

Impact of Legalization on Cannabis Use, Attitudes, and Purchasing Preferences: A Repeated Cross-Sectional Survey of Canadian Young Adults

Cannabis

2024, Volume 7 (2)

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researchmj.org

10.26828/cannabis/2024/000203



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Objective: The Government of Canada legalized recreational cannabis use in October of 2018 with the implementation of the *Cannabis Act*. The act aimed to reduce the illicit cannabis market, improve consumer health outcomes, and reduce youth access to cannabis. However, little is known about the attitudes and behaviors of young adults, who have been shown to have a high prevalence of cannabis use, towards cannabis after legalization. **Method:** In this descriptive study, we examined cannabis use, attitudes, and purchasing preferences among Canadian university-attending young adults both before and after the legalization of cannabis. Participants were recruited from a large Canadian university from 2017 to 2021. **Results:** Our findings showed that there was an increase in cannabis use immediately following legalization that subsequently decreased in later years. Additionally, attitudes about the legalization of cannabis became more favorable in later years (following legalization), particularly among those who did not use cannabis. Most young adults were also keen to purchase cannabis from a government-owned store before legalization. However, with the exception of past-month consumers, this preference decreased substantially following legalization. **Conclusions:** The current research adds to the knowledge base about changes in cannabis-related attitudes and use after legalization and focuses on a key population – young adults.

Key words: = cannabis; legalization; young adults

The Government of Canada's policy on the use of recreational cannabis has shifted tremendously in the past decade—a shift that has corresponded with public perceptions on the legalization of cannabis (Cunningham, 2020). Indeed, most Canadians now accept a public health approach to cannabis, which focuses on reducing cannabis-related harms (as opposed to abstinence) whilst recognizing that most cannabis-related harm is concentrated among a minority of high-risk consumers (Crepault, 2014). The shift toward a public health approach to cannabis mirrors the one Canada has taken with alcohol, tobacco, and gambling (Pacula et al., 2014; Wood et al., 2017). Ultimately, these changing tides culminated in the *Cannabis Act*, which came into effect on

October 17th, 2018. This date marked the beginning of dried cannabis flower and cannabis oil sale in retail stores, followed by cannabis edible products and concentrates exactly one year later (October 17, 2019; Government of Canada, 2021a). The Act created a legal framework for controlling the production, distribution, sale, and possession of cannabis across Canada (Government of Canada, 2021b). The legal age to purchase, grow, and use cannabis ranges based on the province; however, in Ontario, Canada, the legal age is 19 years (Canadian Center on Substance Use and Addiction [CCSA], 2023). The expressed purpose for legalizing cannabis was three-fold: 1) reduce the illicit cannabis market (i.e., lessen the burden on the criminal justice

system and deter illicit activities through appropriate sanctions and measures), 2) improve consumers' health outcomes by providing access to quality-controlled supplies of cannabis, and 3) reduce access to cannabis among youth (Cannabis Act S.C. 2018, c. 16, 2018; Fischer et al., 2021; Zuckermann et al., 2021).

Due in large part to the legalization of cannabis, a growing body of research has emerged from Canada that has sought to better understand overall trends in attitudes, use, and potential risk associated with cannabis (Armstrong, 2022; Cunningham & Koski-Jännes, 2019; MacQuarrie & Brunelle, 2022; Rotterman, 2021). In general, findings suggest that after legalization, cannabis use increased, perceived risks related to cannabis decreased, opinions surrounding the consumption of cannabis become more favorable, and the purchasing of cannabis from government-regulated sites rose (Fischer et al., 2021; Rotermann, 2020; Rudy et al., 2021; Schuermeyer et al., 2014). Despite the increased knowledge about cannabis-related beliefs and behaviors post-legalization (Bae & Kerr, 2020), few Canadian studies tracked and compared cannabis attitudes and use before and after legalization, and fewer have continued to examine the effects of legalization years later.

The purpose of the current research was to provide descriptive summaries that add to the knowledge base about possible changes in cannabis-related attitudes and use after legalization (compared to pre-legalization), focusing on a key population—young adults—who have been shown to have a high prevalence of cannabis use and cannabis-related problems (Allen & Holder, 2014; Mader et al., 2019; Substance Abuse and Mental Health Services Administration [SAMHSA], 2006). Estimates suggest that 18- to 24-year-olds report the highest rates of lifetime, past-year, and past-month use of cannabis (Bonar et al., 2017; Hellemans et al., 2019). However, most people who consume cannabis, including young adults, do so without developing a dependency (Caulkins et al., 2016; Room et al., 2010). Nonetheless, little is known about the beliefs and behaviors of this cohort, particularly regarding possible changes in their belief and behaviors in the aftermath of legalization.

To address these gaps, we examined cannabis use among Canadian young adults, as well as

their attitudes and purchasing preferences, over a five-year period spanning the introduction of the *Cannabis Act* in Canada. We expected that more young adults would report using cannabis after legalization versus before, and that views on legalization would become more favorable toward cannabis and its status as a legal substance in later years. With the increasing presence of government-licensed and privatized cannabis stores, we expected a growing share of young adults to prefer purchasing cannabis in a store.

METHODS

Hypotheses and descriptive analysis plans for this study were preregistered prior to examining the data (<https://osf.io/w5hj3>). All figures and descriptive statistics were created and performed using R Software (R Core Team, 2021) and packages *dplyr* (Wickham & François, 2017), *epiDisplay* (Chongsuvivatwong, 2018), *ggplot2* (Wickham, 2016) and *patchwork* (Pedersen, 2019).

Participants and Procedure

From 2017 to 2021, undergraduate students at a large Canadian university in the Province of Ontario were recruited through the university's online research system (i.e., SONA) at the start of the fall semester (i.e., September) as part of a department-wide mass-testing of students enrolled in Introductory Psychology courses. Participants completed a battery of items online that assessed an array of topics and received course credit as remuneration. Our team was granted access to data drawn only from the subset of measures described below.

Sample sizes varied by year, owing to changes in enrollment and numbers of people who elected to participate in mass-testing: 2017 ($n = 1,372$), 2018 ($n = 1,440$), 2019 ($n = 742$), 2020 ($n = 764$), and 2021 ($n = 907$). Our preregistered plan called for a slightly larger sample size each year, however we elected to exclude participants who reported being 35 years of age or older from this study, causing a minimal decrease in sample size. Mean age across all five years was 19.2 years ($SD = 2.6$) and approximately 75.0% ($n = 3,851$ of 5,189) identified as female. Age and gender did not considerably vary across years; Supplemental Table 1 on our project page (<https://osf.io/nrm2s/>) displays key demographic information for each year.

Measures

Attitudes toward cannabis legalization. We used a single item (adapted from Palamar, 2014; Rudy et al., 2020) to assess attitudes toward legalization. In 2017 and 2018 (i.e., pre-legalization) this item was: “There has been a great deal of public debate about whether marijuana use should be legal. Not counting ‘medical marijuana’ (with a doctor’s prescription), which of the following policies would YOU favour?” On the 2019 to 2021 surveys (i.e., post-legalization), this item was: “There has been a great deal of public debate now that cannabis use is legal. Not counting ‘medical cannabis’ (with a doctor’s prescription), which of the following policies would YOU favour?” Response options both pre- and post-legalization were: *Using cannabis should be entirely legal; It should be a minor violation—like a parking ticket—but not a crime; It should be a crime; and I don’t know.*

Attitudes toward the legal use of cannabis. We used another single item to assess willingness to use cannabis. In 2017 and 2018 (i.e., pre-legalization) we asked: “Aside from ‘medical marijuana’ (with a doctor’s prescription), if marijuana were legal to use and legally available, which of the following would you be most likely to do?” On the 2019 to 2021 surveys (i.e., post-legalization), we asked: “Now that cannabis is legal to use and legally available, which of the following have you done?” Response options were as follows (regardless of whether the item was posed pre- or post-legalization): *Not use it, even if it were legal and available; Try it; Use it about as often as I do now; Use it more often than I do now; Use it less often than I do now; and I don’t know* (on the pre-legalization surveys).

Attitudes on cannabis purchasing. A single item was used to assess where participants would prefer to purchase cannabis. In the 2018 survey (i.e., pre-legalization; not asked in 2017) this item read: “If you were to decide to purchase marijuana once it becomes legally available for sale, where would you feel most comfortable making your purchase?” In the 2019 to 2021 surveys (i.e., post-legalization), this item read: “Now that cannabis is legally available for sale, where do you feel most comfortable making your purchase?” Responses options both pre- and post-legalization were: *I would prefer to buy marijuana at a government owned store; I would prefer to buy marijuana at a privately-owned store; I would prefer*

to buy marijuana from an individual, not a store; I don’t have a preference; and I don’t know.

Cannabis use behaviors. Participants reported their consumption frequency (“On how many occasions have you used marijuana (weed, pot) or hashish (hash, hash oil)?”) in their lifetime, in the past year (12 months), and in the past month (30 days; Johnston et al., 2020). Response options for each timeframe were: *0 occasions; 1-2 occasions; 3-5 occasions; 6-9 occasions; 10-19 occasions; 20-39 occasions; 40 or more occasions.*

As per our preregistration, Supplemental Table 3 contains summary statistics of additional variables pertaining to cannabis that do not form part of our primary analysis, and is available on our project page.

Data Quality

For all years of data collection, data were excluded from analyses if participants were missing all data on measures of interest, or if participants’ cannabis use behaviors were inconsistent (i.e., responded to using cannabis on many occasions in the past month but also to never using cannabis in their life). Attention checks were also introduced to mass-testing in 2019, at which point data were excluded from participants who failed two or more attention check items (e.g., failing to select “strongly agree” in response to “Please respond with ‘strongly agree’ for this item”). In the 2019 to 2021 surveys, three data quality check items were added at the end of the survey asking participants to rate their attention paid to the survey, their degree of honesty in responding, and their opinion of whether their data should be used. Participants who reported paying no or little attention, or who indicated that their data should not be used for analyses, were excluded ($n = 206$ in 2019; $n = 136$ in 2020; and $n = 180$ in 2021). A detailed description of the attention checks can be found on our project page (Attention check codebook; <https://osf.io/nrm2s/>).

RESULTS

Cannabis Use

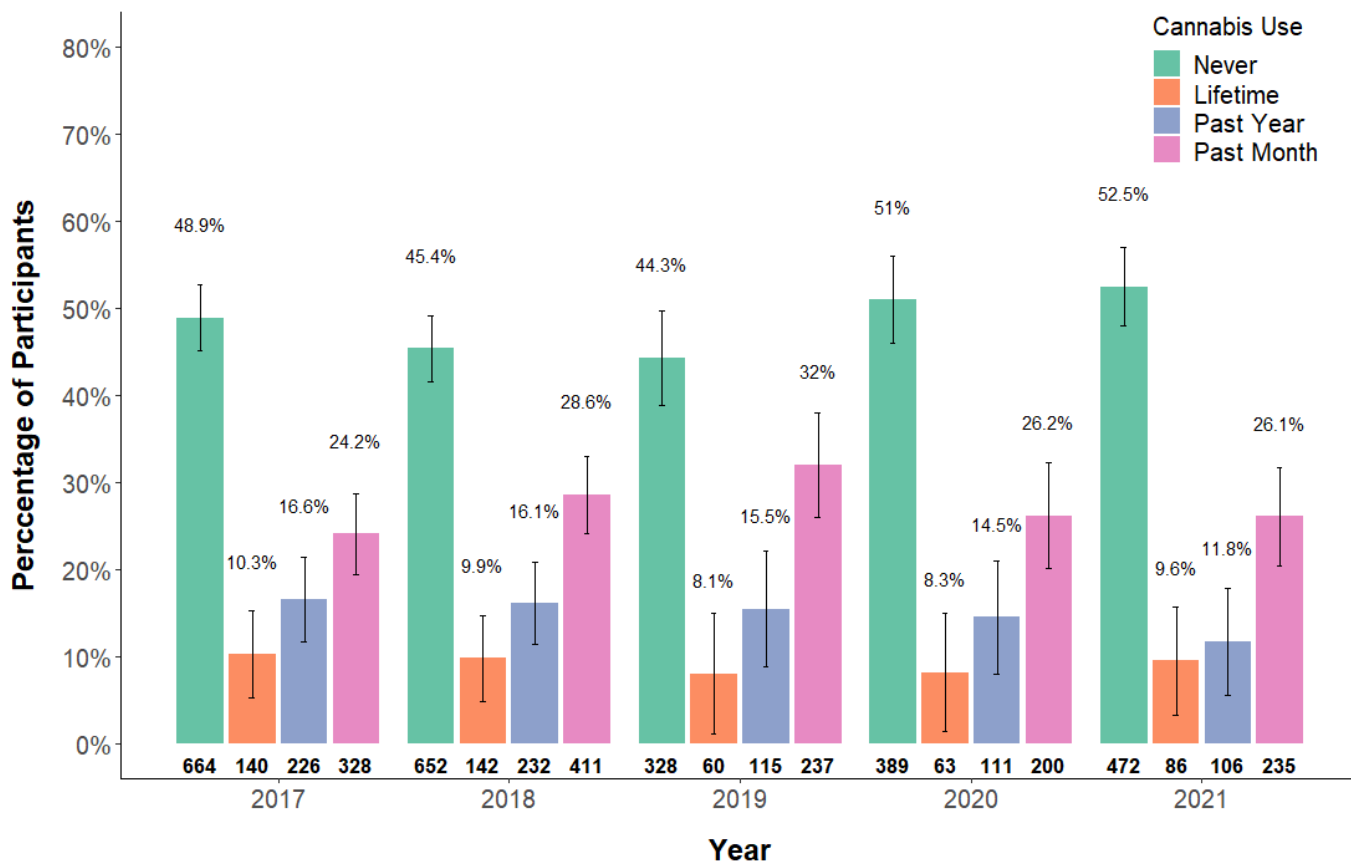
Across the five years of data, an average of 48.0% ($n = 2,505$ of 5,213) of participants reported having never used cannabis, 27.3% of participants used cannabis in the past month, 42.7% used

¹Marijuana may be used interchangeably with cannabis.

cannabis 1-2 times a month, and 7.8% used 40 or more times a month (see Supplementary Table 2 on our OSF project page for detailed annual frequencies of use). Figure 1 shows the frequencies of cannabis use by year of data collection. Focusing on past-month use, rates climbed from 24.2% to 32.0% from 2017 to 2019; annual relative increases of 18.0% (2017 to 2018) and 12.0% (2018 to 2019), but dropped back to 26.2% in 2020 (a relative decrease of 18.0% in the

second full year following legalization, and the first year of the COVID-19 pandemic). Past-month use then remained constant into 2021. Overall, the year-to-year proportion of cannabis use (both before and after legalization) in the current sample of young adults was relatively stable. Table 1 reports the pre-and-post-legalization sample sizes of participants at each level of cannabis use.

Figure 1. *Percentage of participants who were never, lifetime, past-year and past-month cannabis consumers from 2017 to 2021*



Note. Pre-and-Post-legalization, participants were asked “On how many occasions have you used marijuana (weed, pot) or hashish (hash, hash oil)? In your lifetime? During the last 12 months? During the last 30 days?”

Table 1. *Participant sample sizes at various levels of cannabis use both before and after legalization*

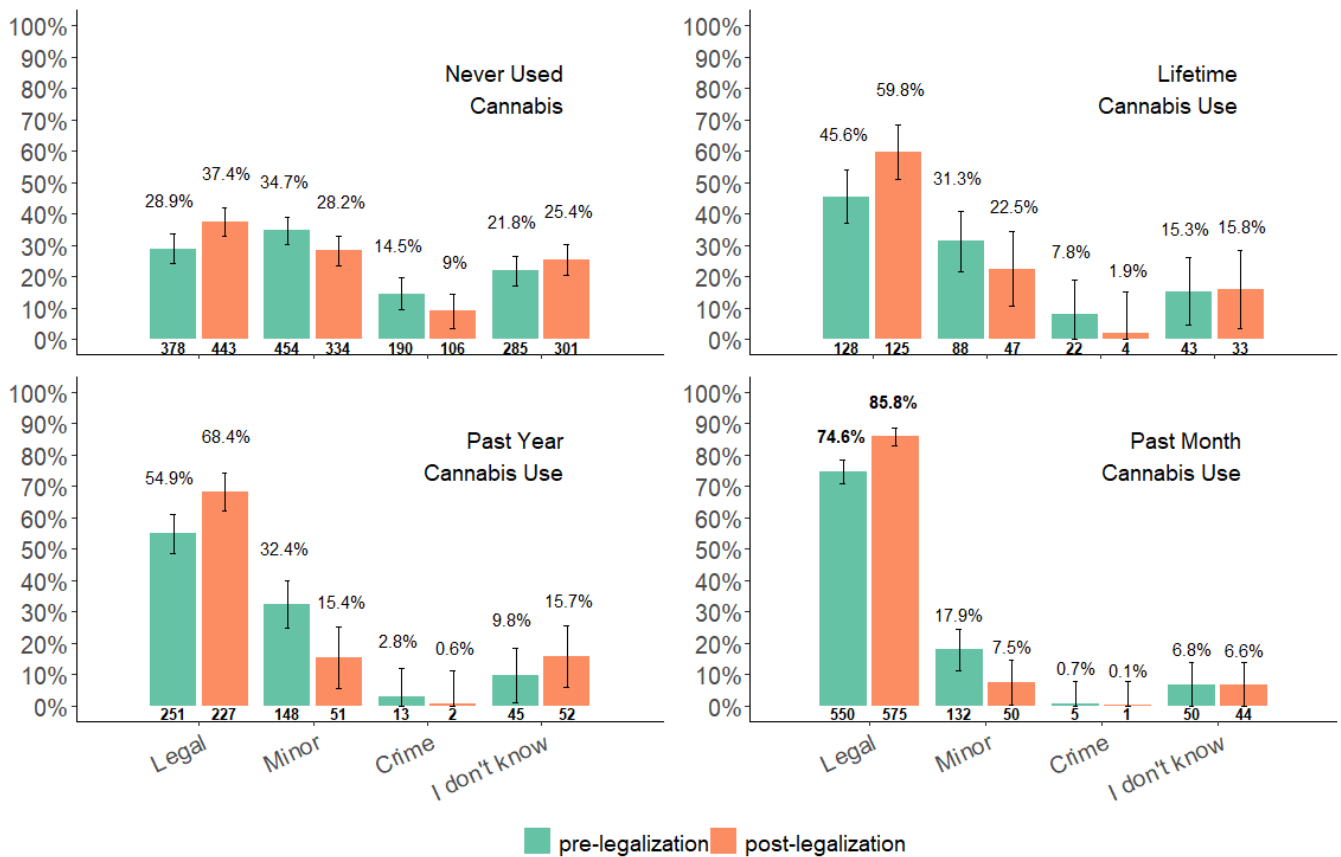
Cannabis Use	Pre-legalization		Post-legalization		
	2017	2018	2019	2020	2021
Never	664	652	328	396	472
Lifetime	140	142	60	71	86
Past Year	226	232	115	113	106
Past Month	328	411	237	205	235
Missing	14	3	2	1	8
Total	1372	1440	742	786	907

Attitudes Toward Legalization

Figure 2 shows that attitudes varied depending on whether participants used cannabis or not. Before and after legalization, most participants who believed that cannabis should be entirely legal were past or current cannabis consumers; however, an increase in this belief was evident across all participants after legalization.

There was also a relative decrease from pre- to post-legalization in the belief that cannabis use should be a minor violation, as well as the belief that cannabis use should be a crime. This decrease was observed among all participants. Overall, beliefs about the illegality of cannabis (minor violation, crime) converged with students' actual cannabis use after legalization.

Figure 2. Pre- and post-legalization attitudes towards cannabis policies for participants who have never used cannabis or who have used at least once in their life, past year and past month



Note. Pre-legalization years were 2017 to 2018, where the single item was framed as “if cannabis were legal”. Post-legalization were 2019 to 2021, where the item was framed as “now that cannabis is legal”. Response options are as follows: *legal* (using cannabis should be entirely legal), *minor* (it should be a minor violation – like a parking ticket – but not a crime), and *crime* (it should be a crime). Non-overlapping pre/post confidence intervals are represented in bold.

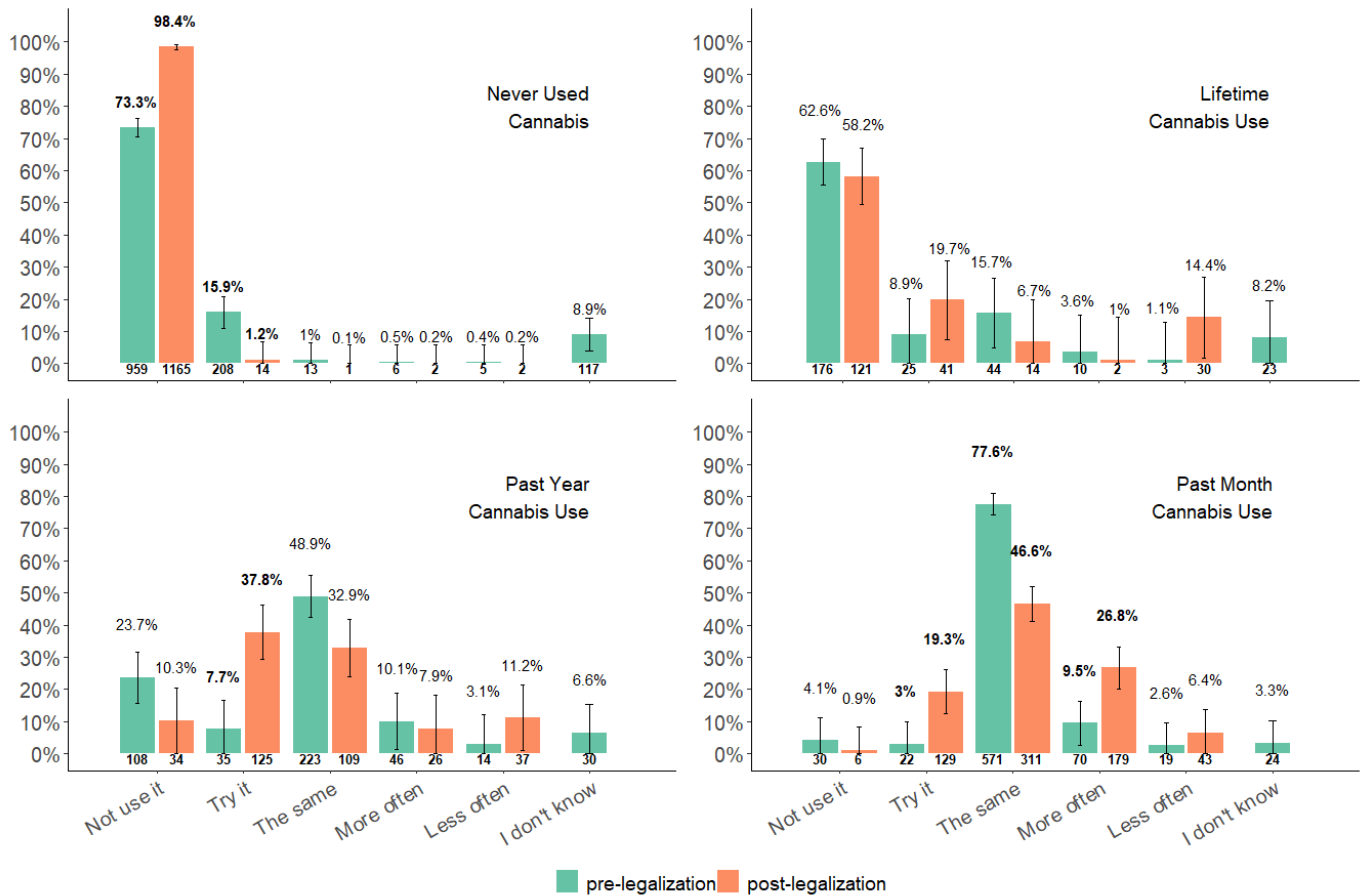
Figure 3 shows rates of willingness to use cannabis when it becomes legal (2017 and 2018 surveys) and willingness to use now that it's legal (2019 to 2021 surveys). Most participants who never used cannabis reported that they would not use cannabis in the future. Results were similar among those who used it at least once in their life.

Notably, however, among participants who never used cannabis, the proportion stating that they would never use cannabis in the future increased from 73.3% before to 98.4% after legalization. Among participants who had used cannabis in the past month, the proportion stating that their use would stay the same dropped from over 75.0% to

nearly 50.0% after legalization. A similar trend was observed among past-year consumers of cannabis (i.e., belief that their cannabis use would stay the same dropped post-legalization relative to pre-legalization) as well as a shift in their attitudes toward trying cannabis post-

legalization. Lastly, among participants who used cannabis in the past month, there was a 17.3% increase (pre- to post-legalization) in the proportion who believed they would use cannabis more after legalization than before legalization.

Figure 3. Pre- and post-legalization attitudes towards using cannabis for participants who have never used cannabis or who have used at least once in their life, past year and past month



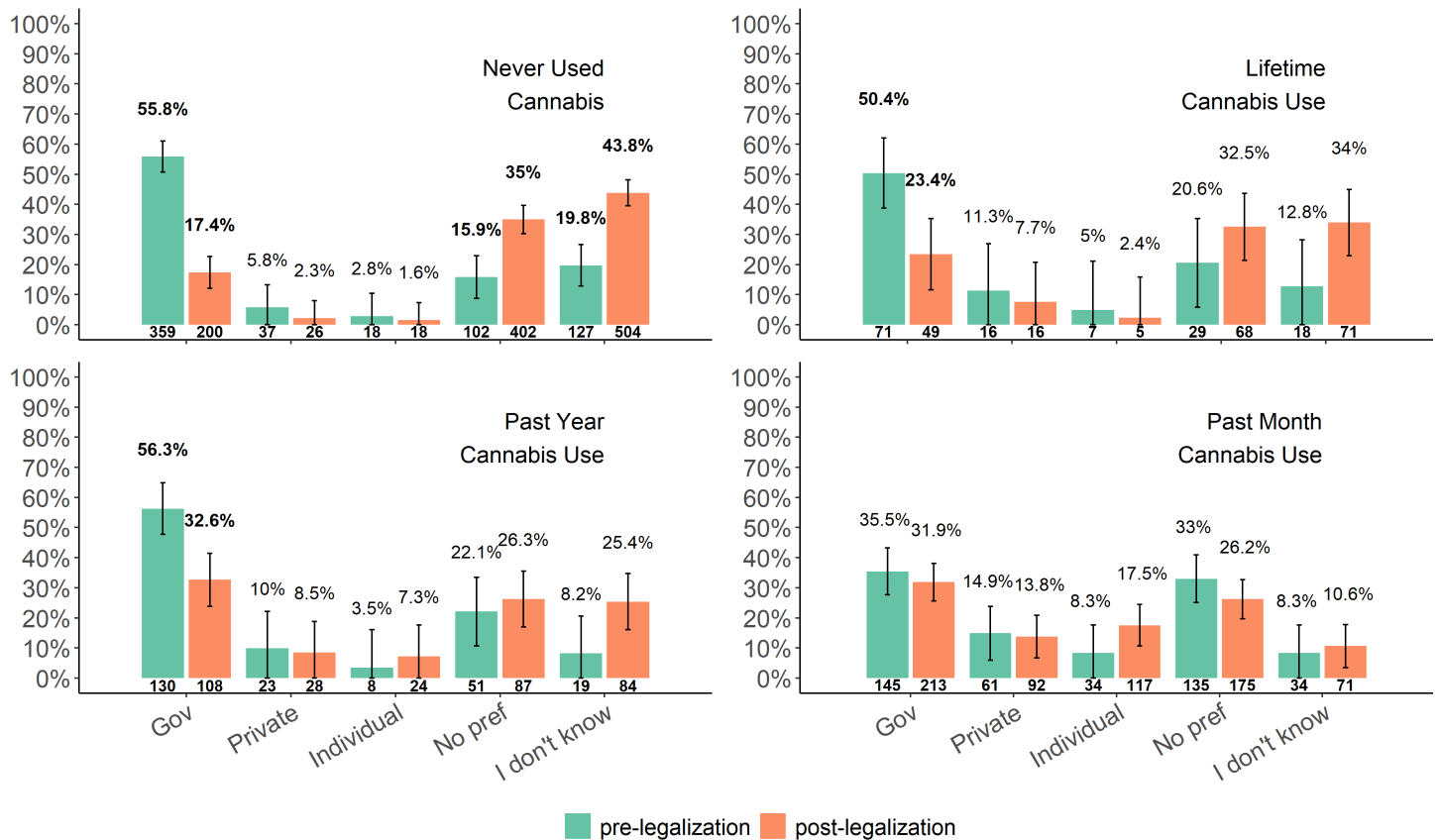
Note. Pre-legalization years were 2017 to 2018 and participants were asked their opinions “if marijuana were legal”. Post-legalization years were 2019 to 2021 and participants were asked their opinions “now that cannabis is legal” (“I don’t know” was not a response option in the post-legalization surveys). Non-overlapping pre/post confidence intervals are represented in bold.

Purchasing Preferences

Figure 4 shows participants’ preferred locations to purchase cannabis. Prior to legalization, over half of participants who used cannabis in the past year, less often, or never, said they would prefer to purchase cannabis from a government-owned store, compared to 35.5% of past-month consumers. Following legalization, fewer participants who used cannabis in the past

year, less often, or never, expressed a preference for purchasing from a government-owned store, while the proportion stating they didn’t know doubled or tripled. Only current (past-month) cannabis consumers remained somewhat stable in their purchasing preferences before and after legalization, although the proportion stating a preference to purchase from an individual more than doubled after legalization.

Figure 4. Pre- and Post-legalization Attitudes Towards Purchasing Cannabis for Participants Who Have Never Used Cannabis or Who Have Used at Least Once in Their Life, Past Year and Past Month



Note. Pre-legalization years were 2017 to 2018, however the 2017 survey did not ask about purchasing preferences. In 2018, the single item was framed as “if you were to decide to purchase marijuana once it becomes legally available for sale”. Post-legalization were 2019 to 2021 and the single item was framed as “now that cannabis is legally available for sale”. Response options are as follows; *Gov* (government owned store), *Private* (privately-owned store), and *Individual* (individual – not a store), and *No pref* (no preference). Non-overlapping pre/post confidence intervals are represented in bold.

DISCUSSION

This descriptive study aimed to illuminate possible changes in university-attending young adults’ attitudes and behaviors towards cannabis before and after legalization, as well as multi-year trends. We found that past-month cannabis use increased after legalization in 2018 but decreased in the subsequent years. This trend was not observed for past-year or lifetime consumers, as these rates slightly declined from 2017 to 2021. Most participants who never used cannabis or who used it at least once in their lifetime indicated no future intent to use, especially after legalization. All young adults in this study, regardless of cannabis use frequency, had less favorable views of purchasing cannabis from the

government after legalization than before. Among past-year and past-month consumers, we observed a greater preference for purchasing cannabis from an individual post-legalization.

From 2017 to 2021, approximately half of the young adults sampled in the present study never used cannabis, and just over one quarter reported past-month use. These rates mirror a U.S. study that examined college students’ cannabis use, harm perceptions, and attitudes toward policies (Rudy et al., 2021). Among students with cannabis use histories, over 25.0% were past-month consumers, and nearly 8.0% used 40 or more times a month (i.e., daily use). According to a 2021 Canadian cannabis survey, 20.0% of 16- to 19-year-olds and 29.0% of 20- to 24-year-olds reported daily or almost daily cannabis use

(Government of Canada, 2021b). The rate of cannabis use underpins the necessity for research to better understand how this age cohort feels about cannabis and cannabis-related topics.

We also observed increases in past-month cannabis use in 2018 (18.0% increase) and 2019 (12.0% increase), the two timepoints immediately preceding and following legalization (for a similar pattern, see Fischer et al., 2021; Rotermann, 2020; Statistics Canada, 2020). These trends may reflect the anticipation of and gradual new uptake in cannabis use, owing in part to delays in retail availability and sales of novel cannabis products such as edibles and concentrates (Sandhu et al., 2019). The Canadian Centre on Substance Use and Addiction (CCSA, 2022) similarly reported increases in cannabis use following the introduction of novel cannabis products. Importantly, however, following this “second wave” of legalization, we observed a nearly 20.0% decrease in past-month use and a 6.5% decrease in past-year use in 2020 (two years after legalization).

One reason for the decrease in use in 2020 may be the limited accessibility or living disruptions experienced during COVID-19. Indeed, although cannabis stores were initially considered an essential service at the onset of the pandemic, thus allowing the public to purchase cannabis within stores regardless of closures to non-cannabis retailers, cannabis retail operations were subsequently limited to curbside pick-up and home delivery (CCSA, 2021). Additionally, university classes shifted to remote virtual learning in March of 2020 (and large classes remained online through 2021), prompting dormitory closures and relocation of students. Approximately 6.0% of young adults moved back in with their parents due to the pandemic, and this rate was higher among those living in Ontario (McKnight, 2021). Restrictions on freedom or privacy that go along with returning to parents’ homes may have made it more difficult for young adults to access or use cannabis. Additionally, living away from peers during this time may have hampered the potential of peer influence and social cues to use cannabis. First-year students have been found to be susceptible to trying cannabis as a way to heighten sociability, ease emotional distress from the transition to university, and grow autonomy from parents (Suerken et al., 2014; Beck et al., 2009). Because

this sample comprises only undergraduates, our results do not reflect pre- to post-legalization cannabis use and attitudes of other young adults. Generally, those not in college are less likely to initiate cannabis use (Miech et al., 2017). Our findings are likely overestimates of the general population of young adults, except for those *not in employment, education, or training* (NEET), who are typically more vulnerable and more likely to use cannabis (Baggio et al., 2015).

Numerous parallels between cannabis use and attitudes towards cannabis policies, desire to use, and purchasing were also observed. In general, young adults who reported any current or past use of cannabis endorsed less restrictive legal measures. This finding is like that reported by Blomgyst (2009), who found that familiar, less stigmatized drugs tend to be perceived as lower risk compared to unfamiliar, more stigmatized drugs. Additionally, Cohn and colleagues (2016) found that young adults in the U.S. who were current cannabis users were more likely to support cannabis legalization compared to non-users. In the current study, over half of participants (51.8%) supported legal use of cannabis both before and after legalization. However, rates were lowest among those who never used cannabis, with just under 30.0% of participants thinking it should be legal. After legalization, more non-users agreed that cannabis should be legal (37.4%), echoing the notion that rates of substance use in society act as a key predictor of attitudes towards cannabis policies (MacQuarrie & Brunelle, 2022).

We expected that young adults, regardless of past cannabis use, would express a desire to try the substance once it became legal. Instead, findings showed a general pattern of attitudes better aligning with behaviors. For example, prior to legalization, almost 16.0% of students who had never used cannabis said they would *try it* if cannabis became legal, compared to just 1.2% after legalization. Prior to legalization, non-users of cannabis comprised students who were either uninterested in using cannabis *or* who were interested but hesitant to try an illegal substance. After legalization, non-users of cannabis were strictly those who did not want to use it. This is important from a public policy perspective, in that the legalization of cannabis likely did not tempt those who had no intention of using it prior to legalization to start consuming the product after

legalization. More generally, our findings reflect the results of a similar study, which found that approximately one in five Canadians were likely to try or increase their cannabis use after legalization for recreational purposes (Sandhu et al., 2019). Ease of access as stores began to open, and the expansive selection of cannabis products such as edibles, drinks and concentrates, may explain cannabis users' expectations of increased use after legalization. Indeed, consumption of edible cannabis products grew in Canada from 2020 to 2021 (CCSA, 2022).

In terms of purchasing preferences, most participants were keen to purchase cannabis from a government-owned store before legalization. However, with the exception of past-month consumers, this preference decreased substantially after legalization. Past-month consumers also expressed a greater preference to purchase cannabis from an individual (e.g., dealer, friend) after legalization (compared to before legalization), suggestive of loyalty to one's dealer. However, this interpretation is purely speculative and in need of future study. Moreover, this finding was contrary to expectations and previous research that has found that people tend to perceive cannabis purchased via government-regulated channels to be safer, more convenient, of greater quality and safer to use (Wadsworth et al., 2022). Additionally, according to the CCSA (2022), such channels captured a large portion of the cannabis market. One possibility is that the price of cannabis tends to be relatively higher at government-regulated stores (Goodman et al., 2022; Government of Canada, 2019), which may be cost prohibitive to young adults attending university. Additionally, privacy concerns may impede young adults from purchasing cannabis from government and privately-owned stores. To the point, cannabis consumers—particularly young adults—may not want the Government of Canada to know they are purchasing cannabis.

We also ruled out accessibility challenges as there are several (5+) stores within walking distance of the university campus, and an abundance across the city. Moreover, almost all dispensaries have a same day (if not within the hour) delivery service. Cannabis accessibility is on par with alcohol, perhaps more so, considering their typically late operating hours, and in our view accessibility is unlikely to be a strong factor driving our reported rates.

Limitations

There are a few limitations to the current research that should be noted. First, participants in our study were more likely to be female (~75.0%), creating a gender-imbalanced sample. Second, data quality checks were not introduced until 2019, which could have led to lower-quality responses before cannabis legalization. Third, clearer definitions could have been provided for participant clarification alongside response options. For example, response options regarding purchasing cannabis included government-owned stores as well as privately-owned stores; this may have influenced results because participants may not have been aware of the differences between the two sources of legal cannabis. For participant clarity, we should have explicitly listed the differences between options. Fourth, the sample is limited to emerging adults in a university setting who decided to enroll in an introductory psychology course, and thus generalizability may be limited. Fifth, our study is strictly descriptive and does not formally test any links to addiction or mental health that might explain attitudes, rates of use, and purchasing preferences. Sixth, it is possible that the COVID-19 pandemic influenced cannabis use. Because this study was strictly descriptive, we did not adjust (or control) for the possible influence of the pandemic on our results. Lastly, we were limited to just two years prior to and three years following legalization, leaving out valuable information about longer-term trends and changes that are as yet unknown.

Conclusion

Our study found that, over five years, cannabis use increased among samples of young adults immediately following legalization but decreased two years following legalization. However, further research is needed to understand what constitutes typical fluctuations in annual rates of use as well as the long-term effects of legalization on attitudes toward cannabis and cannabis use. Overall, this study contributes to the growing body of literature on the consequences of cannabis legalization for attitudes, use, and purchasing preferences among young adults that can inform future policy and public health decisions in this area.

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Funding and Acknowledgements: No funding was received to assist with the preparation of this manuscript. The authors declare that there are no potential conflicts of interest with respect to authorship, and/or publication of this article.

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