Effects of Cannabis Use by Older Adults in Dallas, TX

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Background

Most cannabis addiction research has focused on cannabis users under the age of 35. With a growing older adult population, it is important to examine how cannabis use affects an aging population. This applies especially to cannabis as an analgesic drug and its effects on memory and cognition, since declines in these two areas are associated with both aging and long-term cannabis use. The following hypotheses were drawn from trends in prior research in the literature and in previous studies within the lab, including a large funded project on the gene x environment interactions that contribute to cannabis use (Albuquerque site) as well as a study that focused on determining underlying neural mechanisms of cannabis craving (Dallas site).especially the aging survey done over spring and summer 2021.

Hypotheses

1. Cannabis using older adults will have worse performance in cognition, affect, and emotion regulation relative to non-using older adults.
2. Relative to younger cannabis-using adults matched for duration of cannabis use, cannabis using older adults will have better performance in cognition, affect, and emotion regulation.
3. Older adult cannabis users with early onset of use will have worse performance in cognition, affect, and emotion regulation compared to late onset older adult cannabis users.

Methods

This is a preliminary analyses drawn from several lab studies' data, including the aging survey, which was an anonymous survey distributed through REDCap to participants over the age of 35 in the Dallas area during spring and summer 2021. Other included studies are MEG, MRN, and TMS, each of which were conducted with participants in the lab using a variety of behavioral assessments and brain imaging techniques.

Measures

- Basic Demographics (age, sex, education)
- Cannabis Usage Measures
  - General Use Questions (reasons for use, method of use, duration)
  - CUDIT – 8 question screening tool for cannabis use disorder
- Cognitive Measures
  - WASI II (Wechsler Abbreviated Scale of Intelligence) – measure of cognitive ability, *subscores:* IQ, Vocabulary, Reasoning
  - WMS (Wechsler Memory Scale) - neuropsychological test measuring different memory functions, *subscores:* logical memory 1 (immediate), logical memory 2 (delayed)
  - MMQ (Multifactorial Memory Questionnaire) – assessment of multiple dimensions of metamemory, *subscores:* satisfaction, ability, strategies
- Affect (Mood) Measures
  - BDI (Beck Depression Inventory) - counts characteristic attitudes and symptoms of depression
  - BAI (Beck Anxiety Inventory) - counts characteristic attitudes and symptoms of anxiety
- Emotional Regulation Measures
  - ImpSS (Impulsive Sensation Seeking Scale) – characterizes participants' tendencies to seek change and uncertainty and to act without thinking, *subcores:* impulsivity, sensation seeking

Regarding Hypothesis 1

N = 20, 10 Female, 6 Users (1 Female User)
Ages: 50-55, Average 52.45, St. Dev. 1.88

These data are from the MEG and MRN studies. The cognitive data (WASI, WMS) support the hypothesis that older users would have worse cognitive performance than older non-users. There was no significant difference in terms of affect, perhaps due to small sample size (N=8 controls, 1 user for BDI). The emotional regulation data (ImpSS) do not support the hypothesis that older users would be less in control than older non-users, possibly because of cannabis' ability to induce lethargy.

Regarding Hypothesis 2

N = 12, 4 Female, 6 Older (1 Older Female)*
Older Group Ages: 50-55
Average 52.5, St. Dev. 1.86
Younger Group Ages: 29-30
Average 29.8, St. Dev. 0.41
*Older and Younger users selected for high ratio of duration of use / age (over 0.5)

These data are from the aging survey. The cognitive data (MMQ) support the hypothesis that early-onset users would have worse cognitive performance than late-onset users, since early-onset users had worse memory ability and used more strategies, but the groups did not differ in terms of satisfaction. There was no significant difference in cannabis use disorder severity (CUDIT) between groups. In terms of a sex difference, for which we had no hypothesis, female participants were more satisfied with their memory, though there was no difference in ability or use of strategies. Male participants had worse CUDIT scores, meaning they met more criteria for cannabis use disorder. These relationships should be further explored in future studies.

Other Interesting Data
From Aging Survey (same demographics as H3)

These data (see charts to right) are from the aging survey. 44% of respondents use cannabis 4 or more times per week, and 21% of respondents use 2-3 times per week. Older users are more likely to use for medicinal reasons than recreationally, perhaps due to the illegality of cannabis in Texas. There is a large sex difference, with female users being more likely to use medicinally. Those who use medicinally cited their reasons for using cannabis as mostly due to anxiety, pain, insomnia, and depression. Older users, especially female users, are likely to use edibles, a method that is far less popular among younger populations.

	Older Controls Average	Older Users Average	Number (Control - User)	p-value
Education (years)	17.6	13.7	14 - 6	0.045
WASI IQ	113	103.2	13 - 5	0.035
WASI Vocab	55.6	51.6	13 - 5	(n.s.)
WASI Reasoning	59.5	51.8	13 - 5	0.024
WMS LM1	10.2	7.8	9 - 5	0.043
WMS LM2	10.3	8.4	9 - 5	0.098 (n.s.)
Impulsivity	10	5.3	4 - 3	0.018
Sensation Seeking	6.3	3	4 - 3	0.034

These data are from the MEG and MRN studies. The cognitive data (WASI, WMS) somewhat support the hypothesis that older users would have better cognitive performance than younger users (only WASI vocab was significant, and WASI reasoning scores were slightly better for younger users). There was no significant difference in terms of affect, perhaps due to small sample size (N=1 older, 4 younger for BDI). The emotional regulation data (ImpSS) are not significant, but older users were somewhat less impulsive and slightly more risk-seeking than younger users. These analyses must be repeated with a larger sample size in order to draw conclusions about differences between cognition, affect, and emotional regulation.

	Older Users Average	Younger Users Average	Number (Older - Younger)	p-value
Education (years)	13.7	12	6 - 6	(n.s.)
WASI IQ	113	103.2	5 - 4	(n.s.)
WASI Vocab	51.6	43.5	5 - 4	0.034
WASI Reasoning	51.8	60	5 - 4	(n.s.)
WMS LM1	7.8	7.8	5 - 4	(n.s.)
WMS LM2	8.4	8.3	5 - 4	(n.s.)
Impulsivity	3	5.2	3 - 6	0.087 (n.s.)
Sensation Seeking	5.3	4.2	3 - 6	(n.s.)

Regarding Hypothesis 3

N = 48, 26 Female, 20 Early Onset (12 Early Onset Female)*
Early Onset Ages: Average 64.6, St. Dev. 7.63
Late Onset Ages: Average 65.8, St. Dev. 5.52
*Early Onset defined as starting regular cannabis use before age 30, Late onset starting at age 40 or later

	Early Onset Average	Late Onset Average	Number (Early - Late)	p-value	Female Average	Male Average	Number (Female - Male)	p-value
Age	64.6	65.8	20 - 28	(n.s.)	65.7	64.8	26 - 22	(n.s.)
Education (years)	14.7	14.7	20 - 27	(n.s.)	14.6	14.9	25 - 22	(n.s.)
Duration (years)	19.9	60.3	20 - 25	<0.001	42.0	42.8	24 - 21	(n.s.)
MMQ Satisfaction	3.3	3.0	8 - 3	0.284 (n.s.)	3.4	2.8	7 - 4	0.068 (n.s.)
MMQ Ability	1.5	3.0	8 - 3	0.044	1.7	2.3	7 - 4	(n.s.)
MMQ Strategies	3.4	2.0	8 - 3	0.017	2.7	3.5	7 - 4	(n.s.)
CUDIT Total Score	9.9	10.8	19 - 24	(n.s.)	7.4	13.8	23 - 20	0.002
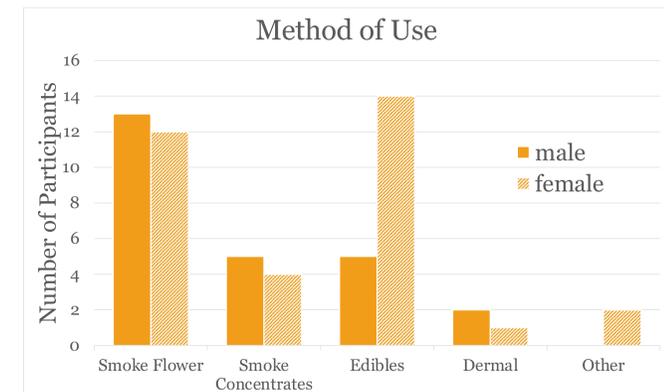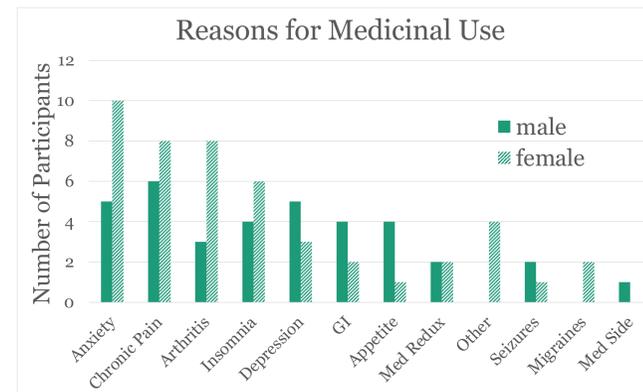
Future Work

We hope to bring older adults into the lab for an expanded future study that will use brain scans in addition to behavioral data to improve our understanding of the neurological effects of cannabis on older adults.

References

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Reason for Use

Reasons for Medicinal Use

Method of Use