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Partnering to Reduce Substance Use in Louisiana’s Collegiate Communities

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Marijuana use & related functional impairment among college students: The impact of anxiety

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2015 Recovery Run Baton Rouge at LSU
Overview

• Cannabis use and related problems
• Factors related to cannabis use and related problems
• The role of anxiety
• Implications for interventions
Cannabis use

- Nearly 19 million people in U.S. are current users
- Rates of use are increasing (from 5.8% in 2007 to 7.3% in 2012)
- Rates of daily use are also increasing
- More than half of users are daily users
- Perception of cannabis as risky is decreasing
- 23% of current users (4.3 mil) have CUD

Per SAMSHA (2013)
Cannabis among undergrads

• Nearly ½ report they have tried cannabis (Mohler-Kuo et al., 2003)
• 1/3 report using in the past year (Kilmer et al., 2006; Mohler-Kuo et al., 2003)
• At LSU, ~ 42% endorse lifetime use (Buckner et al., 2013) and ~ 25% endorse current (past 3-month) use (e.g., Buckner et al., 2012), with ~ 10% endorsing at least weekly use (Buckner, et al., 2010)
Cannabis-related problems & undergrads

• Among 1st years, 25% of past year users met DSM criteria for CUD (Caldeira et al., 2008)

• Among LSU students, 67% of users endorsed at least 1 problem (Buckner et al., 2010)
  – the most common problems relate to academic functioning:
  – procrastination (42% all, 67% weekly)
  – lower energy (31% all, 46% weekly)
  – lower productivity (30% all, 49% weekly)
  – memory loss (24% all, 41% weekly)
  – missing days of work or class (20% all, 33% weekly)

• Cannabis use during young adulthood related to lower odds of having steady employment & graduating college (Schulenberg & Maggs, 2002; Tucker et al., 2005).
Cannabis-related problems & undergrads

• Non-academic problems endorsed as well:
• Approximately half of college cannabis users report driving after using cannabis, a rate comparable to alcohol users (McCarthy, Lynch, & Pederson, 2007).
  – Driving under the influence of cannabis is related to greater risk of crashing (Ramaekers et al., 2004), even fatal crashes (Bédard et al., 2007).
• Regularly inhaling cannabis smoke presents at least as much risk to respiratory & cardiovascular systems as tobacco smoke (Ashton, 2001) & presents comparable cancer risk as tobacco smoke (Fligiel et al., 1997).
FACTORS RELATED TO CANNABIS-RELATED PROBLEMS AMONG UNDERGRADUATES
Factors related to cannabis use & related problems among college students

- Cannabis effect expectancies
- Cannabis use motives
- Normative beliefs
- Solitary use
Cannabis Effect Expectancies

Expectations regarding the effects of cannabis (Schafer & Brown, 1991):

- **Cognitive/Behavioral Impairment** (e.g., “If I have been smoking marijuana, it is harder for me to concentrate and understand the meaning of what is being said”)
- **Relaxation/Tension Reduction** (“Smoking marijuana makes me less tense or relieves anxiety; it helps me to unwind”)
- **Social/Sexual Facilitation** (“I am more sociable when I smoke marijuana”)
- **Perceptual/Cognitive Enhancement** (“Marijuana makes small things seem intensely interesting”)
- **Global Negative Effects** (“Marijuana causes me to lose control and become careless”)
- **Craving/Physical Effects** (“I get the “munchies” (craving for snacks) when I smoke marijuana”)

Cannabis Effect Expectancies

Among college students (Buckner & Schmidt, 2008)

• Expectancies related to cannabis use:
  – Nonusers tend to report more Global Negative Effects expectancies than students who use cannabis
  – Current frequent (weekly) users tend to endorse more Relaxation/Tension Reduction expectancies than nonusers, past-users, or less frequent users
  – Social/Sexual Facilitation & Physical Effects expectancies were positively related to use

• Expectancies related to cannabis-related problems
  – Global Negative Effects & Cognitive/Behavioral Impairment expectancies were positively related to marijuana problem severity

• Limitation: doesn’t assess desirability of each effect
Cannabis Effect Expectancies

Among college students (Buckner, Ecker, & Welch, 2013)

• Frequent (at least weekly) users reported valuing Relaxation/Tension Reduction, Social/Sexual Facilitation, Perceptual/Cognitive Enhancement, & Craving/Physical Effects more than never, past, & infrequent users

• Frequent users reported valuing Cognitive/Behavioral Impairment more than never users & past users

• Valuing these effects related to more frequency cannabis use among current users

• Valuing cognitive/behavioral impairment related to more cannabis problems
Marijuana Motives

Reasons for using cannabis (Simons et al., 1998)

• enhancement (e.g., to get high)
• coping (e.g., to forget my worries)
• social (e.g., to enjoy a party)
• conformity (e.g., to fit in with a group I like)
• expansion (e.g., to expand my awareness)
Marijuana Motives

Among college students (Buckner, Bonn-Miller et al., 2007; Simons et al., 1998):

• Enhancement, coping, social, & expansion motives positively related to cannabis use frequency
• Enhancement, coping, social, & expansion motives positively related to cannabis problems
Normative Beliefs

- College substance use is strongly influenced by beliefs about others’ substance use (i.e., descriptive norms) & others’ approval of substance use (i.e., injunctive norms) (see Borsari & Carey, 2001).
- Cannabis users believe a greater percentage of other students also use cannabis (Wolfson, 2000).
- College students who believed typical students used cannabis in the past month were 3x more likely to have used cannabis in the past month than students who believed typical students did not use (Arbour-Nicitopoulos et al., 2010).
- Descriptive norms are related to more frequent use (Grossbard et al., 2009; Kilmer et al., 2006; Neighbors et al., 2008a; White et al., 2006a) & related problems (Kilmer et al., 2006; Neighbors et al., 2008).
- Injunctive norms are also related to more frequent self-use & related problems (Neighbors et al., 2008).
Normative Beliefs

- The strength of the relationship between normative beliefs & cannabis use varies as a function of reference group.
- Cannabis use was positively correlated with injunctive norms regarding close friends & parents but not students in general (LaBrie et al., 2010).
- Among regular cannabis users (i.e., used cannabis 20+ times in past year), injunctive norms regarding close friends were significantly greater than for students in general or parents (LaBrie et al., 2011).
- Descriptive norms regarding friends were more strongly related to frequency of self-use & related problems than descriptive norms regarding students in general (Kilmer et al., 2006).
## Predictors of cannabis frequency

(Buckner, 2013)

<table>
<thead>
<tr>
<th>Predictor</th>
<th>B</th>
<th>β</th>
<th>t</th>
<th>p</th>
<th>sr²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex</td>
<td>-0.27</td>
<td>-0.06</td>
<td>-1.35</td>
<td>.179</td>
<td>.00</td>
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<tr>
<td>Descriptive norms (friends)</td>
<td>0.40</td>
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<td>6.82</td>
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<td>.07</td>
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<td>Injunctive norms (friends)</td>
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<td>0.18</td>
<td>3.26</td>
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<td>.02</td>
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<tr>
<td>Injunctive norms (parents)</td>
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<td>0.07</td>
<td>1.57</td>
<td>.118</td>
<td>.00</td>
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<tr>
<td>Positive expectancies</td>
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<td>1.26</td>
<td>.208</td>
<td>.00</td>
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<tr>
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<td>-0.10</td>
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<td>.022</td>
<td>.01</td>
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<td>Social motives</td>
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<td>.01</td>
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<tr>
<td>Coping motives</td>
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<td>0.18</td>
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<td>.001</td>
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<td>Enhancement motives</td>
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<td>0.28</td>
<td>4.74</td>
<td>&lt;.001</td>
<td>.03</td>
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Predictors of cannabis problems
(Buckner, 2013)

<table>
<thead>
<tr>
<th>Predictor</th>
<th>B</th>
<th>(\beta)</th>
<th>t</th>
<th>p</th>
<th>(sr^2)</th>
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<td>-1.10</td>
<td>.272</td>
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<td>Frequency of cannabis use</td>
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<td>0.27</td>
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<td>0.01</td>
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<td>Expansion motives</td>
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<td>-0.13</td>
<td>-1.68</td>
<td>.094</td>
<td>0.01</td>
</tr>
</tbody>
</table>
Solitary Use

- Solitary cannabis use positively related to cannabis-related problems, including CUD (Noack, Höfler, & Lueken, 2011)

- Solitary cannabis use in adolescence is prospectively associated with greater likelihood of experiencing illicit drug-related problems in early adulthood, even after controlling for quantity and frequency of use (Tucker et al., 2006).

- It has been theorized that solitary substance use is risky because during solitary use, people do not have the ability to compare their use to their peers’ use (Cooper et al., 1992)
Summary

- Relaxation/Tension Reduction, Social/Sexual Facilitation, & Physical Effect Expectancies related to more frequent use
- Global Negative Effects & Cognitive/Behavioral Impairment expectancies related to more cannabis problems
- More frequent users value/desire these effects (even the negatives ones)
- Enhancement, coping, social, & expansion motives related to more frequent use and related problems
- Beliefs’ about others use (especially friends) related to more frequent use & related problems
- Solitary cannabis use related to more problems
THE IMPACT OF ANXIETY
Anxiety

- People with CUD 5x more likely to have anxiety disorder (Stinson et al., 2006)
- Social anxiety (i.e., fear of evaluation)
- Among most prevalent psychiatric conditions
- Adolescents with SAD 7x more likely to develop cannabis dependence (Buckner, Schmidt et al., 2008)
  - No other anxiety disorder remained sig
- SAD related to greater odds of cannabis dependence than abuse, even after controlling for other anxiety disorders, depression, etc. (Buckner, Heimberg et al., 2012)
  - Not the case for other anxiety disorders assessed (GAD, PD, SP)
Social Anxiety

- CUD-SAD comorbidity greater impairment than either disorder independently (Buckner, Heimberg et al., 2012)
- Socially anxious daily users have greater suicidality (Buckner, Joiner et al., 2012)
- Social anxiety is robustly related to cannabis problems among undergrads (e.g., Buckner, Ecker et al., 2016; Ecker & Buckner, 2014; Buckner, Heimberg et al., 2012; Buckner & Schmidt, 2009; Ecker, Richter et al., 2014)
Why such high rates of cannabis-related problems?
May be that socially anxious students are especially vulnerable to:
- expecting cannabis to help them manage anxiety, increase sociability, slow racing thoughts
- Using to cope with anxiety and other negative emotions
- Fearing deviating from perceived social norms regarding cannabis use
- May use alone as form of social avoidance
Expectancies & Social Anxiety

• Social anxiety and social anxiety disorder (SAD) were related to Cognitive/Behavioral Impairment Expectancy which mediated the relation between social anxiety & cannabis problems (Buckner & Schmidt, 2008, 2009).
• One interpretation: people who experience more cannabis problems come to expect impairment when they use marijuana.
• Yet, we tested this hypothesis & found that cannabis problems failed to mediate the relation between social anxiety and Cognitive/Behavioral Impairment expectancies.
• It may therefore be that socially anxious students use marijuana because they want marijuana to slow their anxiety-induced racing thoughts and/or to make things around them seem less real and, perhaps, less anxiety-provoking.
Motives & Social Anxiety

• Among undergrads (Buckner, Bonn-Miller et al., 2007), social anxiety was a significant predictor of coping and conformity motives for marijuana use

• Coping motives mediated the relation between social anxiety & marijuana use problems
Use to Cope during a Social Interaction

• Participants:
  – 82 (70.7% female) current cannabis using undergrads
  – aged 18-46 ($M = 20.0$, $SD = 3.7$)
  – 20.7% cannabis abuse, 11.0% cannabis dependence, 13.4% SAD

• Experimental Conditions
  – Social Interaction: speak to a confederate for 3 min and make a favorable impression on the confederate.
  – Reading Task: silently read a magazine at their own pace for 3 min

$F(2, 150) = 12.75, \, p < .001, \, w^2 = .05$

*Figure 1. Time X condition interactions predicting state anxiety. Point comparisons significantly different** $p < .01$, *** $p < .001$*
$F(2, 84) = 3.73, \ p = .028, \ \omega^2 = .02$

Figure 2. Time X condition interactions predicting state cannabis craving.
* Slopes significantly different, $p < .05$
Perceived Norms & Social Anxiety

- Those with social anxiety may use to avoid scrutiny from cannabis-using peers.
- Social anxiety related to using to avoid scrutiny from cannabis-using peers (Buckner, Bonn-Miller et al., 2007; Buckner, Zvolensky et al., 2012)
Peer Influence during In Vivo Use

• Aim: Test whether socially anxious individuals are especially likely to use cannabis when others also use.

• Sample:
  – N=49 (38.8% female) cannabis using undergrads
  – Age range: 18-22 (M=19.14, SD=1.02)
  – 83.7% Caucasian
  – Average reported marijuana use: 5-6 times/week
  – Diagnoses:
    • Marijuana abuse (26.5%)
    • Marijuana dependence (36.7%)
    • Social anxiety disorder (20.4%)

EMA Procedures

• Data collected over 2 weeks
• EMA Assessment
  – State Anxiety: 0-10
  – Situation Type: alone, social situation
    • If with others, others use (yes vs no)
  – Marijuana Use
• 3 types of assessments
  – Event contingent: each time they were about to use marijuana
  – Signal contingent: 6 semi random times per day
  – Interval contingent: end of day (bed time)
Results

Compliance
• Completed $M=62\%$ ($SD=23\%$) of both random and end of day assessments

Patterns of Marijuana Use
• 732 marijuana use entries ($M=16.26$, $SD=15.08$ per participant)
• An average of 1.33 ($SD=1.63$) marijuana use episodes per day.
Results

Social anxiety X state anxiety X others’ use, $\beta = -0.025$, $SE = 0.007$, $p = 0.001$

When others were using, social anxiety X SUDS,
$\beta = 0.02$, $SE = 0.007$, $p = 0.010$

Only the simple slope for high social anxiety was significant, $b = 0.33$, $p = 0.015$
Solitary Cannabis Use

- Clinical example
- Social fears and social avoidance were positively related to cannabis-related problems among current users (Buckner, Heimberg et al., 2011)
  - Only social avoidance remained sig related to cannabis problems in multivariate analyses.
Use for Social Avoidance

![Diagram](chart.png)

Figure 1. Structural equation model for cannabis use contexts mediating the relation of social anxiety to cannabis outcomes. Standardized path estimates are presented. Paths between use contexts and between cannabis outcomes are covariances. * $p < .05$, ** $p < .01$, *** $p < .001$.

Summary

- Social anxiety is robustly related to more cannabis-related problems
- Socially anxious students report using cannabis to cope with negative emotions, to cope in social situations, and to avoid social situations if cannabis unavailable
- Socially anxious students report using cannabis to avoid negative evaluation from cannabis-using friends
- Socially anxious students more likely to use cannabis alone, which at least partially accounts for more cannabis problems
TREATMENT CONSIDERATIONS
Interest in CUD treatment

• Among marijuana using students, the vast majority (86.4%) were not interested in marijuana treatment (Buckner, Ecker, & Cohen, 2010):
  – 8.0% of marijuana users were only slightly interested, 4.2% were moderately interested, 1.3% were very interested, and only 0.2% were extremely interested in marijuana treatment.

• It may be that only students with mj problems consider seeking marijuana treatment.
  – 22.7% of marijuana users with more than one marijuana problem

• Interest in marijuana treatment was significantly related to marijuana use frequency, $F(1, 231)=9.80, \ p=.002$, such that weekly users were most interested in treatment.
How to encourage change

• The campus judicial process is a point of intervention for many students who engage in risky cannabis use

• Among 98 students referred by LSU (SAA, Res Life) for CUD treatment:
  – In the 30 days prior to their referring incident, students used cannabis a mean of 29.62 (SD = 33.77) times
  – In the 30 days prior to their intake appointment, participants used cannabis a mean of 7.12 (SD = 17.22) times
  – Pre-intake cannabis use quantity was significantly less than pre-incident quantity, $F(1, 85) = 39.70, p < .001, n^2 = .32$. Pre-intake cannabis use frequency was significantly less than pre-incident frequency, $F(1, 97) = 78.97, p < .001, n^2 = .45$

• The majority (90.9%) decreased their use following their infraction & 58% of the sample reported abstinence in the month before intake.
INTERVENTION IMPLICATIONS
Cannabis Cessation

• Despite the popular notion that marijuana is not “addictive”, quitting can be difficult
• cannabis users seeking treatment report on average 3-7 quit attempts (Budney et al., 2008)
• among pts in outpatient CUD tx, only 54% achieved 2 or more weeks of abstinence
• among those who did achieve abstinence in outpatient tx, 71% lapsed (i.e., used cannabis) within 6 months
• of those that lapsed, over 70% experienced relapse (i.e., returned to regular pre-treatment levels of cannabis use)
Cannabis Cessation: Web-based intervention

- Web-based personalized normative feedback interventions are designed to provide corrective normative feedback to students to decrease cannabis use and related problems
- Benefits: cheap, reach a large number of students (even those not seeking treatment)
- Cons: although there’s evidence that they work for alcohol (Neighbors et al., 2010), they don’t appear to work for cannabis (Lee et al., 2010)
- In-person normative feedback interventions work better than on-lines ones for alcohol (Rodriguez et al., 2015)
Cannabis Cessation: In-person intervention

- We know of only one published test of a BMI developed specifically for college cannabis use (Lee et al., 2013).
- Undergraduates who used cannabis on at least five days in the past month
- Those who attended a one-session cannabis-specific BMI reported less weekly quantity of cannabis use at three-month follow-up compared to an assessment only control group.
- However, at six-month follow-up, undergraduates in the BMI condition used an ave of 7 joints per week, which no longer significantly differed from the control group.
- Cannabis use frequency and related problems also remained high (i.e., nearly half of days in the past 30, nearly 7 cannabis-related problems).
- Next step: ID those students not benefiting from BMIs (e.g., socially anxious students don’t benefit from BMI for alcohol; Terlecki, Buckner et al., 2012)
The Impact of Anxiety

- No known studies testing the impact of anxiety on CUD treatment among undergrads
- Pts seeking CUD treatment report significantly greater anxiety compared to non-patient samples (Copeland et al., 2001)
- Patients who enter CUD tx with higher anxiety also exhibit greater MJ problems & depression (Buckner & Carroll, 2010)
The Impact of Anxiety

• Among pts receiving CUD treatment, anxiety disorder treatment hx is related to reentry into CUD treatment following CUD treatment completion (Arendt et al., 2007).

• Reductions in anxiety during CUD tx are associated with better MJ outcomes (Buckner & Carroll, 2010)
  – Reductions in MJ use not related to anxiety outcomes
  – MET-CBT greater reductions in anxiety than MET alone
Treatment

- There are currently no empirically supported treatments for dually diagnosed patients
- Current CBT for CUD protocols include skills to manage NA as an optional module
- Teaching pts skills to successfully manage anxiety & related NA during CUD tx could result in better cannabis-related outcomes for pts with elevated anxiety
Anxiety & Cannabis Cessation Treatment (ACCT)

- Integration of transdiagnostic CBT for anxiety disorders
  - Benefits include: less training and expense; empirical support (e.g., Allen et al., 2008; Schmidt et al., 2012)
- Attend to motivation each session
- Teach CBT for CUD skills each session to manage cravings, prevent relapse, etc.
False Safety behavior Elimination Therapy (FSET)

- Transdiagnostic CBT for anxiety disorders
- Identification and elimination of the use of false safety behaviors
- FSBs help pts manage anxiety in short-term but maintain or exacerbate anxiety in the long-term
- Repeated use of FSBs can contribute to the maintenance of anxiety disorders (Salkovskis et al., 1991)
- FSET decreases anxiety and depression and improves quality of life (Schmidt et al., 2012).
- Cannabis use can serve as a false safety behavior
  - Regardless of whether anxiety or cannabis first, if anxious people use cannabis to manage anxiety, positive feedback loop can result
Anxiety & Cannabis Cessation Treatment (ACCT)

- Participants 18-45 with current CUD and anxiety disorder who want to quit or reduce cannabis use
- Compare ACCT vs MET-CBT for CUD
- ACCT is 12 session treatment: integrates transdiagnostic CBT for anxiety disorders with CBT for CUD
- Initial data promising
  - CUD in remission
  - Anxiety disorders in remission
  - Depression, PTSD in remission
  - ACCT more likely to be abstinent & less drop-out than MET-CBT
Overall Summary

• 1/3-1/4 undergrads current using cannabis
• Up to ¼ of them experience CUD
• Using cannabis to cope with negative emotions robustly related to more cannabis-related problems
• Anxious students especially vulnerable to coping-motivated use & to more cannabis problems
• Social anxiety is one type of anxiety especially related to problems, due to coping, fear of negative evaluation, and social avoidance
• Most cannabis using students, even those with problems, not interested in treatment
• Interventions may do better if address anxiety
Thank you!

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Questions?