

GAMBLING UNDER THE INFLUENCE OF CANNABIS: THE IMPACT OF
SIMULTANEOUS ENGAGEMENT WITHIN INDIVIDUALS WHO GAMBLE
FREQUENTLY

by

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Abstract

Recent studies have reliably reported that cannabis use while gambling has been associated with increased gambling frequency, risking more money, and higher rates of positive screenings for gambling disorder. In the current study, we take the next step with a longitudinal approach, utilizing an ecological momentary assessment (EMA) method to track gambling behavior within individuals when they are and are not under the influence of cannabis. We hypothesized that individuals would engage in more potentially problematic gambling behavior (e.g. risking larger sums, gambling for longer periods, placing more bets) when they are under the influence of cannabis, compared to gambling without cannabis. Twenty-eight participants were included in the study and completed prompts twice a day reporting their gambling behavior and cannabis use over a two-week period. Within-subjects analysis of differences in gambling behavior found that individuals risked more money, gambled for longer periods of time, and placed more bets when under the influence of cannabis compared to when they were not under the influence of cannabis. This provides support for previous findings, while also giving more direct causal evidence that the acute effect of cannabis is related to more potentially harmful gambling behavior within an individual than could be demonstrated in previous cross-sectional retrospective survey studies.

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Introduction

Gambling is risking something of value on an outcome that is partially determined by chance (Whelan et al., 2007) and is legally accessible throughout much of the world (Abbott, 2020; Tran et al., 2024). At the same time, cannabis is one of the most frequently consumed drugs globally, viewed as socially acceptable (Connor et al., 2021), and legally available in many jurisdictions. As cannabis use becomes more commonplace, empirical questions are being asked about the association between cannabis use and gambling behaviors and the potential risks when these two behaviors are co-occurring. Previous research has suggested an association between gambling under the influence of cannabis and more problematic gambling behavior (McGrath et al., 2023; McPhail et al., 2020, McPhail et al., 2025). However, extant literature consists entirely of correlational, cross-sectional research and lacks detail about how cannabis use affects gambling behavior and vice-versa. The current study aimed to fill this gap by exploring the differences in gambling behavior during gambling episodes when an individual is under the influence of cannabis compared to when that individual gambled without using cannabis. This within-subjects perspective could enhance details of this relation and could inform therapists' efforts to treat those with gambling problems who gamble under the influence of cannabis.

In executive functioning thought areas relating to gambling, cannabis has been shown to produce acute short-term impairment of learning and memory (Schoeler & Bhattacharyya, 2013). Frequent cannabis use may impair attention and concentration (Hart et al., 2001; Morrison et al., 2009). Experimental studies using risk-taking tasks have also found mixed results. Some report no significant effects of tetrahydrocannabinol, or THC, on risk-taking behavior (Ramaekers et al., 2006; McDonald et al., 2003). By contrast, Lane et al., (2005) found that participants given a high dose of THC engaged in significantly greater risk-taking behavior than those receiving a low dose or placebo. These documented neurological effects

lead to questions about the behavioral impact of cannabis use while gambling in non-experimental settings. Considering the potential negative cognitive effects of cannabis on gambling decision-making (Winters & Whelan, 2020), more detailed research into this relation is necessary. Cross-sectional studies have revealed a relation between cannabis use and gambling problems. Within a sample who gambled at least weekly, those who reported gambling under the influence of cannabis gambled more frequently than those who did not (McPhail et al., 2020). In a similar study of those who gamble at least monthly, 56.2% of cannabis users reported gambling under the influence of cannabis (McGrath et al., 2023). In this study it was also reported that cannabis use was associated with both higher problem gambling severity and greater engagement in most forms of gambling. Additionally, broad national surveys have found shared demographic risk factors between cannabis use disorder and gambling disorder (Barnes et al., 2015; Grant et al., 2015; Kerridge et al., 2018), and one representative national study found that one-third of individuals with a cannabis use disorder were also experiencing gambling problems (Barnes et al., 2015). This body of research has demonstrated the relation between cannabis use while gambling, cannabis use, and gambling problems.

There are at least two methodological limitations of these studies. First, recalling behavioral history increases measurement errors, particularly as that time span increases (Serre et al., 2015). Second, estimating the average or typical engagement in behaviors results in the omission of specific behavioral details (Trull & Ebner-Priemer, 2013). For example, in McPhail et al. (2020), participants were asked to estimate the percentage of gambling time they spend under the influence of cannabis. Individuals may estimate this answer in different ways or may be unable to recall this information accurately.

Previous research into gambling and other co-occurring substance use have also found an increased co-occurrence of alcohol use disorder (Grant et al., 2015) and nicotine use

disorder (Ritchie et al., 2019) in individuals with problematic gambling behavior. However, in the case of alcohol use while gambling a meta-analysis of previous research into the acute effects of simultaneous alcohol use on gambling behavior found no significant effects of alcohol on gambling behavior in the moment (Horn et al., 2022). This contrasting finding highlights the need for research into the effects of cannabis use on gambling to consider more specific temporal change, unable to be assessed in large-scale between subject designs. Further research is also needed to clarify the underlying mechanism driving the co-occurrence of substance use and gambling. In the case of alcohol, research examining the influence of expectancy effects on alcohol use while gambling found that individuals who gamble while consuming alcohol are likely to endorse positive expectations of how alcohol will impact their gambling, and that the degree to which people endorsed these positive expectations correlated with their reported percentage of gambling time spent under the influence of alcohol (Horn et al., 2024). However, when expectation effects were examined relating to cannabis use while gambling, a different pattern was observed, with individuals who gamble under the influence of cannabis endorsing strong positive and negative expectations for how being high would impact their gambling (Smith et al., 2024). Therefore, further examination of the motivations to gamble under the influence of cannabis is needed to better understand this relation.

A more precise understanding of wagering under the influence of cannabis within individuals who are already experiencing problems from gambling, or are at risk of experiencing problems, is clinically important. If an individual is engaging in risky gambling, and their gambling risk-taking escalates when they are simultaneously under the influence of cannabis, then interventions around cannabis use might be best integrated into the gambling treatment protocol. In addition, collecting the specific details of how cannabis affects an individual who gambles, in their usual gambling environment, will provide information to

help guide responsible gambling policies and regulations around cannabis use that are applicable in real world settings.

Given the connections between these behaviors, there is a need for a more precise understanding of simultaneous cannabis use and gambling. An approach that would move the literature forward needs to include tracking individuals who gamble and assessing the isolated occurrence of these behaviors to compare how wagering differs when a person gambles under the influence of cannabis. Such an approach would also enable more detailed information about these specific gambling episodes with reduced risk associated with recall mistakes.

A repeated assessment, using longitudinal ecological momentary assessment (EMA) methodology, allows for an exploration of the relation between these two risk behaviors. EMA approaches have been used effectively in the past to examine both gambling (Coelho et al., 2024; Hawker et al., 2021) and substance use (Freeman et al., 2023). Examining the simultaneous engagement of these behaviors has the potential to explore ideas put forward in prior between-group, cross-sectional studies to be further examined for causal relationships (Wyckoff et al., 2018). This allows movement away from broader correlational research and allows the ability to potentially start to make more causal connections.

The present study examined the relation between these two behaviors using an EMA methodology. Data were collected on gambling behavior by the same individual regardless of the consumption of cannabis. Restricting this study to individuals who gamble at least weekly (see McPhail et al., 2020) ensured that a substantial portion of the sample would likely be gambling at a high frequency gambling and meet criteria for gambling disorder.

The primary aim was to examine the differences in gambling behavior within an individual when they gamble and use cannabis simultaneously, compared to when they gamble without cannabis. Based on the existing evidence, it was hypothesized that

individuals gamble at a higher intensity (i.e., by risking more money and placing more bets) when engaging in cannabis and gambling simultaneously, compared to gambling without being under the influence of cannabis.

The secondary aim for this study was to explore the relation between gambling disorder, cannabis use disorder, and gambling under the influence of cannabis. To accomplish this aim, mixed model analyses were used. Based off prior research, it was predicted that individuals who gamble under the influence of cannabis will be more likely to have a gambling or cannabis use disorder.

Methods

Participants

Participants were recruited from CloudResearch's Connect platform (for information on this platform see Hartman et al., 2023). The platform settings were utilized to recruit participants likely to be eligible for this study. The inclusion criteria applied at this stage included: being over the age of 18; being proficient in English; currently residing in a state where both gambling and marijuana are legal (either medically or recreationally); gambled in the past year; and consumes cannabis.

One hundred and forty-eight prospective participants completed the eligibility questionnaire that assessed if they: currently gambled, on average, at least weekly; had consumed cannabis at least twice in the past two weeks; had gambled at least twice in the past two weeks; had gambled under the influence of cannabis in the past two weeks; and were likely to engage with gambling and cannabis similarly over the next two weeks. All participants were paid \$0.63 for completion of the screening questionnaire, regardless of if they were found to be eligible, in line with CloudResearch's policies.

Sixty-eight participants were found to be eligible and were invited to complete the baseline questionnaire, which began with a complete description of the study and an

invitation to consent. Fifty-five participants engaged with this process although one person consented without completing the questionnaire. In addition, two individuals completed the baseline, and provided consent but did not continue to complete any EMAs. All participants who completed the baseline questionnaire were compensated with \$10. Fifty-two participants completed the full study. Of these, 30 participants reported at least one gambling episode without cannabis, and one with cannabis, and so were able to be examined to address the current research question. The other 22 consisted of 21 individuals who reported being under the influence of cannabis on every reported gambling episode during the two-week period, and 1 participant who reported no incidences of gambling under the influence and therefore were not included in the analyses.

After data-cleaning and the removal of multivariate outliers, the final sample was composed of 28 individuals. This final sample had an almost even gender split (53.6% male), and was predominantly white (60.7%), heterosexual (82.1%), and had a college degree or above (75.1%). The mean age was 36.04 years (SD=7.70). Regarding gambling problems, 39.3 % (n=11) were identified as high risk for problem gambling. Considering cannabis use, 46.4% (n=13) were identified as likely meeting criteria for a cannabis use disorder. (See Table 1 for demographic information).

Measures

Demographics. Participants reported their age, gender, race/ethnicity, sexual orientation, relationship status, income, and education (see Appendix A for a list of the demographic questions).

Gambling Behavior. Five items assessed participants' current typical gambling behavior: number of gambling days per week is assessed on a 0-7 scale, gambling type(s) engaged in in the past month (participants filled out how many times they had engaged in

Table 1*Sample Demographics (N=28)*

Note. This table displays the demographic variables for the sample, collected during the baseline survey. M= Mean, SD= Standard Deviation.

Demographics	Frequency	%
Gender		
Male	15	53.6
Female	12	42.9
Other	1	3.6
Race/Ethnicity		
White	17	60.7
Black or African American	3	10.7
Hispanic	3	10.7
Asian	1	3.6
Mixed Race	4	14.3
Sexual Orientation		
Heterosexual	23	82.1
Not Exclusively Heterosexual	5	17.9
Education		
No College	3	10.7
Some College, no degree	4	14.3
Associates Degree	5	17.9
Batchelor's Degree	9	32.1
Master's degree or above	7	25.1
Marital Status		

Table 1 (Continued)

Demographics	Frequency	%
Married or living with partner	20	71.5
Other	8	28.5
Employment		
Employed full time	22	78.6
Employed part time	3	10.7
Student	1	3.6
Unemployed	2	7.1
Annual Income		
Less than \$30,000	3	10.7
\$30,000 - \$59,999	5	17.9
\$ 60,000 - \$99,999	4	14.3
\$ 100,000-\$149,999	9	32.1
\$150,000 or greater	7	25.0
Age	M:36.04	SD: 7.70, Range: 24-59

each gambling type over the past month), time spent gambling (assessed by asking the typical number of time (hours) spent gambling on a gambling day), and money risked on each gambling day (in US dollars) (see appendix A).

Problem Gambling Severity Index (PGSI). The 9-item PGSI assesses participants' gambling behaviors over the past year (Ferris & Wynne, 2001). Responses will be indicated on a 4-point Likert-type scale, ranging from 0 = *not at all* to 3 = *often*, with summed item ratings yielding a maximum score of 27. PGSI cutoff score of 8 has been shown as indicating clinically significant gambling problems and possibly a gambling disorder (Ferris & Wynne,