Learning Objectives

• Explain the prevalence of polydrug use among drug impaired subjects and identify common combinations of drugs abused by those subjects
• Describe the possible effects that combinations of drugs can produce on the major indicators of drug impairment

Upon successfully completing this session the participant will be able to:

• Explain the prevalence of polydrug use among drug impaired subjects and identify common combinations of drugs abused by those subjects.
• Describe the possible effects that combinations of drugs can produce on the major indicators of drug impairment.

CONTENT SEGMENTS

A. The Prevalence of Polydrug Use
B. Possible Effects of Drug Combinations
C. Identifying Expected Indicators of Specific Combinations

LEARNING ACTIVITIES

Instructor-Led Presentations
Interactive Discussions
Workbook Exercise
Video Presentations
Learning Objectives (Cont.)

• Define the terms “Null”, “Overlapping”, “Additive” and “Antagonistic” as they relate to polydrug effects
• Identify specific effects that are most likely to be observed in persons under the influence of particular drug combinations

• Define the terms “Null,” “Overlapping,” “Additive” and “Antagonistic” as they relate to polydrug effects.
• Identify the specific effects that are most likely to be observed in persons under the influence of particular drug combinations.

A. The Prevalence of Polydrug Use

Polydrug

Polydrug use means ingesting drugs from two or more drug categories.
Prevalence of Polydrug Use

It is actually more common for a DRE to encounter polydrug users than single drug users.

- In the Los Angeles Field Study (1985), 72% of the suspects had two or more drugs in them.
- If we discount alcohol, nearly half (45%) of the Field Study suspects had two or more other drugs in them.

National DRE

2011-2012 data collected from the national DRE tracking database from DREs throughout the U.S. indicates that approximately 35% of all cases with toxicology resulted in two or more drug categories detected.
Common Combinations

- Cocaine and Cannabis.
- Cocaine and Heroin.
- PCP and Cannabis.

Many of the subjects you examine will be exhibiting the effects of two or more drugs acting together.

B. Possible Effects of Drug Combinations

Combos

Let us examine the possible ways in which two or more drug categories might interact. Some common combinations of drug categories and their street names include:

- Cocaine and Heroin - “Speedball”
- PCP and Heroin - “Fireball”
- Crack and PCP - “Space base”
- Crack and Marijuana - “Primo”
- Crack and Methamphetamine - “Croak”
There are four effects of drug combinations on major indicators of impairment:

- Null Effect
- Overlapping Effect
- Additive Effect
- Antagonistic Effect

### Null Effect

- If neither drug affects a particular indicator of impairment, their combination also will not affect that indicator.
- **No action plus no action equals no action**

### Four Effects

- **Null Effect**

The first effect is called the “Null Effect.”

### Null Effect (Cont.)

**Example #1: HGN**

- If neither drug affects HGN...

**Example: Narcotic Analgesic and Cannabis**

  - *(Neither category affects HGN)*
  - ...the combination should also *not affect* HGN, so HGN will *not be present* in this combination

**Example #1: HGN**

- Neither drug affects HGN.

The combination would not result in HGN being present.

Example #1 is called the Null Effect.
Null Effect (Cont.)

Example #2: Reaction to Light

• If neither drug affects reaction to light...

Example: Dissociative Anesthetics and Cannabis

  • (Neither category affects the reaction to light)
  • ...the combination will also not affect reaction to light, so reaction to light will be a normal response

Example #2: Reactions to Light

Another example of the Null Effect:

Reaction to Light: neither drug affects reaction to light. Example: a Dissociative Anesthetic and Cannabis.

Null Effect (Cont.)

Example #3: Body Temperature

• If neither drug affects body temperature...

Example: CNS Depressants and Cannabis

  • (Neither category affects the body temperature)
  • ...the combination should also not affect body temperature, so body temperature will be in the DRE average range

Example #3: Body Temperature

Another example of the Null Effect:

Body Temperature: neither a CNS Depressant nor Cannabis usually affects body temperature; the combination of the two leaves body temperature in the DRE average range.

Overlapping Effect

• If one drug affects a particular indicator of impairment, and another drug has no effect on that indicator, the combination of those two drugs will affect the indicator, in the same way as the first drug alone

  • Action plus no action equals action

Overlapping Effect

The second effect is called the “Overlapping Effect.”
Example #1: Pupil Size

Example #1: one drug affects pupil size, but the other does not.
Example: CNS Stimulants and Dissociative Anesthetics. CNS Stimulants dilate pupils, Dissociative Anesthetics do not affect pupil size.
Therefore, pupils should be dilated.

Example #2: HGN

HGN: a CNS Depressant will cause HGN, but Cannabis will not cause HGN; a person under the combined influence of a CNS Depressant and Cannabis will usually have HGN.

Example #3: Lack of Convergence

Another example of the “Overlapping Effect”:
Lack of Convergence. Dissociative Anesthetics cause Lack of Convergence, Hallucinogens do not. Under the influence, lack of convergence should be present.
Additive Effect

The third effect is called the Additive Effect.

- If two drugs independently affect some indicator in the same way, their use in combination will also affect the indicator and the effect may be reinforced.
- **Action** plus the **same action** produces reinforced action.

### Example #1: Pulse Rate

Pulse Rate. Cannabis and Inhalants both elevate pulse rate. Therefore, pulse rate should be elevated, or up.

### Example #2: Pupil Size

Pupil Size. CNS Stimulants and Hallucinogens both dilate the pupils; therefore, pupils should be dilated.
Example #3: Blood Pressure

Blood Pressure. CNS Depressants and Narcotic Analgesics both depress blood pressure. Therefore, the blood pressure should be depressed or down.

Antagonistic Effect

The fourth effect is called the Antagonistic Effect.

When two drugs produce an “Antagonistic Effect,” they tend to try to override or compete with the effect of the other drug(s) until the drug with the longest duration of effects prevails. Normally, whichever drug is more psychoactive at the time determines what we’ll see.
Antagonistic Effect (Cont.)

Whichever drug is more psychoactive at the time determines what we'll see.

There is not an Antagonistic Effect for:
- HGN
- VGN
- Lack of Convergence
- Reaction to Light

Antagonistic Effect (Cont.)

Example #1: Pulse Rate
- One drug affects pulse rate one way, the other drug affects pulse rate in the opposite way.

Example: CNS Stimulants and CNS Depressants
- (CNS Stimulants elevate pulse rate, CNS Depressants depress pulse rate)
- Pulse Rate will be up, down or within the DRE average ranges.

Example #1: Pulse Rate
Pulse Rate. CNS Stimulants elevate pulse rate, CNS Depressants depress pulse rate; therefore, pulse rate will be up, down or within the DRE average ranges.

Antagonistic Effect (Cont.)

Example #2: Pupil Size
- One drug affects pupil size one way, the other drug affects pupil size in the opposite way.

Example: CNS Stimulants and Narcotic Analgesics
- (CNS Stimulants dilate pupils, and Narcotic Analgesics constrict pupils)
- Pupils will be dilated, constricted or within the DRE average ranges.

Example #2: Pupil Size
Pupil Size. CNS Stimulants dilate pupils, Narcotic Analgesics constrict pupils. Pupil size will be dilated, constricted or within the DRE average ranges.
Antagonistic Effect (Cont.)

Example #3: Body Temperature
- One drug affects body temperature one way, the other drug affects body temperature in the opposite way

*Example: Hallucinogens and Narcotic Analgesics*
  - (Hallucinogens elevate body temperature, Narcotic Analgesics depress body temperature)
  - Body Temperature will be up, down or within the DRE average ranges

Body Temperature.
- Hallucinations elevate body temperature, Narcotic Analgesics depress body temperature. Body temperature will be up, down or within the DRE average ranges.

With an “Antagonistic Effect,” we just can’t predict what we will see.

Summary

When drugs from two or more drug categories are taken together, they tend to produce a combination of Null Effects, Overlapping Effects, Additive Effects and Antagonistic Effects.

### Cannabis and CNS Stimulant

<table>
<thead>
<tr>
<th>Impairment Indicator</th>
<th>Cannabis</th>
<th>CNS Stimulant</th>
<th>Type of Effect</th>
<th>What We Will See?</th>
</tr>
</thead>
<tbody>
<tr>
<td>HGN</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**HGN**

A specific example: consider a person who is under the influence of a combination of Cannabis and a CNS Stimulant.
### Cannabis and CNS Stimulant

<table>
<thead>
<tr>
<th>Impairment Indicator</th>
<th>Cannabis</th>
<th>CNS Stimulant</th>
<th>Type of Effect</th>
<th>What We Will See?</th>
</tr>
</thead>
<tbody>
<tr>
<td>HGN</td>
<td>None</td>
<td>None</td>
<td>Null</td>
<td>No HGN</td>
</tr>
<tr>
<td>VGN</td>
<td>None</td>
<td>None</td>
<td>Null</td>
<td>No VGN</td>
</tr>
</tbody>
</table>

Neither Cannabis nor a CNS Stimulant causes HGN. This is a case of no action plus no action equals no action. We will not see HGN with this combination.

### Vertical Gaze Nystagmus

Neither Cannabis nor a CNS Stimulant causes VGN. This is another Null Effect. We won’t see VGN.
### Lack of Convergence

Cannabis causes Lack of Convergence; a CNS Stimulant does not.

This is a case of action plus no action equals action.

We will see Lack of Convergence with this combination.

### Pupil Size

<table>
<thead>
<tr>
<th>Impairment Indicator</th>
<th>Cannabis</th>
<th>CNS Stimulant</th>
<th>Type of Effect</th>
<th>What We Will See?</th>
</tr>
</thead>
<tbody>
<tr>
<td>HGN</td>
<td>None</td>
<td>None</td>
<td>Null</td>
<td>No HGN</td>
</tr>
<tr>
<td>VGN</td>
<td>None</td>
<td>None</td>
<td>Null</td>
<td>No VGN</td>
</tr>
<tr>
<td>LOC</td>
<td>Present</td>
<td>None</td>
<td>Overlapping</td>
<td>LOC</td>
</tr>
</tbody>
</table>

**Notes:**
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
Cannabis and CNS Stimulant

<table>
<thead>
<tr>
<th>Impairment Indicator</th>
<th>Cannabis Type of Effect</th>
<th>What We Will See?</th>
</tr>
</thead>
<tbody>
<tr>
<td>HGN</td>
<td>None</td>
<td>Null</td>
</tr>
<tr>
<td>VGN</td>
<td>None</td>
<td>Null</td>
</tr>
<tr>
<td>LOC</td>
<td>Present</td>
<td>Overlapping</td>
</tr>
<tr>
<td>Pupil Size</td>
<td>Dilated (?)</td>
<td>Overlapping or Additive</td>
</tr>
</tbody>
</table>

Notes:______________

CNS Stimulants dilate pupils; Cannabis either dilates pupils or has no effect on them.
This may be a case of action plus no action equals action.
Or it may be a case of action plus same action reinforces action.
In either case, we should see dilated pupils with this combination.

Notes:______________

Reaction to Light

<table>
<thead>
<tr>
<th>Reaction to Light</th>
<th>Normal Type of Effect</th>
<th>What We Will See?</th>
</tr>
</thead>
<tbody>
<tr>
<td>LOC</td>
<td>Normal</td>
<td>Overlapping</td>
</tr>
<tr>
<td>Pupil Size</td>
<td>Dilated (?)</td>
<td>Overlapping or Additive</td>
</tr>
</tbody>
</table>

Notes:______________

CNS Stimulants slow the pupils’ Reaction to Light; Cannabis usually doesn’t affect the pupils’ reaction.
Here we have another Overlapping Effect.
We should observe a slowed reaction of the pupils.
Both Cannabis and CNS Stimulants usually elevate pulse rate. This is an Additive Effect. We should see a pulse rate that is up or elevated.

**Blood Pressure**
Cannabis and CNS Stimulant

<table>
<thead>
<tr>
<th>Impairment Indicator</th>
<th>Cannabis</th>
<th>CNS Stimulant</th>
<th>Type of Effect</th>
<th>What We Will See?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pulse Rate</td>
<td>Up</td>
<td>Up</td>
<td>Additive</td>
<td>Up</td>
</tr>
<tr>
<td>Blood Pressure</td>
<td>Up</td>
<td>Up</td>
<td>Additive</td>
<td>Up</td>
</tr>
</tbody>
</table>

Cannabis usually causes blood pressure to be up or elevated; so does a CNS Stimulant.

This is another Additive Effect.

We should see a blood pressure that is up or elevated.

Cannabis and CNS Stimulant

<table>
<thead>
<tr>
<th>Impairment Indicator</th>
<th>Cannabis</th>
<th>CNS Stimulant</th>
<th>Type of Effect</th>
<th>What We Will See?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pulse Rate</td>
<td>Up</td>
<td>Up</td>
<td>Additive</td>
<td>Up</td>
</tr>
<tr>
<td>Blood Pressure</td>
<td>Up</td>
<td>Up</td>
<td>Additive</td>
<td>Up</td>
</tr>
<tr>
<td>Body Temperature</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Body Temperature

Cannabis usually does not affect body temperature. But CNS Stimulants usually elevate temperature.

This is another case of action plus no action equals action.

We can expect to see an elevated temperature with this combination.
Cannabis and CNS Stimulant

<table>
<thead>
<tr>
<th>Impairment Indicator</th>
<th>Cannabis</th>
<th>CNS Stimulant</th>
<th>Type of Effect</th>
<th>What Will We See?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pulse Rate</td>
<td>Up</td>
<td>Up</td>
<td>Additive</td>
<td>Up</td>
</tr>
<tr>
<td>Blood Pressure</td>
<td>Up</td>
<td>Up</td>
<td>Additive</td>
<td>Up</td>
</tr>
<tr>
<td>Body Temperature</td>
<td>Normal</td>
<td>Up</td>
<td>Overlapping</td>
<td>Up</td>
</tr>
<tr>
<td>Muscle Tone</td>
<td>Normal</td>
<td>Rigid</td>
<td>Overlapping</td>
<td>Rigid</td>
</tr>
</tbody>
</table>

**Muscle Tone**

Cannabis usually does not affect muscle tone. CNS Stimulants cause muscle tone to be rigid.

This is another case of action plus no action equals action.

We can expect to see rigid muscle tone with this combination.

---

**Dissociative Anesthetics and Narcotic Analgesics**

Another specific example: consider a person under the influence of a combination of a Dissociative Anesthetic and a Narcotic Analgesic.

<table>
<thead>
<tr>
<th>Impairment Indicator</th>
<th>Dissociative Anesthetic</th>
<th>Narcotic Analgesic</th>
<th>Type of Effect</th>
<th>What Will We See?</th>
</tr>
</thead>
<tbody>
<tr>
<td>HGN</td>
<td>Present</td>
<td>None</td>
<td>Overlapping</td>
<td>HGN</td>
</tr>
</tbody>
</table>

**HGN**

A Dissociative Anesthetic causes HGN, Narcotic Analgesics do not.

This is an Overlapping Effect.

We can expect to see HGN with this subject.
**Dissociative Anesthetic and Narcotic Analgesic**

<table>
<thead>
<tr>
<th>Impairment Indicator</th>
<th>Dissociative Anesthetic</th>
<th>Narcotic Analgesic</th>
<th>Type of Effect</th>
<th>What Will We See?</th>
</tr>
</thead>
<tbody>
<tr>
<td>HGN</td>
<td>Present</td>
<td>None</td>
<td>Overlapping</td>
<td>HGN</td>
</tr>
<tr>
<td>VGN</td>
<td>Present</td>
<td>None</td>
<td>Overlapping</td>
<td>VGN</td>
</tr>
</tbody>
</table>

**Vertical Gaze Nystagmus**

A Dissociative Anesthetic should cause Vertical Gaze Nystagmus, especially at high doses. A Narcotic Analgesic will not cause Vertical Gaze Nystagmus.

This is another Overlapping Effect.

We should see Vertical Gaze Nystagmus in this subject.

**Lack of Convergence**
A Dissociative Anesthetic causes Lack of Convergence; Narcotic Analgesics do not. Another Overlapping Effect.

We can expect to see Lack of Convergence.

Pupil Size

A Dissociative Anesthetic doesn’t affect pupil size, but a Narcotic Analgesic constricts pupils.

This is another Overlapping Effect.

We can expect to see constricted pupils with this subject.
A Dissociative Anesthetic doesn’t affect pupil’s Reaction to Light; but a Narcotic Analgesic usually produces a “little or none visible” reaction.

This, too, is an Overlapping Effect.

We can expect a “little or none visible” reaction in this subject’s pupils.
A Dissociative Anesthetic usually causes pulse rate to be elevated; a Narcotic Analgesic usually produces a depressed or lower pulse rate.

This is our first Antagonistic Effect.

We cannot predict what this subject’s pulse rate will be.

The pulse rate could be elevated, or depressed, or within the DRE average ranges.

This subject’s pulse rate will depend on many factors, including:

- How much of each drug was taken.
- How and when each drug was taken.
- How tolerant the subject is of each drug.
A Dissociative Anesthetic usually elevates blood pressure; a Narcotic Analgesic usually lowers blood pressure.

This is another Antagonistic Effect.

We can’t predict what the blood pressure will be.

It could be above DRE average ranges, below DRE average ranges, or within the DRE average ranges.

A Dissociative Anesthetic usually elevates temperature; a Narcotic Analgesic usually lowers it.

This, too, is an Antagonistic Effect.

The temperature could be elevated (up), or depressed (down) or within the DRE average range.
Dissociative Anesthetic and Narcotic Analgesic

<table>
<thead>
<tr>
<th>Impairment Indicator</th>
<th>Dissociative Anesthetic</th>
<th>Narcotic Analgesic</th>
<th>Type of Effect</th>
<th>What Will We See?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Body Temperature</td>
<td>Up</td>
<td>Down</td>
<td>Antagonistic</td>
<td>Up, Down or Normal</td>
</tr>
<tr>
<td>Muscle Tone</td>
<td>Rigid</td>
<td>Flaccid</td>
<td>Antagonistic</td>
<td>Normal, rigid, or flaccid</td>
</tr>
</tbody>
</table>

**Muscle Tone**

Notes:________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

A Dissociative Anesthetic usually causes rigid muscle tone. A Narcotic Analgesic usually causes flaccid muscle tone.

This could be an Overlapping or Antagonistic Effect.

Muscle tone could be normal, rigid, or flaccid.

A Dissociative Anesthetic usually causes rigid muscle tone, a Narcotic Analgesic usually causes flaccid muscle tone.

This could be an Overlapping or Antagonistic Effect.

Muscle tone could be normal, rigid, or flaccid.
Cannabis, CNS Stimulants and Hallucinogens

Another specific example: consider a person under the influence of Cannabis, a CNS Stimulant and a Hallucinogen.

### HGN

None of the three categories causes HGN, This is an example of the Null Effect.

### VGN

None of the three drug categories cause Vertical Gaze Nystagmus, another example of the Null Effect.
Cannabis, CNS Stimulants and Hallucinogens

<table>
<thead>
<tr>
<th>Impairment Indicator</th>
<th>Cannabis</th>
<th>CNS Stimulant</th>
<th>Hallucinogen</th>
<th>Type of Effect</th>
<th>What Will We See?</th>
</tr>
</thead>
<tbody>
<tr>
<td>HGN</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>Null</td>
<td>No HGN</td>
</tr>
<tr>
<td>VGN</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>Null</td>
<td>No VGN</td>
</tr>
<tr>
<td>LOC</td>
<td>Present</td>
<td>None</td>
<td>None</td>
<td>Overlapping</td>
<td>LOC</td>
</tr>
</tbody>
</table>

LOC
Cannabis causes a Lack of Convergence while CNS Stimulants and Hallucinogens do not.
This is an example of an Overlapping Effect and Lack of Convergence should be present.

Pupil Size
Cannabis usually dilates pupils. CNS Stimulants and Hallucinogens also dilate the pupils.
This is an example of an Additive or Overlapping Effect.
The pupils should be dilated.
Reactivity to Light

Cannabis does not effect the Reactivity to Light. CNS Stimulants will slow down the reaction. Most Hallucinogens, with some exceptions, will cause a normal Reactivity to Light.

This is an example of either an Overlapping or Additive Effect.

We could probably see a slow Reactivity to Light.

Pulse Rate

Cannabis will normally elevate the pulse rate as will CNS Stimulants and Hallucinogens.

This is an example of an Additive Effect.

The result would be an elevated pulse rate.
### Impairment Indicators: Cannabis, CNS Stimulants and Hallucinogens

<table>
<thead>
<tr>
<th>Impairment Indicator</th>
<th>Cannabis</th>
<th>CNS Stimulant</th>
<th>Hallucinogen</th>
<th>Type of Effect</th>
<th>What Will We See?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reaction to Light</td>
<td>Normal</td>
<td>Slow</td>
<td>Normal</td>
<td><strong>Overlapping</strong></td>
<td><strong>Up</strong></td>
</tr>
<tr>
<td>Pulse Rate</td>
<td>Up</td>
<td>Up</td>
<td>Up</td>
<td>Additive</td>
<td>Up</td>
</tr>
<tr>
<td>Blood Pressure</td>
<td>Up</td>
<td>Up</td>
<td>Up</td>
<td>Additive</td>
<td>Up</td>
</tr>
</tbody>
</table>

### Blood Pressure

All three drug categories will elevate blood pressure. Blood pressure should be elevated with this combination.

### Body Temperature

Cannabis usually causes a body temperature in the average range. CNS Stimulants and Hallucinogens elevate body temperature. This would be an example of an Additive or Overlapping Effect. The body temperature should be elevated with this combination.

### Muscle Tone

Cannabis causes a normal muscle tone, while CNS Stimulants and Hallucinogens will cause rigid muscle tone. This would be an example of an Additive or an Overlapping Effect. The muscle tone should be rigid with this combination.
C. Identifying Expected Indicators of Specific Combinations

Drug Symptomatology Matrix

The Matrix outlines the expected results of the drug influence evaluation for each drug category.

Worksheet Exercises

Worksheet #1: Dissociative Anesthetic and a Hallucinogen.
Worksheet #2: Cannabis and CNS Depressant.
Worksheet #3: CNS Depressant and CNS Stimulant.

Discussion of Worksheets

On the final five pages of this session, you will find examples of specific drug combinations. The expected results for the first two of these combinations (Cannabis and Stimulants, and Dissociative Anesthetic and Narcotic Analgesic) have been worked out for you. Study those examples, and then complete the work sheets for the three remaining combinations.
## CANNABIS AND CNS STIMULANT IN COMBINATION

<table>
<thead>
<tr>
<th>IMPAIRMENT INDICATOR</th>
<th>EFFECT DUE TO CANNABIS</th>
<th>EFFECT DUE TO CNS STIMULANT</th>
<th>TYPE OF COMBINED EFFECT</th>
<th>WHAT WILL WE SEE</th>
</tr>
</thead>
<tbody>
<tr>
<td>VERTICAL GAZE NYSTAGMUS</td>
<td>NONE</td>
<td>NONE</td>
<td>NULL</td>
<td>NONE</td>
</tr>
<tr>
<td>LACK OF CONV.</td>
<td>PRESENT</td>
<td>NONE</td>
<td>OVERLAPPING</td>
<td>PRESENT</td>
</tr>
<tr>
<td>PUPIL SIZE</td>
<td>DILATED OR NORMAL</td>
<td>DILATED</td>
<td>OVERLAPPING OR ADDITIVE</td>
<td>DILATED</td>
</tr>
<tr>
<td>REACTION TO LIGHT</td>
<td>NORMAL</td>
<td>SLOW</td>
<td>OVERLAPPING</td>
<td>SLOW</td>
</tr>
<tr>
<td>PULSE RATE</td>
<td>UP</td>
<td>UP</td>
<td>ADDITIVE</td>
<td>UP</td>
</tr>
<tr>
<td>BLOOD PRESSURE</td>
<td>UP</td>
<td>UP</td>
<td>ADDITIVE</td>
<td>UP</td>
</tr>
<tr>
<td>BODY TEMP</td>
<td>NORMAL</td>
<td>UP</td>
<td>OVERLAPPING</td>
<td>UP</td>
</tr>
<tr>
<td>MUSCLE TONE</td>
<td>NORMAL</td>
<td>RIGID</td>
<td>OVERLAPPING</td>
<td>RIGID</td>
</tr>
</tbody>
</table>
## DISSOCIATIVE ANESTHETIC AND NARCOTIC ANALGESIC IN COMBINATION

<table>
<thead>
<tr>
<th>IMPAIRMENT INDICATOR</th>
<th>EFFECT DUE TO PHENCYCLIDINE</th>
<th>EFFECT DUE TO HEROIN</th>
<th>TYPE OF COMBINED EFFECT</th>
<th>WHAT WILL WE SEE</th>
</tr>
</thead>
<tbody>
<tr>
<td>HORIZONTAL GAZE NYSTAGMUS</td>
<td>PRESENT</td>
<td>NONE</td>
<td>OVERLAPPING</td>
<td>PRESENT</td>
</tr>
<tr>
<td>VERTICAL GAZE NYSTAGMUS</td>
<td>PRESENT</td>
<td>NONE</td>
<td>OVERLAPPING</td>
<td>PRESENT</td>
</tr>
<tr>
<td>LACK OF CONV.</td>
<td>PRESENT</td>
<td>NONE</td>
<td>OVERLAPPING</td>
<td>PRESENT</td>
</tr>
<tr>
<td>PUPIL SIZE</td>
<td>NORMAL</td>
<td>CONSTRICTED</td>
<td>OVERLAPPING</td>
<td>CONSTRICTED</td>
</tr>
<tr>
<td>REACTION TO LIGHT</td>
<td>NORMAL</td>
<td>LITTLE OR NONE VISIBLE</td>
<td>OVERLAPPING</td>
<td>LITTLE OR NONE VISIBLE</td>
</tr>
<tr>
<td>PULSE RATE</td>
<td>UP</td>
<td>DOWN</td>
<td>ANTAGONISTIC</td>
<td>DOWN/NORMAL/UP</td>
</tr>
<tr>
<td>BLOOD PRESSURE</td>
<td>UP</td>
<td>DOWN</td>
<td>ANTAGONISTIC</td>
<td>DOWN/NORMAL/UP</td>
</tr>
<tr>
<td>BODY TEMP</td>
<td>UP</td>
<td>DOWN</td>
<td>ANTAGONISTIC</td>
<td>DOWN/NORMAL/UP</td>
</tr>
<tr>
<td>MUSCLE TONE</td>
<td>RIGID</td>
<td>FLACCID</td>
<td>ANTAGONISTIC</td>
<td>RIGID/FLACCID/NORMAL</td>
</tr>
</tbody>
</table>
# WORKSHEET #1
## KETAMINE AND LSD

<table>
<thead>
<tr>
<th>IMPAIRMENT INDICATOR</th>
<th>EFFECT DUE TO DISSOCIATIVE ANESTHETICS</th>
<th>EFFECT DUE TO HALLUCINOGEN (Hall)</th>
<th>TYPE OF COMBINED EFFECT*</th>
<th>WHAT WILL WE SEE</th>
</tr>
</thead>
<tbody>
<tr>
<td>HORIZONTAL GAZE NYSTAGMUS</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>VERTICAL GAZE NYSTAGMUS</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LACK OF CONV.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PUPIL SIZE</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>REACTION TO LIGHT</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PULSE RATE</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BLOOD PRESSURE</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BODY TEMP</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MUSCLE TONE</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Null; Overlapping; Additive; or, Antagonistic*
# WORKSHEET #2
CANNABIS AND CNS DEPRESSANT

<table>
<thead>
<tr>
<th>IMPAIRMENT INDICATOR</th>
<th>EFFECT DUE TO CANNABIS</th>
<th>EFFECT DUE TO DEPRESSANT</th>
<th>TYPE OF COMBINED EFFECT*</th>
<th>WHAT WILL WE SEE</th>
</tr>
</thead>
<tbody>
<tr>
<td>HORIZONTAL GAZE NYSTAGMUS</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>VERTICAL GAZE NYSTAGMUS</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LACK OF CONV.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PUPIL SIZE</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>REACTION TO LIGHT</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PULSE RATE</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BLOOD PRESSURE</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BODY TEMP</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MUSCLE TONE</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Null; Overlapping; Additive; or, Antagonistic
# Worksheet #3
CNS Stimulant and CNS Depressant

<table>
<thead>
<tr>
<th>Impairment Indicator</th>
<th>Effect Due to CNS Stimulant</th>
<th>Effect Due to Depressant</th>
<th>Type of Combined Effect*</th>
<th>What Will We See</th>
</tr>
</thead>
<tbody>
<tr>
<td>Horizontal Gaze Nystagmus</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vertical Gaze Nystagmus</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lack of Conv.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pupil Size</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reaction to Light</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pulse Rate</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blood Pressure</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Body Temp</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Muscle Tone</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Null; Overlapping; Additive; or, Antagonistic