Fatal Vision Alcohol & MJ Goggle User Guide

Introduction

Purpose:

Demonstrate the potential consequences of driving under the influence of alcohol and recreational marijuana/THC and the two substances' amplified danger in combination.

Objectives:

At the end of the activity, participants will be able to:

- List driving errors they observed within the activity
- Describe what are the likely impacts of combining alcohol and Marijuana on driving skills

Evidence-Based Approach

The purpose of the following activities using the Fatal Vision® Alcohol and Marijuana Combo Goggle is to give participants an experience of cognitive and gross motor impairment associated with the combination of alcohol and THC and demonstrate their susceptibility to the impairment and the potentially severe consequences that can occur. People may believe that combining alcohol and marijuana is safe and without consequences, especially when consumed at lower levels. However, the combination of these drugs amplifies the impairments. Participants wearing the Fatal Vision® Alcohol and Marijuana Combo Goggle will experience their susceptibility to the modeled cognitive effects of these substances on decision-making and driving skills and understand the potentially severe consequences of this impairment.

MODELED IMPAIRMENTS

The Fatal Vision® Alcohol and Marijuana Combo Goggle models the amplified danger of combining Alcohol and Marijuana use. This combination results in increased impaired coordination and increased distortion of the brain's ability to process cognitive information. These impairments can negatively impact an individual's driving skills and ability to react appropriately to objects and hazards while driving. The Fatal Vision® Alcohol and Marijuana Combo Goggle models specific impairments associated with combining alcohol and recreational marijuana/THC, including distorted perception, divided-attention failure, poor motor coordination, slowed decision-making, and slowed reaction.

CAUTION: The Fatal Vision® Alcohol and Marijuana Combo Goggle may cause a feeling of nausea to individuals who are susceptible to motion sickness. Use spotters when using any Fatal Vision® Goggle otherwise serious injury may result

Activity #1 Maze Driving Activity
Activity Overview

Participants navigate through the DIES® Alcohol and Marijuana Impairment Mat following a route of their choice while "driving" a small model car through a maze.
Participants perform the activity twice.

1. The participant performs an unimpaired baseline attempt.
2. The participant wears the Fatal Vision® Alcohol and Marijuana Combo impairment goggles.

Spectators are engaged in the activity by observing and contrasting the participants' two attempts and identifying the potential impacts on safe driving.

Modeled impairments:

The Fatal Vision® Alcohol and Marijuana Combo Goggle models the amplified danger of combining the use of the two substances. This combination results in increased impaired coordination and increased distortion of the brain's ability to process cognitive information. These impairments can negatively impact an individual's driving skills and ability to react appropriately to objects and hazards while driving. The Fatal Vision® Alcohol and Marijuana Combo Goggle models specific impairments associated with combining alcohol and recreational marijuana/THC and includes distorted perception, poor motor coordination, slowed decision-making, and slowed reactions.

Materials

- **Fatal Vision Alcohol/Marijuana Combo Goggle**
- **Steering wheel**

- **DIES Maze Mat**

Mat Layout Guide:

Black paths- represent drivable roads.

Blue paths- represent opportunities to change lanes. They also function as drivable roads.

Red lanes- represent **r**estricted **r**oads. These restricted roads could be because of construction, hazards, or events where roads are blocked off, or private roads. Do not drive on these roads.

Purple paths- represent **p**aths for **p**edestrians (or bikes). The participant can cross this purple path but not drive on it.

Activity Objective

Navigate from one side of the mat to the other at a consistent speed without making driving errors by using the wrong path or driving off the road.

Activity Steps:

- Baseline attempt: Instruct the driver to travel from one end of the mat to the other, choosing their route. The driver starts at any black line.
  - Stop only to make turns or stop momentarily at pedestrian crossings.
  - Drive on the blue and black roads only.
  - Do not drive on the red or purple paths. However, the driver may cross the purple paths.
- Impaired attempt: Repeat the activity from the opposite side of the mat.
- Have the participant wear the Alcohol and Marijuana Combo goggle.
- Instruct spectators to identify moments where the participant experienced imbalance and decision-making errors.
- Process the experience with the driver and the spectators. See Talking Points below for suggestions.

Talking Points:

- Ask the observers what kind of errors in performance and decision-making they saw with the participant.
- Ask the participant how many of these errors they realized they made while impaired.
- Alcohol affects gross motor coordination, judgment, concentration, visual acuity, and reaction time. THC use affects perception, short-term memory, problem-solving, and reaction time. In what ways did you observe the participants struggling with these types of impairments?
- List some traffic situations where you have needed to, or would need to, assess and respond to a potential hazard immediately. Describe the impact a delay on your processing and reaction time could have in that situation.
- **Sample Takeaway Message:** Each drug (Alcohol and Marijuana) by itself increases crash risk. When a user combines these two drugs the impairment effects are amplified more than either one alone. This means the crash risk is also amplified.

Presentation Tips

Background information on alcohol, Marijuana, and combined impairments.

Some common reactions to the gross motor impairment caused by alcohol's depressant effects on the central nervous system are:

- Driving slower or much faster
- Dizziness
- Inability to stay in one's lane
- Confusion
- Overconfidence in one's ability
- Forgetting driving instructions or cues that they previously responded to without hesitation.

Some common reactions to the cognitive overload/stress due to reduced processing capacity caused by Recreational Marijuana/THC impairment are:

- Driving slower
- Hesitation
- Frustration
- Confusion
- Lack of proper focus
- Lack of confidence, nervousness
- Giving up
- Forgetting driving instructions or cues that they previously responded to without hesitation.

The combination of both Alcohol and Marijuana includes the previously mentioned reactions of each drug. Some notable impacts from the combination can be:

- THC inhibits the body's need to vomit. The body's reflex to vomit toxins can save a person's life in a binge-drinking/alcohol poisoning situation. However, when a person also consumes THC, it can inhibit the body's protective response of expelling excess toxins. [1]
- Doubled odds of drunk driving, social consequences, and harms to self. [2]
- Increased crash risk 8-10% for each .01 BAC unit increase with both substances on board. [3]

[1] https://www.ncbi.nlm.nih.gov/pubmed/11509190
[2] https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4399000/
[3] https://www.ncbi.nlm.nih.gov/pubmed/25612879

Optional Traffic elements

Option 1

- Change the activity by having two people 'in the 'car'. In this version, instead of impairing the person holding the wheel, you may impair the person walking with them and have them as the 'passenger' give directions to the driver. Be prepared to follow up with questions regarding the competence of the person giving directions to the driver. Think of real-world examples where a driver might depend on the passenger to give directions. How could an impaired passenger affect driving safety in this scenario? Also, discuss a potential scenario where both driver and passenger are impaired. How could this make the driving even more hazardous?

Option 2

- Add another driver on the road, traveling in the opposite direction. This addition represents another traffic element a driver must be aware of and react to, and they can see how impairment could impact traffic safety.

Keep the focus on the impairment

Often, the participants will focus on what they couldn't see because of the goggles.

Address it by helping the audience understand that the Fatal Vision Alcohol/Marijuana Combo goggles use a filter that blocks certain information from reaching the eyes but leaves other information unaffected. This filter effect models THC's filtering effect on the brain — it affects how information is perceived and processed. This mental chemical filter does not necessarily affect color, but it will affect random objects and events perceived by the driver's senses and how the brain processes that information. The reality is that traffic does not slow down to compensate for a driver's impairment. Still, an impaired driver's ability to perceive and respond to multiple traffic events will slow down. That results in lost reaction time and possibly a crash.

Help drivers focus on how the impairment affects their thinking, decision making, and confidence in driving safely, *rather than what they didn't see.*

Activity 2 Alcohol and MJ Tic Tac Two

Table-top Version

Modeled Impairment

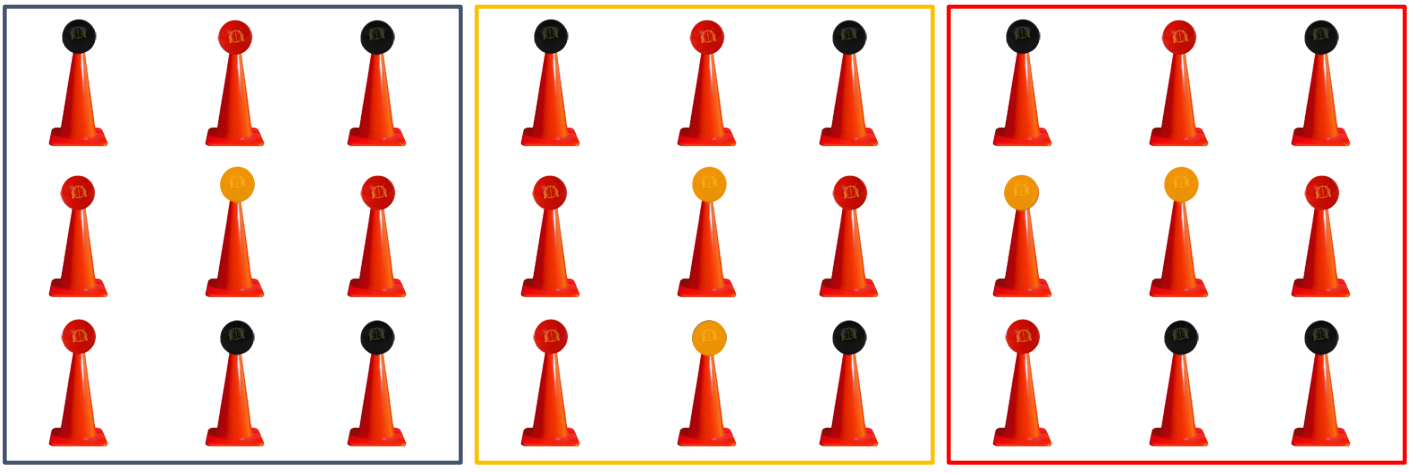
The Fatal Vision Alcohol and Marijuana Combo goggle models the amplified danger of combining alcohol and Marijuana. The combination results in increased impaired coordination and increased distortion of the brain's ability to process cognitive information.

Materials

- Fatal Vision Alcohol/Marijuana Combo Goggle
- 1 '10' walk-the-line tape
- 9 small black cones
- 4 black balls, 4 red balls, 2 orange balls.
- 1 timer
- Table – you must provide

Setup

- Place a 10 feet long line of walk-the-line tape in front of the table.
- Set the cones upside-down in a 3x3 pattern on the table.
- Place the balls in one of the three configurations below.



Activity Objective

This goal is to complete one row of three red balls and one row of three black balls by moving, replacing, and switching the balls on the cones.

Presentation Tips:

When set up and used according to the patterns shown, the participant will need to make at least two correct ball placement choices to complete the activity successfully. This technique ensures that the participant will engage their executive function and short-term memory to solve the activity. The goggles will impair executive function and short-term memory. The instructor can point out this difficulty caused by impairment afterward. Discuss how THC and alcohol can affect problem-solving and making appropriate choices in real life.

Activity Steps

Baseline Attempt

1. The participant stands at the top of the line and studies the cone and ball configuration for 10 seconds.
2. The participant turns their back on the table.
3. The instructor says “go” and starts the timer.
4. The participant turns around and walks down the line heel-to-toe with their arms at their side.
5. At the table, the participant moves the balls from one cup to the other until there are three black balls in a row and three red balls in a row.
6. The participant must say "done" out loud, and the instructor records the time.

Impaired Attempt

1. Reset the balls in a different formation than the previous attempt.
2. The participant stands at the top of the line and studies the new formation for 10 seconds.
3. The participant turns their back on the table.
4. The participant puts on the Fatal Vision® Alcohol and Marijuana Combo goggles.
5. The instructor says, "go” and starts the timer.
6. The participant turns around and walks down the line heel-to-toe with their arms at their side.
7. At the table, the participant moves the balls from one cup to the other until there are three black balls in a row and three red balls in a row. The participant cannot hold onto the table to steady themselves unless their safety is compromised.
8. The participant must say "done""" out loud, and the instructor records the time again.

Process the experience

9. Note any loss of balance, confusion, hesitation, errors in judgment, slower decision making, and wanting to give up on the task.
10. Note any differences in the tone of voice this time, the confidence level, hesitation or increased nervousness, etc.

Talking Points

1. Point out the differences between the two problem-solving attempts.
2. The differences might be quantitative, as in the time to complete the task and accuracy of ball placement.
3. The differences might be qualitative, such as balance, hesitation, confidence, quickness in decision-making, motivation to complete the task, and decreased recall.
4. How might the modeled impairments affect assessing and solving problems in real-life traffic?

Sample Takeaway Message: "Both Alcohol and Marijuana alone have their own impairments. When these two drugs are combined, the impairment effects are amplified more than either one alone. This combination can result in increased risk for errors in decision making, and harm to self or others."

Presentation Tips:

When set up and used according to the patterns shown, the participant will need to make at least two correct ball placement choices to complete the activity successfully. This technique ensures that the participant will engage their executive function and short-term memory to solve the activity. The goggles will impair executive function and short-term memory. The instructor can point out this difficulty caused by impairment afterward. Discuss how THC and alcohol can affect problem-solving and making appropriate choices in real life.

Activity 3 Alcohol and MJ "Tic Tac Two"

Floor Activity

Modeled Impairment

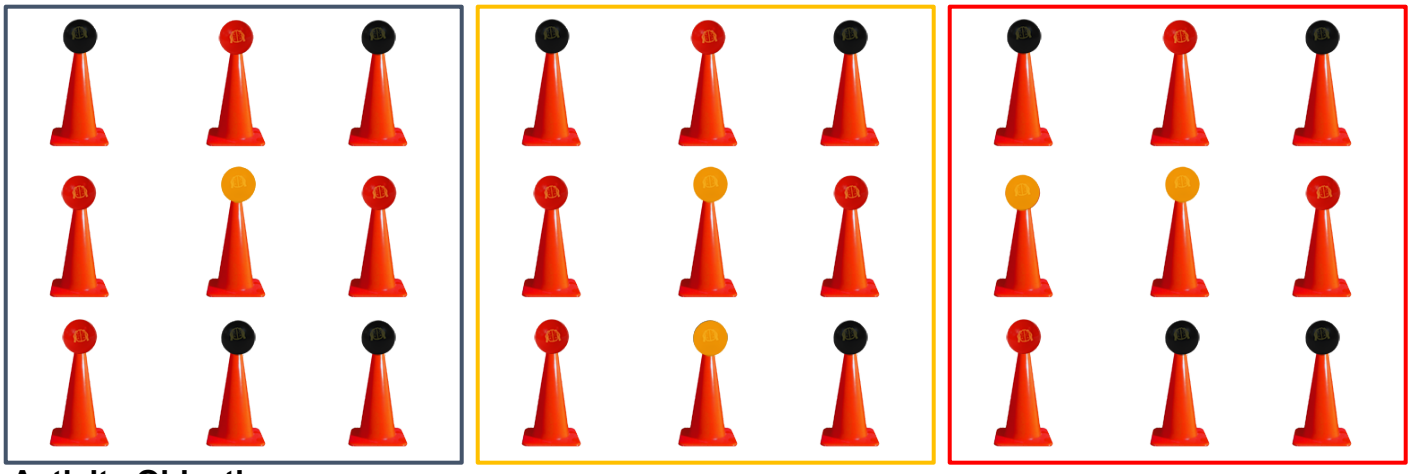
The Fatal Vision Alcohol and Marijuana Combo goggle models the amplified danger of combining the two substances. This combination results in increased impaired coordination and increased distortion of the brain's ability to process cognitive information.

Materials

- Fatal Vision Alcohol/Marijuana Combo Goggle
- 9 tall cones
- 4 black balls, 4 red balls, 2 orange balls.
- 1 timer

Setup

Set up the cones and balls in one of three different formations. Set up the configurations facing any direction, but the pattern should be similar. Note that in the first formation, there is only 1 orange and 4 black and red balls. In the second formation there are 2 orange and 4 red and 3 black. In the third formation there are 2 orange, 3 red and 4 black.



Activity Objective

The activity's goal is to complete one row of three red balls and one row of three black balls by moving, replacing, and switching the various balls on the cones.

Presentation Tips:

When set up and used according to the patterns shown, the participant will need to make at least two correct ball placement choices to complete the activity successfully. This technique ensures that the participant will engage their executive function and short-term memory to solve the activity. The goggles will impair executive function and short-term memory. The instructor can point out this difficulty caused by impairment afterward. Discuss how THC and alcohol can affect problem-solving and making appropriate choices in real life.

Activity Steps

Baseline Attempt

1. The participant studies the pattern of cones for 10 seconds.
2. The participant turns around so they are no longer facing the cones.
3. The instructor says “go” and starts the timer.
4. The participant turns around and moves the balls from one cone to the other until there are three black balls in a row and three red balls in a row.
5. The participant must say "DONE out loud, and the instructor records the time.

Impairment Attempt

1. Reset the balls in a different formation than the previous attempt.
2. The participant studies the pattern of cones once again for 10 seconds.
3. The participant turns around so they are no longer facing the cones.
4. The participant puts on the Fatal Vision® Alcohol and Marijuana Combo goggles.
5. The instructor says “go” and starts the timer.
6. The participant turns around and moves the balls from one cone to the other until there are three black balls in a row and three red balls in a row.
7. The participant must say "done" out loud, and the instructor records the time again.

Process the experience

8. Note any loss of balance, confusion, hesitation, errors in judgment, slower decision making, and wanting to give up on the task.
9. Note any differences in the tone of voice this time, the confidence level, hesitation or increased nervousness, etc.

Talking Points

- Point out the differences between the 2 problem-solving attempts.
- The differences could be quantitative such as time differences and accuracy of ball placement.
- The other differences could be qualitative such as balance, hesitation, confidence and quickness in decision-making, motivation to complete the task, and increased recall.
- Discuss how these impairments modeled could affect assessing and solving problems in various situations in life.

Sample Takeaway Message: Both Alcohol and Marijuana alone have their own impairments. When these two drugs are combined, the impairment effects are amplified more than either one alone. This combination can result in increased risk for errors in decision making, and harm to self or others.

Presentation Tips:

When set up and used according to the patterns shown, the participant will need to make at least two correct ball placement choices to complete the activity successfully. This technique ensures that the participant will engage their executive function and short-term memory to solve the activity. The goggles will impair executive function and short-term memory. The instructor can point out this difficulty caused by impairment afterward. Discuss how THC and alcohol can affect problem-solving and making appropriate choices in real life.

References:

FARS data:

Using 2006-2008 US traffic data for fatal injury crashes:
Marijuana use alone increases fatal injury crash risk by 1.5 times.
Alcohol use alone increases fatal injury crash risk by 16 times.
Combining both Alcohol and Marijuana increases fatal injury crash risk by 25 times.
https://www.ncbi.nlm.nih.gov/pubmed/28286930

Using 1993-2014 data for Fatally Injured in 2 vehicle crashes, Marijuana alone was 1.6x greater risk for a fatally injured crash, alcohol alone was 5.3x greater risk, and combined Marijuana and alcohol was 6.4x greater risk.

Role of alcohol and marijuana use in the initiation of fatal two-vehicle crashes.

From <https://www.ncbi.nlm.nih.gov/pubmed/28595738>

Articles based on above study:
https://www.menshealth.com/health/a19521641/marijuana-car-accidents/

https://www.studyfinds.org/crash-accident-drunk-high/

Human Performance Studies:

Combining alcohol and Marijuana significantly increases active THC concentration in the blood.
http://clinchem.aaccjnls.org/content/early/2015/05/05/clinchem.2015.238287

https://www.ncbi.nlm.nih.gov/pubmed/11543984

Marijuana and alcohol combination increased standard lane deviation, increased speed, and decreased awareness of attempting to compensate for impairment.

https://www.ncbi.nlm.nih.gov/pubmed/26889769

https://www.ncbi.nlm.nih.gov/pubmed/26144593

Marijuana has an antiemetic effect that can prevent the body from vomiting excess alcohol to prevent blood alcohol poisoning in a binge drinking situation.

https://www.ncbi.nlm.nih.gov/pubmed/11509190

Combined use of Marijuana and alcohol produced severe impairment of cognitive, psychomotor, and actual driving performance in experimental studies and sharply increased the crash risk .

https://www.drugandalcoholdependence.com/article/S0376-8716(03)00284-9/fulltext

Compared to the use of alcohol alone, simultaneous use of alcohol and Marijuana approximately doubled the odds of drunk driving, social consequences, and harms to self.

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4399000/

Combined Marijuana and alcohol increased crash risk 8-10% for each .01 BAC unit increase with both substances on board.

https://www.ncbi.nlm.nih.gov/pubmed/25612879

French study shows the crash risk is **2.3x for cannabis alone** (THC ≥ 1 ng/mL), to **9.4x for alcohol alone** (≥0.5 mg/L), and to **14.1x for the alcohol-cannabis combination**.

https://www.tandfonline.com/doi/abs/10.1080/15389580701737561?scroll=top&needAccess=true&journalCode=gcpi20