Shifting Through the Smoke: Effects of Cannabis Abstinence on Cognitive Function
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BACKGROUND

- Importance of Research: Shifts in socio-political attitudes have increased cannabis usage and availability. Therefore, it is crucial to learn as much as possible about the plant and its effects.
- Prior research indicates cannabis abstinence for one month improves verbal memory, but has no effect on attention.
- Unethical to ask participants to use cannabis regularly, so best way to look at causal associations is by paying those who use cannabis regularly to stop using.
- Importance of Twin Study: Controls for shared environmental and genetic confounds. Therefore, important in understanding whether an association between two variables is significant or coincidental.
- Participants are randomly assigned to contingency management protocol (paid to abstain from cannabis use) or control protocol; twin one assigned to contingency management, twin two assigned to control.
- Aim: Understand the effects of cannabis abstinence on cognitive function utilizing a twin pair.

METHODS

- Contingency Management Protocol: Reverses learned substance use with consistent, competing positive reinforcement.
- Qualitative urine tests at each visit to validate cannabis abstinence leads to contingency management payment plan.
- Higher frequency of check-in dates at the beginning due to withdrawal effects, therefore ensuring contingency management protocol is working.
- Contingency management has proved to be one of the most effective protocols in promoting abstinence (90% abstinence rate in previous studies).
- Twin pairs control for important confounds such as growing up in the same household and shared genetics.

PARTICIPANT DEMOGRAPHICS

<table>
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<tr>
<th>Gender</th>
<th>Twin One</th>
<th>Twin Two</th>
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<tbody>
<tr>
<td>Female</td>
<td>Dizygotic</td>
<td>Caucasian</td>
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Positive Marijuana Toxicology: Present
Positive Amphetamines: Not Present
Positive Opiates Toxicology: Not Present
Positive Meth Toxicology: Not Present
Positive Cocaine Toxicology: Not Present

CUDIT* Total Score: Baseline
- Twin One: 10.0
- Twin Two: 18.0

Number of Days Cannabis Use Past Two Weeks: Baseline
- Twin One: 14.0
- Twin Two: 14.0

THC-COOH Toxicology Results**: Baseline
- Twin One: 82.0
- Twin Two: 12.6

CWS*** Total Score: Baseline
- Twin One: 41.0
- Twin Two: 39.0

Number of Days Cannabis Use Past Two Weeks: Day 14
- Twin One: 0.0
- Twin Two: 14.0

THC-COOH Toxicology Results: Day 14
- Twin One: 16.5
- Twin Two: 29.0

CWS Total Score: Day 14
- Twin One: 66.0
- Twin Two: 35.0

*CUDIT: Cannabis Use Disorder Identification Test (0-32)
**THC-COOH: Toxicology Test (0.0-200.0)
***CWS: Cannabis Withdrawal Scale (0-80)

RESULTS

Subjective Cognitive Function Total Score

Spatial Span (SSP): Visuospatial Working Memory

Pattern Recognition Memory (PRM)

Immediate Condition: Visual Recognition Memory

Delayed Condition: Visual Recognition Memory

Paired Associates Learning (PAL): Visual Memory

FUTURE DIRECTIONS

- This Case Study: twin one (contingency management) indicated maintenance of subjective cognitive function, improved SSP performance, and a decline in PRM and PAL performance; twin two (control) indicated a decline in subjective cognitive function and SSP performance, and improved PRM and PAL performance.
- Plan to recruit 50 twin pairs (N = 100) who use cannabis at least weekly: randomly assign contingency management protocol or control.
- With larger sample size, we can conduct statistical analysis and draw more inferences.
- Expect to see similar trends with larger sample size (improved visuospatial working memory correlated with cannabis abstinence).
- Check-in Dates: Days 1, 3, 5, 7, 14, 21, 28, 42
- Continued contingency management payment plan:

FUTURE

- All studies up to now focus on cannabis abstinence outcomes under 30 days, therefore plans with this study aim for a longer period of abstinence (42 days).