Applying Three Lessons about Prevention to Explore the Culture of Driving Under the Influence of Cannabis

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Research Scientist
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THANK YOU
Center’s Purpose

We are an interdisciplinary center serving communities and organizations through research, training and guidance to cultivate healthy and safe cultures.

Core Issues

- Traffic Safety
- Substance Abuse
- Violence / Child Maltreatment

Unintentional injury is the leading cause of years of potential life lost before age 65. Overdoses and motor vehicle incidents are the two leading causes. Violence and adverse childhood experiences (ACES) are contributing factors to numerous health-related problems.
Financial Disclosure

All funding for the Center for Health and Safety Culture comes directly (or indirectly) from federal, state, or county funding.
Overview

• Three Important Lessons
• Behavioral Modeling
• Driving Under the Influence of Cannabis

3 Lessons from Research
(to help us be more effective)
Three Important Lessons

1. Raise Concern and Hope

2.

3.

What is the difference between concern and fear?
But are there unintended consequences?
Claims that the campaign is effective are not supported by data. The campaign has been associated with increases in the acceptability of using methamphetamine and decreases in the perceived danger of using drugs.”


“When accounting for a preexisting downward trend in meth use, effects on meth use are statistically indistinguishable from zero.”

Fear Appeals can...

have **unintended adverse effects** associated with public health communication activities:
1. label and stigmatize,
2. expand social gaps, and
3. promote poor health as a value.


“Humiliation, shame, guilt and angst are **not** the primary engines of change. Ironically, such experiences can even immobilize the person, rendering change more remote.”

The Research Suggests a Balanced Approach

A meta-analysis of 354 HIV-prevention interventions and 99 control groups, revealed that effective interventions combined:

- attitudinal arguments,
- educational information,
- behavioral skills arguments, and
- behavioral skills training.


Hope

“the perceived capability to derive pathways to desired goals, and motivate oneself via agency thinking to use those pathways.”

- Willingness to move forward (the will)
- Seeing a path forward (the way)

Concern + Hope

Embrace Life Video
Three Important Lessons

1. Raise Concern and Hope

2.

3.

Early Prevention PSA
Definitions of Evidence-Based Strategies

- US Substance Abuse and Mental Health Services Administration (SAMHSA)
- US Department of Education
- Centers for Disease Control and Prevention
- Department of Justice

Why are they important?

Rocket Science
Three Important Lessons

1. Raise Concern and Hope
2. Embrace Learning

“The leader’s interior work deals with meeting and mastering three enemies.”

Quieting the voices of

• Judgment
• Cynicism
• Fear

Examples of Transformation

Collective Changes across the Community

Smoking
Drinking and Driving
Occupant Protection in Cars
Concussion Prevention

It’s hard to see transformation when we’re in it
Cultivate

Three Important Lessons

1. Raise Concern and Hope
2. Embrace Learning
3. Cultivate Transformation
Overview

• Three Important Lessons
• Behavioral Modeling
• Driving Under the Influence of Cannabis
Can you change someone else’s behavior?

Simplified Behavior Model

Values  Attitudes & Beliefs  Willingness & Intention  Behavior

(represents one individual)
Behavioral Model

Values

Behavioral Beliefs

Normative Beliefs

Control Beliefs

Attitudes

Prototypical Image

Perceived Norms

Perceived Control

Willingness / Intention

Risky or Protective Behavior
Beliefs

Behavioral beliefs are expectations about engaging in a behavior that inform attitudes.

“If I exercise, I will feel better.”
(positive expectancy)

“I don’t like getting all sweaty when I exercise.”
(negative expectancy)

Normative beliefs are an individual’s perceptions of what is expected and common about a behavior.

Injunctive
“My doctor expects me to exercise.”

Descriptive
“Most people like me exercise regularly.”
Beliefs

Control beliefs are an individual’s perceptions of his/her ability to engage (or not engage) in a behavior.

“If I wanted to, I could walk 20 minutes every day.”

“I might want to do yoga, but I don’t know how.”
Culture

Shared values, attitudes, beliefs, and behaviors of a group of people.

Overview

• Three Important Lessons
• Behavioral Modeling
• Driving Under the Influence of Cannabis
Language

Cannabis vs. “marijuana”

Understanding Evidence

“There is no research showing that cannabis impairs driving ability.” vs. “Research shows that cannabis does not impair driving ability.”
Lesson 2. Embrace Learning

The Health Effects of Cannabis and Cannabinoids
The Current State of Evidence and Recommendations for Research

The National Academies of Sciences, Engineering, and Medicine
(formerly the Institutes of Medicine)


Driving Under the Influence of Cannabis (DUIC)

Traffic crashes are a leading contributor to years of potential life lost (YPLL) in the U.S.

DUIC and Traffic Safety

Assessing DUIC crash risk is complicated
– assessing impairment due to cannabis is complex
– biometric measures are challenging

DUIC and Traffic Safety

DUIC increases crash risk

“CONCLUSION 9-3 There is substantial evidence of a statistical association between cannabis use and increased risk of motor vehicle crashes.”

DUIC and Traffic Safety

DUIC increases crash risk

– In meta-analysis of nine studies, Asbridge et al. found that recent cannabis use increased risk of a traffic crash (OR 1.92 (95% CI: 1.35, 2.73)).


DUIC and Traffic Safety

DUIC increases crash risk

– In a meta-analysis of 66 studies, Elvik reported “The summary odds ratio indicates that the risk of becoming involved in an accident at any level of severity increases moderately (by about 25-50%) when using cannabis.”

DUIC and Traffic Safety

DUIC increases crash risk

- A study by Gadegbeku et al. found that drivers under the influence of cannabis were more likely responsible for a fatal crash than non-intoxicated drivers (OR = 1.89 [1.43-2.51]).


DUIC and Traffic Safety

DUICA increases crash risk

- “the odds ratio when being under the influence of both alcohol and cannabis of being responsible for a fatal crash (compared to drivers not exposed to cannabis nor to alcohol) was estimated at 8.39”

DUIC and Traffic Safety

DUIC is increasing

– In 2007, 8.6% of weekend nighttime drivers tested positive for THC
– In 2013-14, 12.6% tested positive for THC


Conclusions

• Assessing the crash risk of driving under the influence of cannabis (DUIC) is complex.

• Aggregated evidence indicates that DUIC does increase crash risk - especially in combination with other drugs.

• Whereas more significant risk factors still persist (alcohol), evidence that DUIC is increasing suggests the need to understand the reasons people are choosing this behavior.
Research Sponsor

Traffic Safety Culture Pooled Fund

The Federal Highway Administration’s Transportation Pooled Fund (TPF) Program allows federal, state, and local agencies and other organizations to combine resources to support transportation research studies.

Current Participants: CA, CT, IA, ID, IN, LA, MT, NH, TX, UT, and WA.

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Research Questions

1. How does culture compare between users and non-users of cannabis?
2. How does culture affect the decision to drive under the influence of cannabis?
3. How does culture compare between states with and without legalized recreational use laws?
Survey Summary

<table>
<thead>
<tr>
<th>Demographic / Method</th>
<th>Geography</th>
<th>Qualification</th>
<th>Recruitment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adults (18+) Mail</td>
<td>Colorado, Washington</td>
<td></td>
<td>1,600 randomly selected households $2 cash incentive</td>
</tr>
<tr>
<td>Adults (18+) Mail</td>
<td>States without legalized recreational marijuana use except AK, CO, WA, OR, and Washington DC.</td>
<td></td>
<td>1,600 randomly selected households $2 cash incentive</td>
</tr>
<tr>
<td>Adults age 18-30 Internet</td>
<td>States without legalized recreational marijuana use except AK, CO, WA, OR, and Washington DC.</td>
<td>30-day use of cannabis</td>
<td>Purchased panel n= 735</td>
</tr>
<tr>
<td>Adults age 18-30 Internet</td>
<td>Colorado, Washington</td>
<td></td>
<td>Purchased panel n= 526</td>
</tr>
</tbody>
</table>

Survey implemented in February – March 2016. Mailed survey had a 32% response rate.

Behavioral Model
DUIC Behavior

“driving within 4 hours of using marijuana”

(now shifting to 2 hours of using marijuana to be consistent with others)

Attitudes

Subjective evaluation of a behavior in terms of emotional reaction and perceived utility.

“Driving after using marijuana feels...”

• Not Cool-Cool
• Dangerous-Safe
• Stupid-Smart
• Unpleasant-Pleasant
Beliefs

Behavioral beliefs are expectations about engaging in a behavior that inform attitudes.

If I drive after using marijuana,

- “I will feel calmer.” [positive]
- “I will be more alert.” [positive]
- “I will be more cautious.” [positive]
- “I will be more likely to get arrested.” [negative]
- “my reaction time will be slower.” [negative]
- “I am more likely to be in an accident.” [negative]

Beliefs

Perceived norms are an individual’s general perceptions of what is common and expected about a behavior.

Injunctive

“My [XX] would think it was OK if I drove after using marijuana.”

Friends, family, employer, law enforcement, most people in my community
Beliefs

Perceived norms are an individual’s general perceptions of what is common and expected about a behavior.

Descriptive

“How often do most people like you / most people in your community drive within four hours of using marijuana?”

Beliefs

Perceived control is an individual’s perception of his/her general ability to engage (or not engage) in a behavior.

“How likely are you to find yourself in the following situations within four hours of using marijuana?”

- Needing to drive to work or school.
- Needing to drive to run errands.
- Needing to drive home (after using marijuana when out or at a party).
Summary of Scales

<table>
<thead>
<tr>
<th>Component / Scale</th>
<th>Items</th>
<th>Internal Reliability (Cronbach’s Alpha)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Mail (age 21+, all states)</td>
</tr>
<tr>
<td>Willingness</td>
<td>6</td>
<td>0.94</td>
</tr>
<tr>
<td>Attitudes</td>
<td>5</td>
<td>0.91</td>
</tr>
<tr>
<td>Perceived Attitudes</td>
<td>5</td>
<td>0.94</td>
</tr>
<tr>
<td>Perceived Norms–injunctive</td>
<td>2</td>
<td>0.47</td>
</tr>
<tr>
<td>Perceived Norms–descriptive</td>
<td>2</td>
<td>0.78</td>
</tr>
<tr>
<td>Perceived Control</td>
<td>3</td>
<td>0.93</td>
</tr>
</tbody>
</table>

Prevalence of DUIC

“Thinking back over the past 12 months, how often did you drive within four hours of using marijuana?”

<table>
<thead>
<tr>
<th>Survey</th>
<th>Never</th>
<th>Once or twice</th>
<th>3 to 6 times</th>
<th>7 to 11 times</th>
<th>Monthly</th>
<th>Weekly</th>
<th>Daily</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mailed (age 21+, all states)</td>
<td>90.5%</td>
<td>1.7%</td>
<td>1.1%</td>
<td>1.2%</td>
<td>0.2%</td>
<td>2.2%</td>
<td>3.0%</td>
</tr>
<tr>
<td>Internet (18-30, no CO WA)</td>
<td>84.6%</td>
<td>3.5%</td>
<td>2.0%</td>
<td>1.8%</td>
<td>1.8%</td>
<td>3.8%</td>
<td>2.5%</td>
</tr>
<tr>
<td>Internet* (18-30, CO WA, user)</td>
<td>46.6%</td>
<td>17.6%</td>
<td>6.0%</td>
<td>4.6%</td>
<td>8.9%</td>
<td>8.7%</td>
<td>7.5%</td>
</tr>
</tbody>
</table>

*All 30-day users of cannabis.
Prevalence of DUIC Among Past Year Users of Cannabis

“Thinking back over the past 12 months, how often did you drive within four hours of using marijuana?”

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<tr>
<th>Survey</th>
<th>Never</th>
<th>Once or twice</th>
<th>3 to 6 times</th>
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<th>Monthly</th>
<th>Weekly</th>
<th>Daily</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mailed (age 21+, all states)</td>
<td>57.7%</td>
<td>7.7%</td>
<td>4.9%</td>
<td>5.5%</td>
<td>1.1%</td>
<td>9.9%</td>
<td>13.2%</td>
</tr>
<tr>
<td>Internet (18-30, no CO WA)</td>
<td>51.8%</td>
<td>11.0%</td>
<td>6.1%</td>
<td>5.7%</td>
<td>5.7%</td>
<td>11.8%</td>
<td>7.9%</td>
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*All 30-day users of cannabis.

Behavioral Model (mailed survey)
Compare Shared Beliefs among 3 Groups

- No past-year use of cannabis (no DUIC)
- Past-year use; no DUIC
- Past-year use; DUIC

Compare Beliefs

Means with 95% confidence intervals

- DUIC
- Intention/Willingness
- Attitude
- Injunctive Norm
- Descriptive Norm
- Control

Key:
- Light grey: No past-year use
- Dark grey: Past-year use, no DUIC
- Black: DUIC
**Attitude**  “Driving after using marijuana is”  
Means with 95% confidence intervals

<table>
<thead>
<tr>
<th>Negative (about DUIC)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Uncool</td>
</tr>
<tr>
<td>Dangerous</td>
</tr>
<tr>
<td>Stupid</td>
</tr>
<tr>
<td>Unpleasant</td>
</tr>
<tr>
<td>Unacceptable</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Positive (about DUIC)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cool</td>
</tr>
<tr>
<td>Safe</td>
</tr>
<tr>
<td>Sensible</td>
</tr>
<tr>
<td>Pleasant</td>
</tr>
<tr>
<td>Acceptable</td>
</tr>
</tbody>
</table>

- No past-year use
- Past-year use, no DUIC
- DUIC

**Behavioral Beliefs** (Mailed Survey)

<table>
<thead>
<tr>
<th>Belief</th>
<th>Correlation with Attitude*</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;If I drive after using marijuana, I will feel calmer.&quot;</td>
<td>positive</td>
</tr>
<tr>
<td>&quot;If I drive after using marijuana, I will be more alert.&quot;</td>
<td>positive</td>
</tr>
<tr>
<td>&quot;If I drive after using marijuana, I will be more cautious.&quot;</td>
<td>positive</td>
</tr>
<tr>
<td>&quot;If I drive after using marijuana, I will be more likely to get arrested.&quot;</td>
<td>negative</td>
</tr>
<tr>
<td>&quot;If I drive after using marijuana, my reaction time will be slower.&quot;</td>
<td>negative</td>
</tr>
<tr>
<td>&quot;If I drive after using marijuana, I am more likely to be in an accident.&quot;</td>
<td>negative</td>
</tr>
</tbody>
</table>

*p<0.000 01
Injunctive Norms

Injunctive Norm

“My friends would think it was OK if I drove after using marijuana.”
“My family would think it was OK if I drove after using marijuana.”
“My employer would think it was OK if I drove after using marijuana.”
“Law enforcement would think it was OK if I drove after using marijuana.”
“Most people in my community would think it was OK if I drove after using marijuana.”

<table>
<thead>
<tr>
<th>No past-year use</th>
<th>Past-year use, no DUIC</th>
<th>DUIC</th>
</tr>
</thead>
</table>

Means with 95% confidence intervals

Descriptive Norms

Descriptive Norm

How often did most people like you in your state drive within four hours of using marijuana?
How often did most people age 21 and older in your state drive within four hours of using marijuana?

<table>
<thead>
<tr>
<th>No past-year use</th>
<th>Past-year use, no DUIC</th>
<th>DUIC</th>
</tr>
</thead>
</table>

Means with 95% confidence intervals
Control Beliefs

Means with 95% confidence intervals

How likely are you to find yourself in the following situations within four hours of using marijuana?

- Needing to drive to work or school.
- Needing to drive to run errands.
- Needing to drive home (after using marijuana when out or at a party).

- No past-year use
- Past-year use, no DUIC
- DUIC

Broad-mindedness*
Self-Direction*
Helpfulness
Stimulation***
Enjoyment in Life**
Conformity***
Achievement
Tradition***
Security***
Power

*p<0.001; **p<0.0001; ***p<0.00001
Conclusions

• There are significant differences in beliefs (attitude, behavioral, normative, control) between non-users, users, and those who DUIC.
• No significant differences in beliefs were found between states with or without recreational use laws.

Limitations

1. Results are based on self-report data.
2. Behavioral models are based on correlation (not causational analyses).
3. Results are based on limited samples.
Three Important Lessons

1. Raise Concern and Hope
2. Embrace Learning
3. Cultivate Transformation

To Learn More

• Visit Center’s website (www.chsculture.org)
• Symposium on How Positive Culture Improves Health and Safety
  – June 20-22 in Bozeman, MT (register ASAP)
• Overview of Positive Culture Framework
  – Next session!
  – Full training: September 25-27 in Savannah, GA