

Marijuana Education Initiative  
Marijuana Intervention Curriculum for High School Students  
Colorado

Evaluation Report: July 2016

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## Executive Summary

Marijuana Education Initiative (MEI) provides innovative prevention and intervention curricula and services aimed to foster informed understanding of the impact of youth and adolescent marijuana (MJ) use. MEI's intervention program was designed for middle and high school youth who have developed a habit of marijuana use and expressed a desire to reduce or quit their usage. This program aims to (a) assist participants in identifying their marijuana use habits, (b) educate participants on the ways in which marijuana impacts their body, behavior and brain, and (c) provide participants with strategies and supports to modify their marijuana use.

To achieve these goals, the MEI team designed a seven-unit curriculum of 60-minute sessions to be administered by a school mental health professional. This curriculum involves open group dialogue, self-reflection through journaling activities, mindfulness activities, one week of abstaining from marijuana use, and information and tools for participants to make their own decisions regarding their future behaviors.

The purpose of this evaluation report is to provide a comprehensive understanding of the impact of MEI's Intervention Curriculum in its first year of implementation. Participants of this evaluation were high school students at Steamboat Springs High School in Steamboat Springs, CO and Centennial High School in Fort Collins, CO. This evaluation combines data from two implementations of MEI's curriculum: one from Steamboat Springs High School and one from Centennial High School. Both implementations of the curriculum took place during the 2015-2016 academic year. All participants were self-identified marijuana users who expressed an interest in altering their marijuana use behaviors. Participant data was only included for those who fully completed the curriculum and both the pre and post-intervention measures. Therefore, the evaluation sample includes 17 participants (10 from Steamboat Springs HS, and 7 from Centennial High School; 65% male, 71% White/Caucasian). Participants were in 10<sup>th</sup> to 12<sup>th</sup> grades and ranged in age from 15 – 18+ years old at baseline ( $M = 17$  years old).

The evaluation used a single group pretest-posttest design to examine the effectiveness of this curriculum on various outcomes targeted by the program. This evaluation primarily examined changes in participants' knowledge of marijuana and its effects, their perceptions of marijuana's harm to themselves, participants' intentions and supports to modify MJ usage, and their reported marijuana use behaviors. Because of the small sample size, this evaluation did not have the statistical power to detect statistical significance. Therefore, pre and post-intervention mean scores on the outcome variables were compared and examined to provide an assessment of program impact.

Although there are acknowledged limitations of the evaluation design and small sample size that limit the ability to make causal inferences about program effectiveness, MEI's intervention curriculum shows promise in meeting its goals and objectives. Results of this evaluation provide support that this curriculum may:

- Increase participants' perceptions of the harmful effects of MJ on overall health, the body, brain, mental health, relationships, and in comparison to other drugs
- Increase participants' desires to reduce and/or quit using marijuana
- Increase participants' support, confidence, and strategies to modify their MJ use
- Decrease participants' perceptions of their long-term future MJ use
- Reduce participants' self-reported current marijuana use

This evaluation sheds light on the impact of MEI's Marijuana Intervention Curriculum. It offers promising support for this curriculum in empowering adolescent marijuana users with information and tools to understand the impact of marijuana on themselves, and make informed decisions about their own marijuana use.

## **Marijuana Education Initiative: Intervention Curriculum**

### **Brief Description**

MEI provides educators, schools, and families with information and resources to aid them in navigating marijuana legalization and its effects on today's students. The intervention curriculum is specifically designed for middle and high school students who have self-identified as marijuana users and expressed interest in modifying their marijuana behaviors. The program is voluntary, and therefore, students must be willing to assess their own marijuana use habits and the effects their use has on their body, brain, and behavior.

### **Mission**

“Marijuana Education Initiative is committed to supporting communities, schools, families, and organizations, by providing standards-based curricula, materials, and training to help navigate marijuana legalization.” (MEI, 2016).

### **Learning Objectives**

The primary objectives of the intervention curriculum are to assist participants in their ability to:

- Identify their marijuana use habits
- Identify their position in the Erikson's Stage of Change Model
- Better understand the impact of their marijuana use on their body, brain, behavior, and relationships
- Employ stress management techniques to replace the use of marijuana for stress relief
- Receive support from others and identify social supports in their lives

### **Theoretical Considerations**

The intervention curriculum was designed with several empirically based theories/models in mind. The theories/models are as follows:

- Motivational Enhancement Therapy
- Cognitive Behavior techniques
- Trans-theoretical Model
- Mindfulness/stress management practices
- Behavior-image model
- Social Cognitive Theory

## Program Components

The intervention curriculum is comprised of 7 units that are approximately 50-60 minutes long. The curriculum is to be administered on a weekly or bi-weekly basis by a school mental health professional. The units are described below:

### 1. Unit 1 - Introduction

- Students examine their patterns of MJ use including understanding their triggers, who they use with, when they use, and why they use. An overview of Cognitive Behavioral Theory is used to help students understand the process of change. Students do an activity to map their use to get a visual idea of patterns.

### 2. Unit 2 – Marijuana Statistic Information, Social Expectations, and Stages of Change

- Students do an activity followed by a discussion regarding social expectations and how they may fall into specific habits. This leads the group to challenge their perceptions of themselves and others. Leader facilitates a discussion about the statistics of adolescent use. Students then look at the stages of change model and identify where they currently fall on this model regarding their marijuana use.

### 3. Unit 3 – Marijuana and My Body

- This lesson explores how marijuana impacts the physical body. Students learn what effects marijuana has on the different parts of the body including the lungs, liver, reproductive organs, heart, and stomach. This lesson discusses the difference between tobacco and marijuana use on the body as well as reviews the physical withdrawal symptoms when marijuana use is discontinued.

### 4. Unit 4 – Marijuana and My Brain

- This lesson addresses marijuana's impact on IQ, memory, and executive function. Students will examine different parts of the brain and how marijuana use affects the brain. Students get a visual idea of the effects of marijuana use by viewing images of healthy brains vs. a brain of someone who uses substances.

### 5. Unit 5 – Marijuana and My Behavior and Thoughts

- Students are presented with information on how marijuana affects their behavior and motivation, both long and short term. Erickson's stages of development are discussed as well as looking at how marijuana use impacts one's ability to successfully move to the next stage. The lesson also addresses marijuana's impacts in mental health.
- Students begin to discuss their feelings about eliminating marijuana use for one week (or another determined amount of time).

### 6. Unit 6 – Marijuana Addiction and Tolerance

- This unit kicks off the abstinence trial. Group reviews strategies and supports to help them prepare for quitting. This is an opportunity for one or two returning students to come and speak about their experience with this week. There will also be a discussion on addiction, tolerance and dependence as well as to what the students can physically and mentally expect if/when they quit.

### 7. Course Wrap Up, Review of Elimination Trial, and Survey

- This lesson focuses on processing the “quit” period. Students evaluate the past week regarding their marijuana cessation and examining the techniques they used to support their attempts to quit/reduce. Students discuss what worked for them and how they anticipate maintaining their cessation.

## **Program Evaluation**

### **Goals of the Evaluation**

This evaluation aims to provide a comprehensive assessment of the effectiveness of MEI's Intervention Curriculum. It is intended to shed light on the impact of this curriculum on those in need of it in Colorado. Insights gained from this evaluation will be utilized to improve both the intervention curriculum as well as the measurement tools used to assess it. Furthermore, these findings will be provided to school personnel who have a vested interest in the outcomes of this program for their students. Evaluation goals can be summed into three key elements:

- Provide objective and comprehensive insight into the intervention's effectiveness in meeting program objectives
- Provide information that will be used to improve intervention curriculum and measurement
- Provide helpful and easily comprehensible information that can be used for public communication and promotion

### **Evaluation Design**

The evaluation consists of pre and post-intervention comparisons of mean scores on the intervention's targeted outcome variables: perceived knowledge and harm of marijuana use, intentions to modify their MJ use, participants' confidence, support, and strategies for modifying MJ use, and participants' reported marijuana use habits. The baseline measures for the intervention were taken just prior to program implementation, and post-intervention measures were taken just after program completion. Because of the small sample size, mean scores will be compared from pretest to posttest without testing for statistical significance.

It is acknowledged at the outset that the design is limited in several ways. First, the absence of a control group to compare participants' responses poses a barrier to inferring causal associations between the curriculum and outcome variables. Furthermore, the small sample size does not allow for the testing of statistical significance. These limitations mean that for any changes in participants' scores from pre to posttest, the intervention cannot be considered the sole cause. Other factors aside from the program cannot be ruled out as responsible for any changes. However, the evaluation does provide valuable information about the potential impact of MEI's intervention curriculum on participating students in its first year of implementation.



## **Measures**

The pre and post survey measures were designed by Hope Cornelis of the Colorado State University Prevention Research Center in collaboration with MEI personnel. These measures were tailored to assess the outcome objectives of this particular intervention curriculum. Variables assessed in the pre and post survey measures include the following:

- Demographic information
- Marijuana (MJ) use history
- Current marijuana behaviors and patterns
- Likelihood for changing MJ behaviors and patterns
- Perceived harm of MJ
- Program Impact

For a detailed list of all measures, please see the Appendix on pages 23-26.

## **Data Collection**

The first implementation of the curriculum took place in September of 2015 at Steamboat Springs High School in Steamboat Springs, CO. The second implementation took place from April to May of 2016 at Centennial High School in Fort Collins, CO. Pretests were administered to participants immediately prior to beginning the intervention curriculum, and posttests were administered immediately following completion of the intervention curriculum. The pre and posttest surveys were administered through the Qualtrics Survey website.

## Baseline Data

### Participants

**Demographic Information.** All demographic information is displayed in Table 1 below. There were 10 participants in the first implementation, and seven participants in the second implementation. Eleven participants were male (65%) and six were female (35%). A majority of participants were 17 or 18 years or older (71%), with 17 as the mean age of participants at baseline. A majority of participants were in 12<sup>th</sup> grade ( $n = 9$ , 53%) followed by 11<sup>th</sup> grade ( $n = 5$ , 29%) and 10<sup>th</sup> grade ( $n = 3$ , 18%). Most participants identified as White/Caucasian ( $n = 12$ , 71%), followed by Hispanic or Latino ( $n = 4$ , 24%). Ten of the 17 participants (59%) reported receiving free lunch at school, indicating a lower SES. Most participants reported receiving either mostly A's or mostly B's in school ( $n = 12$ , 71%) at baseline.

Demographic Characteristic	n	Percent
<b>Implementation</b>		
1	10	58.8
2	7	41.2
<b>Sex</b>		
Male	11	64.7
Female	6	35.3
<b>Grade</b>		
10	3	17.6
11	5	29.4
12	9	52.9
<b>Age</b>		
15	1	5.9
16	4	23.5
17	6	35.3
18+	6	35.3
<b>Ethnicity</b>		
American Indian or Alaskan Native	1	5.9

Asian	0	0
Black or African American	0	0
Hispanic or Latino	4	23.5
Multiracial	0	0
White/Caucasian	12	70.6
Other	0	0
<b>Free Lunch</b>		
Yes	10	58.8
No	7	41.2
<b>Academic Grades</b>		
Mostly A's	7	41.2
Mostly B's	5	29.4
Mostly C's	5	29.4
Mostly D's or Below	0	0

**Table 1. Participant Demographic Information**

### **Marijuana Use History**

**Age of first use.** The average age participants reported first using MJ was approximately 13 or 14 years old. A majority of participants reported first trying MJ between the ages of 11 and 14 years old. See Table 2 below.

**Lifetime use.** Participants' responses to how many times they've used MJ in their lifetimes are depicted in Table 2 below. A majority of participants reported using MJ 100 or more times in their lives ( $n = 13$ , 76.5%).

**Who introduced to marijuana.** The survey question that asked about who introduced participants to their first marijuana experiences was not asked in the first implementation of MEI's intervention curriculum at Steamboat Springs High School. Therefore, the following information is gathered from the seven participants from the second implementation at Centennial High School. Three participants indicated that their siblings first introduced them to MJ, one was introduced by an older peer/friend, and three were introduced by a peer/friend their same age. See Table 2 below.

**First method.** The survey question that asked about participants' first method of MJ use was not asked in the first implementation of the intervention at Steamboat Springs High School. Therefore, the following information is gathered from the seven participants from the second implementation at Centennial High School. All seven participants indicated their first method of marijuana use was smoking. See Table 2 below.

**Age of regular use.** The survey question that asked when participants began regularly using marijuana (i.e., using marijuana three or more times a week for a duration longer than a month) was not asked in the first implementation of the intervention at Steamboat Springs High School. Therefore, the following information is gathered from the seven participants from the second implementation at Centennial High School. A majority ( $n = 5$ ) of these participants began regularly using marijuana at the age of 13-14, and the remaining two participants began regularly using at age 15-16. See Table 2 below.

<b>MJ Use History</b>	<b>n</b>	<b>Percent</b>
<b>Age of First Use</b>		
8 or younger	0	0
9 or 10	1	5.9
11 or 12	7	41.2
13 or 14	7	41.2
15 or 16	1	5.9
17 or older	1	5.9
<b>Lifetime Use</b>		
0 times	0	0
1 or 2 times	0	0
3 to 9 times	1	5.9
10 to 19 times	0	0
20 to 39 times	0	0
40 to 99 times	3	17.6
100 or more times	13	76.5
<b>Introduced*</b>		
Siblings	3	42.9
Parents	0	0
Older Peer/friend	1	14.3
Same age peer/friend	3	42.9
Younger peer/friend	0	0
Someone I don't know	0	0
Other	0	0
<b>First Method*</b>		
Smoking	7	100

Vaping	0	0
Edibles	0	0
Other	0	0
<b>Age of Regular Use*</b>		
8 or younger	0	0
9 or 10	0	0
11 or 12	0	0
13 or 14	5	71.4
15 or 16	2	28.6
17 or older	0	0

**Table 2. Participants' MJ Use History**

\* indicates data from implementation 2 only

**Reasons for using MJ.** Participants were able to select as many options as they liked in response to reasons they use MJ. The most commonly selected reasons participants' reported were to reduce anxiety/stress ( $n = 13$ ) and to increase recreational enjoyment ( $n = 13$ ), followed by to engage with peers ( $n = 10$ ) and to help fall asleep ( $n = 9$ ). See Table 3 below.

<b>Reasons for Using MJ</b>	<b>n</b>	<b>Percent</b>
Reduce anxiety/stress	13	76.5
Help fall asleep	9	52.9
Increase recreational enjoyment	13	76.5
Engage with peers	10	58.8
Other*	7	41.2

**Table 3. Participants' Reasons for Using MJ**

Other\*: "To eat," "Relax after work," "insomnia," "to get high," "I love it."

**Summary.** Participants in this sample reported high levels of lifetime marijuana use, and for those who were asked, became regular MJ users at a young age. Therefore, this is an appropriate sample to target for this MEI Marijuana Intervention Curriculum.

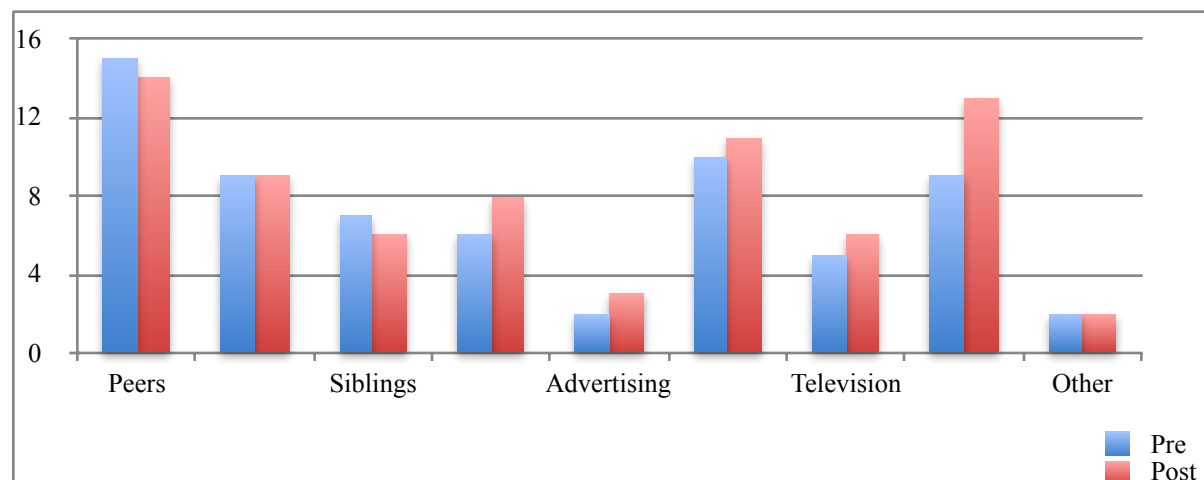
## Program Outcomes

### Sources of Knowledge about MJ

Participants were asked to identify where they derive their perceptions and knowledge about marijuana at pre and posttest. They could select as many options as they liked. At both pre and posttest, peers were the most commonly selected source of knowledge about marijuana. Following the MEI Marijuana Intervention Curriculum, the most notable change in participants' sources of MJ knowledge was an increase in teachers/counselors as a source of knowledge ( $MD = 4$ ). See Table 4 and Figure 1 below.

Sources of MJ knowledge	Pre	Post
Peers	15	14
Parents	9	9
Siblings	7	6
Medical Professionals	6	8
Advertising	2	3
Internet	10	11
Television	5	6
Teachers/Counselors	9	13
Other	2	2

**Table 4. Participants' Sources of MJ Knowledge at Pre and Posttest**



**Figure 1. Participants' Sources of MJ Knowledge at Pre and Posttest**

## Perception of Harm

**Overall understanding of marijuana's effects.** Combined mean scores on five items assessing participants' overall understanding of MJ's effects were compared from pre to posttest. Higher scores indicate a greater level of understanding. Participants' responses indicated an increase in overall understanding of the effect of MJ from pretest ( $M = 3.365$ ) to posttest ( $M = 4.118$ ). Participants' changes in overall understanding are displayed in Table 5 and Figure 2 below.

**Body.** Combined mean scores on five items assessing participants' knowledge of the potentially harmful impact of marijuana on their bodies were compared from pre to posttest. Higher scores indicated greater perceived harm. Participants' responses indicated an increase in perceptions of the harmful effects of MJ on the body from pretest ( $M = 3.092$ ) to posttest ( $M = 3.861$ ). See Table 5 and Figure 2 below.

**Brain/cognitive abilities.** Combined mean scores on three items assessing participants' perceived harm of MJ's impact on the brain/cognitive abilities were compared from pre to posttest. Higher scores indicated greater perceived harm. Participants' responses indicated an increase in perceived harm of MJ on the brain from pretest ( $M = 3.083$ ) to posttest ( $M = 4.092$ ). See Table 5 and Figure 2 below.

**Mental health.** Combined mean scores on two items assessing participants' knowledge of the potentially harmful impact of marijuana on their mental health were compared from pre to posttest. Higher scores indicated greater perceived harm. Participants' responses indicated an increase in perceptions of the harmful effects of MJ on mental health from pretest ( $M = 2.594$ ) to posttest ( $M = 3.559$ ). See Table 5 and Figure 2 below.

**Relationships.** Participants' responses to the question: "Using marijuana can negatively impact my social relationships" were compared from pre to posttest (1 = *Strongly Disagree*, 5 = *Strongly agree*). Higher scores indicated greater perception of harm. Participants' responses indicated an increase in perceptions of MJ's harm on relationships from pretest ( $M = 2.412$ ) to posttest ( $M = 3.235$ ). See Table 5 and Figure 2 below.

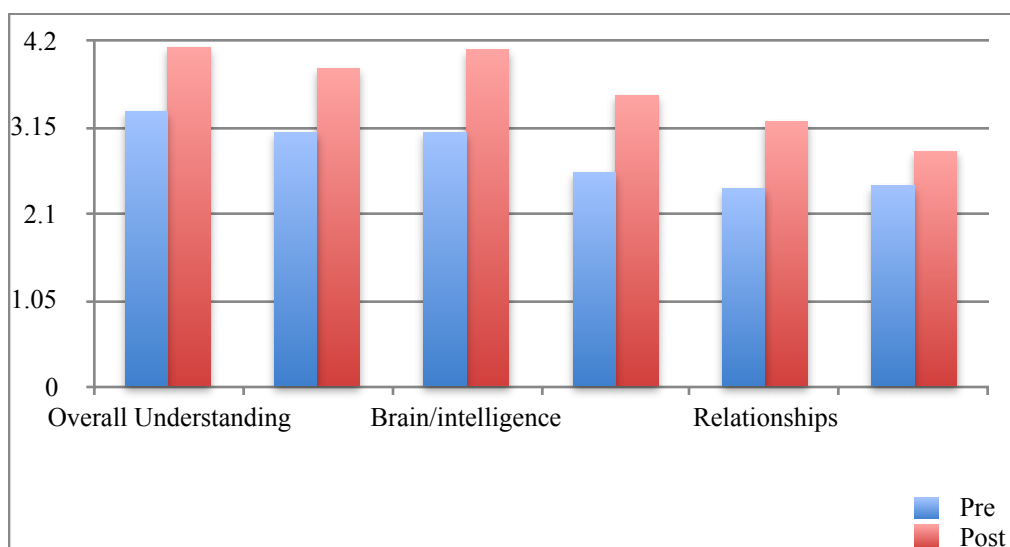
**Compared to other drugs.** Combined mean scores on seven survey items assessing participants' perceptions of the harmful effects of marijuana compared to other drugs, including potential for marijuana addiction and withdrawal symptoms, were compared from pre to posttest. Higher scores indicated greater perceived harm. Participants' responses indicated a slight



increase in perceptions of MJ's harm compared to other drugs from pretest ( $M = 2.447$ ) to posttest ( $M = 2.874$ ). See Table 5 and Figure 2 below.

Perception of MJ's Harm	Pre	Post	<i>MD</i>
Overall Understanding	3.365	4.118	0.753
Body	3.092	3.861	0.769
Brain/cognitive	3.083	4.092	1.009
Mental Health	2.594	3.559	0.965
Relationships	2.412	3.235	0.823
Compared to Other Drugs	2.447	2.874	0.427

**Table 5. Participants' perceived harm of MJ at pre and posttest**



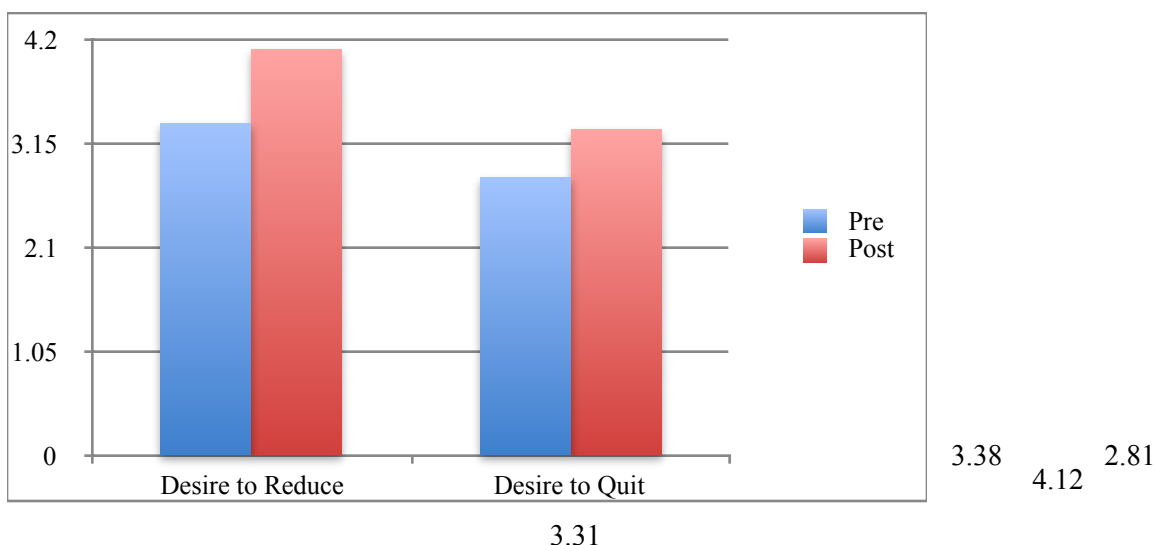
**Figure 2. Participants' perceived harm of MJ at pre and posttest**

**Summary.** Although it is not possible to assess for statistical significance in the changes described above, there is at least a slight increase in participants' perceptions of the harmful effects of marijuana from pre to posttest on all domains tested. The largest increases in perceptions of harm were found in participants' perceptions of MJ's impact on the brain/cognitive abilities ( $MD = 1.009$ ), followed by MJ's impact on mental health ( $MD = .965$ ) and relationships ( $MD = .823$ ).

## Intentions and Supports to Modify MJ Use

**Desire to reduce MJ use.** Participants' desires to reduce their MJ use were assessed at pre and posttest. Participants' responses indicated an increase in their desires to reduce their MJ use from pretest ( $M = 3.375$ ) to posttest ( $M = 4.118$ ;  $MD = .743$ ). See Figure 3 below.

**Desire to quit using MJ.** Participants' desires to quit using MJ were also compared from pre to posttest. Participants' responses indicated an increase in desire to quit using MJ from pretest ( $M = 2.813$ ) to posttest ( $M = 3.313$ ;  $MD = .5$ ). See Figure 3 below.

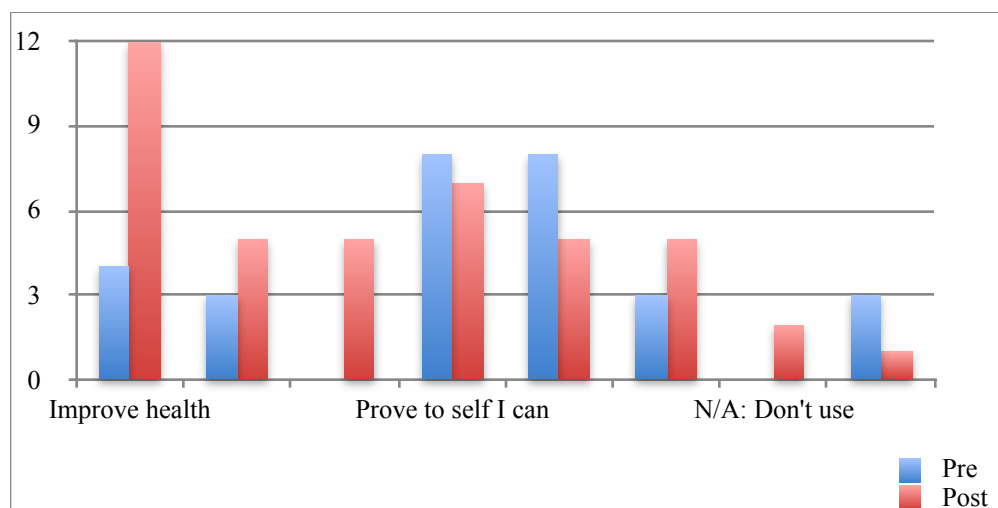


**Figure 3. Participants' Desires to Modify their MJ Use at Pre and Posttest**

**Reasons for reducing/quitting MJ use.** Participants' reasons for wanting to reduce or quit using marijuana were assessed at pre and posttest. Students were able to select as many options as they wanted on this item. The most notable changes from pre to posttest were an increase in improving health as a reason to modify usage ( $MD = 8$ ) and improving academics as a reason to modify usage ( $MD = 5$ ). In addition, the number of participants who reported not wanting to modify their usage at baseline decreased from 3 to 1, and the number of participants who reported not using MJ increased from 0 to 2. See Table 6 and Figure 4 below.

Reasons to Modify MJ Use	Pre	Post
Improve health	4	12
Improve relationships	3	5
Improve academics	0	5
Prove to self I can	8	7
Prove to others I can	8	5
Other*	3	5
N/A: Don't use	0	2
Don't want to	3	1

**Table 6. Participants' Reasons for Modifying MJ Use at Pre and Posttest**



**Figure 4. Participants' Reasons for Modifying MJ Use at Pre and Posttest**

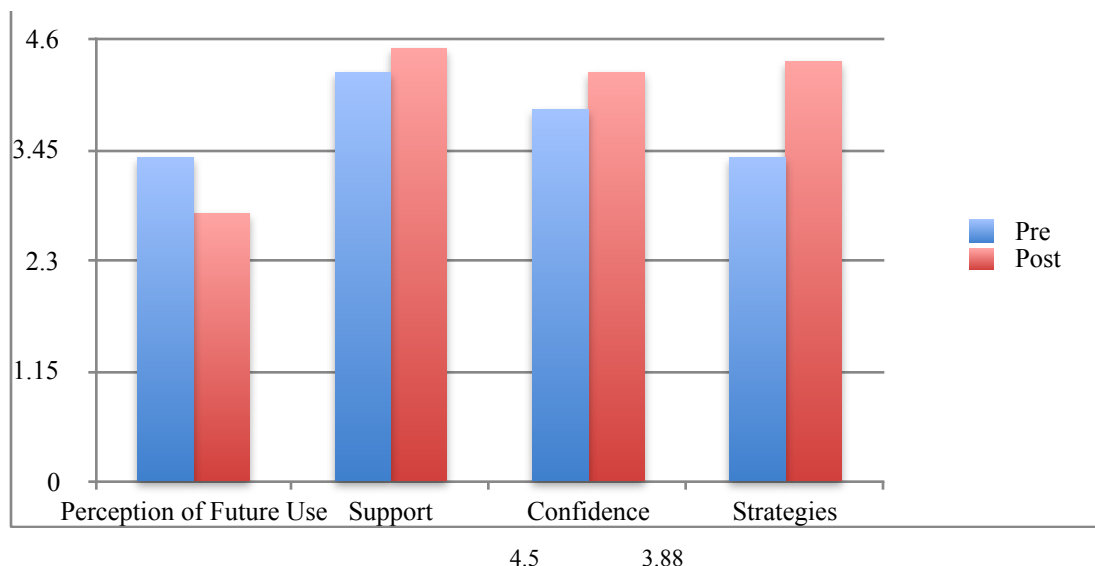
**Perceptions of future use.** Combined mean scores on 3 items assessing participants' perceptions of their future MJ use were compared from pre to posttest. Higher scores indicated a higher likelihood for future long-term marijuana use. Participants' scores revealed a decrease in their perceptions of the likelihood that they'll continue using marijuana in the long-term future from pretest ( $M = 3.371$ ) to posttest ( $M = 2.782$ ;  $MD = -.589$ ). Participants' perceptions of future use are displayed in Figure 5 below.

**Support for reducing/quitting.** Participants' responses to the question: "I know who I can count on to support me in reducing/quitting my marijuana use" were compared from pre to posttest (1 = *Strongly Disagree*, 5 = *Strongly agree*). Responses indicated a slight increase in

support from pretest ( $M = 4.25$ ) to posttest ( $M = 4.5$ ;  $MD = .25$ ). Changes in support are displayed in Figure 5 below.

**Confidence in reducing/quitting.** Participants' responses to the question: "I feel confident that I can reduce or quit using marijuana" were compared from pre to posttest (1 = *Strongly Disagree*, 5 = *Strongly Agree*). Responses indicated a slight increase in confidence from pretest ( $M = 3.875$ ) and posttest ( $M = 4.267$ ;  $MD = .392$ ). Changes in confidence are displayed in Figure 5 below.

**Strategies for reducing/quitting.** Participants' responses to the question: "I can identify strategies to use when attempting to reduce/quit using marijuana" were compared from pre to posttest (1 = *Strongly Disagree*, 5 = *Strongly Agree*). Participants' responses indicated an increase in identified strategies from pretest ( $M = 3.375$ ) to posttest ( $M = 4.375$ ;  $MD = 1.0$ ). Changes in perceived strategies are displayed in Figure 5 below.



**Figure 5. Participants' Likelihood for Change in MJ Behaviors**

**Summary.** Overall, participants identified more reasons to reduce or quit their MJ use, exhibited a decrease in their perceptions of long-term future use, and reported feeling more supported with greater confidence and strategies to modify their MJ use. Although it is not possible to assess whether these improvements are statistically significant, these changes are in the intended direction and offer promising support for the impact of MEI's intervention curriculum in terms of empowering participants to modify their heavy MJ habits.

## Marijuana Use

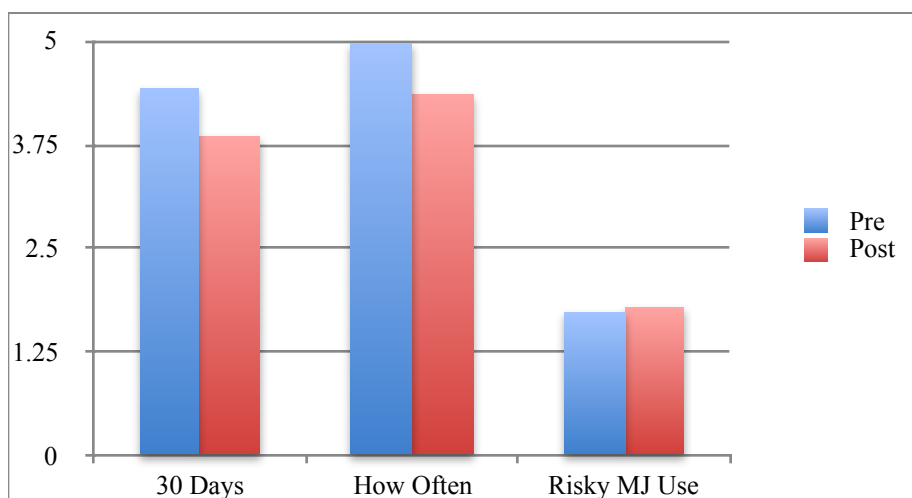
**MJ Use in past 30 days.** Participants' MJ use in the last 30 days was assessed at pre and posttest. Participants' responses indicated a decrease in their MJ use in the past 30 days from pretest ( $M = 4.429$ ) to posttest ( $M = 3.834$ ;  $MD = -.595$ ). See Table 7 and Figure 6 below.

**How often.** Mean scores of participants' reports of how often they currently use MJ were compared from pre to posttest (1 = *I don't currently use*, 2 = *Less than once a month*, 3 = *1-2 times a month*, 4 = *1-2 times a week*, and so on). Participants indicated a decrease in their frequency of MJ use from pretest ( $M = 5.0$ ) to posttest ( $M = 4.375$ ;  $MD = -.625$ ). See Table 7 and Figure 6 below.

**Risky MJ use.** Combined scores on participants responses to two survey items asking how often they went to school while high and drove a vehicle while high were compared from pre to posttest (1 = *0 times*, 2 = *1 or 2 times*, 3 = *3-9 times*, and so on). Participants reported very low levels of risky MJ use at both time points, but scores indicated a very slight increase in risky MJ use from pretest ( $M = 1.732$ ) to posttest ( $M = 1.781$ ;  $MD = .049$ ). See Table 7 and Figure 6 below.

Current MJ Use	Pre	Post	MD
30 Days	4.429	3.834	-0.595
How Often	5	4.375	-0.625
Risky MJ Use	1.732	1.781	0.049

**Table 7. Participants' MJ use behaviors at pre and posttest**



**Figure 6. Participants' MJ use behaviors at pre and posttest**

**Summary.** Participants reported lower levels of current MJ use at posttest than at pretest. Although these assessments were taken a relatively short time after one another, this offers

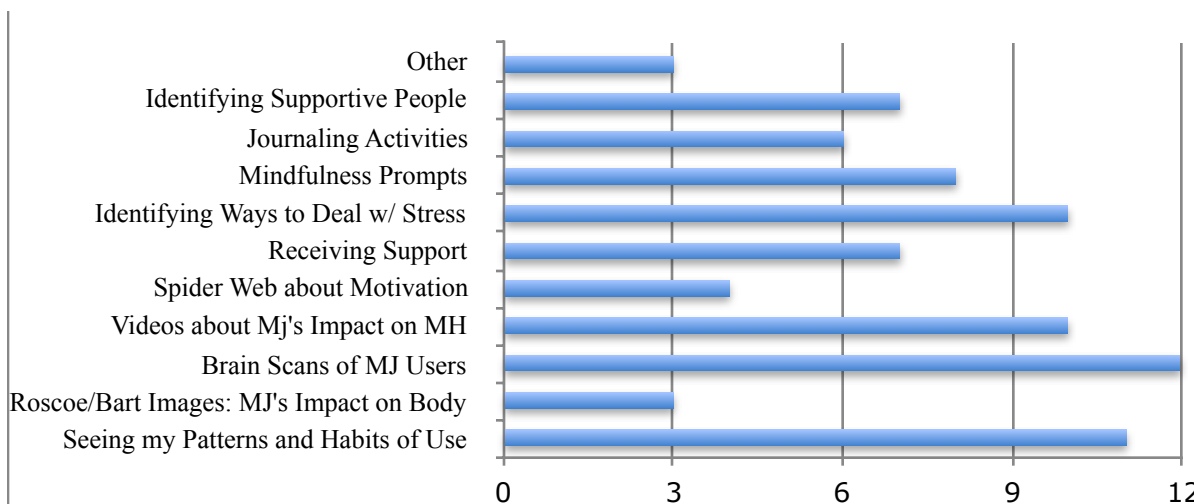
support that the curriculum may aid in assisting and motivating adolescent marijuana users to reduce their MJ use.

### **Delinquent Behaviors**

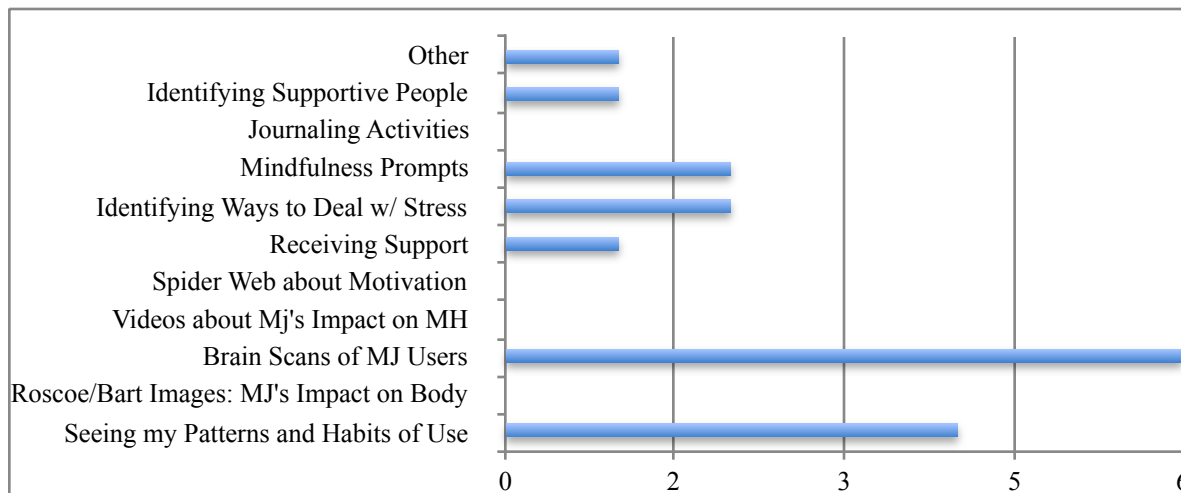
Combined mean scores on eight items assessing participants' involvement in delinquent behaviors in the past 30 days were compared from pre to posttest. Although participants' reports of delinquent behavior were low at both assessment points, their responses indicated a slight increase in self-reports of delinquent behavior from pretest ( $M = 1.86$ ) to posttest ( $M = 1.949$ ,  $MD = .089$ ).

### Program Impact

On the post-intervention survey, participants were first asked to select all aspects of the program that were most impactful for them in terms of altering their marijuana use. Then, they were asked to select only one aspect that was most impactful for them. Figure 7 below depicts participants' responses when they could select multiple aspects of the program, and Figure 8 depicts participants' responses to the single most impactful aspect of the program.



**Figure 7. Participants' reports of the most impactful aspects of the intervention**



**Figure 8. Participants' reports of the single most impactful aspect of the intervention**

**Summary.** Based on these results, it appears that all aspects of the program were found to be impactful to at least some of the participants, with the brain scans on marijuana users, seeing one's patterns and habits of use, and identifying ways to deal with stress other than MJ as some of the most impactful aspects of the curriculum to this sample.

## **Conclusion**

The purpose of this evaluation was to provide a comprehensive assessment of MEI's Intervention Curriculum across two implementations of the program at Steamboat Springs High School and Centennial High School in Colorado. Despite the lack of a control comparison group and small sample size, which limit this evaluation, it is informative and descriptive in portraying the potential impact of this intervention curriculum. Results of this evaluation provide support that MEI may be reaching some of its primary objectives in terms of:

- Increasing participants' perceptions of the harmful effects of MJ on overall health, the body, brain, mental health, relationships, and in comparison to other drugs
- Increasing participants' desires to reduce and/or quit using marijuana
- Increasing participants' support, confidence, and strategies to modify their MJ use
- Decreasing participants' perceptions of their long-term future MJ use
- Reductions in participants' self-reported current MJ use

## **Recommendations**

- It is recommended that the program evaluator and MEI staff continue to collaborate to modify the survey measurement items in order to improve their capacity to accurately capture participants' knowledge and perceptions, as well as objectives targeted by the curriculum.
- Due to current constraints on this program, it is understood that a control comparison group, larger sample size, and long-term follow-up were not feasible. However, in order to enhance the statistical rigor of the evaluation and demonstrate greater effectiveness of the curriculum, comparison groups and longer term follow-up assessments in the future are recommended, when feasible.



## Appendix

### Measures

#### Demographic Variables

**Age.** Age was assessed using two questions: One that asked participants' birthdays and other that asked participants to select their age from 7 options ranging from "12 years old or younger" to "18 years or older."

**Grade.** Participants' grade in school was measured using a single question with a dropdown list of 7 options ranging from 6-12.

**Sex.** Sex was measured as a dichotomous variable. Participants identified as either male or female.

**Ethnicity.** Participants' ethnicity was measured using a single survey item asking participants to select from 8 options the one that best describes them. Participants were able to select an "Other" option with text entry if they did not fall into the other 7 options.

**Academic grades.** Participants' academic grades were measured using a single survey item asking participants what grades they typically earn in school. There were 4 options ranging from "Mostly A's" to "Mostly D's or below."

**Socioeconomic status (SES).** SES was measured as a dichotomous variable using a single item asking whether the student receives free lunch at school. The two options were "yes" or "no."

**School, district, and state.** Participants (in implementation 2 only) were asked to write in the name of their school, district, and the state their school is in.

#### Marijuana (MJ) History

**Previous marijuana use.** Previous MJ use was assessed using two survey items which asked how old they were when they first tried marijuana – with a scale ranging from "8 years old or younger" to "17 years or older," and an item asking how many times in their lives they have used marijuana – with a 7-point scale ranging from "I have never used marijuana" to "100 or more times."

**Regular use.** Regular use of marijuana was assessed (in implementation 2 only) using one survey item asking participants how old they were when they first began *regularly* using

marijuana (i.e., 3 or more times a week for a duration longer than a month) – with a 7-point scale ranging from “I was never a regular user of marijuana” to “17 years old or older.”

**How MJ was introduced/obtained.** One item asked participants (in implementation 2 only) who introduced them to their first marijuana experience with 8 options including “I have never experienced marijuana,” “my sibling(s),” “my parent(s),” “an older peer/friend,” “other (please describe),” etc. Another item asked participants, “If you have used or are currently using marijuana, where have you gotten it or how do you typically get it?” – with 9 options including “I have a medical card,” “from friends/siblings for FREE,” “from friends/siblings when I PAY,” “from parents who know I take it,” etc.

**First method.** Participants’ first method of marijuana tried was assessed (in implementation 2 only) using a single item asking “What method did you first start using when you began using marijuana?” with 5 options including “None (I have never tried marijuana),” “smoking,” “vaping,” “edibles,” and “other (please describe).”

**Reasons for use.** Participants’ reasons for using marijuana were measured using a single survey item in which participants could select as many options as they liked. Options included “to reduce anxiety/stress,” “to help you fall asleep,” “to increase recreational enjoyment,” etc.

## Outcome Variables

### MJ Behaviors

**Current marijuana use.** Current MJ use was assessed using four survey items asking participants about their MJ use in the past 30 days (e.g., “During the past 30 days, how many grams of marijuana did you use?” with a rating scale ranging from “0 grams” to “26 or more grams”).

**Risky MJ behaviors.** Risky MJ behaviors were measured using two survey items asking how often participants were high while driving and were high at school – with a 7-point scale ranging from “I have not used marijuana in the last 30 days” to “30 or more times.”

**Desires to change marijuana habits.** Intentions to alter habits were measured using two survey items (e.g., “How do you feel in regards to quitting your marijuana use?” with a scale ranging from “I don’t want to/I can’t quit” to “I’m already trying to quit.”). Participants’ motivational reasons for altering their marijuana behaviors were also assessed with options such as “to improve my health,” “to improve my academics,” etc.

### Likelihood for Change

**Perceptions of future use.** Three items were also included to assess the participants' perceptions of their future use (e.g., "It is difficult to imagine my life without marijuana use" with a 5-point rating scale ranging from "Strongly disagree" to "Strongly agree.")

**Social support for reducing/quitting.** Social support was measured using one item asking about participants' abilities to identify supportive people in their lives who could assist them in changing their marijuana habits with a 5-point rating scale ranging from "Strongly disagree" to "Strongly agree".

**Confidence for reducing/quitting.** One item was used to assess participants' reported confidence in altering their MJ behaviors (e.g., "I feel confident that I can reduce or quit using marijuana" with a 5-point rating scale ranging from "Strongly disagree" to "Strongly agree").

**Strategies for reducing/quitting.** One item was used to assess participants' ability to identify strategies to use in altering their behaviors regarding marijuana (e.g., "I can identify strategies to use when attempting to reduce/quit using marijuana" with a 5-point rating scale ranging from "Strongly disagree" to "Strongly agree").

### **Perception of Harm**

**Overall understanding of marijuana's effects.** Participants' levels of understanding of marijuana's effects were measured using five survey items (e.g., "I understand the effects THC in marijuana can have on the body" with a 5-point rating scale ranging from "Strongly disagree" to "Strongly agree.").

**Body.** Participants' perceptions of marijuana's effects on the body were assessed using five survey items (e.g., "Using marijuana can increase my heart rate and lower my blood pressure" with a 5-point rating scale ranging from "Strongly disagree" to "Strongly agree.").

**Brain/cognitive abilities.** Participants' perceptions of marijuana's effects on the brain were measured using two survey items (e.g., "I don't think marijuana has any negative effects on the brain" with a 5-point rating scale ranging from "Strongly disagree" to "Strongly agree.").

**Mental health.** Participants' perceptions of marijuana's effects on mental health were assessed using 2 survey items (e.g. "Long-term use of marijuana can increase anxiety." - with a 5-point rating scale ranging from "Strongly disagree" to "Strongly agree.").

**Social relationships.** These perceptions were assessed using one survey item: “Using marijuana can negatively impact my social relationships” with a 5-point rating scale ranging from “Strongly disagree” to “Strongly agree.”).

**Compared to other drugs.** Seven items were used to measure perceptions of the effects on marijuana on overall health compared to other drugs such as tobacco, alcohol, and prescription drugs (e.g. “Using marijuana doesn’t have as many negative effects as tobacco” - with a 5-point rating scale ranging from “Strongly disagree” to “Strongly agree”).

### **Program Impact**

**Program impact.** Participants’ opinions regarding impactful aspects of the program were assessed using two survey items on the post-intervention survey only. There were 8 options describing various curriculum activities and components. The first question asked participants to select as many options as they wanted and the second question had the same options but asked participants to select only one aspect that was the single MOST impactful aspect of the curriculum.

**\*Note:** For all questions asking participants about their own MJ use, an option stating that they have not or do not use marijuana was available.