Problem Substance Use: Predicting Who Is at Risk and Testing Novel Interventions

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College of Health and Human Performance (HHP)
Outline of Talk

- Brief background
- Prediction of risk
- Human laboratory model
- Initial tests of novel interventions
- Enhance/focus current intervention along these lines
“Young man, go to your room and stay there until your cerebral cortex matures.”
The Problem

- Over 40% of young adults past-month heavy drinking
- Negative consequences, damage to brain
- Challenging population
  - aspects of their lives
  - motivation
- Current interventions: small effects
- Test new interventions, enhance & focus current ones
Impaired Control over Alcohol Use

• “A breakdown of an intention to limit consumption in a particular situation” (Heather et al., 1993, p. 701)

• Two aspects that map onto DSM-5 criteria
  • Inability to control use altogether
  • Inability to control use once it has begun

• Under-addressed, especially in young drinkers

Leeman, Beseler et al., 2014; Leeman, Patock-Peckham, & Potenza, 2012
Early Onset

- Often reported by adolescent drinkers
- Endorsed retrospectively
- Contrast with more severe criteria

Beseler, Taylor & Leeman, 2010; Chick & Duffy, 1979; Langenbucher & Chung, 1995
Prediction of Risk
Prospective Survey

- Sample of undergraduates first assessed during their freshman year ($N = 337$) re-contacted during senior year ($N = 201$)

- Predicted two problem drinking variables (prior 3 months):
  - Alcohol-related problems
  - Weekly frequency of heavy episodic drinking (5 or more drinks for males, 4 or more drinks for females)

Leeman, Toll, Taylor, & Volpicelli, 2009
## Time 2 Prospective Models

<table>
<thead>
<tr>
<th>Time 1 Variable</th>
<th>Heavy drinking ($R^2 = .38$)</th>
<th>Alcohol-related problems ($R^2 = .34$)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$B$</td>
<td>$SE$ $B$</td>
</tr>
<tr>
<td>Prob drinking variable</td>
<td>.58</td>
<td>.09</td>
</tr>
<tr>
<td>Drinks/wk</td>
<td>---</td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td>- .04</td>
<td>.03</td>
</tr>
<tr>
<td>Depression</td>
<td>- .06</td>
<td>.04</td>
</tr>
<tr>
<td>Sens seeking</td>
<td>.00</td>
<td>.01</td>
</tr>
<tr>
<td>Euphoric/social</td>
<td>.01</td>
<td>.00</td>
</tr>
<tr>
<td>Dysphoric</td>
<td>.09</td>
<td>.07</td>
</tr>
<tr>
<td>Sexual</td>
<td>-.07</td>
<td>.08</td>
</tr>
<tr>
<td>Impaired control</td>
<td>.01</td>
<td>.02</td>
</tr>
</tbody>
</table>

* $p < .01$, ** $p < .001$

Leeman, Toll, Taylor, & Volpicicelli, 2009
Human Laboratory Model
Benefits of Human Laboratory Research

- Model aspects of addictive behaviors

- Given enhanced experimental control, can learn more about mechanisms underlying addictive behaviors (e.g., Leeman, Corbin, & Fromme, 2009)

- Predict outcomes prospectively

- Obtain preliminary data regarding efficacy of treatment approaches
Human Laboratory Model of Impaired Control

- Given importance of construct to addiction & young adult drinking, would be valuable to have a behavioral index of individual differences in impaired control

- Limitations of self-report

- Initial study to begin process of validating paradigm

Leeman, Corbin, et al., 2013
Key Elements of Paradigm

1. **Guideline** for controlled drinking provided to participants before alcohol self-administration

2. Possible **reductions in participants’ payment** after alcohol self-administration
Naturalistic Paradigm

Conducted self-administration sessions in an actual community bar.

Ran self-administration sessions with 2-4 participants at a time.

No assessments (self-reports, tasks, BrAC readings) during self-administration period.
Timeline: Day of Session

Morning/early afternoon

- BrAC, urine tests

4pm

- Arrival at bar, self-reports, baseline tasks

Beers & non-alcoholic drinks ordered from RA

5pm

eBAC monitored

- Ad lib drinking begins

8pm

- Ad lib drinking ends, self-reports, BrAC, post-drinking tasks

9pm-12am

- Hourly self-reports, BrAC

12am

- Dismissal when BrAC < .02

- No alcohol allowed

- No eating allowed
## Key Elements of Laboratory Paradigm

<table>
<thead>
<tr>
<th>Element</th>
<th>Details</th>
<th>Meant to Model</th>
<th>Pragmatic Benefit to Paradigm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drinking guideline</td>
<td>Males should consume no more than <strong>3 drinks</strong> during ad-lib period</td>
<td>A limit on alcohol consumption to which those with impaired control typically have difficulty adhering</td>
<td>Provides participants with a guideline for controlled drinking</td>
</tr>
<tr>
<td></td>
<td>Females should consume no more than <strong>2 drinks</strong> during ad-lib period</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Key Elements of Laboratory Paradigm

<table>
<thead>
<tr>
<th>Element</th>
<th>Details</th>
<th>Meant to model</th>
<th>Pragmatic Benefit to Paradigm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Payment reductions</td>
<td>At a follow-up appointment 1-3 days after self-administration session, participants draw from a hat for a possible pay reduction ($0, $6, $12) once for each of 4 cognitive/psychomotor tasks that they perform poorly following alcohol self-administration</td>
<td>Negative consequences of alcohol use: both their probabilistic and distal nature</td>
<td>Creates a disincentive for participants to drink excessively and a reason to abide by guideline</td>
</tr>
</tbody>
</table>
Pictorial Representation

“Bro, no!”

FORLEY 4/12
Goals of Preliminary Research

- Compare drinking behavior between heavy drinking young adults in experimental and control conditions
- Observe variability within experimental condition
Two Conditions

- Experimental
  - Guideline for controlled drinking given
  - Possible pay reductions tied to cognitive/psychomotor task performance following alcohol self-administration

- Free drinking (control condition)
  - No guideline
  - Cognitive/psychomotor tasks completed, but no pay reduction contingencies
Results: Number of Drinks Ad-Lib

Leeman, Corbin, et al., 2013
Results: Peak eBAC/Peak BrAC

Red = Experimental
Yellow = Free Drinking

Leeman, Corbin, et al., 2013
Results: Differences & Variability

• Lighter alcohol consumption in experimental compared to free drinking condition

• Suggests aspects of paradigm created disincentives to drink alcohol excessively

• At the same time, there was a great deal of variability in experimental condition
Intervention Targets

- Initial results promising in terms of utilization of paradigm for evaluating preliminary intervention efficacy

- Current study with paradigm: testing intervention to ameliorate cognitive biases underlying heavy drinking
Testing Novel Interventions
Automatic Action Tendency

- Definition
- Dual process model
- A number of different types of tasks to measure it
- Will focus on computer task involving joystick
Depiction of Task

C. Wiers et al.: Neuropsychopharmacology advance online publication 16 October 2013.
doi:10.1038/npp.2013.252
Cognitive Bias Modification

- General goal to break associations among cues, substance seeking and substance use
- Specific goal to orient approach tendency away from salient, substance-related cues toward neutral cues
- Based on standard versions of tasks for assessment purposes
Depiction of Task

C. Wiers et al.: Neuropsychopharmacology advance online publication 16 October 2013.
doi:10.1038/npp.2013.252
Automatic Action Tendency Retraining

- Evidence for reduced approach tendencies
- Findings in heavy drinking young adults equivocal
- Compelling early evidence of long-term efficacy among treatment-seeking population

Eberl et al., 2013; Wiers et al. 2010; 2011
Efficacy of AAT Retraining

Red = Retraining  
Yellow = Control

Percent Relapsed

<table>
<thead>
<tr>
<th>Study</th>
<th>Percent Relapsed</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wiers et al. (2011)</td>
<td>+</td>
<td>214</td>
</tr>
<tr>
<td>Eberl et al. (2013)</td>
<td>*</td>
<td>509</td>
</tr>
</tbody>
</table>
Current Study

- Heavy drinking young adults ($N = 72$) as in first study

- Study conditions
  - Experimental: push alcohol images on 90% of trials
  - Control: push alcohol & control beverages equally

- Complete 4 retraining/control tasks in 5 days

- Then alcohol drinking session: IC paradigm
Future Directions

- Prospective prediction
- BAC-app study
Enhance & Focus
Current Intervention
Along These Lines
Brief Interventions

- Evidence for efficacy in college students
- Based on motivational interviewing principles
- Most brief interventions require 45-60 min
- Multiple lines of evidence: brief & straightforward
- To do so: find most efficacious components

Tanner-Smith & Lipsey, 2015; Jouriles et al., 2010; Ray et al., 2014; Reid & Carey, 2015
Computer & Web-Based

- Popularity has grown in recent years
- Evidence for efficacy in college students
- Advantages including privacy
- Web-based: convenience and dissemination
- Even more brief: greater reach

Carey et al., 2009; Cunningham et al., 2006
THRIVE

- Tertiary Health Research Intervention via Email
- Very brief, MI-based, web-based alcohol screening & reduction intervention for college students
- Originally utilized with students from Australia & New Zealand
- Efficacy established in two very large clinical trials + precursors efficacious in large & small prior trials

Kypri et al., 2009; 2013; 2014
Dissemination Potential

- Very brief (average of 9 minutes: Kypri et al., 2009)
- Computer files for intervention freely available
- Important because of lack of utilization on campuses

Lenk et al., 2012; Nelson et al., 2010; Toomey et al., 2013
Thanks for completing the survey Joe.

Here you will find some feedback based on the answers you have provided as well as some other information on staying safe while drinking which you may find useful.

**YOUR ALCOHOL USE**

<table>
<thead>
<tr>
<th>Score</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Abstinence</td>
</tr>
<tr>
<td>1-7</td>
<td>Moderate Drinking</td>
</tr>
<tr>
<td>8-14</td>
<td>Hazardous Drinking</td>
</tr>
<tr>
<td>15-19</td>
<td>Harmful Drinking</td>
</tr>
<tr>
<td>20-40</td>
<td>Alcohol Dependence</td>
</tr>
</tbody>
</table>

Some of the questions you answered regarding your drinking come from the Alcohol Use Disorders Identification Test, a questionnaire developed by the World Health Organisation to determine whether a person's drinking might be becoming problematic.

**Your AUDIT score was 21**

ABSTINENCE (0) For ideas to help you to maintain abstinence or to drink moderately with a low risk of alcohol-related harm, please read through the information on the tabs labeled 'Facts', 'Tips' and 'Support'.

MODERATE DRINKING (1-7) Low risk of alcohol-related harm.

HAZARDOUS DRINKING (8-14) High risk of experiencing alcohol-related harm and some people in this range may already be experiencing significant harm.

HARMFUL DRINKING (15-19) A person scoring in this range will already be experiencing significant alcohol-related harm.

ALCOHOL DEPENDENCE (20-40) A person scoring in this range may be alcohol dependent and advised to have a clinical assessment of their drinking. To find out some services that might be useful go to the support page.

The main way to reduce your risk level (and AUDIT score) is to reduce the number of drinks you consume per occasion. You may like to check out the tips section for ideas on reducing your consumption.
YOUR BLOOD ALCOHOL CONTENT

Your estimated Blood Alcohol Content (BAC) for your heaviest drinking occasion is **0.23%**

Your BAC is an indication of how intoxicated you are, with a higher BAC corresponding with a greater likelihood of experiencing alcohol-related harm, especially when driving.

This estimate takes into account your gender, weight, the number of standard drinks consumed and the number of hours over which you reported drinking this amount.

At a BAC of 0.15 and above you are **380 times more likely** to be killed in a single-vehicle crash than a driver with a zero BAC.

YOUR MONEY

Depending on where you buy your drinks (i.e. a liquor store, bar or club), you have spent between $4,290 and $17,160 on alcohol in the last year.

YOUR DRINKING AMOUNT COMPARED

Standard Drinks Consumed Per Occasion

You reported having approximately **10** drinks on a typical occasion. The graph on the right shows how this compares to other people your age and gender.
Stuff other people do...

Flock together
There are more reasons to stick with your friends then just to laugh at them when they start stumbling. Looking out for them (and they for you) can ensure that the night ends on a good note and not with someone left on the side of the road or unconscious in a toilet cubicle.

Cashed up?
Two-minute noodle dinners can get pretty boring after the second week - but then that might be the only option after a big night out! Carrying less money with you when you go out reduces the amount of alcohol you purchase which can be good for your body as well as your pocket. Make sure you leave some aside though if you need to catch a taxi - try putting it in your shoe so you're less likely to spend it.

How many have you had?
Do you know what a standard drink is? It's a measurement of alcohol and it isn't always the same as a bottle/can/glass. Most drinks are more than a single 'standard drink' so you could be consuming more than you think. Safe drinking guidelines are based on this measurement so it pays to know what they are. Set a limit at the start of the night and stick to it. Avoid partial drink refills so you can actually keep track.

Slow down
Extend your night - space your drinks with water or soft drinks. It'll keep you hydrated and less likely to end up on the floor. Even start off your night with a non-alcoholic drink to quench your thirst before moving onto the booze. Grab a bite to eat beforehand and snack throughout the night.

Be yourself
If you don't feel like another drink or want to drink at your own pace, real friends should respect that. If you're getting hassled, tell them you're driving, on antibiotics, or you're a sexual athlete who needs to perform later that night. And soft drinks look the same whether there's alcohol in them or not. Find something that works for you.
US-THRIVE

- Have altered to fit American college students
- Slang, norms
- Also local laws, resources, etc.
- Tested efficacy in small clinical trial among students at a local college with at least occasional heavy drinking ($N = 208$)
US-THRIVE

- Invited all day college students at school 1-month after the beginning of semester

- Randomized eligible participants to 1 of 3 variants of US-THRIVE or educational/assessment control

- Initial, 1-month and 6-month follow-ups
Protective Behavioral Strategies

- Cognitive behavioral strategies
- Aimed at reducing alcohol use & consequences
- Efficacious intervention component, but little attention paid to optimizing delivery
- Prior studies: mixed results
- Unique aspect to this study

Benton, 2004; Larimer & Cronce, 2007; Lewis et al., 2010; Martens et al., 2004
Variants

- Full list of protective behavioral strategies
- **Direct strategies**: pertaining to manner of drinking
- **Indirect strategies**: related ancillary behaviors not pertaining to manner of drinking
- Hypotheses
Behavioral Strategy Sets

“Direct”
- Count drinks
- Set a drink limit
- Space drinks
- Alternate

“Indirect”
- Look out for your friends
- Carry protection
- Pre-plan transportation
- Designated driver
Strategy Types & Alcohol Involvement

Direct Strategies → Alcohol Use: -0.26***

Indirect Strategies → Alcohol Use: 0.02

Alcohol Use → Consequences: 0.49***

Indirect Strategies → Consequences: -0.19***

Note. Only direct effects are illustrated. *** p < 0.001.

DeMartini, Palmer, Leeman et al., 2013
Strategies Not Created Equal?

- History of difficulty teaching moderate drinking
- Young adults use of strategy types
  - Direct: $M = 11.91, SD = 5.81$
  - Indirect: $M = 16.05, SD = 5.08$
- Resulting hypotheses

Maisto & Addesso, 1977; Sobell & Sobell, 29173; DeMartini, Palmer, Leeman et al., 2013
Overall Weekly Alcohol Consumption

<table>
<thead>
<tr>
<th>Study Condition</th>
<th>Drinks per week</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>6.00</td>
</tr>
<tr>
<td>Full</td>
<td>7.00</td>
</tr>
<tr>
<td>Direct</td>
<td>8.00</td>
</tr>
<tr>
<td>Indirect</td>
<td>6.00</td>
</tr>
</tbody>
</table>

Red = Baseline
Yellow = 1-month post
Green = 6-month post

* Indicates significant difference from Baseline
# Indicates significant difference from 1-month post

Red = Baseline
Yellow = 1-month post
Green = 6-month post
Overall Weekly Alcohol Consumption

Study Condition

Control  Full  Direct  Indirect

Change in drinks per week

-5  -4  -3  -2  -1  0  1  2  3  4  5

*  #
Peak Consumption in a Day

Peak Drinks

Study Condition

Control | Full | Direct | Indirect

Red = Baseline
Yellow = 1-month post
Green = 6-month post
Peak Consumption in a Day

Study Condition

- Control
- Full
- Direct
- Indirect

Change in peak drinks

-5
-4
-3
-2
-1
0
1
2
3
4
5

* *
Other Results

- No significant changes in overall frequency, frequency of heavy drinking days, negative consequences, strategy use

- Exploratory severity comparisons
Future Directions for US-THRIVE

- 3 year grant with 2 years of data collection
- Larger sample
- Comparisons across versions of US-THRIVE
- Mediation analyses to get at mechanisms of change
- Moderation analyses to determine for whom intervention might be more/less effective
Conclusions

- Young adult heavy drinking a public health concern
- Impaired control highly relevant: predictive
- Need for new interventions/role for human lab studies
- Can enhance/focus current interventions
Acknowledgments

Roger Bibace, Ph.D.
Will Corbin, Ph.D.
Taru Kinnunen, Ph.D.
Stephanie O’Malley, Ph.D.
Ismene Petrakis, M.D.
Marc Potenza, M.D., Ph.D.
Paul Rozin, Ph.D.
Mehmet Sofuoglu, M.D., Ph.D.
Joseph Volpicelli, M.D., Ph.D.
Seymour Wapner, Ph.D.
Cheryl Beseler, Ph.D.
Kelly DeMartini, Ph.D.
Lisa Fucito, Ph.D.
Telle Korhonen, Ph.D.
Sherry McKee, Ph.D.
Clayton Neighbors, Ph.D.
Julie Patock-Peckham, Ph.D.
Edward Royzman, Ph.D.
Benjamin Toll, Ph.D.
Devorah Bogart
Tyler Brown
Rosa Cohen
Elisa Gagliardi
Christine Nogueira, M.A.
Qisi (Mary) Sun
Laura Taylor, M.D.

NIH Grants: F31 AA014743, K01 AA 019694, & R03 AA022232 (Leeman), T32 DA07238 (Petrakis), R01 AA016621 (O’Malley)

A grant from ABMRF/the Foundation for Alcohol Research
VA VISN1 MIRECC
CT Department of Mental Health & Addiction Services
Environmental Risk Factor: Part-time Job

- May increase likelihood of engagement in addictive behaviors & related problems

- Several possible reasons: ↑ spending money; ↑ time with older, deviant peers; ↓ parental monitoring

- May be especially problematic for adolescents who are more impulsive or sensation seeking

Goldstein et al., 2009; Steinberg et al., 1991; Tanner et al., 1991; Valois & Dunham, 1999
Young People & Difficulties with Self-control

- Adolescents & young adults prone to difficulties with self-control: normative brain development of brain

- Difficulties with self-control share genetic features with substance use disorders

Chambers et al., 2003; Kandel et al., 2007; Kendler et al., 2003; White et al. 2002
### Smoking & Nicotine Dependence

**Smoking status** \((N = 2827)\)

<table>
<thead>
<tr>
<th>Smoking Status</th>
<th>Age 17</th>
<th>Adult</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strict non-smoker</td>
<td>61.4%</td>
<td>41.0%</td>
</tr>
<tr>
<td>Irregular &amp; lighter smokers &lt;10 cigs per day</td>
<td>30.2%</td>
<td>45.2%</td>
</tr>
<tr>
<td>Heavier, regular smokers ≥ 10 cigs per day</td>
<td>8.8%</td>
<td>13.8%</td>
</tr>
</tbody>
</table>

**Adult nicotine dependence** \((N = 1139)\)

<table>
<thead>
<tr>
<th>Nicotine Dependence</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-dependent (FTND score = 0)</td>
<td>52.4%</td>
</tr>
<tr>
<td>Smoker with low dependence (FTND score 1-4)</td>
<td>38.7%</td>
</tr>
<tr>
<td>Smoker with moderate/severe dependence (FTND ≥ 5)</td>
<td>8.9%</td>
</tr>
</tbody>
</table>
Predictors: Age 14 or 17

- Key “environment” variables:
  - perceived parental permissiveness (age 14)
  - having part-time job or not (age 17)

- Self-control difficulties:
  - impulsivity (age 17)
  - sensation seeking (age 17)

- Similar interactions

- Adjustment: sex, age at time of young adult assessment

Leeman, Korhonen, et al., 2014
## Predicting Irregular/Lighter Smoking

<table>
<thead>
<tr>
<th>Variable</th>
<th>Initial model</th>
<th>Subsequent model</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>OR</td>
<td>95% CI</td>
</tr>
<tr>
<td>Sex</td>
<td>0.80</td>
<td>0.67-0.96</td>
</tr>
<tr>
<td>Parental permissiveness</td>
<td>1.07</td>
<td>0.98-1.17</td>
</tr>
<tr>
<td>Part-time job</td>
<td>1.34</td>
<td>1.04-1.72</td>
</tr>
<tr>
<td>Impulsivity</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Sensation seeking</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Age 17 smoking</td>
<td>---</td>
<td>---</td>
</tr>
</tbody>
</table>

All interactions non-significant

**underlined** = assessed at Age14, other variables at 17

Adjusted for age at adult assessment
Timeline of Participation

1. Preliminary screening by phone or web
2. In-person screening to assess final eligibility
3. Informed consent
4. TLFB & other assessments
5. Day of self-administration session
6. Pay reduction drawings
7. Follow-up 1-3 days after session
8. Debriefing and motivational interview
9. Initial cognitive/psychomotor task performance
Participants

- Ages 21-25
- Frequent heavy drinkers
- Alcohol dependence not an exclusion, severe dependence was
- Non-dependent on nicotine and other drugs including cannabis
- No psychoactive drug use based on urine test (except THC)
- Non-treatment-seeking
- No psychototropic medications
- No serious medical conditions
Sample ($N = 39$)

- 69% Male
- 85% White, non-Hispanic
- 49% full-time students, 5% part-time students, 46% non-students

- 42% first-order relative with a lifetime alcohol problem history

- 59% lifetime history of alcohol abuse, 23% current
- 31% lifetime history of alcohol dependence, 15% current

- 36% current smokers
Baseline Past 30-Day Alcohol Use

- **Frequency of any alcohol use**
  \[ M = 18.08 \ (SD = 5.55), \text{range: } 12-30 \]

- **Frequency of heavy alcohol use**
  \[ M = 10.29 \ (SD = 4.56), \text{range: } 4-21 \]

- **Drinks per drinking day**
  \[ M = 6.11 \ (SD = 2.60), \text{range: } 2.41-12.73 \]

- **Peak alcohol use**
  \[ M = 10.29 \ (SD = 4.56), \text{range: } 6-21 \]
Results: Techniques to Limit Drinking

- **Mean duration of drink cons.**
  - Red = Experimental
  - Yellow = Free Drinking

- **Inter-drink interval:**
  - 1st to 2nd drink
  - 2nd to 3rd drink

<table>
<thead>
<tr>
<th>Time in minutes</th>
<th>Mean duration of drink cons.</th>
<th>Inter-drink interval: 1st to 2nd drink</th>
<th>Inter-drink interval: 2nd to 3rd drink</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Red</td>
<td>Yellow</td>
<td>Red</td>
</tr>
<tr>
<td>0.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>30.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>40.00</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

* denotes a significant difference.
Results: Techniques to Limit Drinking

Percent Self-Administering 1 or More Non-Alcoholic Drinks Ad Libitum

- **Experimental Condition**: Approximately 80%
- **Free Drinking Condition**: Approximately 10%

Significance: ** **
Automatic Cognition

- Research focus on automatic condition in the addictions is relatively new but follows several long-standing research traditions:
  - Associative learning
  - Cue-reactivity
  - Prior findings on automatic cognition and behavior

- Compulsivity and habit
Theory related to impact of cues: incentive salience

Empirical support (Burke et al., 2008)

Thought to have causal role (Robinson & Berridge; Franken)

Clear, testable hypotheses
Automatic Cognition

- Cognitive biases pertain to larger category of automatic cognition

- Argument that much of cognition is automatic, rapid, cue-driven and associative (e.g., Kahneman 2011), relevant to the addictions

- Argument that automatic cognition has been under-addressed in interventions for health behaviors (Marteau et al. 2012)
Alcohol and Sexual Risk

- Relationships among impaired control over alcohol use, other difficulties with self-control and sexual risk behavior in young adults?

- Intentions following hypothetical sexual encounter (e.g., Gilmore et al. IP)

- Hypothetical encounters can be varied: different levels of risk associated with encounter
Alcohol and Sexual Risk

- Alcohol has been found to increase intentions for risky sexual behavior (e.g., Purdie et al. 2011)

- Alcohol-related expectancies appear to be highly relevant (e.g., Stappenbeck et al., 2013)

- Sexual disinhibition subscale in measure of Drinking Induced Disinhibition (Leeman et al., 2007; 2009)
Possible Relevance to Lab Paradigm

- In lab paradigm, relationship between greater alcohol self-administration and self-reported sexual risk in general or intentions assessed in lab

- Have screening data on whether sexually active and use of birth control, could enhance

- Test impact of interventions to reduce both alcohol use and sexual risk taking on both alcohol self-administration and sexual risk taking intentions
Clinical Trials

- Direct tests of intervention efficacy
- Enhance/leverage current interventions
- Current project: very brief web-based intervention
- Translation from lab to informing clinical practice
Background

- Heavy drinking a problem among college students
- Despite high risk level, limited motivation to change
- Good candidates for brief interventions
- Brief interventions found to be efficacious
- In particular, non-judgmental motivational interviewing techniques, personalized feedback & protective behavioral strategies

Carey et al. 2012; Cronce & Larimer 2011; Epler et al. 2009; Murphy et al. 2010; SAMHSA 2010
Components

- MI-concordant elements
  - Individualized feedback based on assessment
  - Non-judgmental delivery of material
  - Presentation of options

- CBT-concordant elements
  - Protective behavioral strategies to reduce drinking
  - Particular focus on strategies in current project
Brevity

- Average of 9 minutes to complete in Kypri et al. (2009)

- Included all components: assessment, review of intervention materials, etc.

- Their version included 2 brief, unrelated measures, duration of course depends on number of measures included
Welcome

This survey will take approximately 5 to 10 minutes to complete and will ask questions about your alcohol and tobacco use.

The survey is conducted by Albertus Magnus College and Yale University School of Medicine to explore the use of alcohol by college students. Administrators at Albertus Magnus College will not be made aware of your responses. Your participation helps us to evaluate the use of Internet-based methods of health promotion and data collection.

In order for us to personalize this survey for you, please enter a name in the box below (it doesn’t need to be your real name). Please do not enter your last name:

Your Name: Joe

Please enter the 4-digit ID number in the email message you received from Yale.

Your 4-digit ID: 9999

Submit

The THRIVE program was developed by: Dr Kypros Kypri 1,2, Mr Jonathan Hallett 3,4,5, Professor Peter Howat 3,4,5, Associate Professor Alexandra McManus 3, Professor Bruce Maycock 3,4,5

1. School of Medicine and Public Health, University of Newcastle, Australia
2. Injury Prevention Research Unit, University of Otago, New Zealand
3. Western Australian Centre for Health Promotion Research, Curtin University, Perth, Australia
4. Centre for Behavioural Research in Cancer Control, Curtin University, Australia
6-Month Drinking Outcomes

Kypri et al. (2009)

Red = Intervention
Yellow = Control

<table>
<thead>
<tr>
<th></th>
<th>Frequency of alcohol use</th>
<th>Drinks per drinking day</th>
<th>Drinks per Week</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>2435</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*
Preliminary Results

- Invited to participate: 725
- Screened for eligibility: 412 (57% response rate)
- Ineligible: 204
- Randomized: 208 (50% eligible), 63.5% female
- Completed initial assessment: 183 (88% retained)
- Completed 1-month follow-up: 169 (92% retained)
- 6-month follow-up:
## Overall Drinks per Week

<table>
<thead>
<tr>
<th>Cond</th>
<th>Regular</th>
<th></th>
<th>Severe</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Control</td>
<td>3.52 (2.7)</td>
<td>3.71 (3.9)</td>
<td>8.45 (5.47)</td>
<td>9.26 (12.39)</td>
</tr>
<tr>
<td>Full</td>
<td>4.34 (4.49)</td>
<td>3.75 (4.1)</td>
<td>15.16 (8.9)</td>
<td>9.89 (10.66)</td>
</tr>
<tr>
<td>Direct</td>
<td>4.21 (4.32)</td>
<td>2.88 (3.77)</td>
<td>12.19 (10.93)</td>
<td>13.71 (14.86)</td>
</tr>
<tr>
<td>Indirect</td>
<td>3.27 (3.09)</td>
<td>2.68 (3.3)</td>
<td>14.46 (10.57)</td>
<td>13.18 (14.67)</td>
</tr>
</tbody>
</table>
# Peak Drinking

<table>
<thead>
<tr>
<th>Cond</th>
<th>Regular</th>
<th>Severe</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Regular</td>
<td>Severe</td>
</tr>
<tr>
<td></td>
<td>Cond</td>
<td></td>
</tr>
<tr>
<td>Control</td>
<td>4.88 (1.18)</td>
<td>6 (2.85)</td>
</tr>
<tr>
<td></td>
<td>4.19 (3.52)</td>
<td>7 (4.42)</td>
</tr>
<tr>
<td>Full</td>
<td>5.88 (2.78)</td>
<td>8.73 (4.42)</td>
</tr>
<tr>
<td></td>
<td>3.88 (3)</td>
<td>7.71 (5.41)</td>
</tr>
<tr>
<td>Direct</td>
<td>5.28 (1.72)</td>
<td>8.3 (5.63)</td>
</tr>
<tr>
<td></td>
<td>3.67 (3.15)</td>
<td>8.14 (5.03)</td>
</tr>
<tr>
<td>Indirect</td>
<td>5.3 (1.84)</td>
<td>8.28 (3.48)</td>
</tr>
<tr>
<td></td>
<td>3.27 (3.18)</td>
<td>7.71 (5.03)</td>
</tr>
</tbody>
</table>
Benefits of Human Lab Approach

- Given enhanced experimental control, useful for learning more about underlying mechanisms

- With validated paradigms, can observe/measure substance-related difficulties with self-control in lab

- Can also measure relationship between self-control issues & addictive behaviors/related phenomena in real time with high experimental control

  e.g., Leeman, Corbin, & Fromme, 2009; Leeman, O’Malley, et al., 2010
Nicotine & Food Lab Study

- An additional example: lab study to test risk factors & underlying mechanisms

- Non-treatment seeking, nicotine dependent smokers ($N = 30$) in day-long laboratory study

- Between-subjects “waiting period” conditions
  - Nicotine deprivation (18 hours)
  - Nicotine (18 hours) + food deprivation (13 hours)

- Followed by opportunity to smoke

Leeman, O’Malley, et al., 2010
Weight Concerns

- Lower likelihood of making a quit attempt
- Attrition in smoking cessation studies
- Relapse in some studies

Klesges et al., 1988; Leeman et al., 2006; Meyers et al., 1997; Pomerleau et al., 2001
Food Restriction Detrimental?

- Weight concerns may lead some smokers to restrict their food intake during a quit attempt.
- Evidence that simultaneous restriction of food and smoking is detrimental.

Perkins et al., 2001
# Lab Session Schedule

<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1am (latest)</td>
<td>Final cigarette</td>
</tr>
<tr>
<td>8:30am</td>
<td>Session begins</td>
</tr>
<tr>
<td>Noon/6pm</td>
<td>Lunch/dinner (nic. dep. alone condition)</td>
</tr>
<tr>
<td>6:45pm</td>
<td>Food craving priming task involving individualized snack food cues</td>
</tr>
<tr>
<td>7:05pm</td>
<td>First chance to smoke or delay up to 50 minutes for monetary reinforcement</td>
</tr>
<tr>
<td>After delay</td>
<td>60 minute ad libitum smoking period, monetary compensation for cigarettes not smoked (out of a possible 8 cigarettes)</td>
</tr>
</tbody>
</table>

Leeman, O’Malley, et al., 2010
Mean Length of Delay (Minutes) to Start Smoking by Condition

Significant main effect of condition, $t(19.15) = 2.56, p = .019$, Cohen’s $d = .93$

Leeman, O’Malley, et al., 2010
Percent Smoking at Least 1 Cigarette Ad Libitum by Condition

Significant difference, $z = 2.345$, $p<.005$, effect size $= 0.88$

Leeman, O’Malley, et al., 2010
Future Directions

- Model food restriction not outright deprivation
- Supporting survey findings