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Short communication

Consumer perceptions of 'legal' and 'illegal' cannabis in US states with legal cannabis sales

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HIGHLIGHTS

- The study examined consumer perceptions of cannabis from legal vs. illegal sources.
- Consumers reported generally positive perceptions of legal cannabis.
- Cannabis from legal sources was considered more expensive than from illegal sources.
- Perceptions became more positive as time since legal retail sales increased.

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ABSTRACT

Introduction: In jurisdictions that have legalized recreational cannabis, perceptions of the 'legal' market may influence whether consumers transition from illegal retail sources. The current study examined consumer perceptions of legal versus illegal retail sources in 6 US states with legal retail sales as of 2018: Alaska, California, Colorado, Nevada, Oregon, and Washington State.

Methods: Data are from Wave 1 of the International Cannabis Policy Study, an online survey conducted in 2018 among 16–65-year-olds. US respondents were asked about cannabis consumption and perceptions of legal cannabis (n = 5530). Multinomial regression models were fitted for each of five consumer perception outcomes.

Results: Compared to illegal sources, at least one third of respondents perceived legal cannabis to be higher quality (37.6%) and safer to use (40.3%). More than half reported legal cannabis was more convenient to buy (59.2%) and safer to purchase (56.1%), whereas 30.6% of respondents perceived legal cannabis as more expensive. Perceptions varied according to the length of time since legal cannabis sales began: respondents living in more 'mature' legal markets were more likely to perceive legal cannabis as higher quality (AOR = 1.25, 99%CI = 1.07–1.46, p = 0.0003), less expensive (AOR = 1.20, 99%CI = 1.07–1.35, p < 0.0001), more convenient to buy (AOR = 1.36, 99%CI = 1.13–1.62, p < 0.0001) and safer to purchase (AOR = 1.21, 99%CI = 1.02–1.44, p = 0.0047).

Conclusions: With the notable exception of price, consumers reported generally positive perceptions of the legal cannabis market, with more positive perceptions in US states with more 'mature' legal markets.

1. Background

In recent years, 11 US states and the District of Columbia have legalized cannabis for non-medical ('recreational') use. One of the primary objectives of cannabis legalization is to transition cannabis consumers from illegal to legal retail sources. However, the extent to which consumers switch to legal retail sources following legalization is likely to depend on several factors, including cannabis prices and accessibility of legal stores (Armstrong, 2018; Murphy, 2019). In US states that have legalized recreational cannabis, most retail stores have opened one to two years after legalization, with a gradual increase in the number of retail stores over time (Pardo, 2014). For example, recreational cannabis was legalized in Colorado and Washington in December 2012, yet retail sales did not begin until January and July 2014, respectively (ProCon.org, 2019). Similarly, retail sales in Oregon and Nevada began within 6 months of legalization, over a year post-legalization in California, and almost 2 years post-legalization in Alaska (ProCon.org, 2019). In terms of price, legalization is predicted to lower the cost of cannabis (Hall & Lynskey, 2016; Hunt & Pacula, 2017; Kilmer, 2014). For example, the retail price of cannabis in Colorado declined 62%

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Table 1
Sample characteristics overall and by state* (n = 5530).

	Overall (n = 5530)	Alaska (n = 154)	California (n = 1172)	Colorado (n = 1165)	Nevada (n = 846)	Oregon (n = 1038)	Washington State (n = 1155)
Age, mean (SD)	40.8 (14.3)	40.2 (13.6)	39.2 (15.2)	40.7 (14.3)	41.7 (13.9)	41.5 (13.9)	41.2 (14.0)
Sex							
Female	49.5 (2735)	46.8 (72)	49.7 (582)	49.0 (571)	49.7 (421)	50.1 (520)	49.3 (569)
Male	50.5 (2795)	53.2 (82)	50.3 (590)	51.0 (594)	50.3 (425)	49.9 (518)	50.7 (586)
Education							
Less than high school	8.8 (489)	5.2 (8)	15.5 (182)	8.1 (94)	6.4 (54)	6.6 (69)	7.1 (82)
High school diploma or equivalent	17.4 (963)	23.6 (36)	12.7 (149)	16.6 (194)	19.0 (161)	17.5 (182)	20.9 (241)
Some education after high school	48.1 (2658)	46.2 (71)	37.9 (444)	44.8 (522)	55.7 (471)	53.3 (553)	51.7 (597)
Bachelor's degree or higher	25.7 (1419)	25.0 (39)	33.9 (397)	30.5 (355)	18.9 (160)	22.5 (234)	20.3 (235)
Ethnicity							
White	80.5 (4455)	74.0 (114)	71.6 (839)	85.7 (998)	77.9 (659)	86.4 (896)	82.1 (948)
American Indian or Alaskan Native	1.7 (96)	9.8 (15)	1.9 (22)	1.3 (15)	0.5 (4)	2.8 (29)	0.9 (10)
Asian	6.3 (348)	4.6 (7)	11.2 (132)	2.7 (31)	6.0 (51)	3.4 (35)	7.9 (92)
Black	5.0 (274)	0.2 (1)	7.1 (83)	5.0 (58)	9.0 (76)	1.7 (18)	3.4 (39)
Native Hawaiian or Pacific Islander	0.4 (20)	0 (0)	0.4 (5)	0 (0)	1.0 (8)	0.2 (2)	0.4 (5)
Other/2 + races/Unstated	6.1 (336)	11.4 (17)	7.7 (90)	5.3 (62)	5.7 (48)	5.5 (57)	5.3 (61)
Income adequacy							
Very difficult to make ends meet	8.1 (450)	7.8 (12)	9.4 (110)	7.0 (82)	6.9 (58)	7.2 (75)	9.8 (113)
Difficult to make ends meet	20.6 (1139)	20.1 (31)	18.4 (216)	19.8 (230)	20.6 (174)	23.7 (246)	20.8 (240)
Neither easy nor difficult	32.1 (1775)	27.9 (43)	30.8 (361)	33.9 (394)	33.6 (276)	31.0 (322)	32.8 (379)
Easy to make ends meet	23.6 (1304)	26.6 (41)	23.3 (273)	25.1 (293)	24.5 (207)	23.3 (242)	21.4 (248)
Very easy to make ends meet	13.4 (740)	14.9 (23)	14.6 (171)	12.8 (149)	14.4 (122)	12.5 (130)	12.6 (146)
Unstated	2.2 (122)	2.6 (4)	3.5 (41)	1.4 (17)	1.0 (8)	2.3 (233)	2.6 (30)
Frequency of cannabis use							
Never user	33.6 (1859)	27.3 (42)	43.4 (509)	31.7 (370)	26.0 (220)	31.9 (331)	33.5 (387)
Less than monthly user	39.7 (2194)	47.2 (73)	33.4 (392)	41.3 (481)	46.9 (397)	38.8 (403)	38.7 (448)
Monthly or weekly user	13.5(747)	4.0 (6)	13.9 (162)	11.4 (133)	16.0 (135)	12.4 (129)	15.8 (182)
Daily/almost daily user	13.2 (730)	21.5 (33)	9.3 (109)	15.6 (181)	11.1 (94)	16.9 (175)	12.0 (138)

* Data are mean (SD) or n (%)

between 2014 and 2017 (Orens, Light, Lewandowski, Rowberry, & Saloga, 2018), approximately 60% in Washington between 2014 and 2016 (Caulkins et al., 2018), and 50% in Oregon between 2016 and 2018 (Oregon Liquor Control Commission, 2019). However, changes in price may not occur immediately on market opening; an analysis of sales data across four states with a legal retail market showed states that had recently legalized had higher cannabis prices than those that had a 'mature' retail market (Headset, 2019). Nonetheless, research from behavioural economics suggests that cannabis users may tolerate somewhat higher prices for legal cannabis (Amlung et al., 2019).

A range of other factors may influence the extent to which cannabis consumers transition from illegal to legal retail sources post-legalization, including perceptions of product quality and safety. Indeed, research supports greater demand and willingness to pay more for cannabis which is perceived as high quality (Vincent et al., 2017). Perceptions of legal cannabis products may also differ across consumer types. For example, more frequent cannabis consumers are likely to have more established product preferences, as well as established relationships with illegal 'dealers', which could act as barriers to purchasing from legal sources (Statistics Canada, 2019b). Where both legal and illegal cannabis products are available, it is important to consider perceptions of price and other factors which may be relevant to consumer decisions about where to source their cannabis. Indeed, this is one of the key questions confronting regulators who are responsible for shifting consumers to legal retail sources and must determine the appropriate price/taxation level, retail density, product communications, and other factors that may influence consumer behaviour. However, little data exists on perceptions of legal cannabis quality, safety and accessibility in US jurisdictions with legal retail sales. In Canada, where non-medical cannabis was legalized in October 2018, a population-based survey conducted in the first two months after legalization found that when considering where to source their cannabis, approximately three quarters of cannabis consumers considered the quality or safety of the product, 38% the price, and one third the accessibility (Statistics Canada, 2019a). Examining consumer perceptions of legal and illegal cannabis on these factors can provide insight into areas which may facilitate, or conversely, hinder transitioning to the legal cannabis market.

The current study examined perceptions of quality, price, convenience, and safety of use and purchasing cannabis from legal versus illegal sources in US states with legal retail sales. The study also sought to examine associations between cannabis use, length of time since legal sales, and perceptions of legal cannabis.

2. Methods

2.1. Study design

Data are from Wave 1 of the International Cannabis Policy Study (ICPS), conducted in Canada and the US. Data were collected via self-completed web-based surveys conducted from August to October 2018 with respondents aged 16–65. Respondents were recruited through the Nielsen Consumer Insights Global Panel and their partners' panels. Email invitations (with a unique link) were sent to a random sample of panelists (after targeting for age and country criteria).

Respondents provided consent prior to completing the survey. Respondents received remuneration in accordance with their panel's usual incentive structure. The study was reviewed by and received ethics clearance through a University of Waterloo Research Ethics Committee (ORE#22392/31330). A full description of the study methods can be found in the ICPS Technical Report – Wave 1 (2018) (Goodman & Hammond, 2019).

2.2. Measures

Socio-demographic measures included age, sex at birth, education, ethnicity and perceived income adequacy (see Table 1 for response options). Frequency of cannabis use (see Table 1) was determined from questions about lifetime, most recent use and frequency of use. Respondents were collapsed into four exclusive categories: never, less than

monthly, monthly or weekly, and daily/almost daily users.

Perceptions of legal cannabis were assessed by asking, "We would like to know how marijuana products from legal, authorized sources compare to marijuana products from unauthorized/unlicensed sources (stores, websites and street dealers). Are the legal marijuana products: 1. Higher quality/No difference/Lower quality; 2. More expensive/No difference/Less expensive; 3. More convenient to buy/No difference/Less convenient to buy; 4. Safer to use/No difference/Less safe to use; 5. Safer to buy/No difference/Less safe to buy?" All questions included a 'Don't know' option. Finally, US states were coded according to the time (in years) since in-state legal cannabis sales became available (continuous variable).

2.3. Statistical analysis

The current study included respondents from the six states with legal retail sales as of August 2018: Alaska, California, Colorado, Nevada, Oregon, and Washington State (n = 5542). After excluding 12 respondents with missing data, the final sample comprised 5530 respondents. Post-stratification sample weights were constructed based on US Census estimates, and respondents from the US legal states were classified into age-by-sex-by-legal state, education, and region-by-race groups (Goodman & Hammond, 2019). Estimates are weighted unless otherwise specified. Nominal multinomial logistic regression models were fitted for each of the five 'consumer perception' outcomes. Independent variables included 'time since retail sales began' (in years) and cannabis use frequency. All models were adjusted for age, sex, education, ethnicity and perceived income adequacy. Adjusted odds ratios and 99% confidence intervals (CIs) are reported. Analyses were conducted using SAS Release 9.4.

3. Results

Table 1 shows sample characteristics, and Table 2 shows perceptions of legal cannabis products compared to those from unauthorized/unlicensed (illegal) sources, overall, by state, and by frequency of cannabis use.

3.1. Perceptions of product quality

As Table 2 indicates, approximately one third of respondents across all states perceived legal cannabis as higher quality, whereas very few perceived legal products as lower quality. As time since legal retail sales increased, respondents were more likely to report that legal cannabis was 'higher quality' or to state 'don't know' (vs. 'lower quality') than cannabis from illegal sources (AOR = 1.25, 99%CI = 1.07–1.46, p = 0.0003; AOR = 1.25, 99%CI = 1.07–1.47, p = 0.0002, respectively). Compared to never cannabis users, all user groups were more likely to report that legal cannabis was 'higher quality' than that from illegal sources (less than monthly use, AOR = 3.97, 99%CI = 2.10–7.48, p < 0.0001; monthly/weekly use AOR = 2.80, 99%CI = 1.33–5.89, p = 0.0004; daily use AOR = 2.24, 99%CI = 1.11–4.51, p = 0.0031). Additionally, more frequent users were less likely to state 'don't know' (vs. 'lower quality') than never users (monthly/weekly use AOR = 0.18, 99%CI = 0.08–0.41, p < 0.0001; daily use AOR = 0.09, 99%CI = 0.04–0.21, p < 0.0001).

3.2. Perceptions of price

One quarter to one third of respondents perceived legal cannabis as more expensive, whereas no more than 15% in any state perceived legal cannabis as less expensive. However, with longer time since legal sales, respondents were less likely to report legal cannabis as 'more expensive' (vs 'less expensive') than that from illegal sources (AOR = 0.83, 99%CI = 0.75–0.93, p < 0.0001). One third or more of all cannabis users perceived legal cannabis to be more expensive. Less than monthly users were more likely than never users to report that legal cannabis was 'more expensive' (vs 'less expensive') (AOR = 1.76, 99%CI = 1.08–2.84, p = 0.0026), while all cannabis user groups were less likely to state 'don't know' (vs. 'less expensive') than never users (less than monthly use AOR = 0.58, 99%CI = 0.36–0.91, p = 0.0026; monthly/weekly use AOR = 0.13, 99%CI = 0.08–0.23, p < 0.0001; daily use AOR = 0.05, 99%CI = 0.03–0.09, p < 0.0001). Daily users were also less likely to report 'no difference' (vs. 'less expensive) than never users (AOR = 0.40, 99%CI = 0.23–0.69, p < 0.0001).

3.3. Perceptions of convenience

At least 40% of respondents across all states considered legal marijuana more convenient to buy, with less than 10% perceiving it as less convenient. With longer time since retail sales, respondents in legal states were more likely to report that legal cannabis was 'more convenient to buy' (vs. 'less convenient to buy') (AOR = 1.36, 99%CI = 1.13–1.62, p < 0.0001). While similar perceptions of convenience were reported regardless of the frequency of cannabis use, more frequent users were less likely to state 'don't know' (vs. 'less convenient to buy') than never users (monthly/weekly use AOR = 0.14, 99%CI = 0.06–0.32, p < 0.0001; daily use AOR = 0.08, 99%CI = 0.03–0.20, p < 0.0001).

3.4. Perceptions of safety of use

Approximately one third of all respondents perceived legal cannabis to be safer to use, with very few perceiving it to be less safe. All cannabis user groups were more likely to report that legal cannabis was 'safer to use' (vs. 'less safe to use') than cannabis from illegal sources (less than monthly use, AOR = 4.48, 99%CI = 2.39–8.39, p < 0.0001; monthly/weekly use, AOR = 2.55, 99%CI = 1.07–6.09), p = 0.0055; daily use, AOR = 5.44, 99%CI = 1.79–16.53, p < 0.0001, respectively). Less than monthly and daily users were also more likely than never users to perceive 'no difference' in safety of use (vs. 'less safe to use') (AOR = 3.29, 99%CI = 1.74–6.21, p < 0.0001, AOR = 4.61, 99%CI = 1.52–14.04, p = 0.0004, respectively), while monthly/weekly users were less likely to state 'don't know' (vs. 'less safe to use') than never users (AOR = 0.30, 99%CI = 0.12–0.77, p = 0.0004).

3.5. Perceptions of safety of purchasing

Almost half of respondents perceived legal cannabis as safer to purchase than cannabis from illegal sources. As time since retail sales increased, respondents were more likely to perceive legal cannabis as 'safer to buy' (vs. 'less safe to buy') than illegal cannabis (AOR = 1.21, 99%CI = 1.02–1.44, p = 0.0047). Daily and less than monthly users were more likely than never users to report that it was 'safer to buy' (vs. 'less safe to buy') than legal cannabis (AOR = 4.32, 99%CI = 2.31–8.08, p < 0.0001; AOR = 3.58, 99%CI = 1.30–9.87, p = 0.0012, respectively). Monthly/weekly users and daily users were less likely to state 'don't know' (vs. less safe to buy) than never users (AOR = 0.15, 99%CI = 0.06–0.40, p < 0.0001; AOR = 0.25, 99%CI = 0.08–0.82, p < 0.0001, respectively).

4. Discussion

The current findings suggest generally positive perceptions of the legal cannabis market. Most respondents, including frequent cannabis consumers, perceived legal cannabis to be of equal or greater quality and convenience, and as safer to buy and use than cannabis from illegal sources. The one notable exception was price: legal cannabis products were perceived as more expensive than illegal products, particularly among frequent cannabis users. The prevalence of this belief suggests that price may in fact be a barrier to transitioning to the legal market;

Table 2
Perceptions of legal cannabis vs cannabis from unauthorized/unlicensed sources overall and by state and cannabis use status* (n = 5530).

	Overall (n = 5530)	Colorado (n = 1165)	Washington State (n = 1155)	Oregon (n = 1038)	Alaska (n = 154)	Nevada (n = 846)	California (n = 1172)	Never user (n = 1859)	Less than monthly user (n = 2194)	Monthly or weekly user (n = 747)	Daily/almost daily user (n = 730)
Quality of legal marijuana products:											
• Lower quality	3.7 (206)	2.6 (30)	3.2 (37)	3.0 (31)	4.4 (7)	4.4 (37)	5.5 (64)	4.3 (80)	2.3 (50)	4.8 (36)	5.6 (41)
• No difference	24.7 (1366)	21.3 (248)	25.1 (289)	20.9 (217)	29.3 (45)	24.8 (210)	30.4 (356)	23.6 (438)	22.1 (485)	29.3 (219)	30.5 (223)
• Higher quality	37.6 (2080)	41.6 (485)	37.7 (436)	38.7 (402)	32.1 (49)	39.9 (338)	31.6 (371)	19.2 (357)	40.8 (895)	55.5 (414)	56.7 (414)
• Don't know	33.9 (1878)	34.5 (402)	34.0 (393)	37.4 (388)	34.2 (53)	30.9 (261)	32.5 (381)	52.9 (984)	34.8 (764)	10.4 (78)	7.2 (52)
Price of legal marijuana products:											
• Less expensive	10.6 (586)	10.5 (123)	13.2 (152)	14.5 (151)	6.8 (10)	6.1 (51)	8.4 (98)	7.5 (140)	7.6 (166)	14.2 (106)	23.7 (173)
• No difference	21.5 (1191)	20.2 (235)	22.3 (258)	20.2 (210)	23.6 (36)	20.8 (176)	23.6 (277)	19.4 (360)	19.5 (427)	29.5 (220)	25.3 (185)
• More expensive	30.6 (1690)	30.3 (352)	26.4 (305)	24.2 (251)	32.5 (50)	41.1 (348)	32.7 (384)	17.8 (331)	33.8 (740)	42.3 (316)	41.3 (301)
• Don't know	37.3 (2063)	39.1 (455)	38.1 (440)	41.1 (426)	37.1 (57)	32.0 (271)	35.3 (413)	55.3 (1027)	39.2 (861)	14.0 (105)	9.7 (71)
Convenience of buying legal marijuana products:											
• Less convenient	4.1 (227)	3.0 (35)	3.1 (36)	2.3 (24)	2.1 (3)	4.1 (35)	8.0 (93)	4.5 (84)	2.6 (56)	5.6 (42)	6.0 (44)
• No difference	16.9 (935)	14.5 (169)	14.4 (166)	12.8 (133)	23.2 (36)	19.5 (165)	22.8 (267)	16.3 (303)	16.3 (357)	20.3 (152)	16.8 (123)
• More convenient to buy	59.2 (3271)	63.3 (738)	65.3 (754)	66.2 (686)	51.4 (79)	58.5 (495)	44.2 (518)	44.7 (831)	63.9 (1402)	67.8 (506)	72.9 (532)
• Don't know	19.8 (1097)	19.2 (223)	17.2 (199)	18.8 (195)	23.2 (36)	17.8 (151)	25.1 (294)	34.5 (641)	17.2 (378)	6.3 (47)	4.3 (31)
Safety of using legal marijuana products:											
• Less safe to use	2.9 (162)	2.8 (33)	2.8 (33)	1.9 (20)	0.9 (1)	1.9 (16)	5.1 (60)	4.8 (90)	1.6 (35)	3.6 (27)	1.5 (11)
• No difference	31.7 (1755)	26.4 (307)	32.0 (370)	30.5 (317)	41.1 (64)	33.5 (283)	35.4 (415)	26.7 (496)	30.7 (674)	37.2 (278)	42.0 (306)
• Safer to use	40.3 (2227)	45.4 (529)	40.3 (465)	41.1 (426)	33.1 (51)	42.4 (358)	33.8 (396)	28.6 (531)	43.4 (952)	50.6 (378)	50.2 (366)
• Don't know	25.1 (1386)	25.4 (296)	24.8 (287)	26.5 (275)	24.9 (38)	22.2 (188)	25.7 (301)	39.9 (742)	24.3 (533)	8.6 (64)	6.3 (46)
Safety of purchasing legal marijuana products:											
• Less safe to buy	2.7 (149)	2.1 (25)	2.0 (23)	2.3 (24)	2.9 (4)	1.7 (15)	5.0 (58)	4.3 (81)	1.3 (29)	3.8 (28)	1.6 (11)
• No difference	20.4 (1128)	16.7 (195)	18.3 (212)	17.3 (180)	26.5 (41)	21.2 (180)	27.3 (320)	20.2 (376)	17.5 (384)	23.6 (176)	26.1 (191)
• Safer to buy	56.1 (3100)	58.3 (679)	61.0 (705)	59.9 (621)	47.4 (73)	59.2 (501)	44.5 (522)	39.7 (737)	62.2 (1365)	67.5 (504)	67.6 (494)
• Don't know	20.8 (1153)	22.9 (266)	18.7 (215)	20.5 (212)	23.2 (36)	17.9 (151)	23.2 (272)	35.8 (665)	19.0 (416)	5.1 (38)	4.7 (34)

*Data are % (n).

however, it is also possible that higher prices may be tolerated given that legal cannabis products may be perceived as higher quality, safer and more convenient to access. However, frequent users may be able to obtain what they perceive as high-quality products at lower prices through established relationships with unauthorized dealers. Price perceptions were generally more favourable in states with a longer time with retail sales: Colorado, Washington, and Oregon. As time since retail sales increased, respondents were less likely to report that legal cannabis was more expensive than illegal cannabis, which reflects the decreases in price seen in Colorado, Washington and Oregon since retail sales began. For example, Oregon had the most favourable price perceptions of legal cannabis, which may reflect lower prices due to the high cannabis supply which exceeded demand in 2018 (Oregon Liquor Control Commission, 2019). These findings suggest that consumers are aware of price differentials, and efforts to make prices of legal products competitive are warranted. The factors influencing purchase sources in US states—namely quality, safety of use, price and convenience—may also apply to a Canadian context. For example, within the first eight months of legalization, Canadian cannabis users stated that quality, safety, price, and accessibility were among the most important factors they considered when selecting a purchase source (Statistics Canada, 2019a, 2019b). Considering the increasing availability of products, including flower, oils, extracts and edibles, as well as variations in product potency, future work should examine perceptions of specific product types.

As expected, a substantial portion of never and infrequent cannabis users stated 'Don't know' when asked about the quality and price of legal cannabis. However, a greater number had opinions about the convenience and safety of buying legal cannabis. This suggests that a considerable number of consumers know how to obtain legal cannabis, even if they do not purchase it regularly.

As time since retail sales increased, perceptions of cannabis from legal sources tended to be more favourable, including those related to price. In California, where retail sales were initiated most recently, convenience and safety of purchasing were perceived less favourably. Indeed, California's illegal market is said to be substantial due to barriers in regulatory processes that discourage applications for licensure, which may perpetuate the illegal market (Bureau of Cannabis Control California, 2018, 2019). Future research should examine how consumer perceptions and purchase sources change in California and other markets over time.

4.1. Limitations

This study is subject to limitations common to survey research. Respondents were recruited using non-probability-based sampling; therefore, the findings do not provide nationally representative estimates. Secondly, self-report data can be subject to recall and social desirability bias, however, the study was conducted online, as opposed to in-person (as in most national surveys). Compared to interviewer-assisted survey modes, self-administered surveys can reduce social desirability bias by providing greater anonymity for sensitive topics, including substance use (Dodou & de Winter, 2014; Krumpal, 2013). Finally, this study was unable to examine whether perceptions of legal cannabis products were associated with actual consumer purchasing behaviours.

4.2. Conclusion

Consumers reported generally positive perceptions of legal cannabis products, with the important exception of price. Even in the case of price, only one third of consumers across all US legal states reported that legal cannabis products were more expensive, although this number increased among the most frequent users who account for the greatest proportion of cannabis consumption. Future research should examine the relative importance of price and other consumer perceptions on purchasing behaviour, as well as regulatory differences across legal states that may influence consumer purchasing patterns.

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6. Contributors

Author DH designed the study. Author SG prepared the initial data set. Author EW contributed statistical code and research summaries on price. Author FF conducted the statistical analysis and wrote the first draft of the manuscript, and all authors contributed to and have approved the final manuscript.

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Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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