Driving Under the Influence of Cannabis: Associations with Latent Profiles of Substance Use and Executive Cognitive Functioning

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INTRODUCTION

- Driving under the influence of cannabis (DUIC) almost doubles car crash risk (odds ratios range: 1.28-2.49)[1-5]
- Known DUIC correlates include male gender,[6] low perceived danger of DUIC,[7-10] and greater frequency of cannabis and other drug use[11,12]
- Less is known about the role of executive cognitive functioning (e.g., planning skills, organization) as a correlate of DUIC
- Deficits in executive functioning could precede, and be exacerbated by heavy cannabis use, potentially contributing to DUIC risk
- This cross-sectional survey study used a person-centered analysis (latent profile analysis) to address two aims:

STUDY AIMS

- **AIM 1:** To identify prototypical profiles representing aspects of executive functioning and substance use in young adults
  - *Hypothesis*: At least two profiles would be identified: mainly or only cannabis use vs polysubstance use
- **AIM 2**: To determine which profiles were associated with self-report of DUIC
  - *Hypothesis*: Polysubstance use profile would be associated with worse executive functioning and self-report of DUIC

METHOD

- Young adults (N=69, ages 18-25) who reported at least weekly cannabis use were recruited from the community (Pittsburgh, PA) to participate in a study on the effects of cannabis use on cognition[13]
- Mean age=20.0 [SD=1.9]; 62.3% female
- 75.4% White, 13.0% Black; 11.6% Other race/ethnicity
- Total Sample:
  - Mean number of times used cannabis/week: 4.1 (2.0)
  - DUIC in past 6 months (% yes): 50.7
  - Cannabis onset age<16 (% yes): 26.1
  - ASSIST Cannabis score mean: 15.9 (7.0)

MEASURES

At Baseline, young adults reported on:

- Demographics: age, gender, race/ethnicity
- Cannabis and other substance use: self-reported age of cannabis use onset (age <16 vs age ≥16),[14] NIDA modified ASSIST,[15,16] Marijuana Withdrawal Checklist,[17] Alcohol Use Disorders Identification Test
- Executive cognitive functioning: Behavior Rating Inventory of Executive Functioning (BRIEF),[18] working memory, organization and planning scales
- Marijuana Consequences Questionnaire[19] (item on "driven a car when high" in past 6 months)

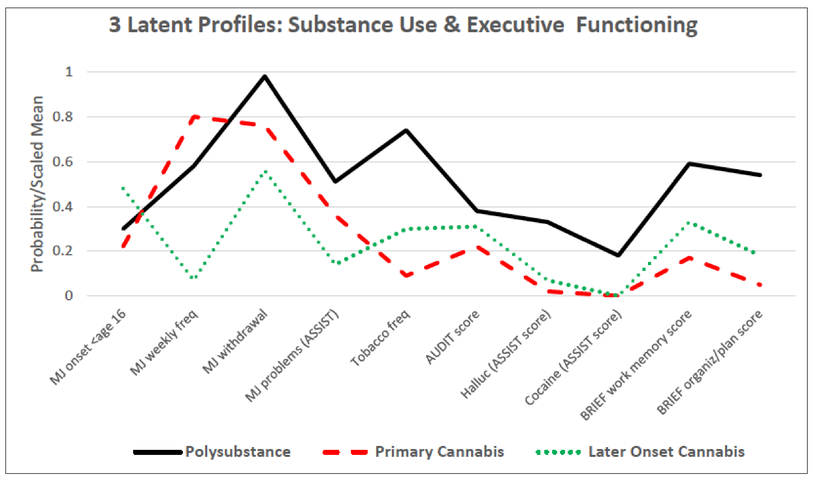
ANALYSIS PLAN

- Latent profile analysis (Latent Gold 5.1[20]) was used to identify distinct classes, testing the fit of 1-5 classes
- Each model included 10 indicators: age of cannabis use onset, frequency of cannabis and tobacco use, cannabis withdrawal severity, ASSIST scores for cannabis, cocaine and hallucinogens (the substances most often reported), AUDIT score, and BRIEF working memory, and organization/planning scores
- For the best fitting model, covariates (i.e., self-report of DUIC, age, gender) were examined as profile correlates in a final step

RESULTS: Aim 1

PROTOTYPICAL PROFILES OF SUBSTANCE USE & EXEC. FUNCTION

- A model with 3 latent profiles was selected



- Polysubstance Use Profile: 40.8%
- Primary Cannabis: 22.3%
- Later Onset Cannabis: 36.9%

RESULTS: Aim 1, cont'd

- Polysubstance use profile reported more cannabis-related problems and other drug use, and more problems with executive cognitive functioning than the other profiles (*p*<.05), see Table below
- Later Onset (vs Polysubstance Use) profile had older onset age (*p*<.05), and had the lowest level of cannabis involvement
- Primary Cannabis and Later Onset profiles did not differ in report of problems with executive functioning

Sample descriptive statistics

	Total Sample N=69	Polysubstance N=28	Later Onset Cannabis N=26	Primary Cannabis N=15	Significance testing (chi-square/ANOVA)
Age	20.0 (1.9)	19.7 (1.7)	19.5 (1.7)	21.5 (1.8)	*p*<.01
% Female	62.3%	57.1	61.5	73.3	ns
Race: White	75.4%	78.6	76.9	66.7	ns
Black	13.0%	10.7	7.7	26.7	
Other	11.6%	15.4	6.7	11.6	
DUIC (past 6 months): % yes	50.7%	75.0	30.8	40.0	X^2=11.43, df=2, *p*<.003
Cannabis onset age <16 (% yes)	26.1%	46.4	3.8	26.7	X^2=12.68,df=2, *p*<.002
# times used cannabis per week	4.1 (2.0)	4.9 (1.8)	2.4 (0.5)	6.0 (1.5)	*p*<.01
ASSIST tobacco frequency	2.8 (1.5)	4.0 (1.2)	2.2 (1.2)	1.4 (0.6)	*p*<.01
ASSIST cannabis score	15.9 (7.0)	20.7 (7.0)	10.8 (3.8)	15.9 (5.1)	*p*<.001
MJ withdrawal score	6.5 (6.4)	10.8 (6.9)	2.0 (1.8)	6.1 (5.5)	*p*<.001
AUDIT score	17.6 (4.1)	18.6 (5.2)	17.5 (2.9)	16.1 (3.0)	ns
ASSIST hallucinogen score	1.0 (1.8)	2.0 (2.3)	0.4 (0.9)	0.2 (0.8)	*p*<.001
ASSIST cocaine score	0.6 (1.9)	1.6 (2.8)	0.0 (0.0)	0.0 (0.0)	*p*<.01
BRIEF working memory score	1.6 (0.3)	1.8 (0.3)	1.5 (03)	1.3 (0.2)	*p*<.001
BRIEF organiz/ planning score	1.4 (0.3)	1.7 (0.3)	1.5 (0.3)	1.2 (0.2)	*p*<.001

Notes: DUIC= Driving under influence of cannabis; ASSIST= NIDA drug screen; AUDIT= alcohol problems screening measure; BRIEF= executive functioning measure

RESULTS: Aim 2

IDENTIFY PROFILES ASSOCIATED WITH DUIC

- DUIC in the past 6 months was more likely to be reported by Polysubstance than Later Onset profile (*p*<.01)
- Polysubstance Use profile was younger than Primary Cannabis profile (*p*<.05)
- The profiles did not differ by gender

DISCUSSION

- As hypothesized, Polysubstance Use profile (which reported early cannabis use onset; and worse executive cognitive functioning, including problems with memory, planning/ organization) was associated with DUIC
- Results highlight the role of self-reported executive functioning difficulties in DUIC risk, and the importance of targeting polysubstance use in preventing DUIC

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