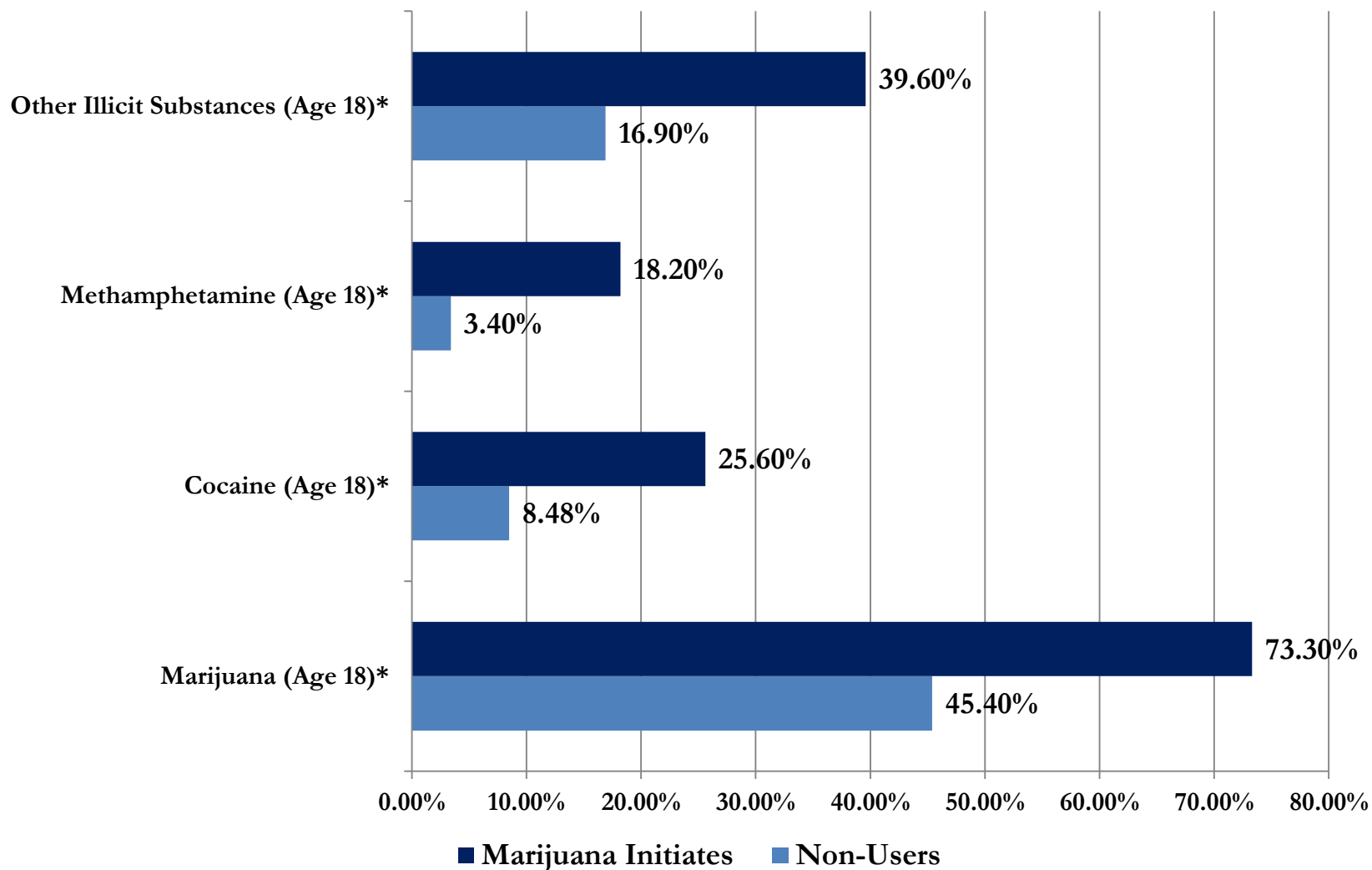
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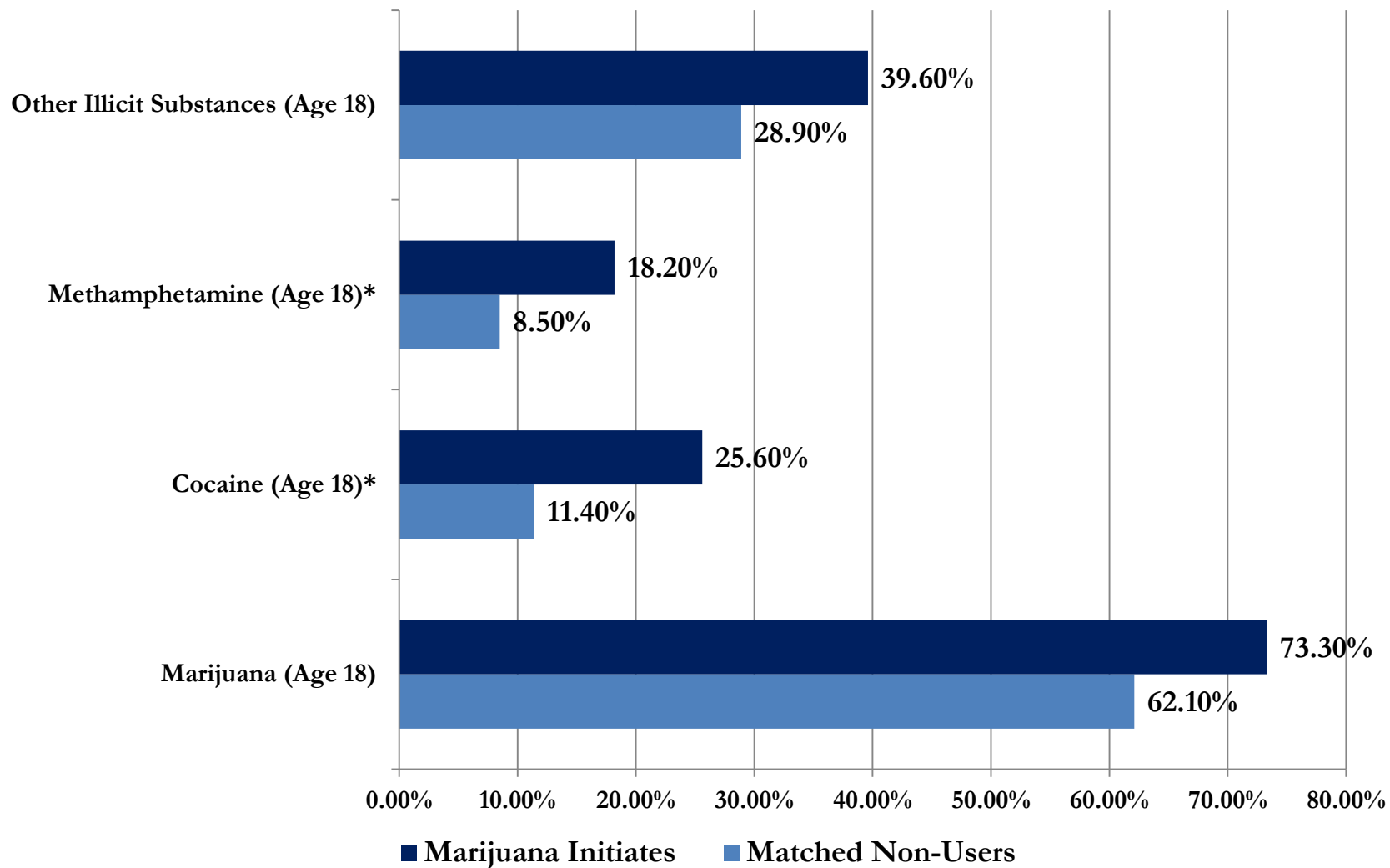
Differences in Select Background Characteristics: Users vs. Matched Non-users



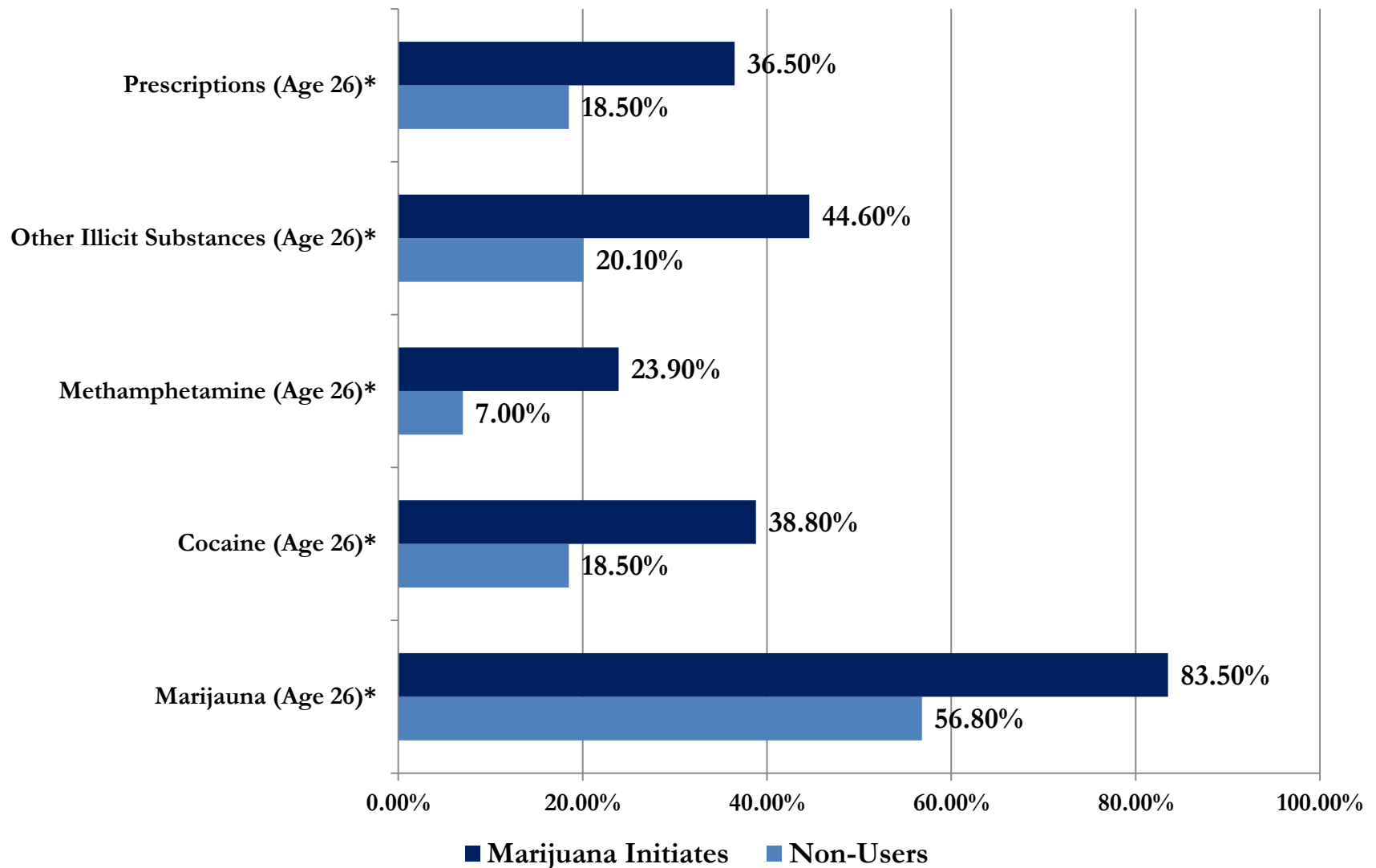
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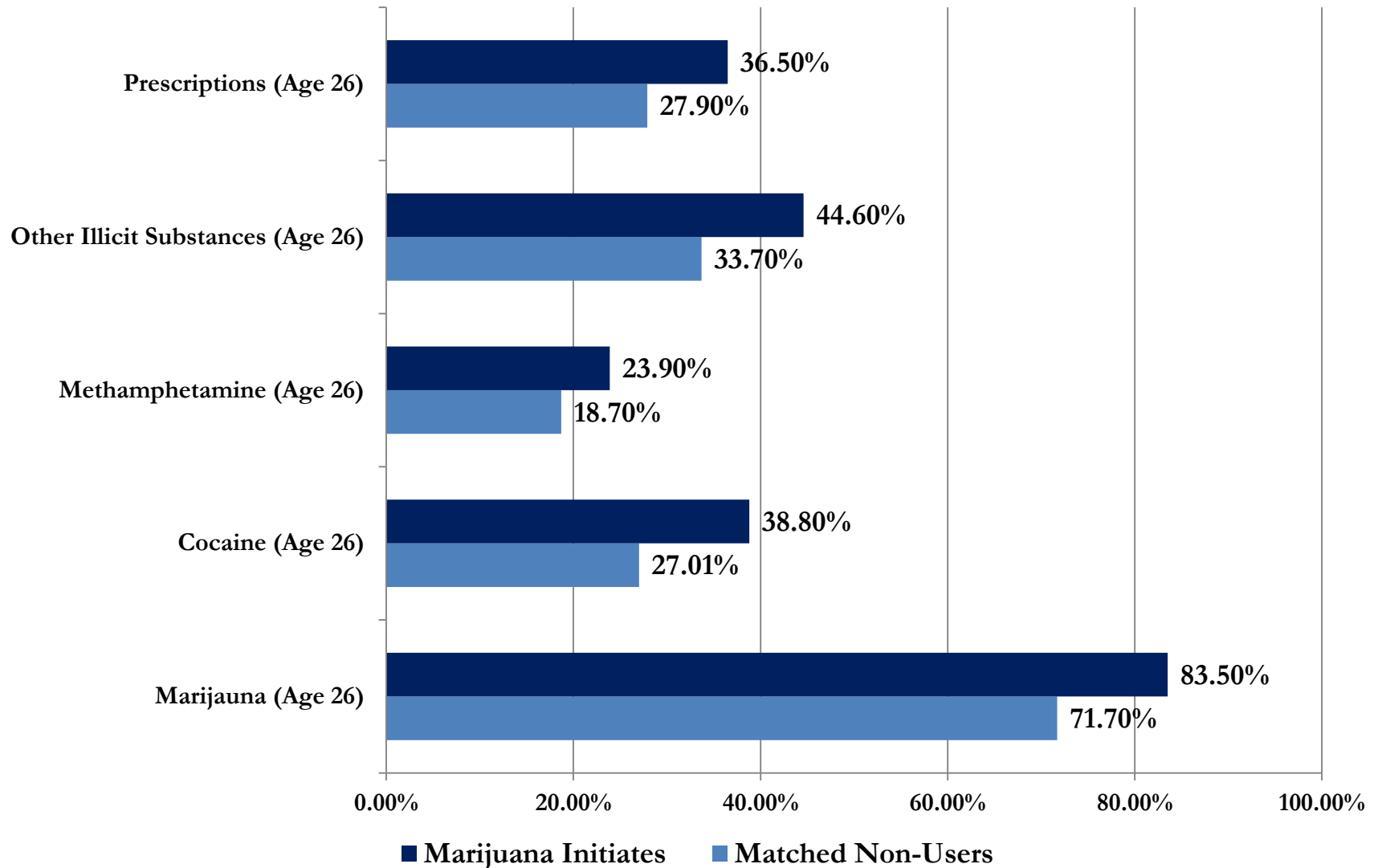
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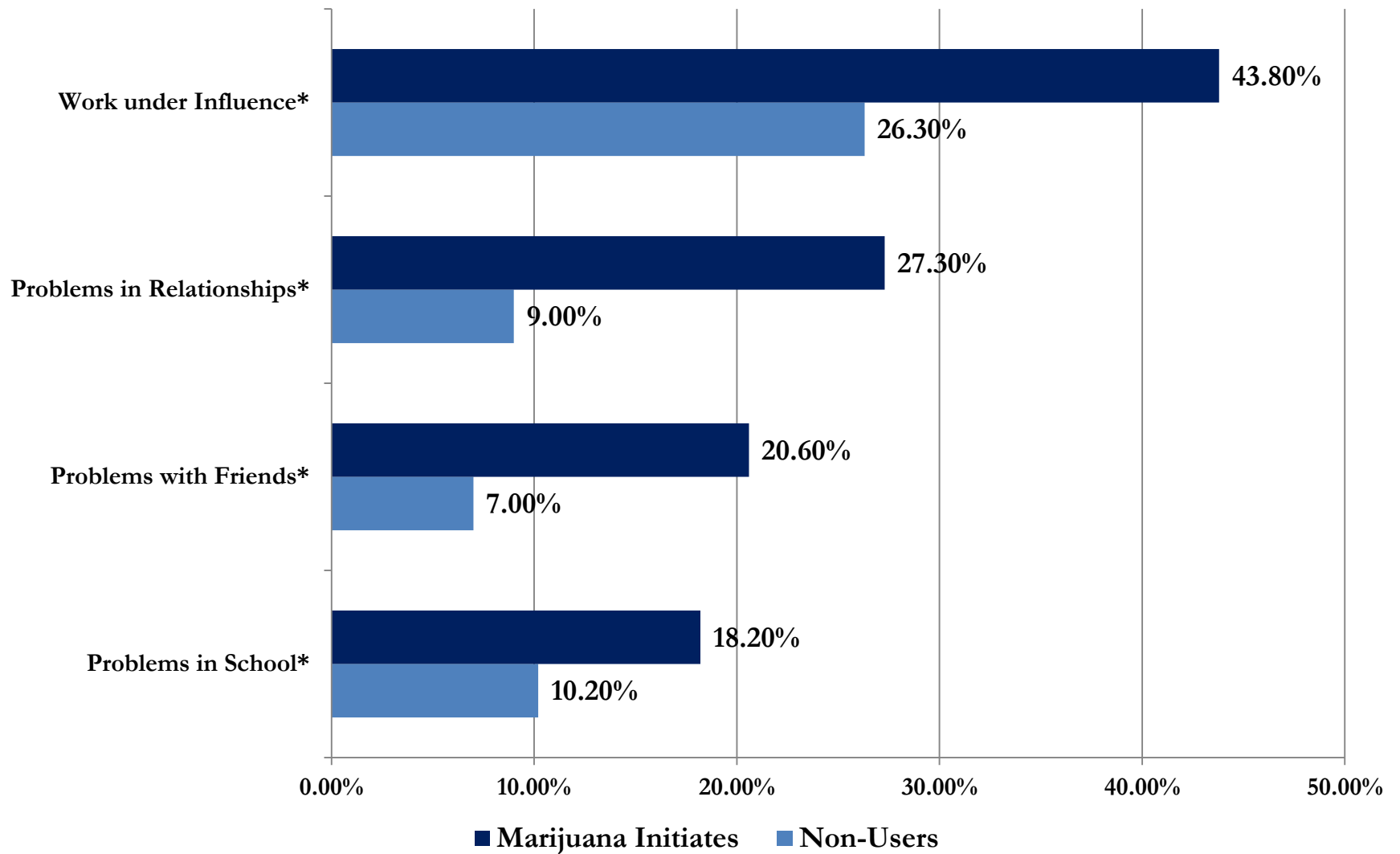
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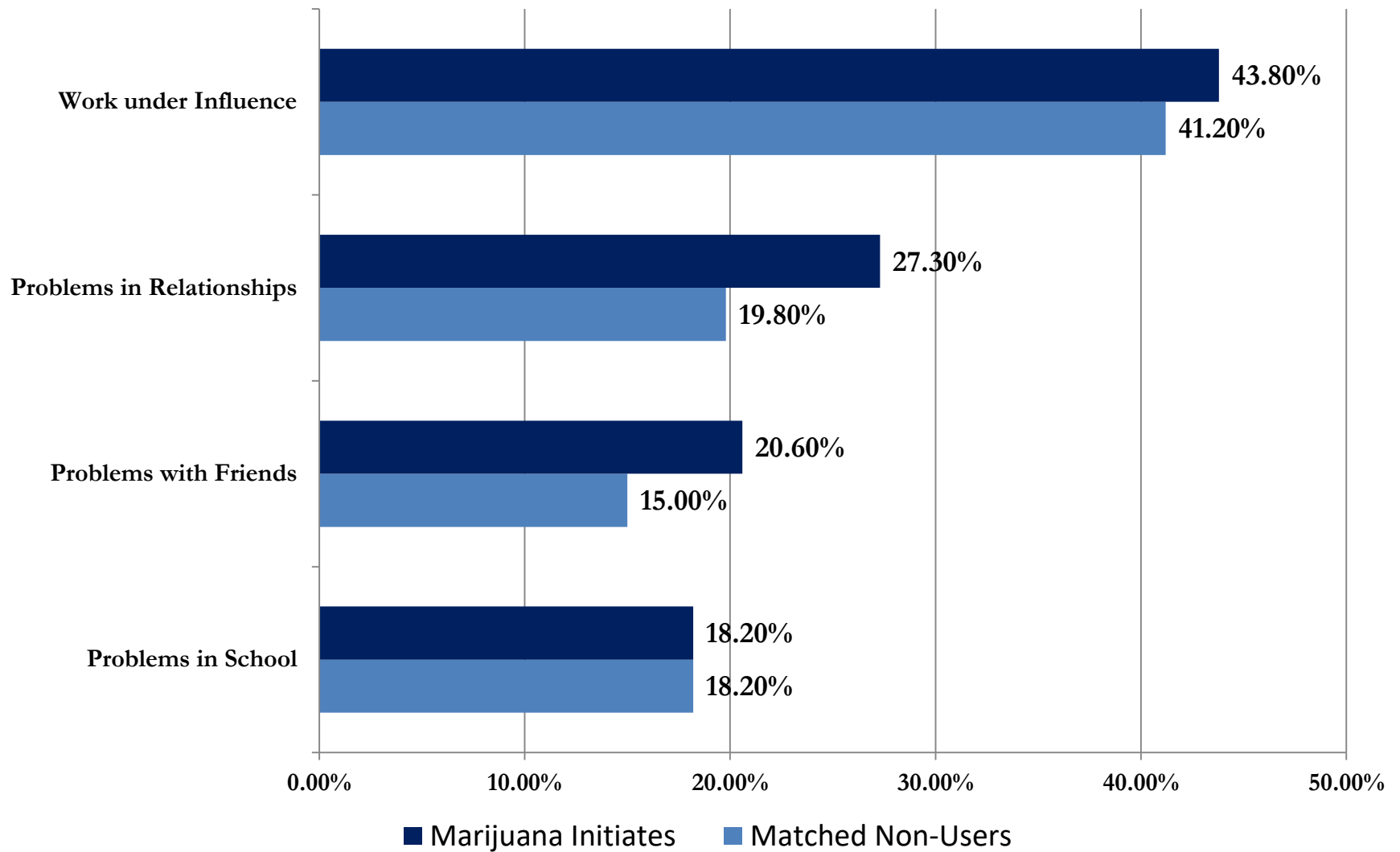
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12 - Month Prevalence of Problems across Domains: Users vs. Non-users



12 - Month Prevalence of Problems across Domains: Users vs. Non-users



Discussion

- Generally speaking, there is nothing unique about precocious marijuana *initiation* that increases risk for subsequent substance use problems
- Instead, there is something unique about precocious marijuana *users*
- Much of the observed gateway effect can be attributed to selection bias
 - Once addressing group differences, the “effect” of early marijuana initiation on later substance use is negligible.

Discussion

- Precocious marijuana initiation is symptom of a larger constellation of risk-factors that contributes to later life substance use
 - From a prevention standpoint, we are better off targeting peer influences, ACEs, etc.
- In today's "drug landscapes" prevention efforts are perhaps best directed toward the more obvious precursors

Thanks!

Matt Vogel, Ph.D.

Department of Criminology and Criminal Justice
University of Missouri – St. Louis

OTB – Research for the Built Environment
TU – Delft, the Netherlands

vogelma@umsl.edu