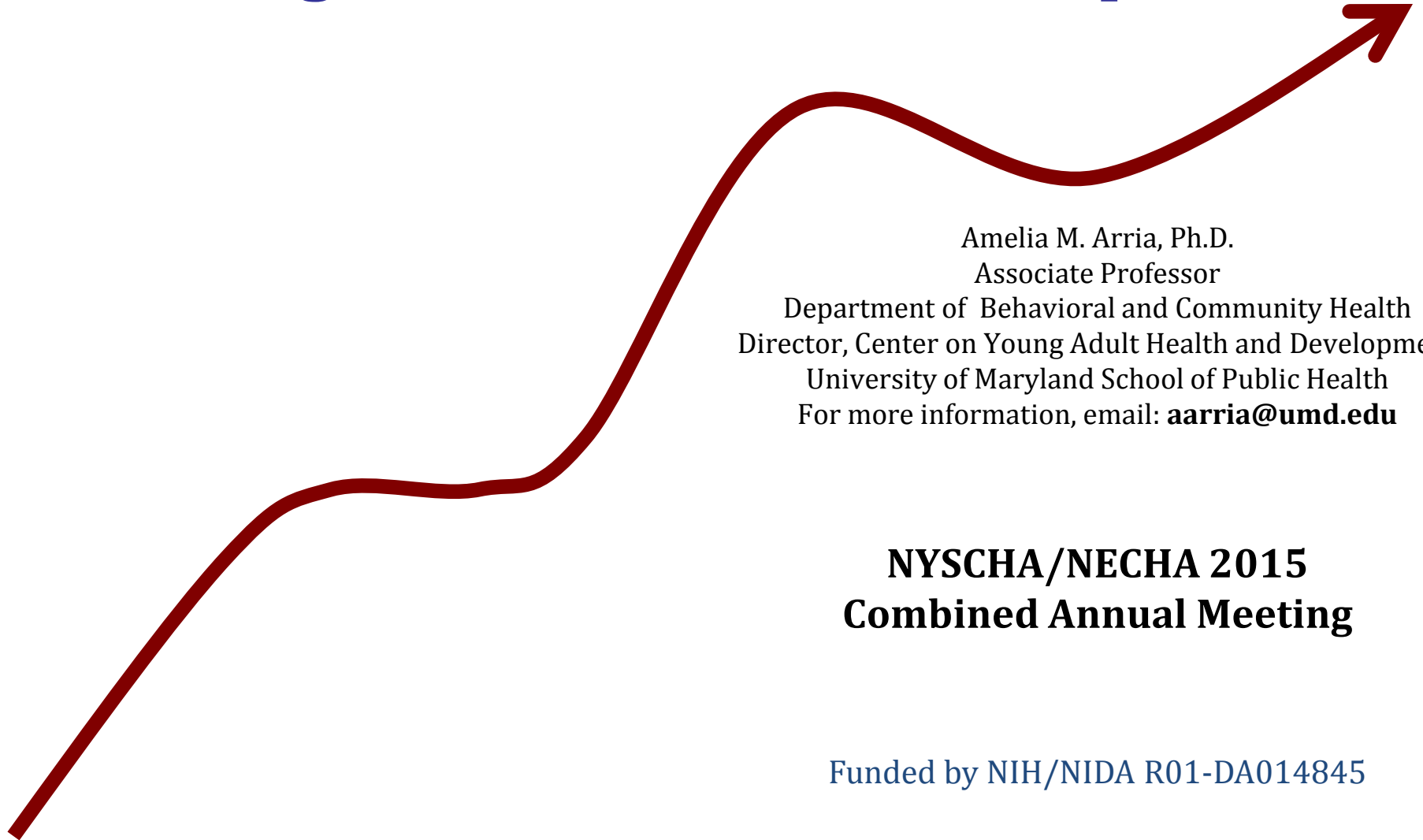


Impacts of Substance Use and Mental Health on Young Adult Health and Development



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**NYSCHA/NECHA 2015
Combined Annual Meeting**

Funded by NIH/NIDA R01-DA014845

PART 1:
The Challenges

PART 2:

Mechanisms – the Whys

PART 3:
Moving Upstream:
Strategies and Solutions

PART 1:
The Challenges

Syrian Refugees: Flight Into the Unknown

MARCH 2015

NATIONAL GEOGRAPHIC

CLIMATE CHANGE DOES NOT EXIST

EVOLUTION NEVER HAPPENED

THE MOON LANDING WAS FAKE

VACCINATIONS CAN LEAD TO AUTISM

GENETICALLY MODIFIED FOOD IS EVIL

THE WAR ON SCIENCE

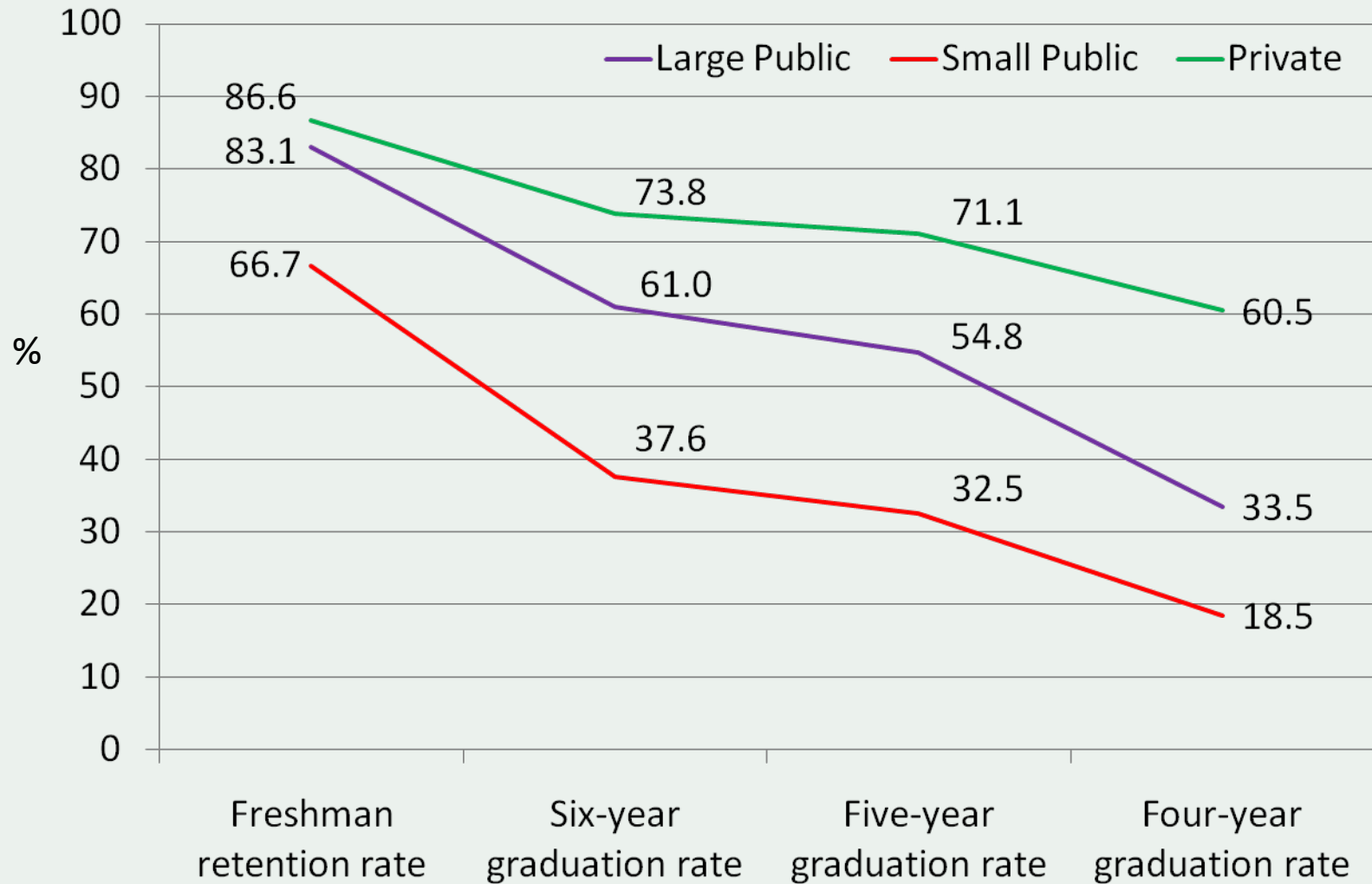


A WORKER ADJUSTS A DIORAMA OF A MOON LANDING AT THE KENNEDY SPACE CENTER.

College Students

- They comprise a very large segment of the population (~14.5 million individuals)
- Large societal and familial investment
- Given our investment, they aren't doing as well as we might have hoped.

Measures of Academic Success among Universities in the United States



IMPACT ON GLOBAL COMPETITIVENESS



“America’s schools face unprecedented challenges to prepare students for postsecondary education and entry into the U.S. and global workforce. The skills of the current and future workforce are closely tied to our nation’s ability to thrive in a global economy.”

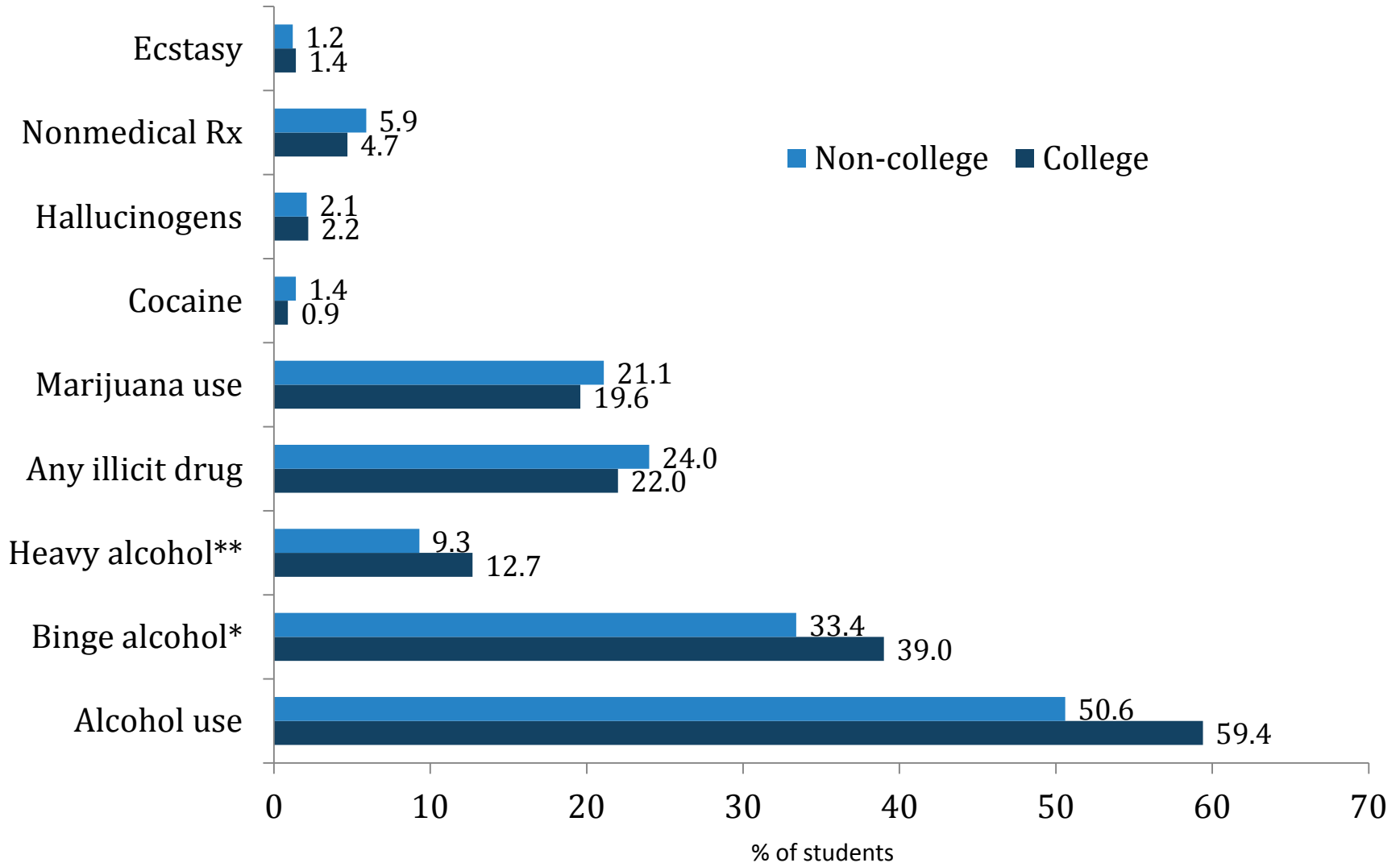
READINESS FOR EMPLOYMENT



Association
of American
Colleges and
Universities

*“When it comes to the types of skills and knowledge that employers feel are most important to workplace success, **large majorities of employers do NOT feel that recent college graduates are well prepared.** This is particularly the case for applying knowledge and skills in real-world settings, **critical thinking skills, and written and oral communication skills** — areas in which fewer than three in 10 employers think that recent college graduates are well prepared. Yet even in the areas of ethical decision-making and working with others in teams, many employers do not give graduates high marks.”*

National data: Past-month alcohol and other drug use among 18 to 22-year-olds, by college enrollment

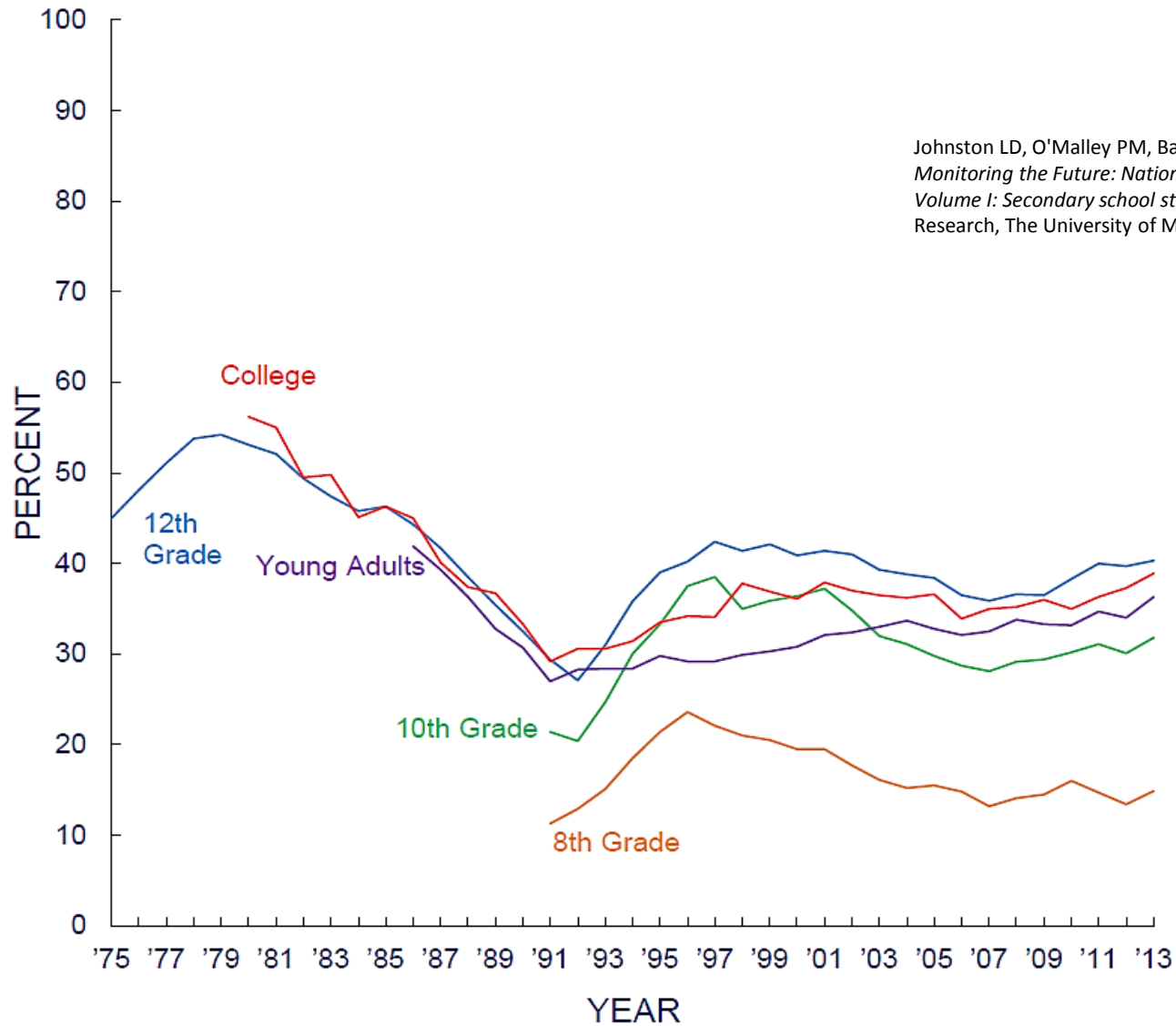


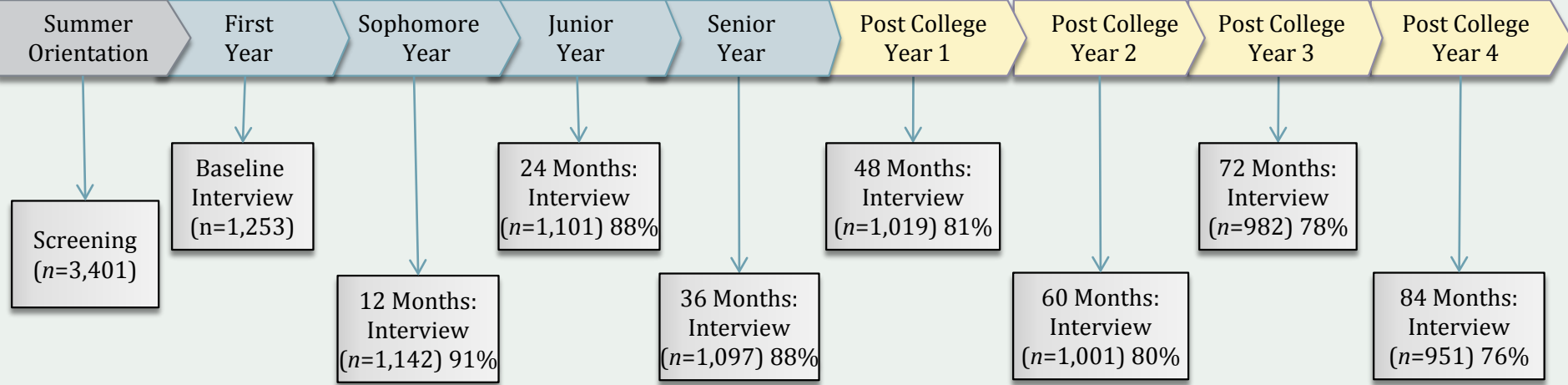
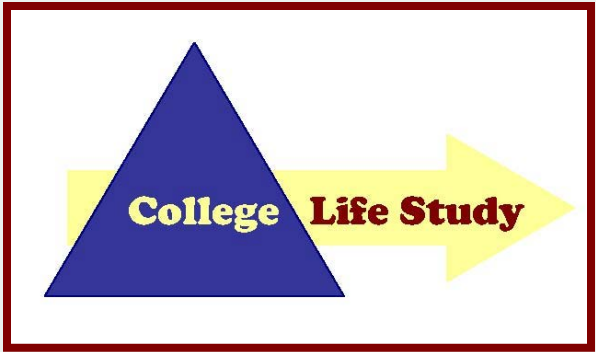
*"Binge use" defined as "Five or more drinks on the same occasion at least once in the past 30 days."

**"Heavy use" defined as "Five or more drinks on the same occasion on each of 5 or more days in the past 30 days."

Trends in Annual Prevalence of an Illicit Drug Use Index across 5 Populations

Johnston LD, O'Malley PM, Bachman JG, Schulenberg JE, Miech RA.
Monitoring the Future: National survey results on drug use, 1975-2013: Volume I: Secondary school students. Ann Arbor, MI: Institute for Social Research, The University of Michigan; 2014.





Domains Measured in the CLS

Demographics

Family Composition
Gender
Race/Ethnicity
Socioeconomic Status
Parental Education

Mental Health

Depression
Bipolar
Anxiety
ADHD
Suicide Ideation

Individual Characteristics

Personality
Religiosity
Sensation-seeking
Dysregulation
Perceived Harm
Physical Health

Stress

General Distress
Life Event Stress
Social Support

Peer Relations

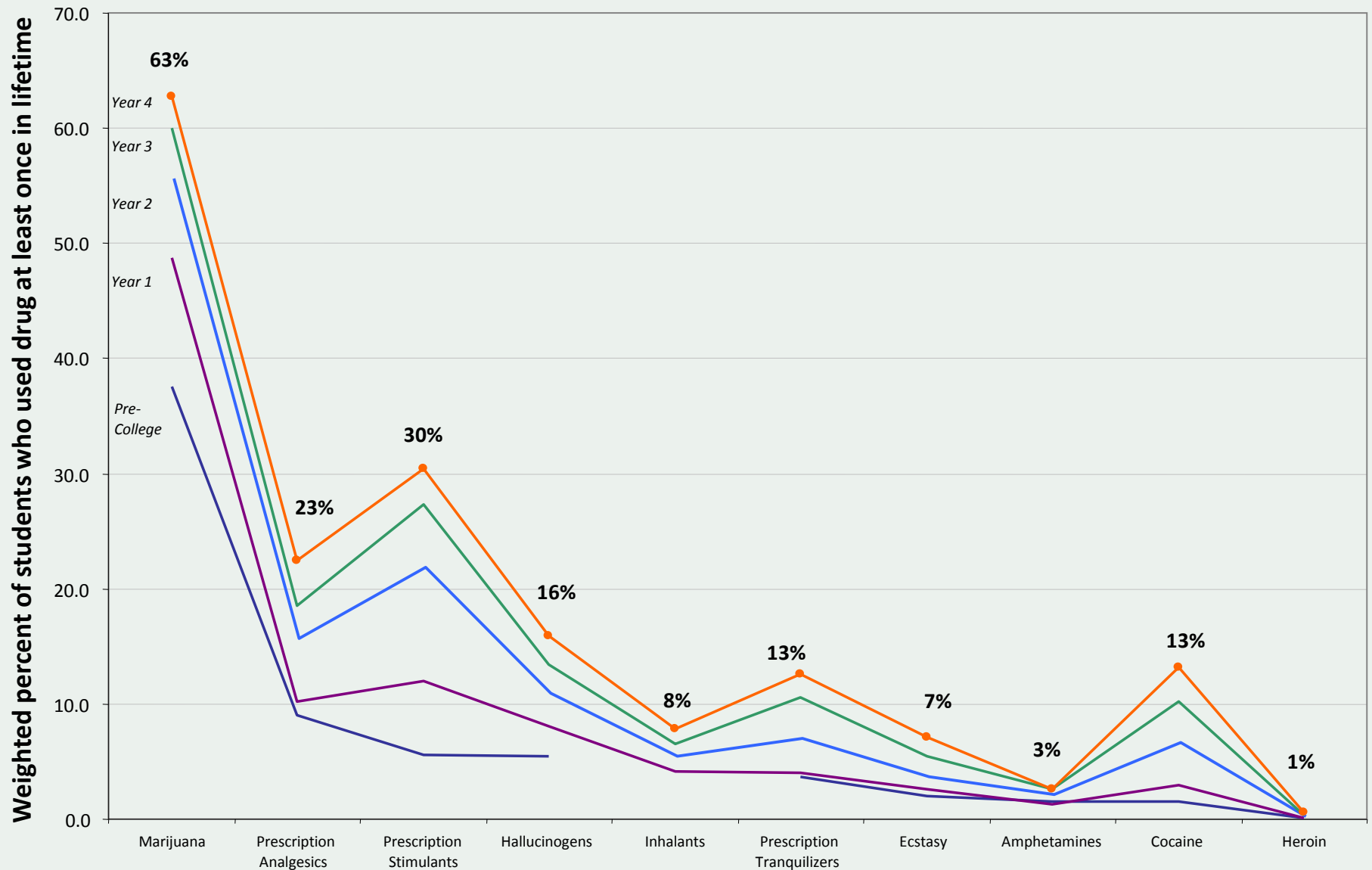
Parent Influences

Parental Monitoring
Relationship Quality
Communication
Parental Authority Style
Family History

High School & College Experiences

Volunteer work
Extracurricular Activities
Academic Achievement
Scholarships
Goals and Expectations

Illicit and nonmedical drug use in the first four years of college



Data weighted to adjust for both sampling bias and attrition.

Source: College Life Study. Not for redistribution without written consent from Dr. Amelia M. Arria, PI

Estimated probabilities of developing alcohol dependence based on drinking level at college entry (College Life Study)

Drinking level at **college entry:**

High-risk Drinkers:
26%
(6+ drinks/day)

Medium Risk Drinkers:
40%
(3-5 drinks/day)

Low-risk Drinkers:
22%
(1-2 drinks/day)

Non-drinkers:
12%

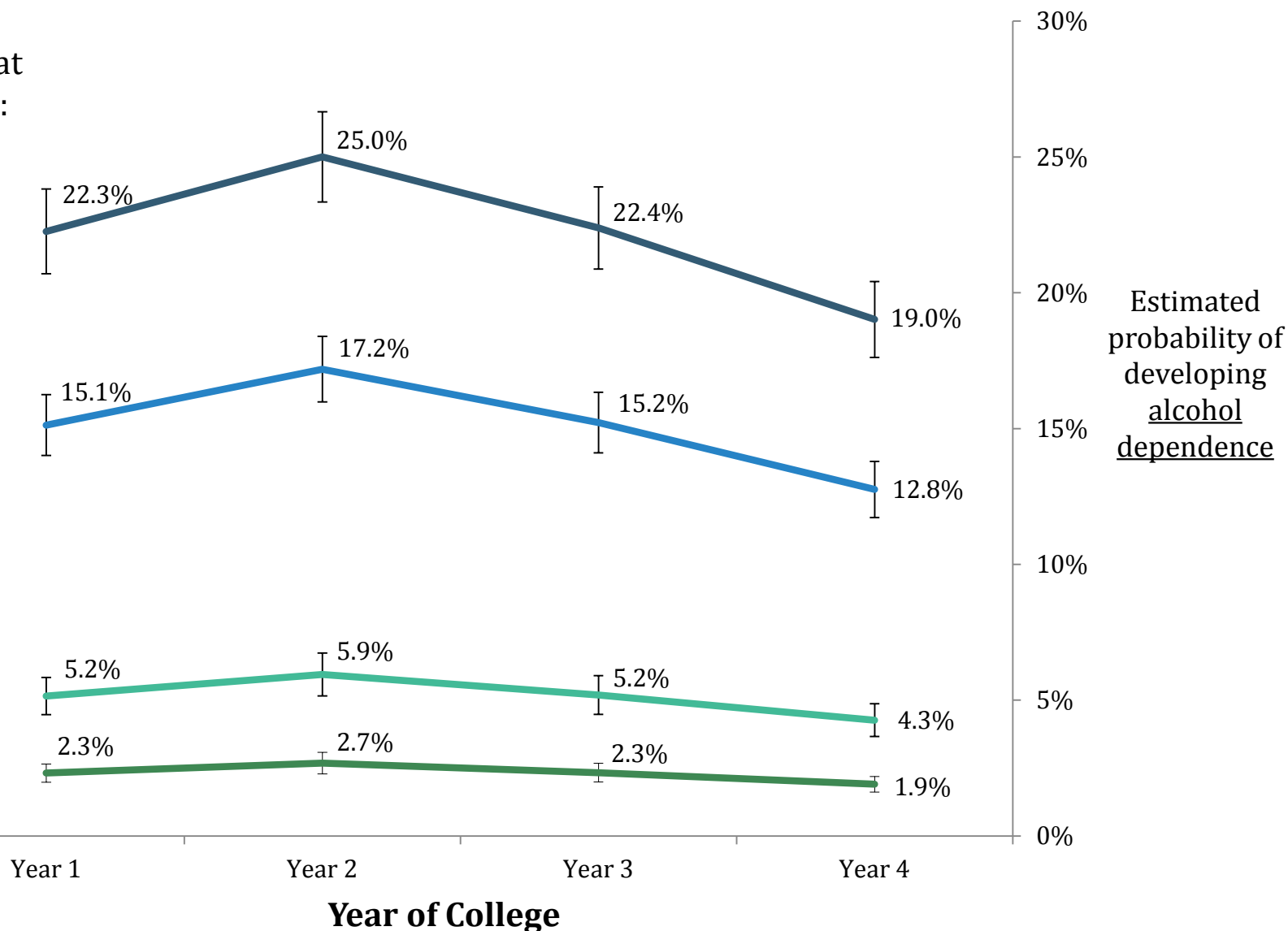
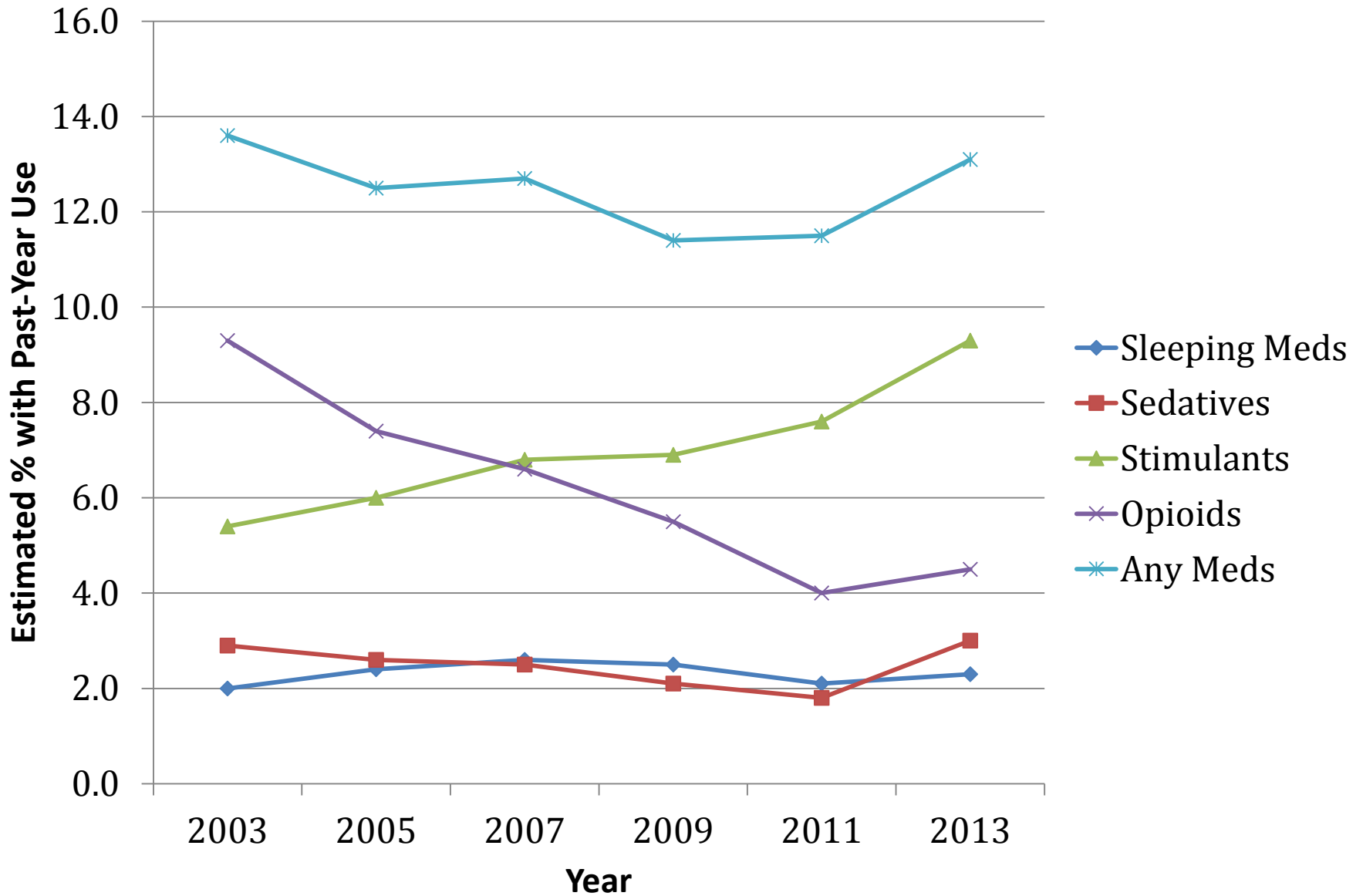


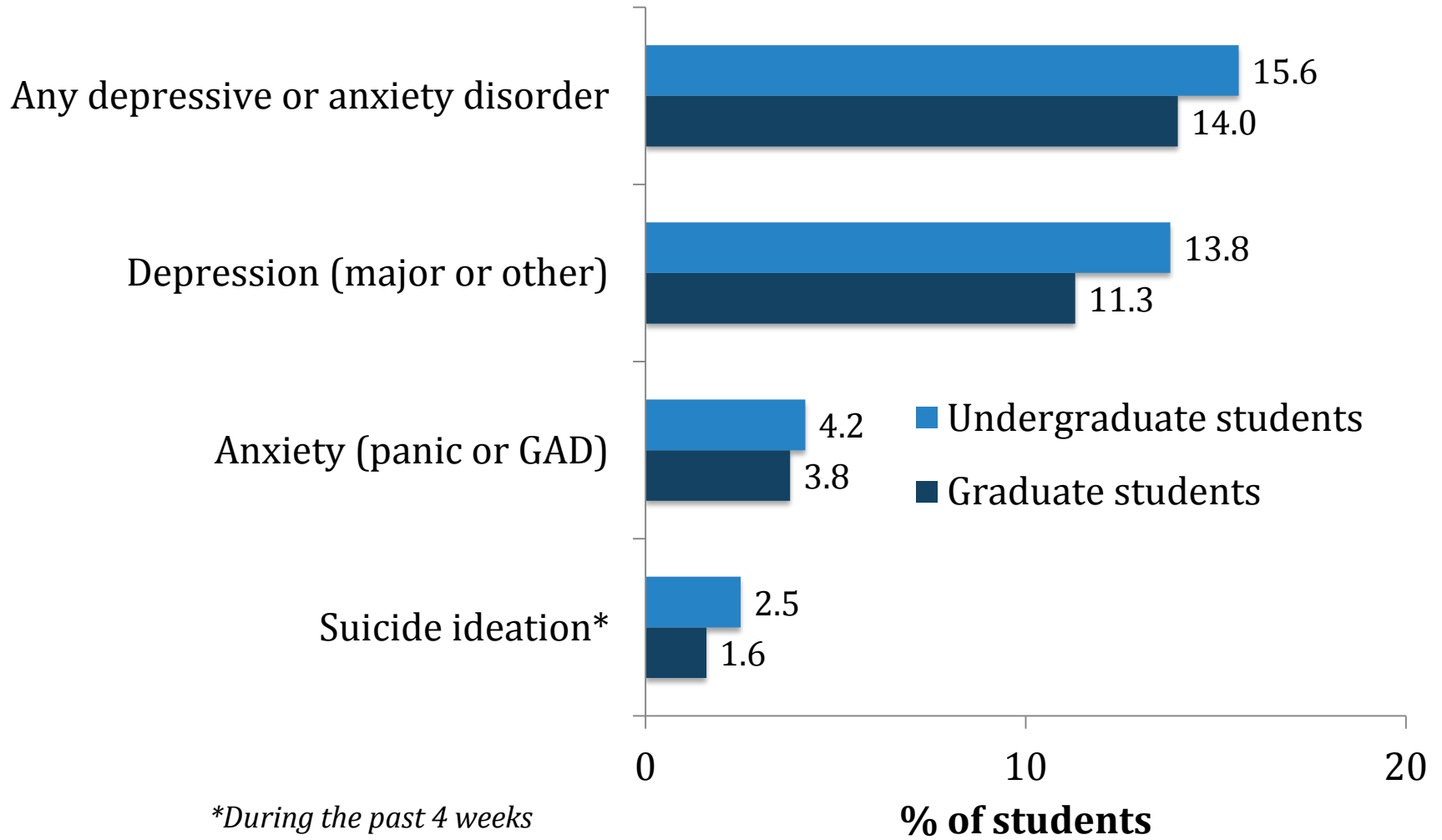
Figure 1. Trends in past-year nonmedical use of prescription medications: 2003-2013



Mental health of college students

- 46% of college students meet criteria for at least one DSM-IV disorder in the past year, 75% of whom do not receive treatment (Blanco et al., 2008)
- Severity and complexity of health center caseloads is increasing (Benton et al., 2003; Gallagher, 2010)
- Depression prevalence is increasing (ACHA, 2006)
- 10% seriously consider suicide (ACHA, 2006)
- Recent high-profile tragedies – students who “fell through the cracks”

How many college students screen positive for current mental health problems?



Marijuana use and health outcomes

- Constructed six subgroups based on marijuana use during college
- Examined 10 possible health outcomes seven years after college entry
- Groups differed on functional impairment, general health rating, psychiatric symptoms, quality of life, and service utilization for physical and mental health problems
- Adjusted for tobacco and alcohol use trajectory, baseline health status and other variables



Summary of Challenges

- Academic issues
- Excessive drinking
- A complex drug landscape
- Mental health problems
- Connections between AOD, mental and physical health
- Lack of self-recognition of problems by students
- Many well-intentioned parents have views that are at odds with the research evidence

Substance Use and Academic Achievement

Academic
Performance
Problems

Substance
Use

?

Substance
Use

Academic
Performance
Problems

?

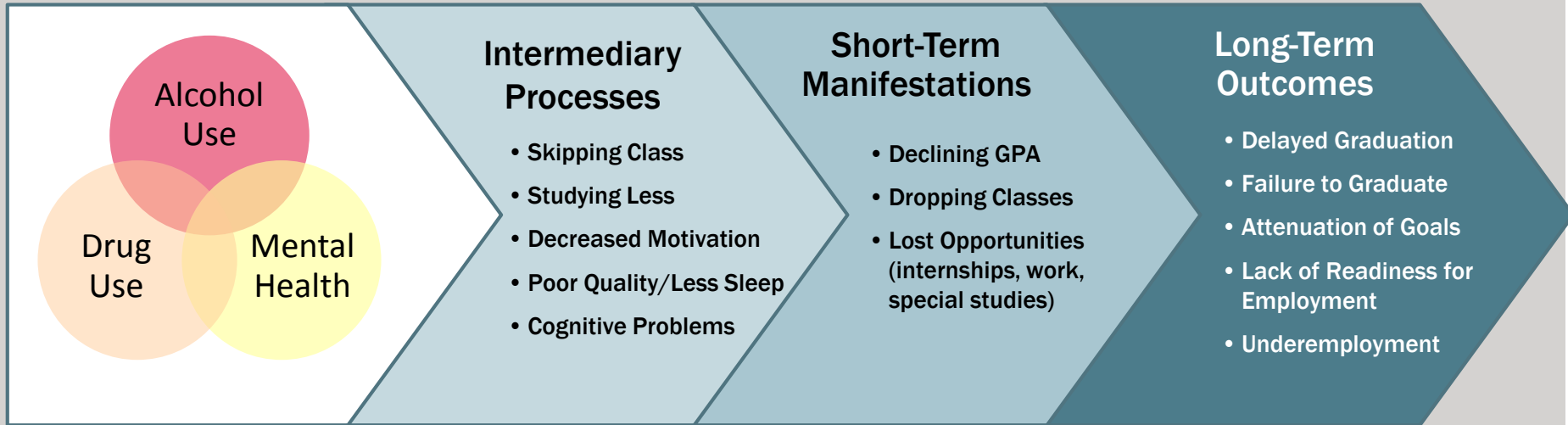
**America's Dropout Crisis:
The Unrecognized Connection
To Adolescent Substance Use**

"There is no problem so bad that alcohol and drugs will not make it worse."

March, 2013

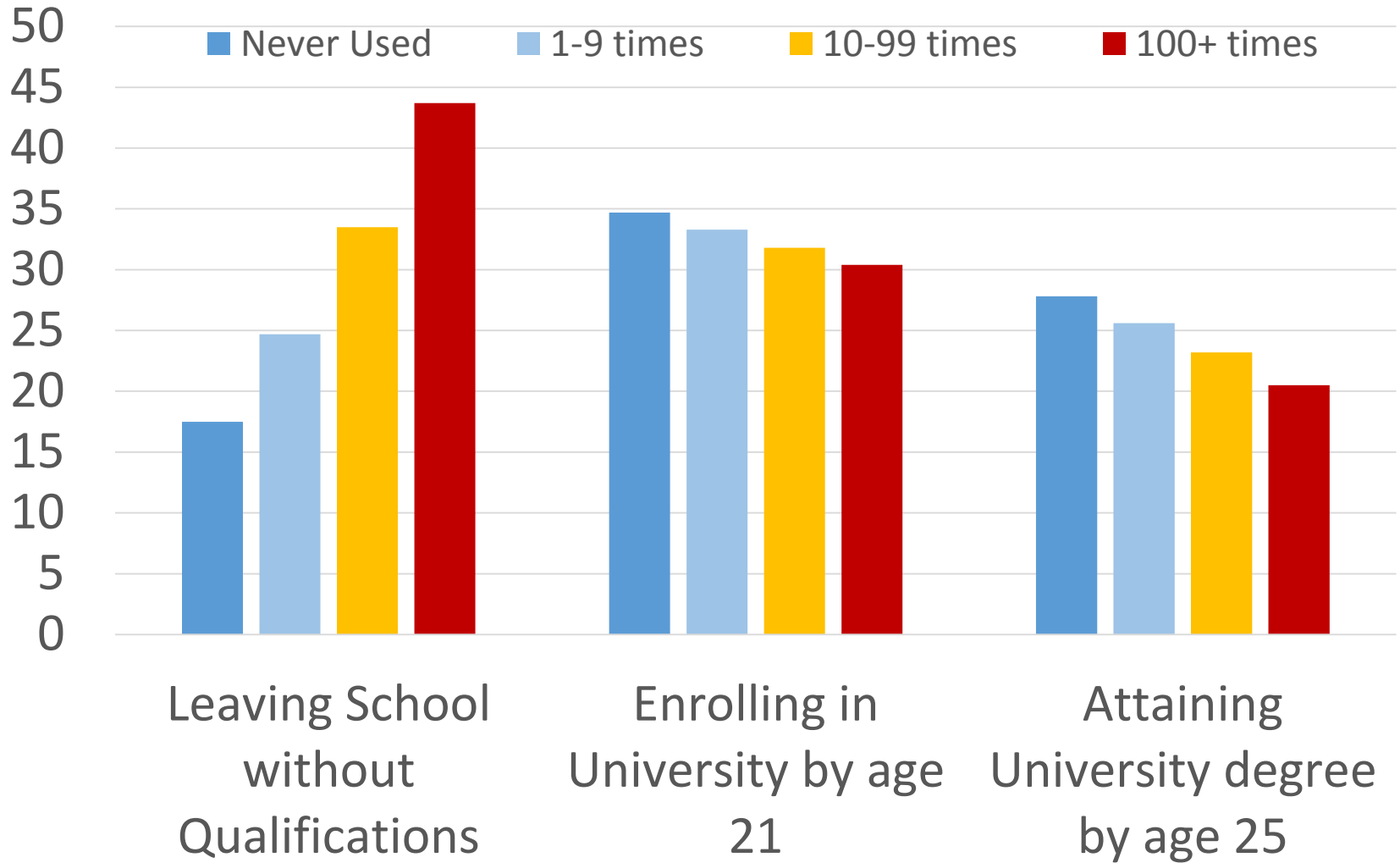
Available online at www.cyahd.umd.edu

CONCEPTUAL MODEL



Cumulative Frequency of Cannabis Use and Educational Outcomes

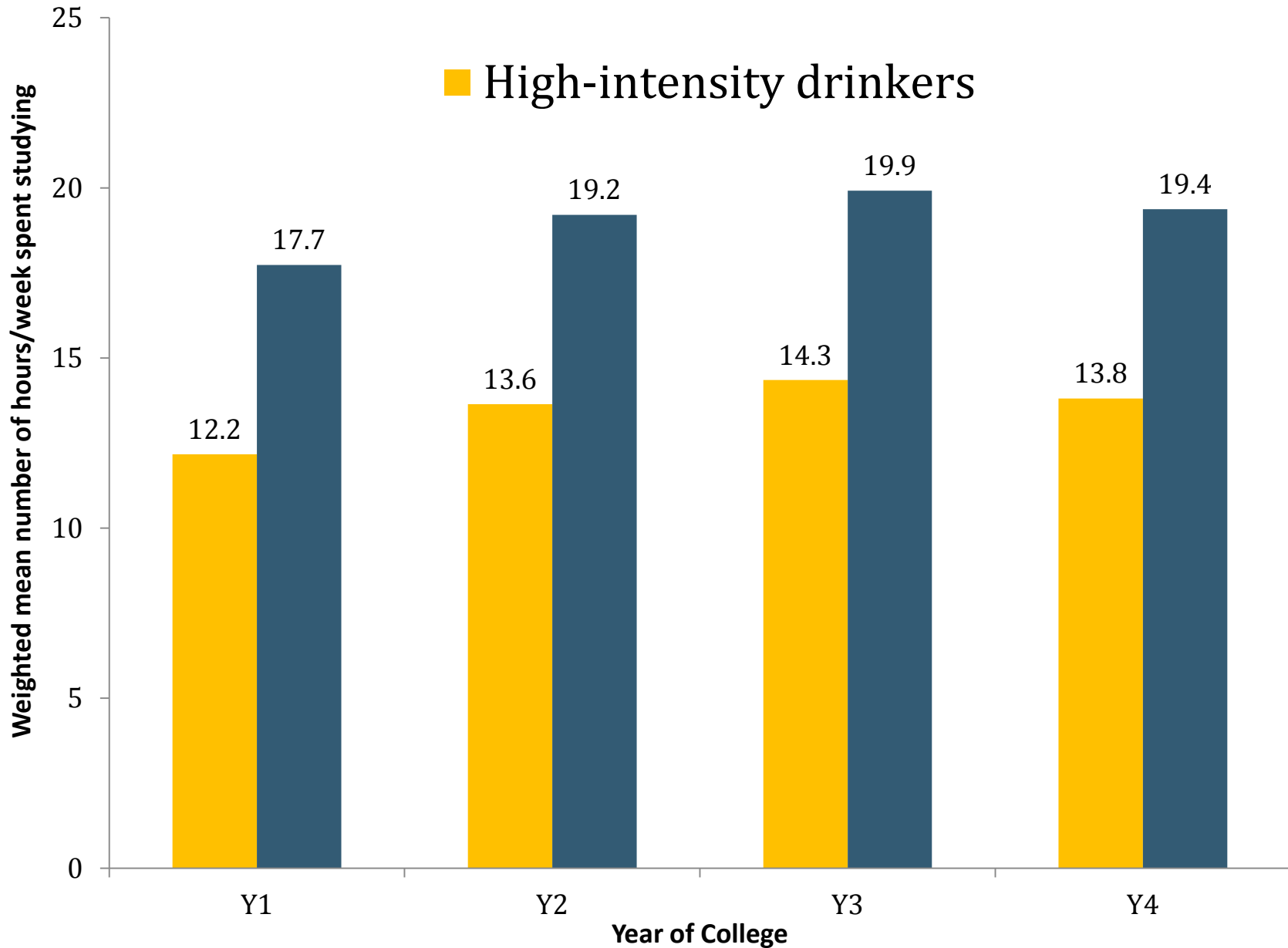
(Fergusson et al., 2003)



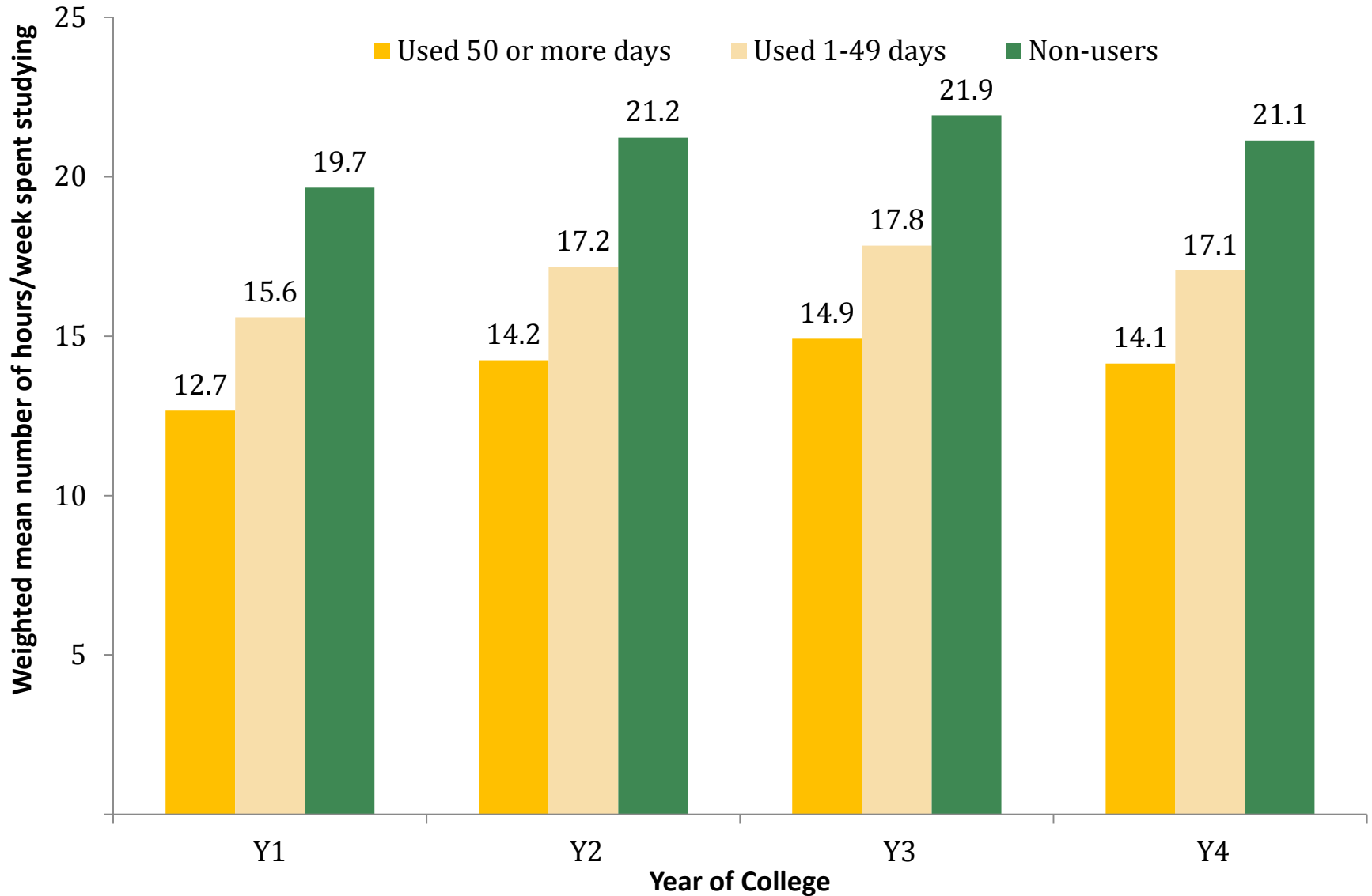
Excessive Drinking and Academic Performance

- Alcohol, sleepiness, and GPA
(Singleton and Wolfson, 2009)
- Excessive drinking and fewer interactions with faculty
(Porter and Prior, 2007)
- Alcohol use and decreases in GPA (Pascarella, 2007)

Time spent studying, by high-intensity drinking

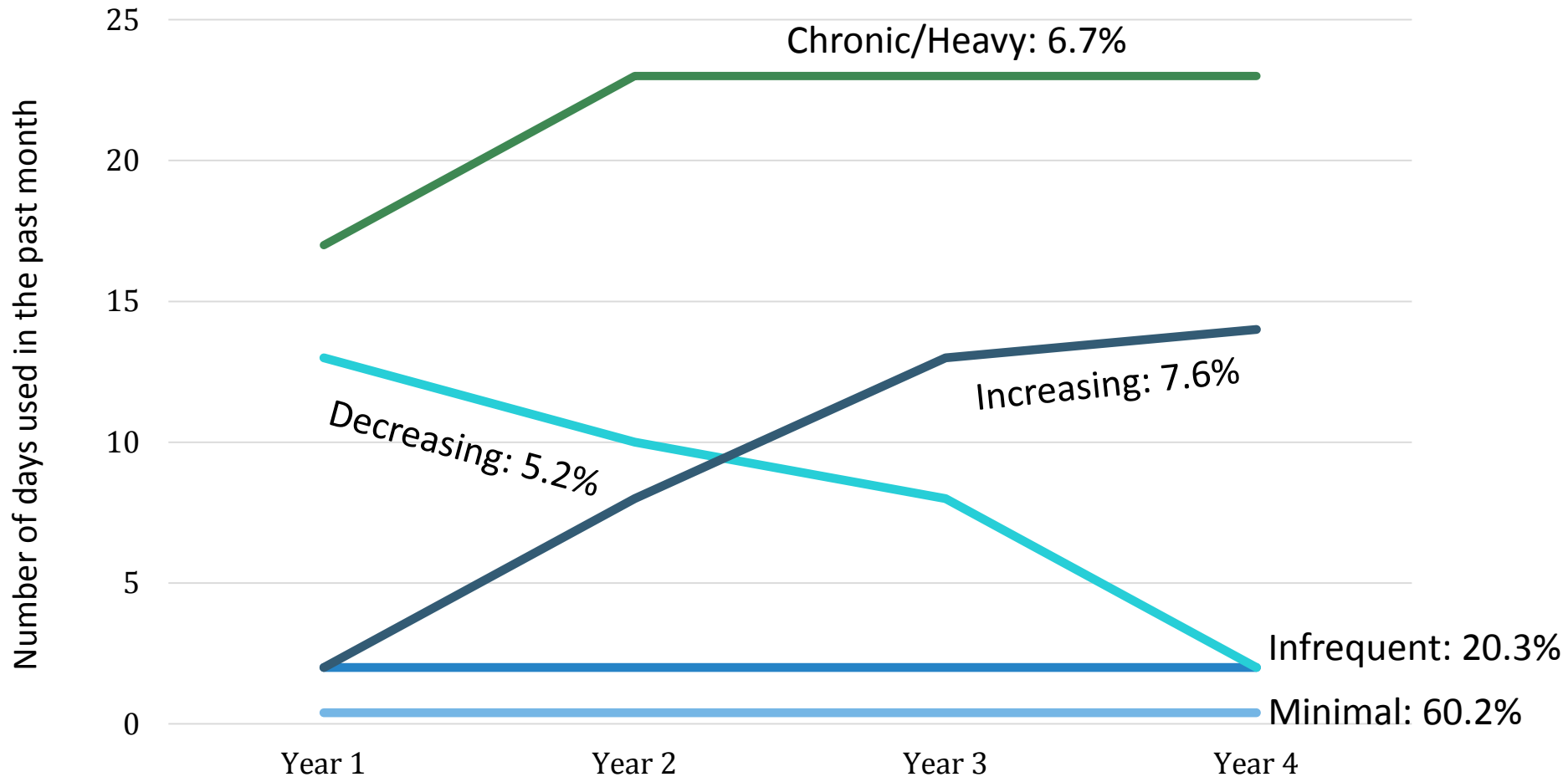


Time spent studying, by frequency of illicit drug use

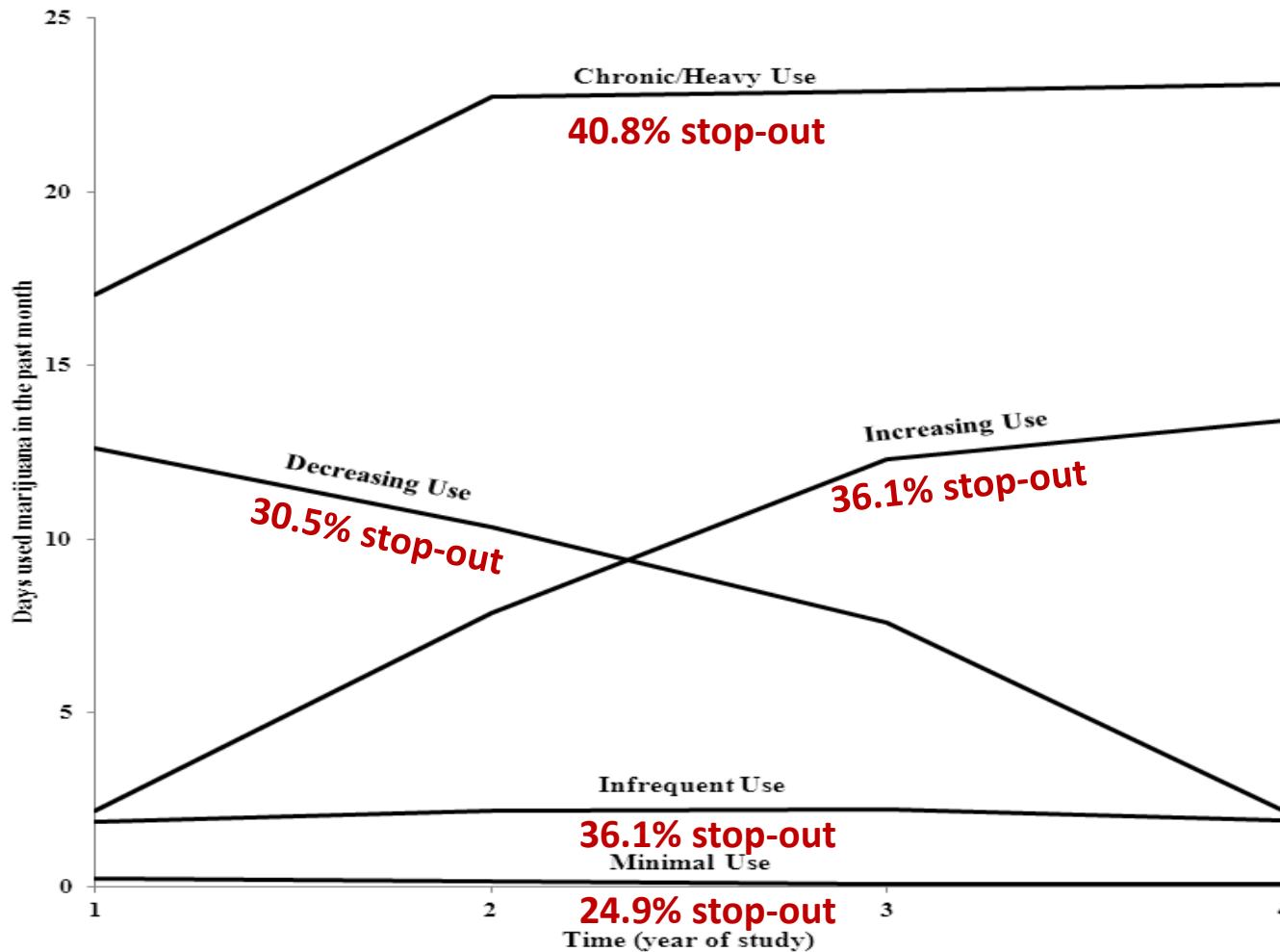


“Stopping out” –
Gaps in College Enrollment

Patterns of marijuana use during college *College Life Study*



Marijuana use trajectories: relationship to “discontinuous” enrollment

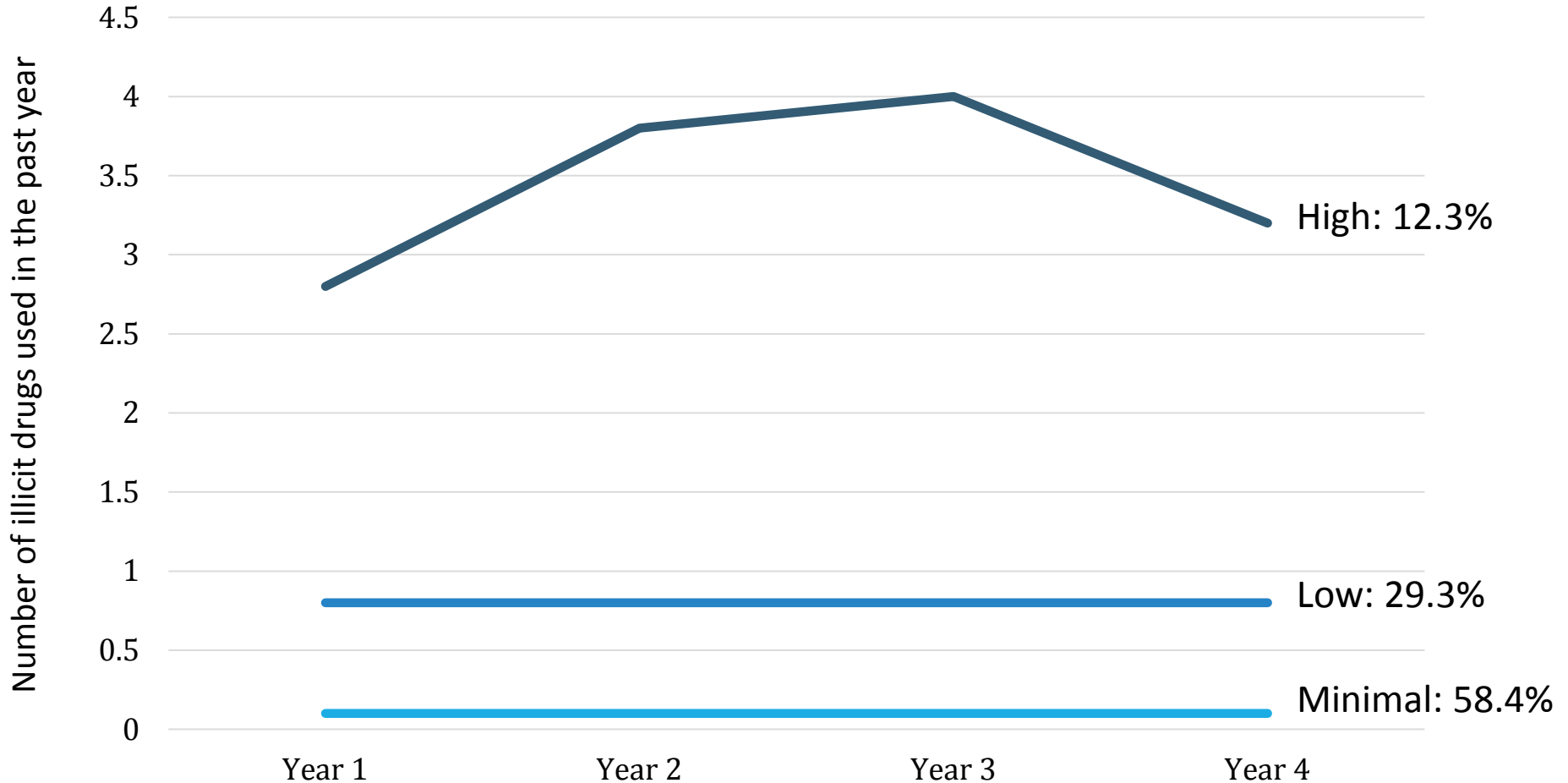


Chronic/Heavy marijuana users were 2.0 times as likely as “minimal users” to have discontinuous enrollment.....even after controlling for demographics, personality, and high school GPA.

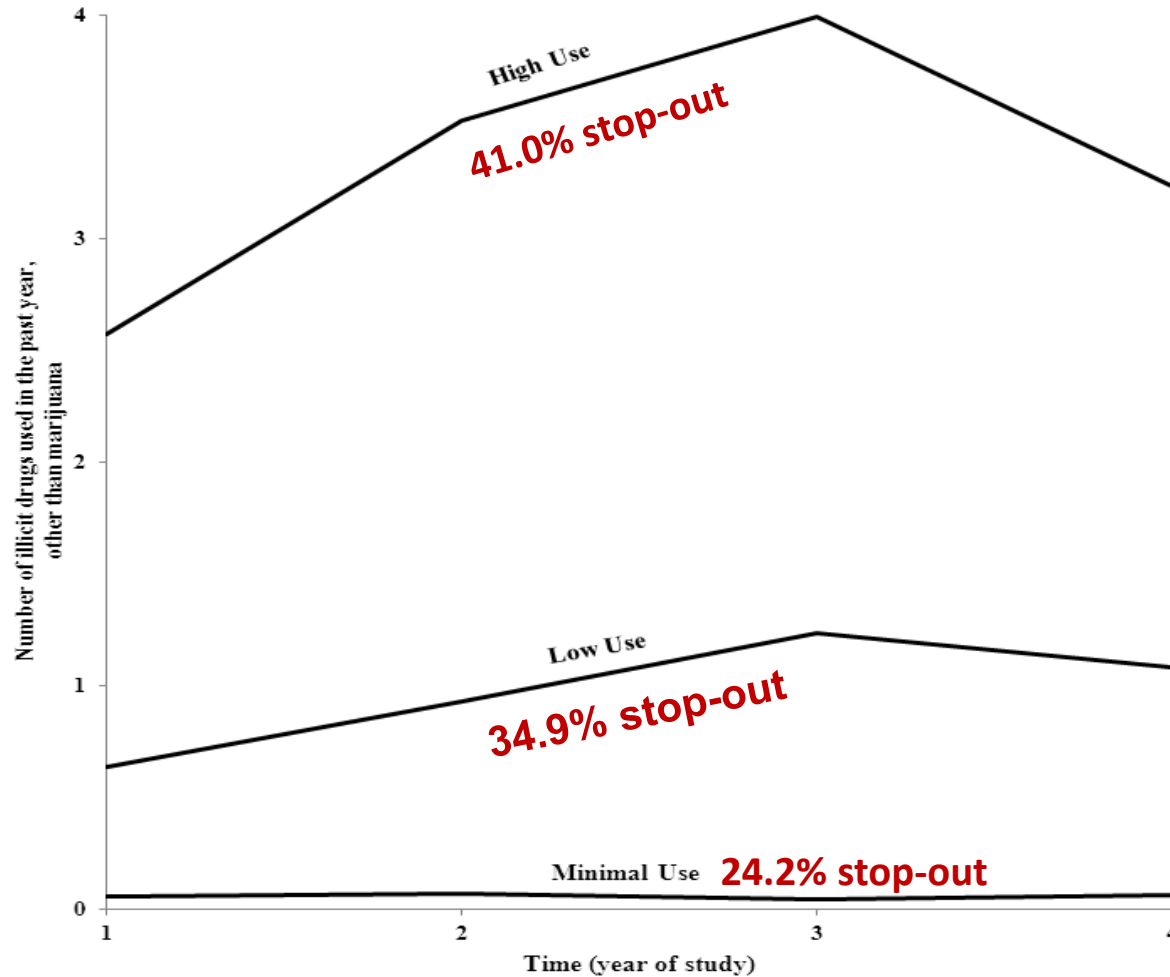
Marijuana Trajectory Group Membership	n	% of Sample
Minimal	682	60.2
Infrequent	230	20.3
Decreasing	59	5.2
Increasing	86	7.6
Chronic/Heavy	76	6.7

Patterns of illicit drug use during college

College Life Study



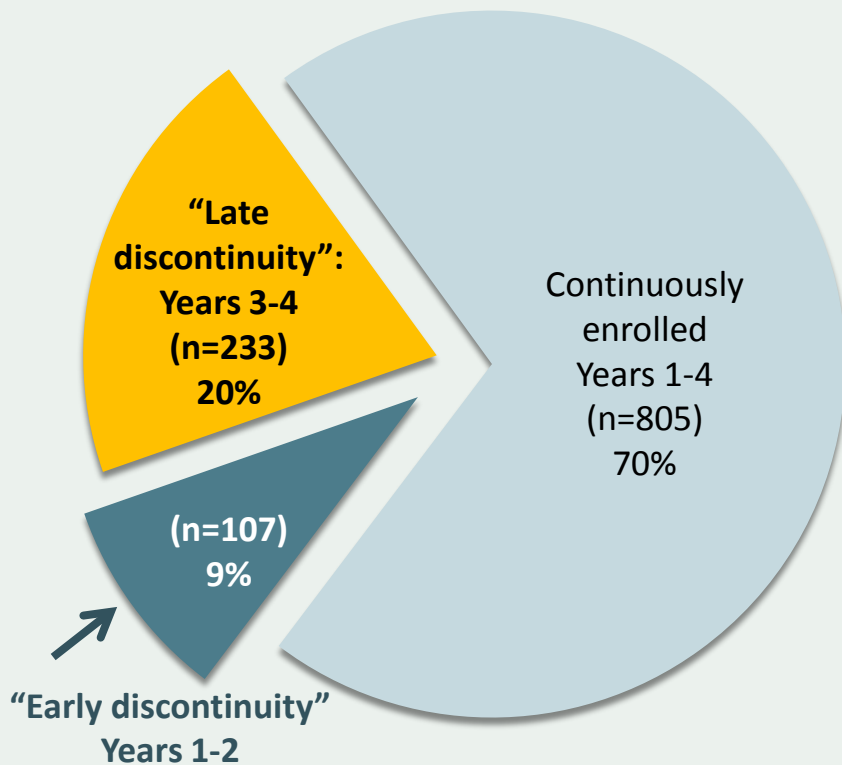
Drugs other than marijuana: relationship to “discontinuous” enrollment



“High-level” drug users were 2.0 times as likely as “minimal users” to have discontinuous enrollment... even after controlling for demographics, personality, and high school GPA.

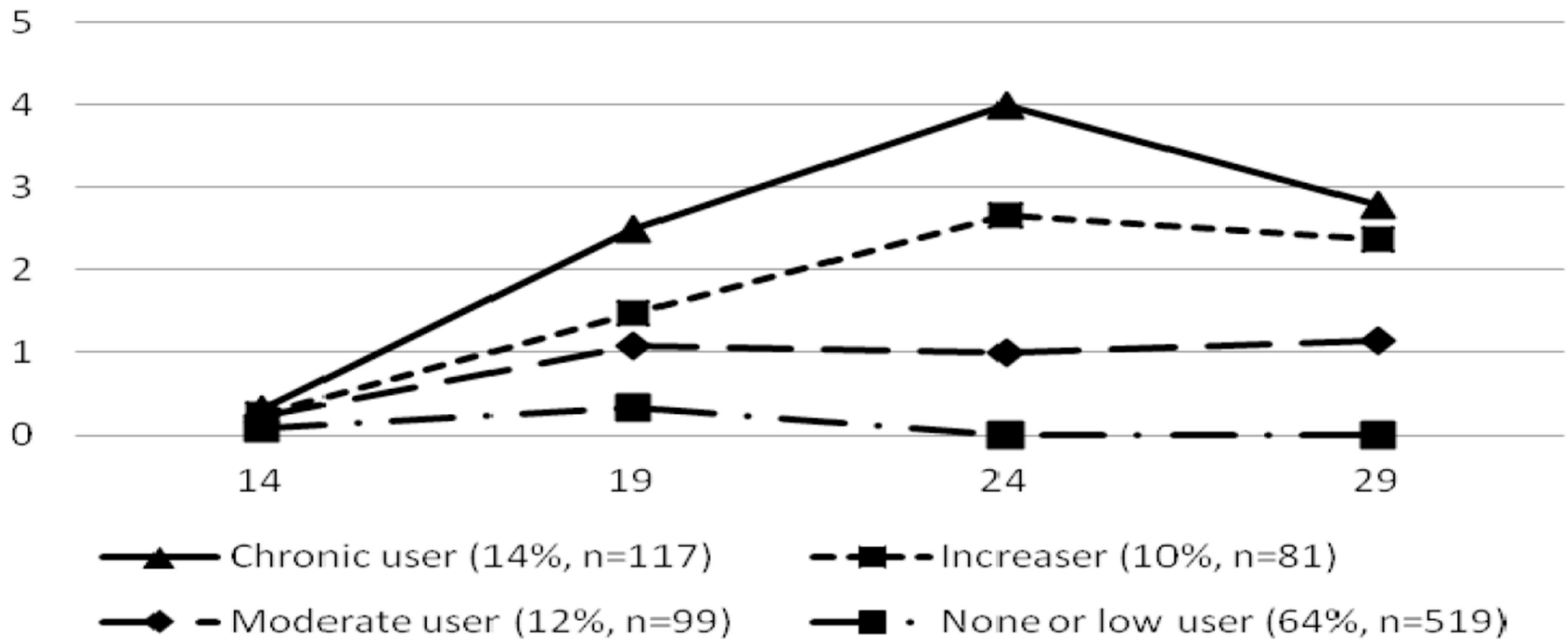
Illicit Drug Trajectory Group Membership	<i>n</i>	% of Sample
Minimal	662	58.4
Low	332	29.3
High	139	12.3

Marijuana and alcohol use: relationships to discontinuous enrollment



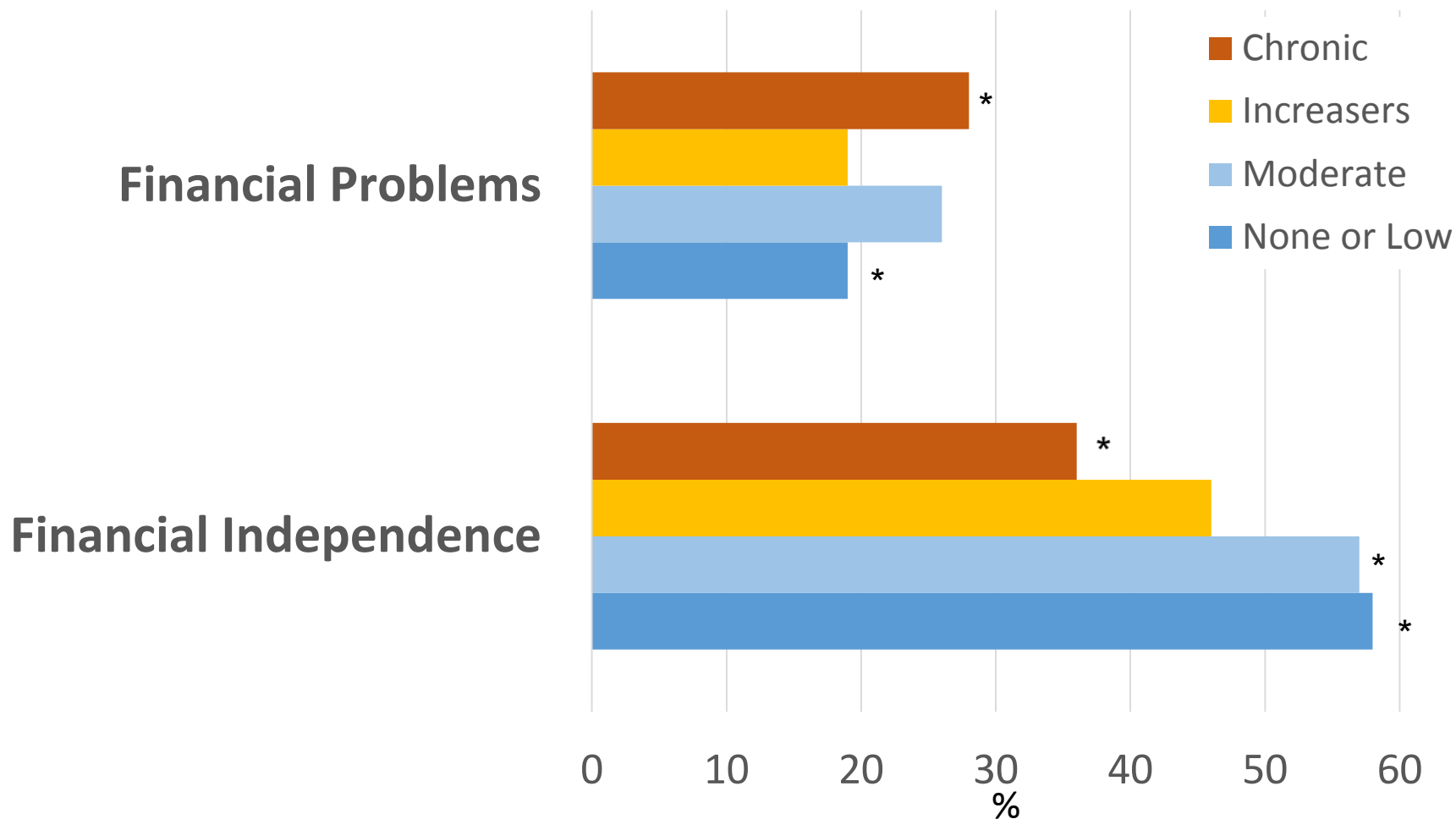
First year alcohol use (typical number of drinks/day) and frequency of marijuana use was related to late discontinuity, even after controlling for demographics, psychiatric symptoms and diagnosis, and high school GPA.

Marijuana use



Marijuana Use Trajectory Group and Financial Stability

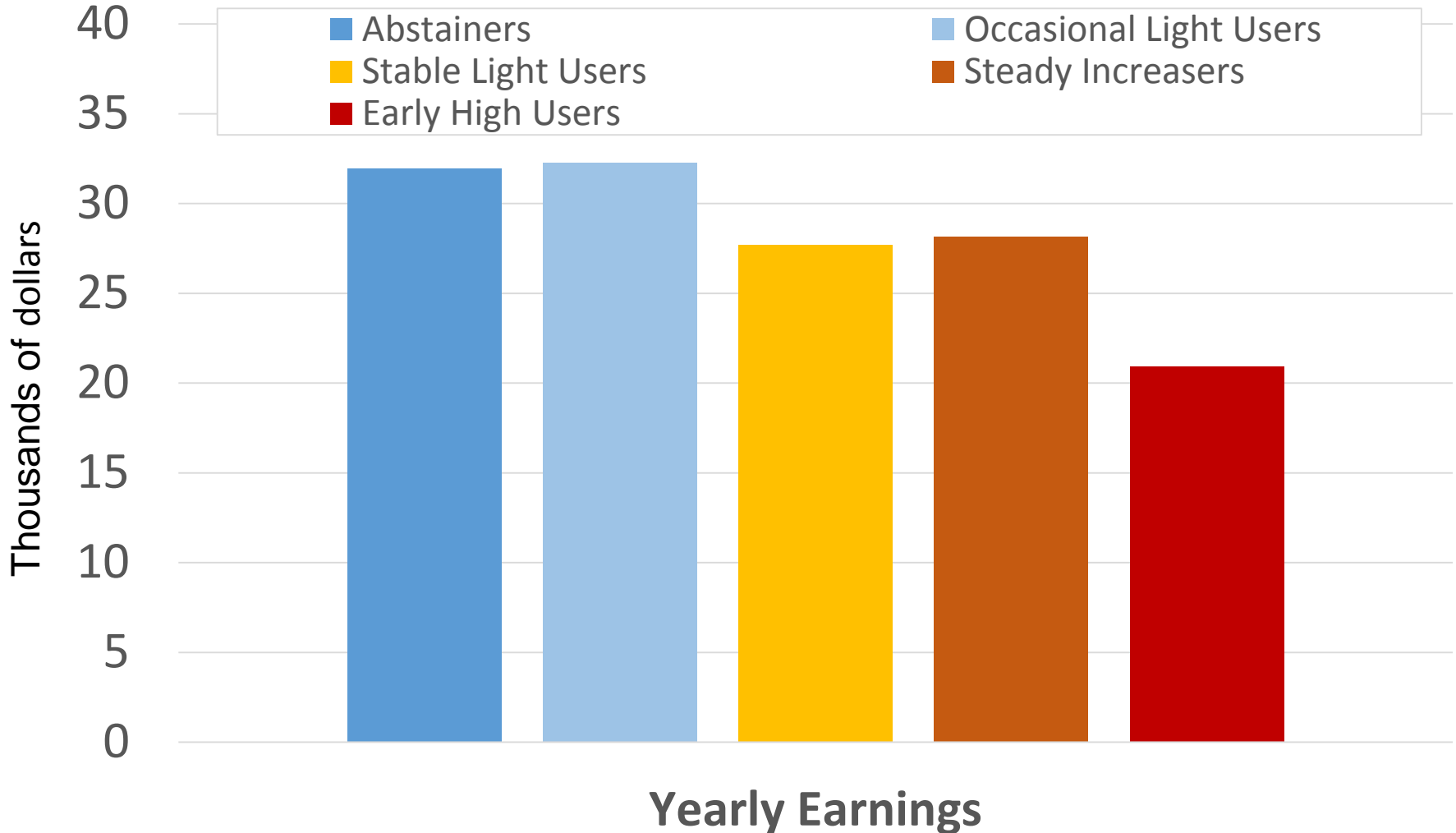
(Brook et al., 2013)



Brook, JS; Lee, JY; Finch SJ; Seltzer N; Brook DW (2013) Adult Work Commitment, Financial Stability, and Social Environment as Related to Trajectories of Marijuana Use Beginning in Adolescence. *Substance Abuse*; 34(3): 298-305. Financial problems was measured with a six-item scale (highest 16th percentile); Financial independence with a three-item scale (yes to all three items = 1).

Marijuana Trajectory Class and Earnings at Age 29

(Ellickson et al., 2004)

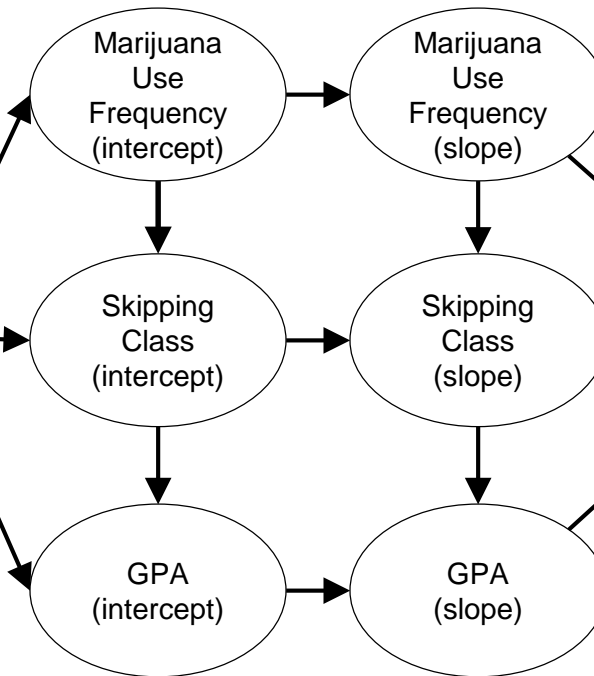


Baseline Covariates

AOD Use	Alcohol Use Frequency
	Typical Alcohol Quantity
	Count of Other Illicit Drugs
Demog. Risk Factors	Sex
	Race/Ethnicity
	Parents' Education
College Engagement	Living-Learning Program Involvement
	Extracurricular Involvement
	Fraternity/Sorority Involvement
Psychological Risk Factors	Sensation-Seeking
	Depressive Symptoms
	Anxiety Symptoms
	ADHD Diagnosis
	Behavioral Dysregulation

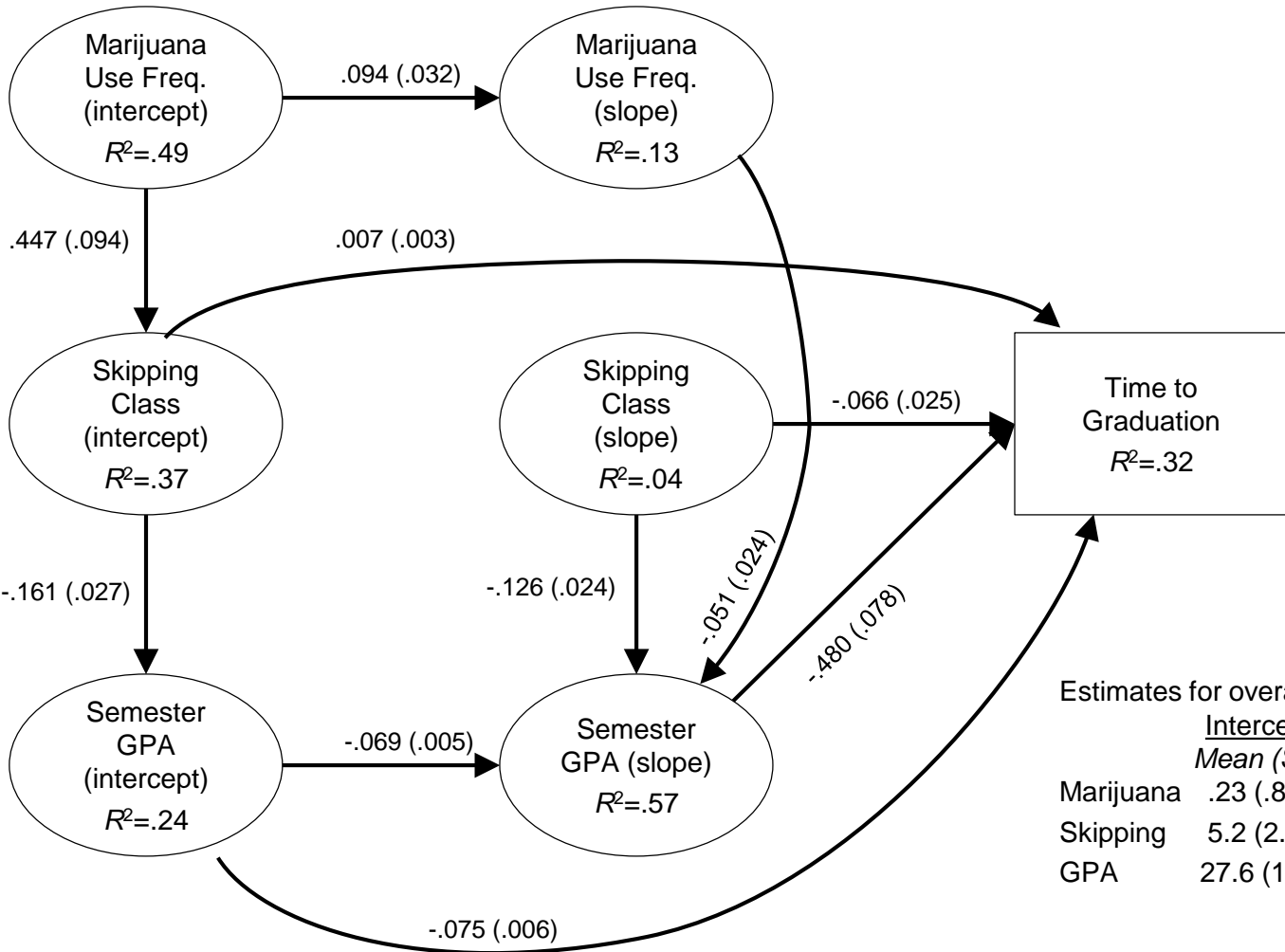
College Trajectories

Intercepts Slopes



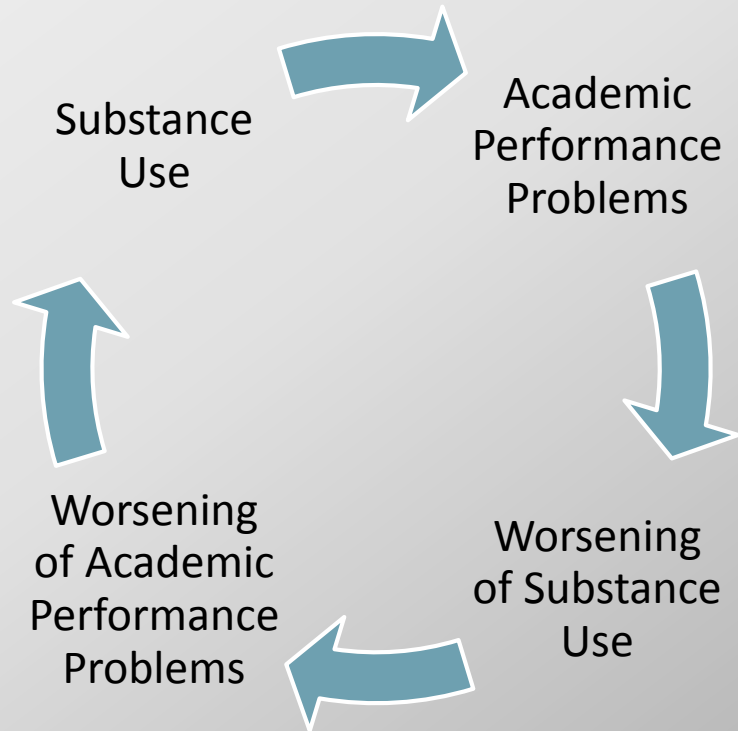
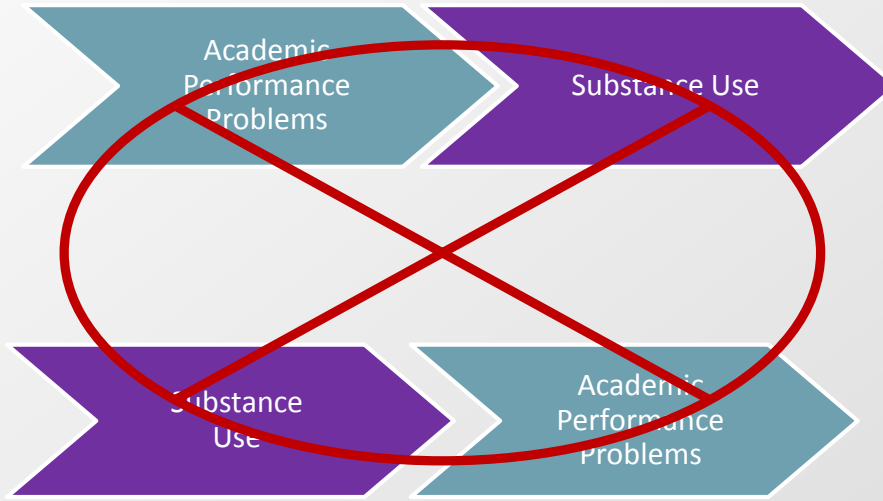
College Academic Outcome

Time to Graduation



Estimates for overall sample:

	<u>Intercept</u> Mean (SE)	<u>Slope</u> Mean (SE)
Marijuana	.23 (.81)	-.26 (.35)
Skipping	5.2 (2.0)	-1.4 (0.8)
GPA	27.6 (1.1)	1.5 (0.3)



THE ACADEMIC OPPORTUNITY COSTS OF SUBSTANCE USE DURING COLLEGE

*A Brief Report from the
Center on Young Adult Health and Development*

Amelia M. Arria, Ph.D.
Kimberly M. Caldeira, M.S.
Brittany A. Bugbee, B.A./B.S.
Kathryn B. Vincent, M.A.
Kevin E. O'Grady, Ph.D.

May 2013

Center on Young Adult Health and Development (CYAHD)
University of Maryland School of Public Health
College Park, MD 20742
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op·por·tu·ni·ty cost:
what a person sacrifices when they choose one option over another

www.activeminds.org



Nearly half of students say that their **mental health affected their academic performance** in the past month.

One in five **missed academic obligations** during the past week due to mental health problems.

- The presence of a psychiatric disorder makes a student significantly less likely to complete a college degree, **especially when the disorder is diagnosed during college.**
- Students with **anxiety and mood disorders** are less likely to graduate than other students.
- Having **more than one** psychiatric disorder increases the risk of not graduating.

Discontinuous College Enrollment: Associations With Substance Use and Mental Health

Amelia M. Arria, Ph.D.
Kimberly M. Caldeira, M.S.
Kathryn B. Vincent, M.A.
Emily R. Winick, B.A.
Rebecca A. Baron, B.A.
Kevin E. O'Grady, Ph.D.

Objective: This study examined the prospective relationship of substance use and mental health problems with risk of discontinuous enrollment in college. **Methods:** Participants were 1,145 students at a large public university who were interviewed annually for four years beginning at college entry in 2004 (year 1). Discontinuous enrollment was defined as a gap in enrollment of one or more semesters during the first two years (early discontinuity) or the second two years (late discontinuity) versus continuous enrollment throughout all four years. Explanatory variables measured in year 1 were scores on the Beck Depression Inventory (BDI) and the Beck Anxiety Inventory, childhood conduct problems, cannabis use, number of illicit drugs used, and alcohol consumption. In years 3 and 4, participants reported lifetime history of clinically diagnosed attention-deficit hyperactivity disorder, depression, and anxiety, including age at diagnosis. Multinomial logistic regression models were developed to evaluate the association between the independent variables and discontinuous enrollment while holding constant background characteristics. **Results:** Higher BDI scores predicted early discontinuity but not late discontinuity, whereas cannabis and alcohol use predicted only late discontinuity. Receiving a depression diagnosis during college was associated with both early and late discontinuity. Self-reported precollege diagnoses were not related to discontinuous enrollment once background characteristics were taken into account. **Conclusions:** Students who experience depressive symptoms or seek treatment for depression during college might be at risk of interruptions in their college enrollment. Cannabis use and heavy drinking appear to add to this risk. Students entering college with preexisting psychiatric diagnoses are not necessarily at risk of enrollment interruptions. (*Psychiatric Services* 64: 165-172, 2013; doi: 10.1176/appi.ps.201200106)

Dr. Arria, Ms. Caldeira, Ms. Vincent, Ms. Winick, and Ms. Baron are affiliated with the Center on Young Adult Health and Development, Department of Family Science, University of Maryland School of Public Health, 1142 School of Public Health Building, College Park, MD 20742 (e-mail: aarria@um.edu). Dr. Arria is also with the Treatment Research Institute, Philadelphia. Dr. O'Grady is with the Department of Psychology, University of Maryland, College Park.

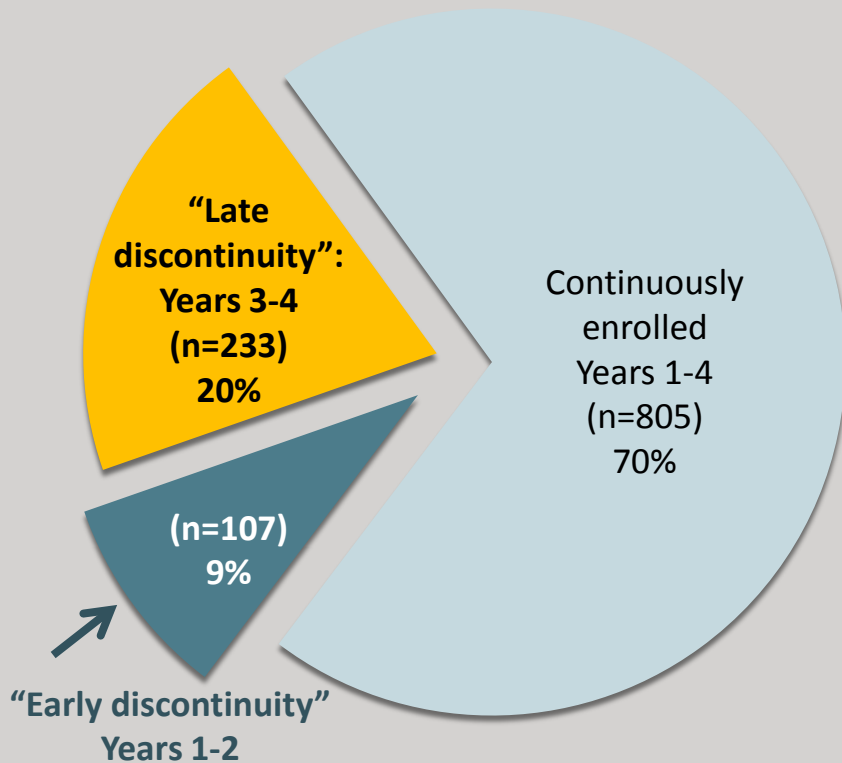
Discontinuous College Enrollment: Associations with Substance Use and Mental Health

Mental health problems and substance use among young adults are major public health concerns because of their impact on well-being, safety, and an individual's productivity. College students have high rates of excessive drinking and drug use (1,2), and counseling centers have seen increasing numbers of students with mental health problems, including depression and suicidality (3), and students taking medications for psychiatric conditions (4). Nationally, one in ten college students sought counseling during the past year (4), with the most recent data showing that 28% of students "felt so depressed in the past year that it was difficult to function" (5). Regardless of college enrollment, young adulthood is a period of high risk for many psychiatric disorders (6), especially the onset of substance use disorders (7).

An understudied aspect of this problem is the possibility that psychiatric disorders and substance use among college students are associated with academic problems, perhaps making it more difficult for students to stay enrolled and complete their degree on time. For example, stress related to academic struggles might precipitate an underlying mental health condition, such as depression, or lead to escalation of substance use. Alternatively, psychiatric symptoms could negatively affect decisions to participate in both academic pursuits and

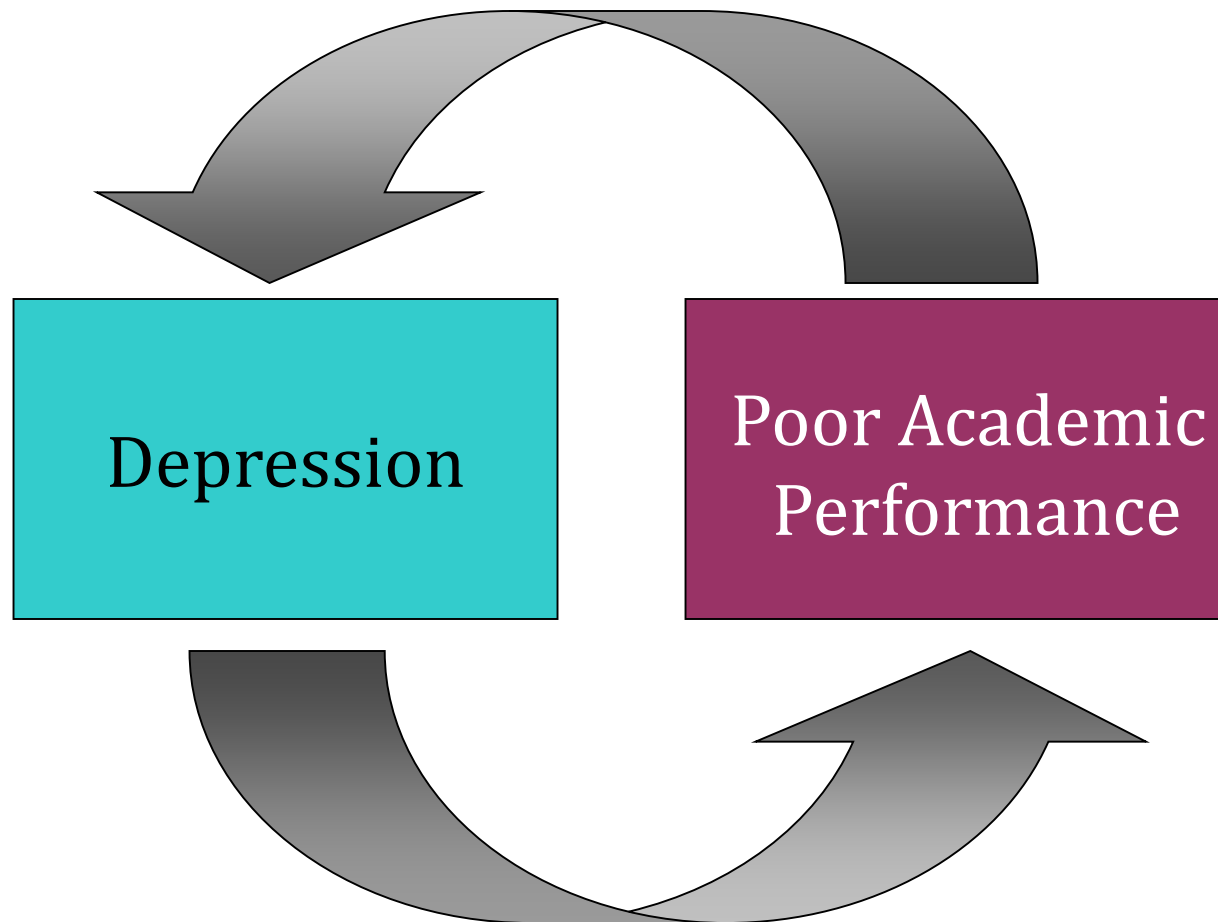
By the fourth year of the study, 14% of our sample received a diagnosis of depression.

MENTAL HEALTH PROBLEMS RELATED TO DISCONTINUOUS ENROLLMENT DURING COLLEGE



Individuals who were diagnosed with depression during college were three times more likely to experience early discontinuity, even after controlling for demographics, drug and alcohol use, and high school GPA.

Depression and Academic Performance



What do you think are the **top three** reasons cited for poor academic performance among students surveyed in a national study?

Top self-identified reasons for poor academic performance (ACHA, 2012)



Top self-identified reasons for poor academic performance (ACHA, 2012)



Where's alcohol, drug use?

PART 2:

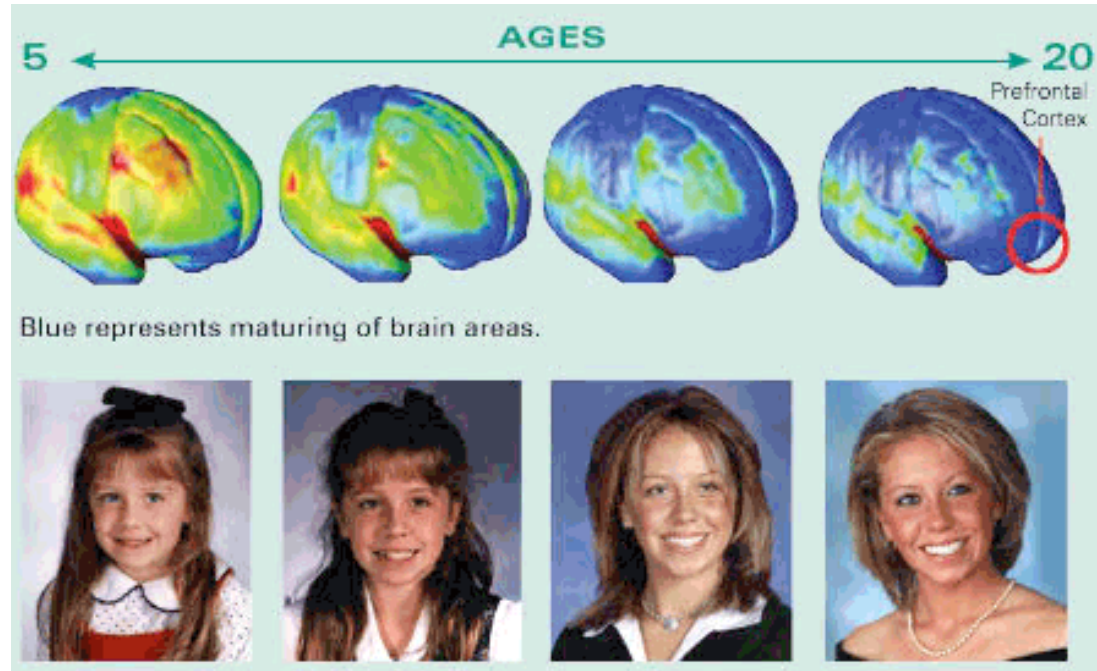

Mechanisms – the Whys

Developmental Context

Why do most 16-year-olds
drive like they're
missing a part of their brain?

— (M) —

BECAUSE THEY ARE.



Why does drug use have a negative impact on academic performance?

1. “Toxic” Effect on Cognition:

Substance use is associated with attention problems, sleep disturbances, and other cognitive deficits, making classroom learning, studying and homework more difficult.

NEUROBIOLOGICAL CONSEQUENCES OF ALCOHOL USE

In adolescents, heavy alcohol use is associated with:

- Structural and function changes in the brain
- Differences in sleep patterns
- Poor planning
- Impaired executive functioning
- Spatial deficits
- Attention deficits

NEUROBIOLOGICAL CONSEQUENCES OF MARIJUANA USE

Acutely, marijuana use is associated with:

- Attention and concentration difficulties
- Decreased working memory
- Decreased information processing
- Decreased decision response speed

Longer-term...

- Impaired planning, organizing, and problem solving
- Deficits to allocation of attentional resources and filtering out irrelevant material
- Retrieval and immediate verbal memory deficits

Poor sleep

- Poorer negative moods
- Higher levels of stress
- More physical illness
- Use of prescription, OTC, and other drugs
- Drinking more alcohol

Why does drug use have a negative impact on academic performance?

2. “Hijacking” of Brain Reward Pathways

Substance use “hijacks” reward pathways in the brain.

Academic pursuits become less meaningful as drugs become more valued.

Risk and Reward...

1. Is it risky?

2. Is there a benefit to using?

3. Does the benefit outweigh the risk?

What influences the balance of perceptions between risk and reward?

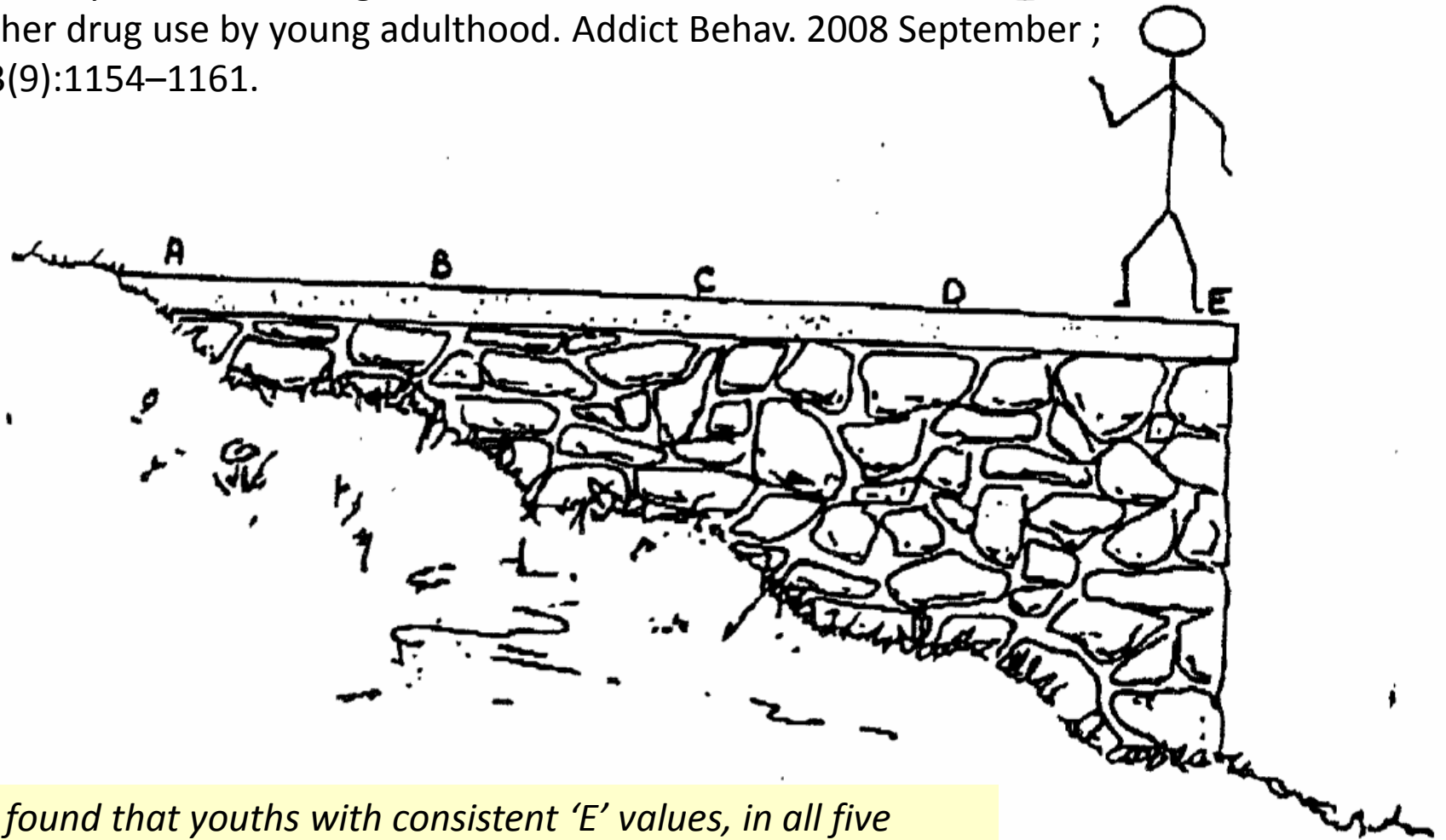


Individual

Peers and Caregivers

Community

Carlos F. Ríos-Bedoya, Holly C. Wilcox, Marina Piazza, and James C. Anthony. Children taking risks: The association with cocaine and other drug use by young adulthood. *Addict Behav.* 2008 September ; 33(9):1154–1161.



“We found that youths with consistent ‘E’ values, in all five assessments, were an estimated nine times more likely to try cocaine by young adulthood as compared to youths who consistently placed themselves at the lower end (‘A’ position) of the wall values.”

*What peers think, say and do
compounds risk-taking –
Experiments show that adolescents
can behave “adult-like” in the
absence of peers.*

Deviant peer affiliation compounds substance use problems – having peers that also do not care about academic pursuits makes learning problems worse and encourages more substance use.


Parents matter too... parents who disapprove of early drinking and set zero tolerance limits on alcohol use during adolescence reduce their child's chances of alcohol problems later in life.

Parents set expectations and monitor academic performance.

PART 3:
Moving Upstream:
Strategies and Solutions

PART 3: STRATEGIES AND SOLUTIONS



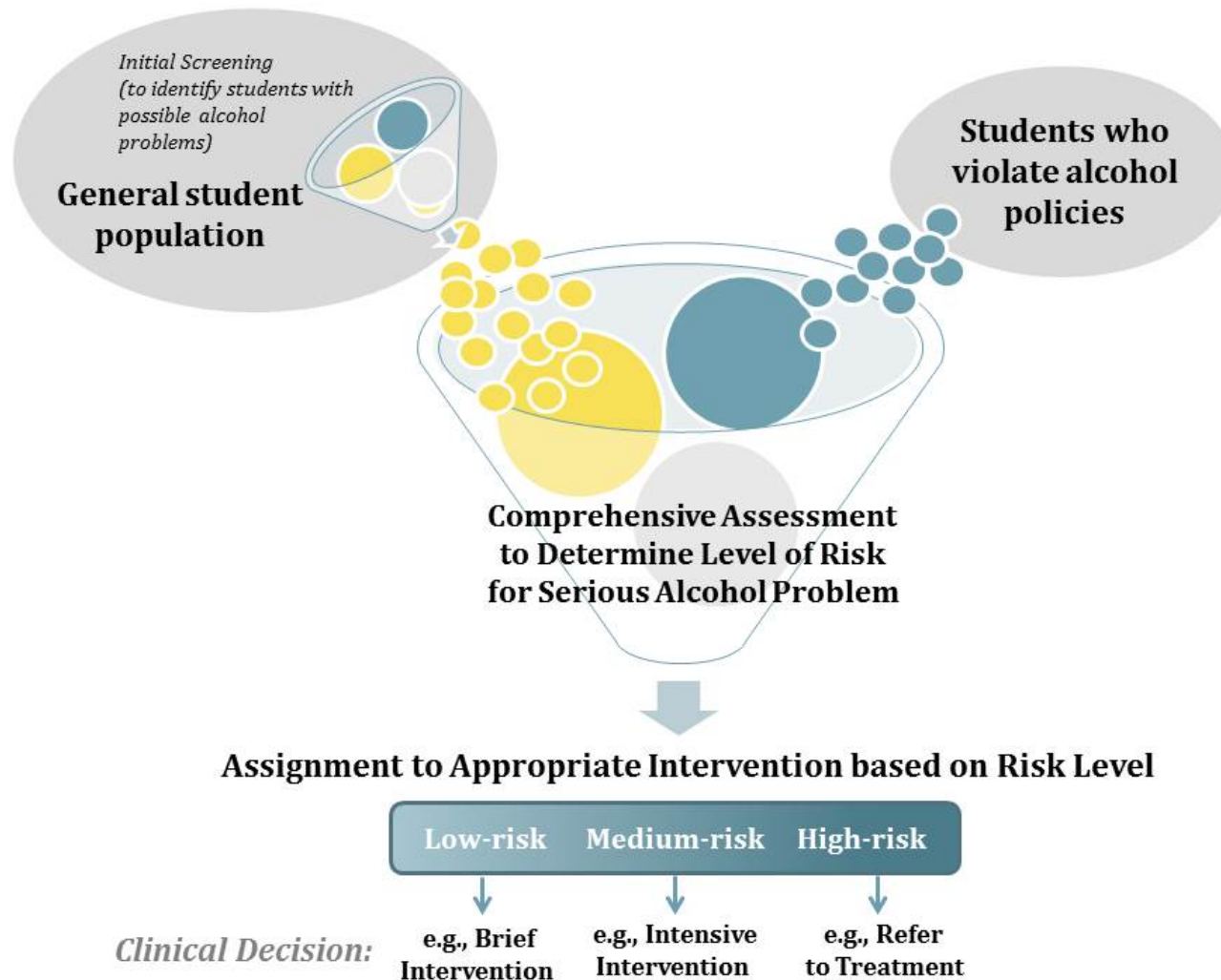
- a. Individual Approaches
 - b. Connecting with Parents
 - c. Bolstering Capacity of Educational Professionals
- 



A 2010 study of 351 colleges and universities found that:


- 58% of college administrators had reviewed the recommendations, but 1 in 5 were not aware that recommendations had been made.
- 98% of colleges and universities offered alcohol education programs, but less than half required students to complete it.
- Only half of schools offered intervention programs that were empirically supported.

Create a system for screening , identifying and intervening with college students with different levels of alcohol involvement



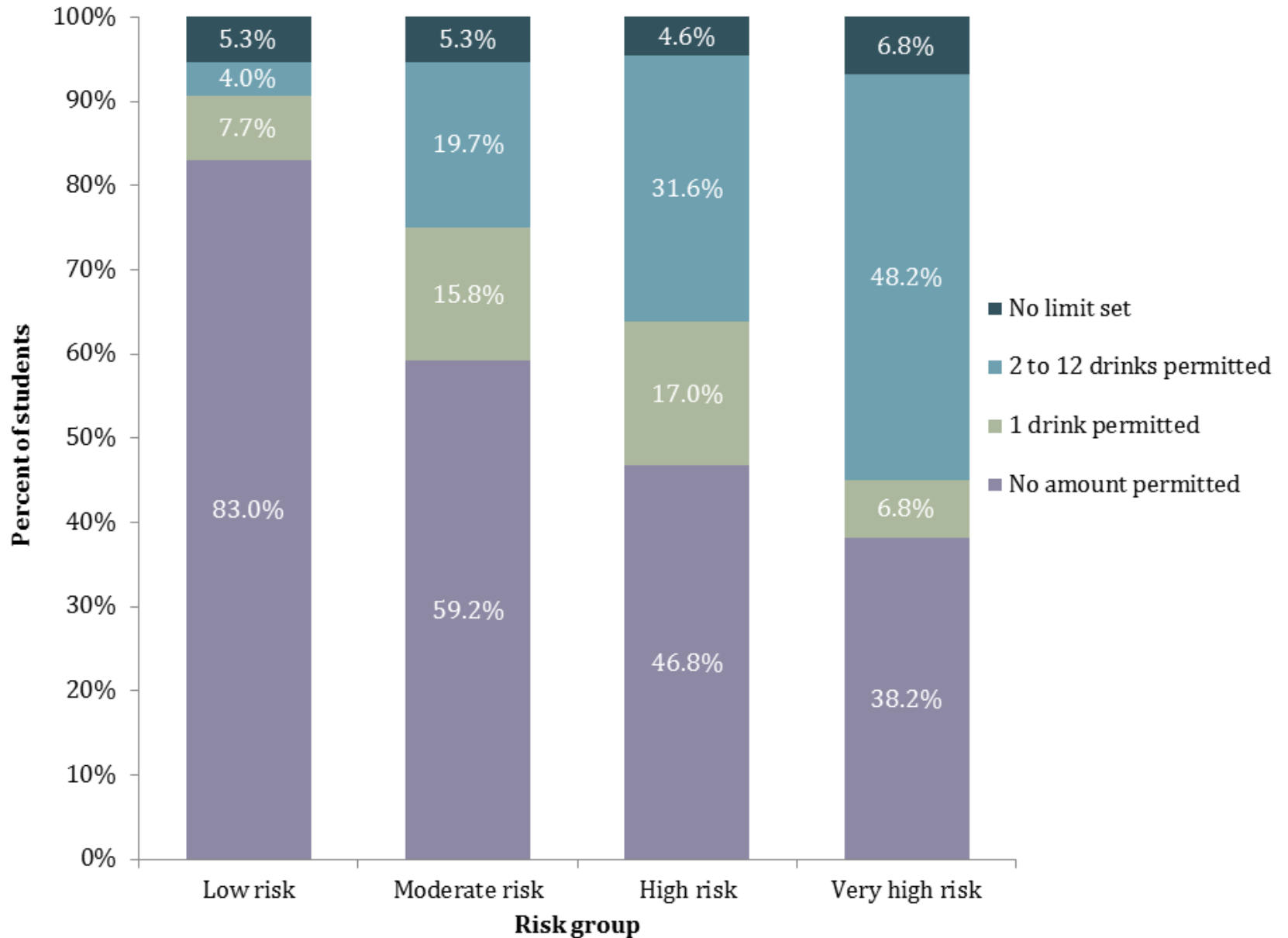
PART 3: STRATEGIES AND SOLUTIONS



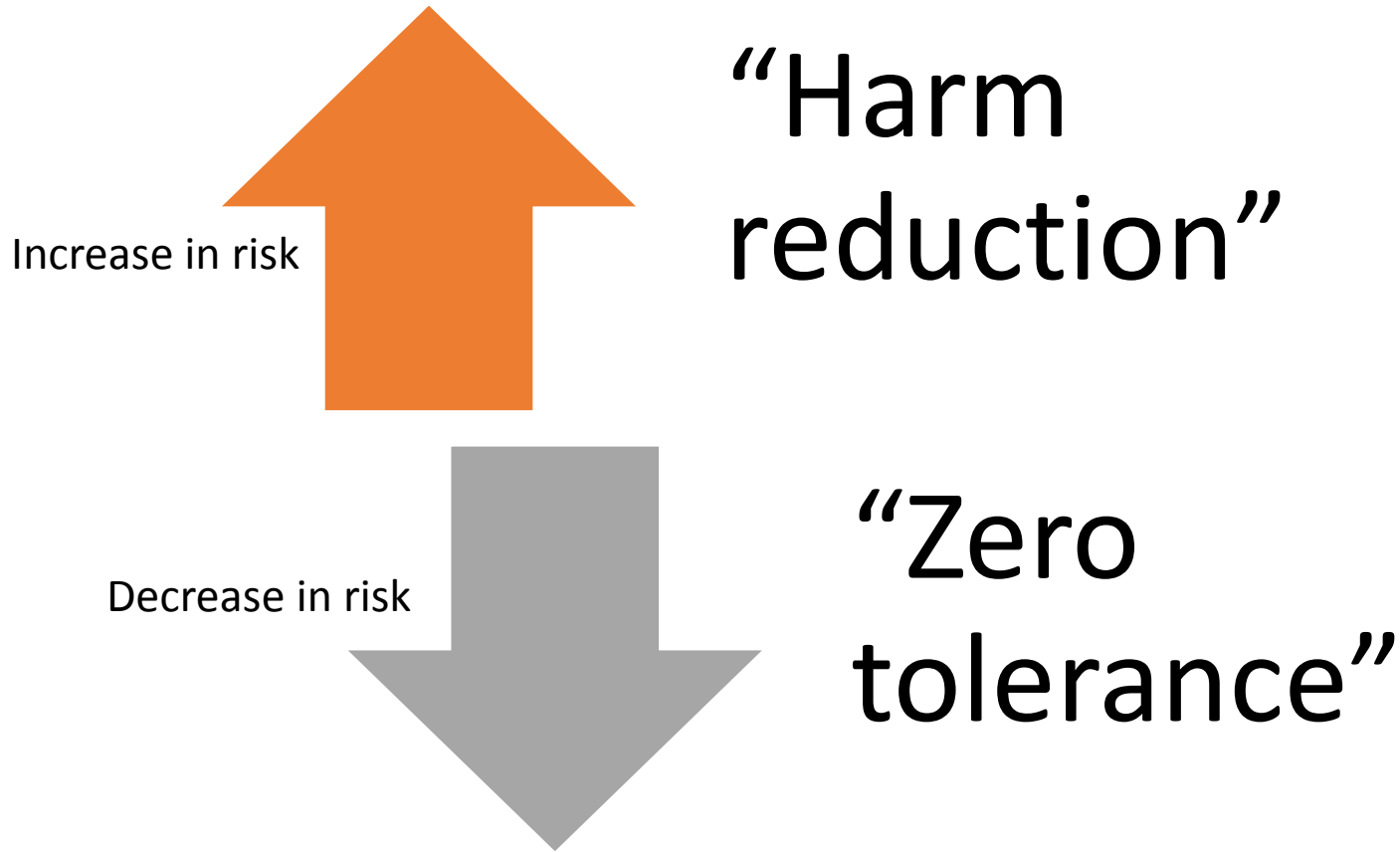
- a. Individual Approaches
 - b. Connecting with Parents**
 - c. Bolstering Capacity of Educational Professionals
- 

Research shows that parents can have a powerful impact on behavioral choices early on, but in college the nature of their influence changes.

Q. During your senior year of high school, how many drinks would your parents/guardians consider to be the upper limit for you to consume on any given occasion?



Messages from parents impact risk for weekend drinking during college





Getting them to college is just the beginning...
With **good communication** you will guide them through it.

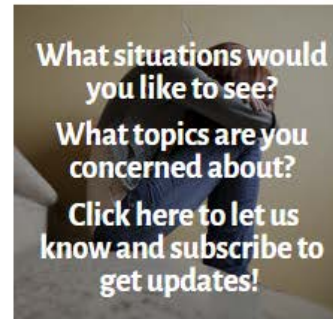
Your child still needs your guidance to navigate the obstacles standing between them and their diploma. Excessive drinking can be one of the biggest. It is a serious problem that undermines students' health, safety, and academic success, for both themselves and their fellow students. Parents like you can help students avoid such problems... And keeping those lines of communication open is where you start.

6 HIGH RISK DRINKING
SITUATIONS TO TALK ABOUT

7 TIPS FOR GOOD
COMMUNICATION


**High Risk
Drinking Situations
To Talk About**

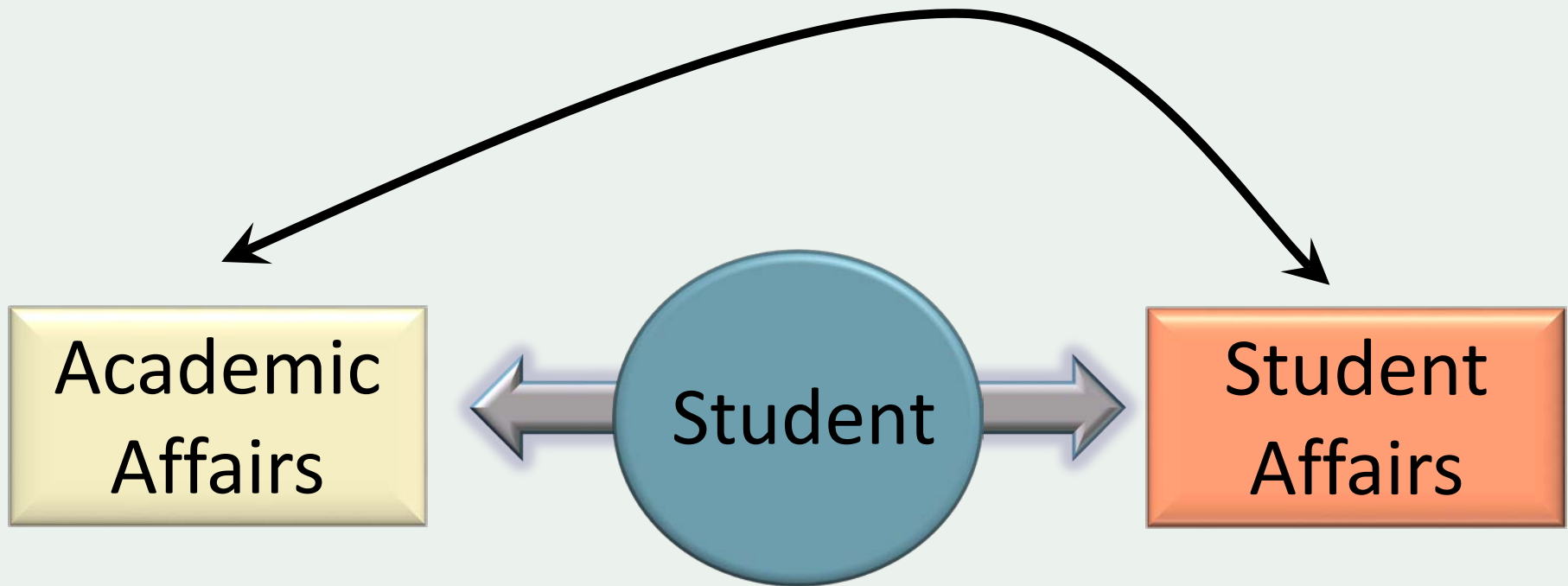
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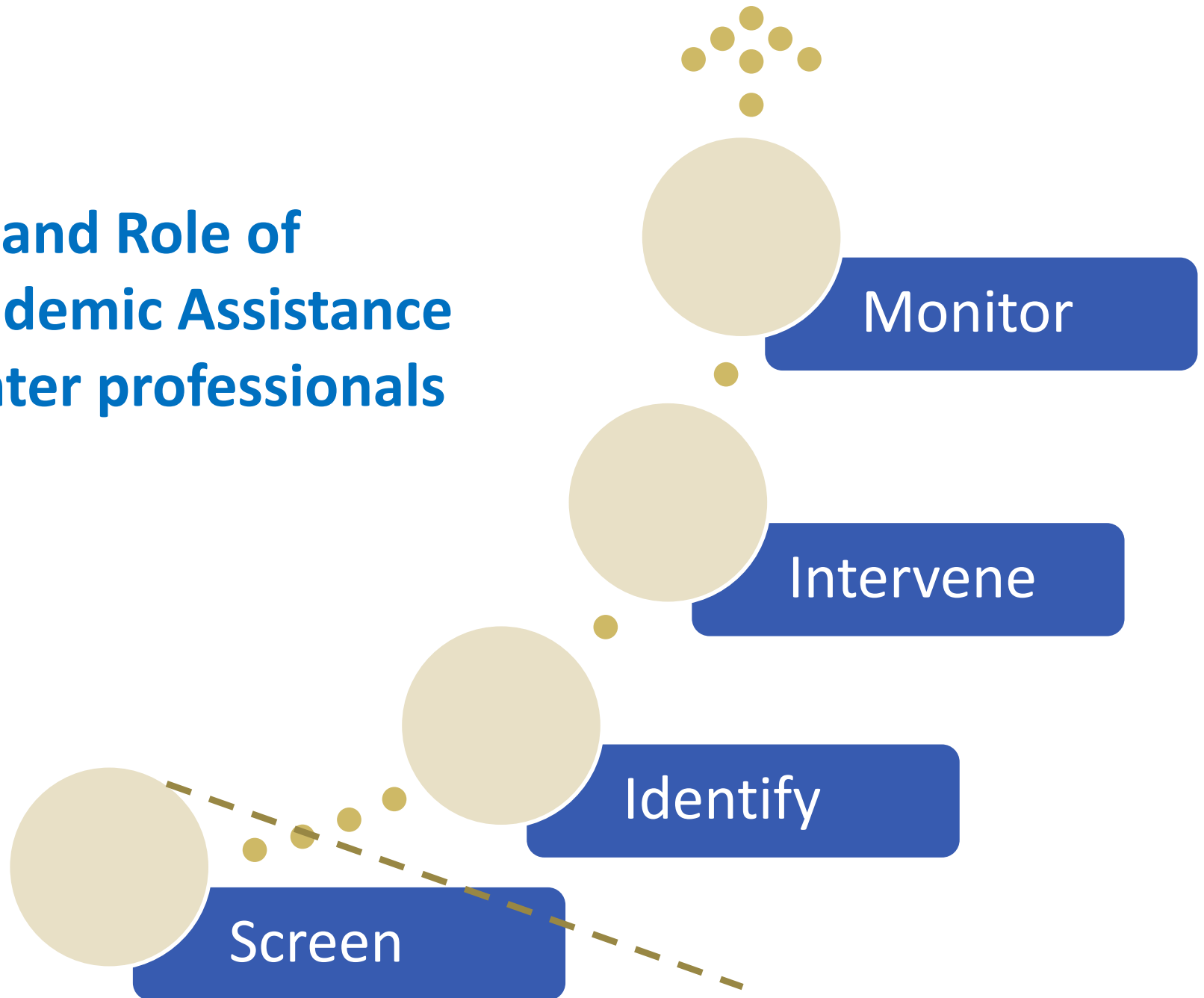
PART 3: STRATEGIES AND SOLUTIONS



- a. Individual Approaches
 - b. Connecting with Parents
 - c. Bolstering Capacity of Educational Professionals
- 



Expand Role of Academic Assistance Center professionals



EXPAND ROLE OF ACADEMIC ASSISTANCE CENTERS

- Implement AOD/mental health screening in academic assistance centers.
- Focus on students who are struggling academically.
- Monitor both AOD use and academic performance to chart progress to student
- Include questions about concentration problems, missed classes due to AOD use, and personal academic goals.

“Connect the dots” between substance use and academic behaviors (e.g., skipping class, GPA)

Facilitate self-reflection of changing aspirations and diffusion of goals

- Develop confidential methods for “electronic student records” which facilitate self-reflection of student progress and changing goals and aspirations.
- This might help track student progress toward goals and draw connections between individual behaviors and achievements (or becoming de-railed).

Students

- Spread the word to other students about the true risks of nonmedical use.
- Challenge misperceptions about “how many people are doing it.”
- Link nonmedical drug use to illicit drug use.
- Dispel “smart drug” myth.

Parents

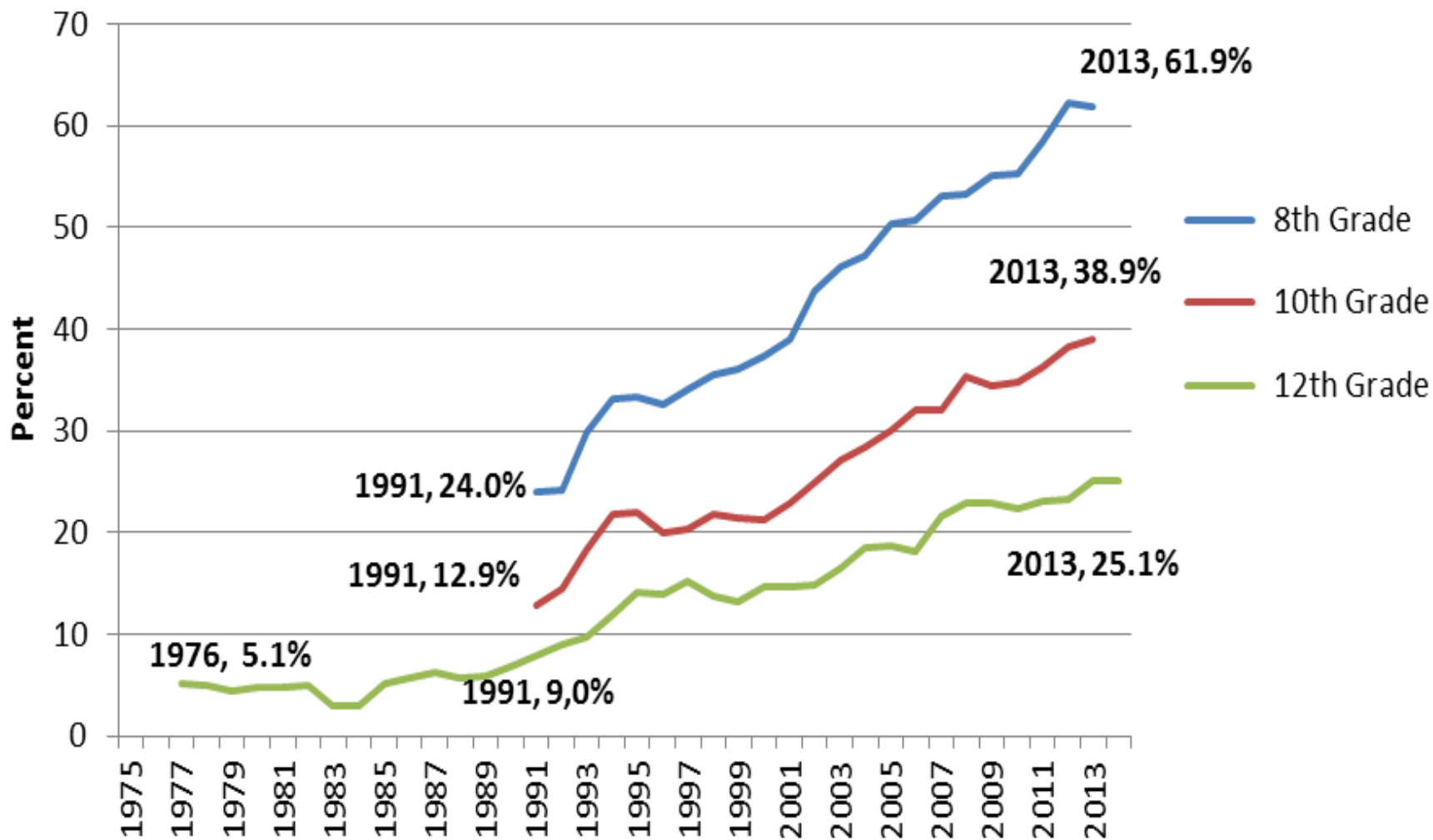
- Dispel “smart drug” myths
- Do not condone or facilitate drug use
- Raise awareness about the opportunities for “new” drug use in college
- Educate parents to recognize signs of emerging mental health and drug problems
- Educate parents regarding medication adherence and role modeling of proper medication use
- Parent effectively to reduce risk of use

Colleges and Universities

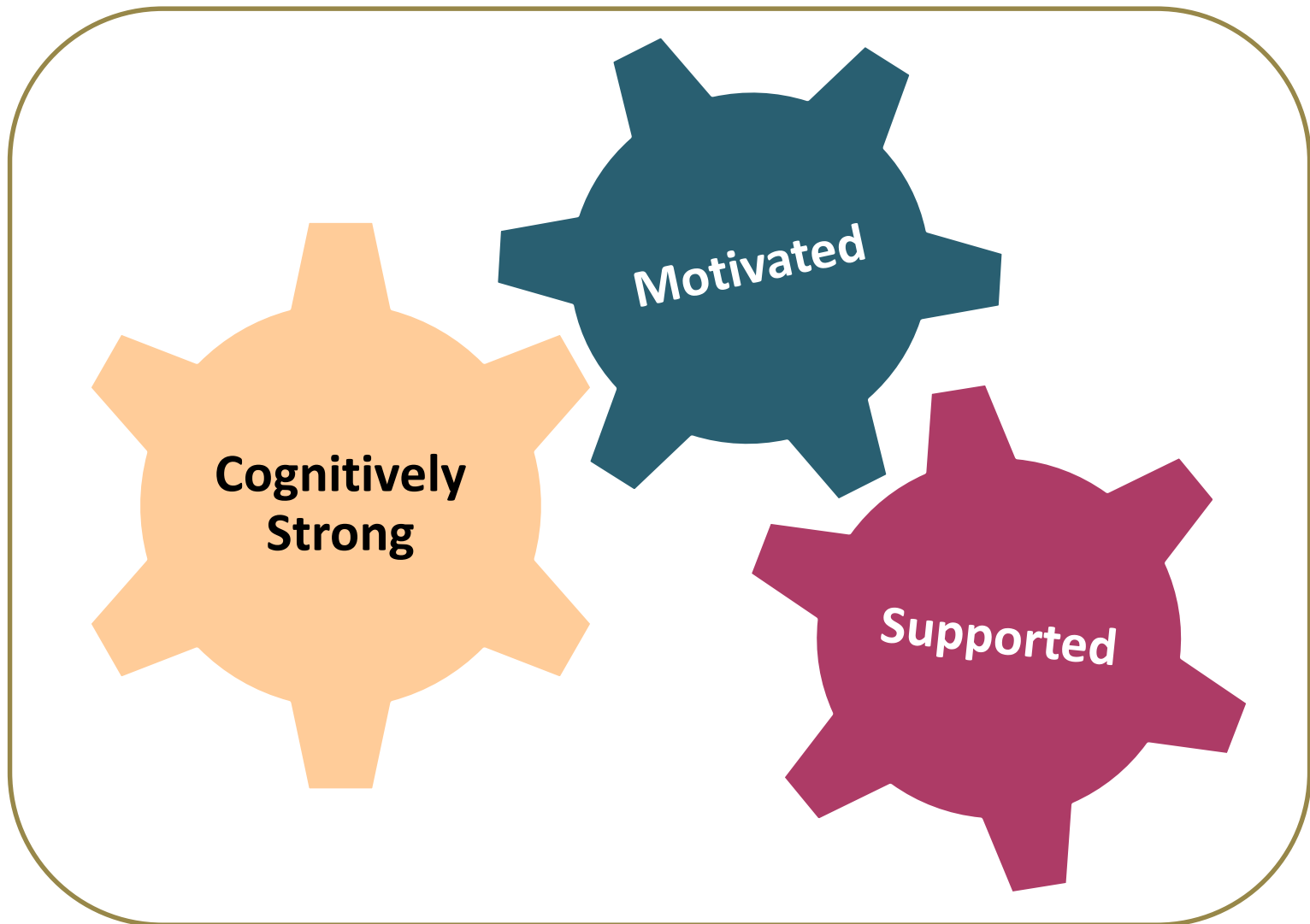
- Sponsor ongoing dialogues that raise awareness and share experiences of college professionals
- Develop multidisciplinary campus action plans to reduce nonmedical prescription stimulant use.
- Have students re-think taking 18 credits per semester in the first year of college.
- Consider options for enforcing sanctions against diversion.

**Give students
who don't use a
LOUDER voice**

Trends in Abstaining from Illicit Drugs, Alcohol and Cigarettes - Lifetime



Interlocking Dimensions of Student Success



Acknowledgments

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Special Focus on Nonmedical Use of Prescription Stimulants

Motives

Access and Availability

*Among college students,
friends and peers
are the most common
sources to obtain
prescription medications
used nonmedically.*

References:

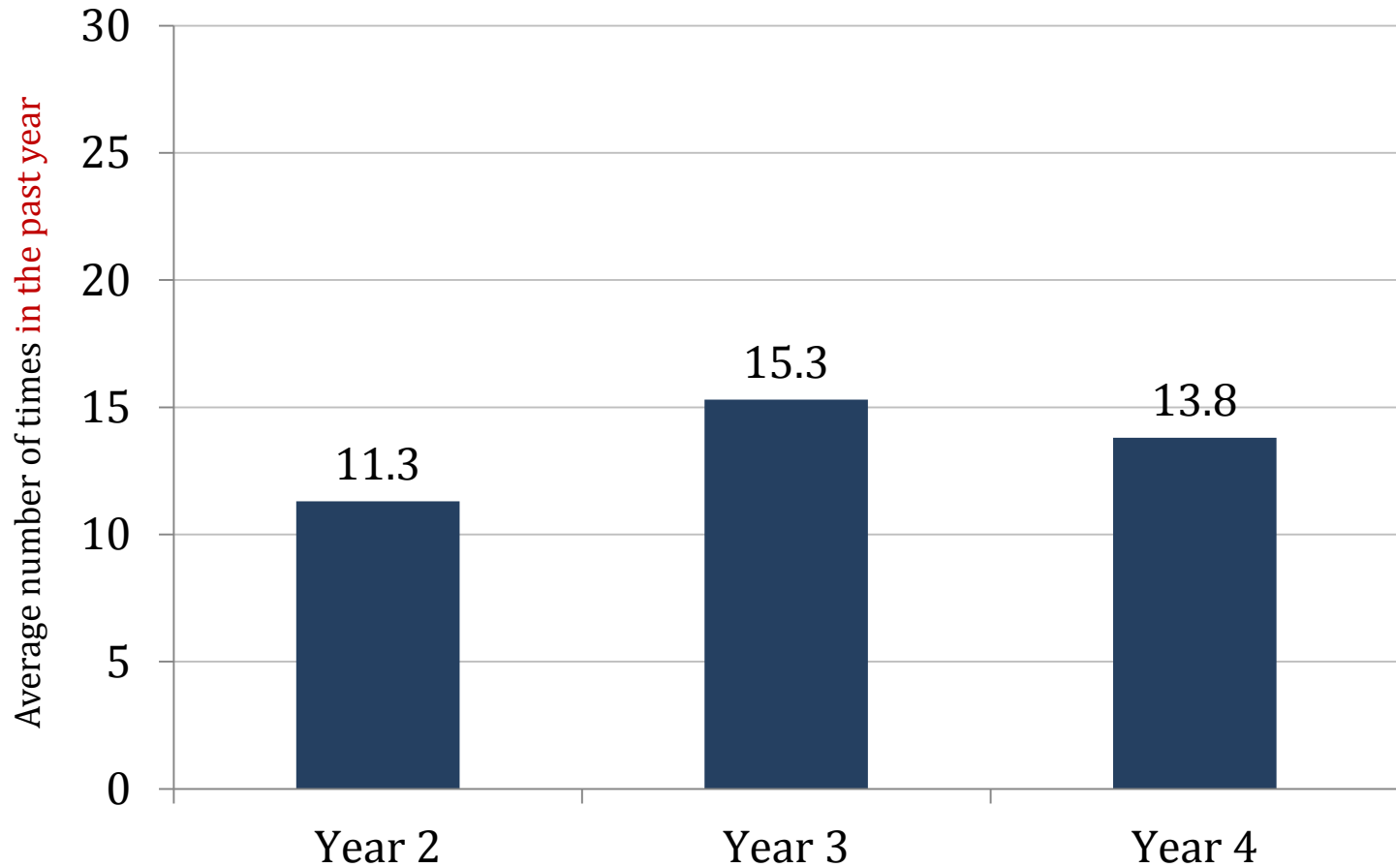
McCabe SE, Teter CJ, Boyd CJ. Medical use, illicit use and diversion of prescription stimulant medication. *J Psychoactive Drugs* 2006;38(1):43-56.

McCabe SE, Boyd CJ. Sources of prescription drugs for illicit use. *Addict Behav* 2005;30(7):1342-1350.

McCabe SE, Cranford JA, Boyd CJ, Teter CJ. Motives, diversion and routes of administration associated with nonmedical use of prescription opioids. *Addict Behav* 2007;32(3):562-575.

Barrett SP, Darredeau C, Borden LE, Pihl RO. Characteristics of methylphenidate misuse in a university student sample. *Can J Psychiatry* 2005;50(8):457-461.

How **often** do users take prescription stimulants nonmedically?



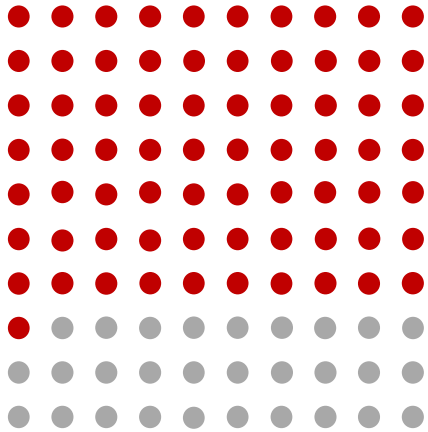
DIVERSION

*60.2% of one sample of college students with ADHD shared or sold their **prescription stimulants**;*

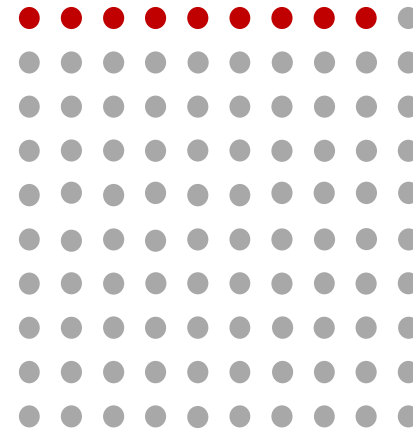
*35.4% of students with **prescription analgesics** diverted their medications.*

Students overestimate how many others use

**Students who reported their
peers used stimulants
nonmedically**



**Students who used stimulants
nonmedically**



Nonmedical Use is also associated with:

High levels of
positive
expectancies
about the
purported benefit
on performance

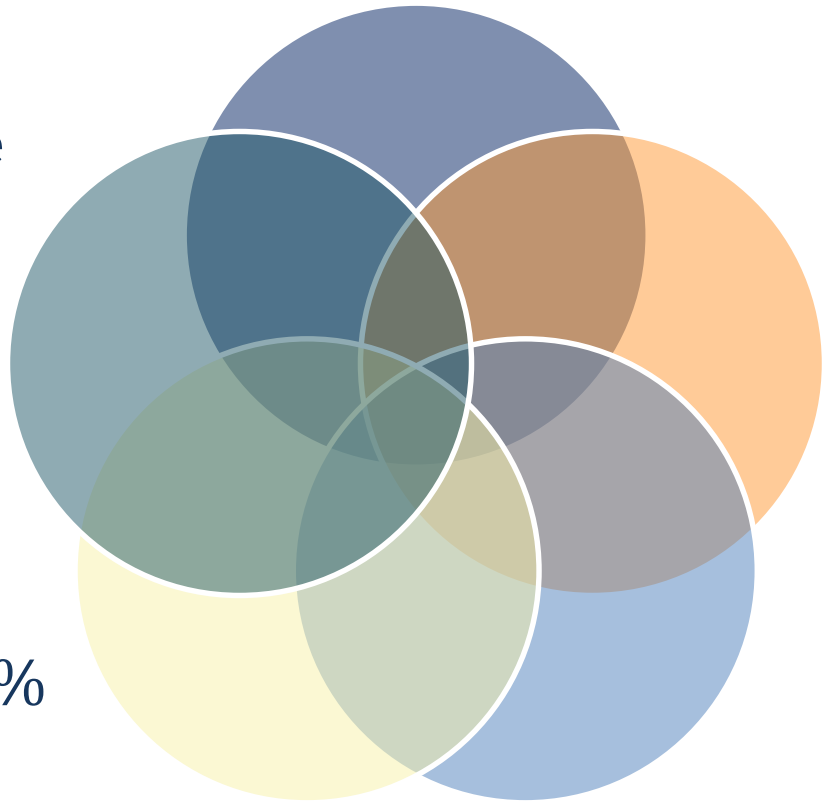
“It will work”

Low levels of
negative
expectancies
about consequences

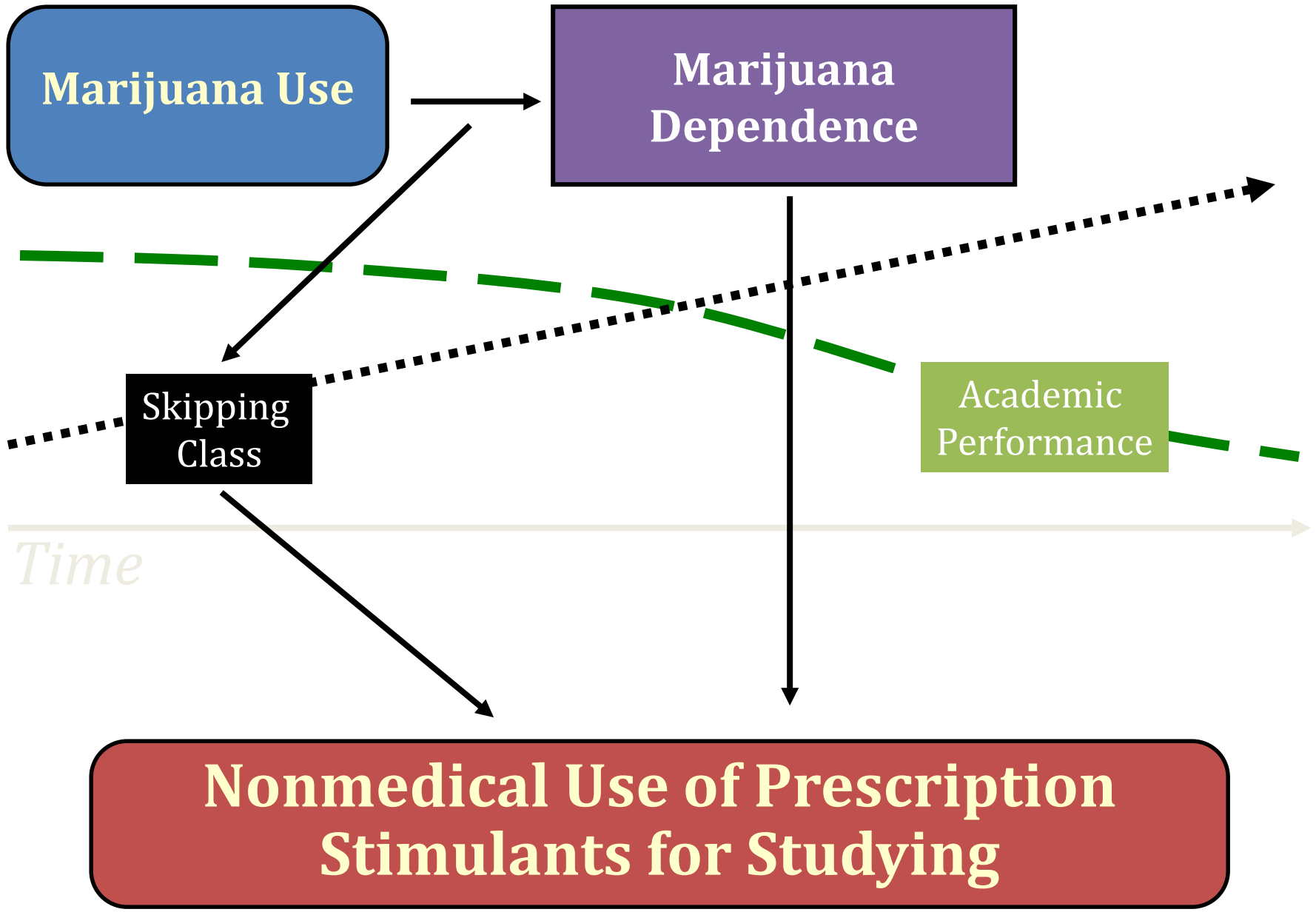
*“I won’t get in
trouble”*

Nonmedical prescription drug use is strongly associated with alcohol and other drug use

- Numerous studies report past-year prevalence estimates for marijuana use of 85%+
- Cocaine: 35-60%
- Ecstasy: 52%
- Prescription Analgesics: 44%



Nonmedical
stimulant users
spend less time
studying,
skip classes
more often,
and earn lower
grades.



Marijuana Use

Marijuana Dependence

Skipping Class

Academic Performance

Nonmedical Use of Prescription Stimulants for Studying

Time

Nonmedical Use



Medical Overuse



**Medically
Supervised Use**



Improving Clinical Practice on College Campuses

Increase vigilance regarding diversion and nonmedical use among college-bound patients.

Partner with local university health centers to promote staff awareness of diversion and the risks of nonmedical use.

Work with counseling center staff to recognize signs of mental health issues and drug problems... and intervene with students who are academically struggling.

Screen ADHD patients for illicit drug use and convey risks of diversion.