

LIGHT CANNABIS AS A SUBSTITUTE FOR ADDICTIVE SUBSTANCES: A CROSS-SECTIONAL ANALYSIS OF SURVEY DATA IN FRANCE AND ITALY

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Abstract

Cannabidiol-based products are attractive to consumers because of their wide range of potential health effects. Despite the hype of this market, there is a substantial lack of information on consumers' attitudes and motivations toward light cannabis products. We thus conducted an ad-hoc online survey to investigate the characteristics of French and Italian users, focusing on smoking as the main mode of consumption. Logistic regressions are performed to explain the factors associated to light cannabis use as a substitution for any drug or for a specific substance. Our results indicate that one out of five current light cannabis users use it as a substitute (self-replacement therapy) for other substances. The reduction in substance use is more prevalent for regular cannabis, tobacco and medications than for alcohol use. However, the use of light cannabis seems to facilitate alcohol consumption reduction, mostly among males with low income. Whereas sublingual oils are more likely to be used to substitute medications, smoking is the favourite means of substitution for tobacco and regular cannabis. Overall, the motivations behind consumption determine differential preferences across light cannabis users. This calls for a rethinking of the most adequate distribution channels for specific products based on the purpose of use. The goal should be to maximize the substitution with other addictive substances by providing a differential degree of quality and taxation across supply channels based on the expected harm.

Keywords: consumer survey, light cannabis, substance substitution, logistic regression, EU

Abbreviations:

CBD	Cannabidiol
C-light	Light Cannabis
EMCDDA	European Monitoring Centre for Drugs and Drug Addiction
FDA	Food and Drug Administration
THC	Tetrahydrocannabinol
WHO	World Health Organization

3.1. Introduction

The *Cannabis sativa L.* plant contains over 400 chemical compounds. In view of its widespread recreational use, plant breeding has for decades been aimed at production of variety with high tetrahydrocannabinol (THC) content which we call ‘regular cannabis’. Cannabidiol (CBD) is the second most prevalent cannabinoid after THC. Contrary to THC, CBD is neither a narcotic nor an intoxicating substance, and has no risk of abuse or dependence according to the World Health Organization (WHO, 2018). It does not produce anxiety, panic, or psychotic symptoms – even at high doses. While CBD was discovered in 1940, scientific interest in this molecule has expanded in recent times (Leas et al., 2019) given its anxiolytic, antiepileptic, anti-inflammatory and antipsychotic properties as well as its potential therapeutic effects in neuropsychiatric and substance use disorders (Crippa et al., 2018; Sholler et al., 2020). Products with high CBD and low THC, which in Europe is often called light cannabis (C-light), have thus become a global consumer phenomenon, resulting in a tenfold increase of sales for certain items between 2017 and 2019 (Gammon et al., 2021).

Despite its medical potential and its apparent lack of side effects (Chesney et al., 2020), policymakers appear to be concerned about the market for C-light and the impact of its liberalisation¹. De facto, each EU country has responded to its emergence through differential approaches. Given the lack of evidence-based policies around C-light, the EMCDDA (2020) have recommended performing cross-national studies to develop standard monitoring tools and collect information on C-light consumers. To better understand the reasons behind its widespread use, we conducted an anonymous survey among C-light users in France and Italy during the first lockdown and one year forward to determine if there was a change in the patterns of consumption. The survey aimed at collecting self-reported socio-demographic characteristics and behaviors, preferred means of use and reasons for using C-light. Given the large amount of free time, this period represented a unique opportunity to collect detailed information on light cannabis users.

Overall, this study had five goals: (1) to understand which factors can predict the initiation of C-light to substitute other substances; (2) to elicit which profiles and patterns of use increase the likelihood to substitute addictive substances with C-light; (3) to evaluate the behavioral

¹ The WHO recommendation to remove CBD preparations (with less than 0.2% THC) from the international drug control was rejected at the 63rd session of the UN Commission on Narcotic Drugs (2020).

mechanisms behind the substitution effect; (4) to identify which type of product and supply channels maximize the substitution potential of C-light for specific substances and; (5) to understand how institutional differences affect consumption dynamics. While this is the first study on substitution patterns driven by C-light, some of these objectives have been partly addressed from the prior literature outside the EU through online surveys. In Switzerland, Zobel et al. (2019) found that more than one out of ten C-light users use it to substitute regular cannabis or tobacco. In the US, Wheeler et al. (2020) found that three out of ten young C-light users consume it as a substitute of regular cannabis. This chapter contributes to this growing literature on C-light by being the first to (1) study its use in Mediterranean countries; (2) report the proportion who use C-light as substitutes for five different types of substances; (3) investigate which mechanisms influence the substitution; and (4) which factors increase the likelihood to initiate and currently substitute addictive substances with C-light. Moreover, this is the first study to identify specific patterns of consumption linked with smoking C-light to substitute other substances and what increases the likelihood of this behavior.

In spite of the existence of multiple forms of C-light (e.g. e-cigarettes, tinctures, gel capsule), the most common C-light products across EU countries are sublingual oils and herbal products. The latter can indeed be smoked or vaporised in the same way as regular cannabis. Currently, however, its combustion represents the favourite mean of consumption for three quarters of Swiss consumers (Zobel et al., 2019). Given the similarity in consumption method with more dangerous substances and highest prevalence among our surveys, a specific analysis was performed on the respondents who smoke C-light products to substitute tobacco and regular cannabis. Among this sub-sample, the aim was to understand how the intensity of consumption, joint mixture, diversification of varieties and specific sub-products used affect the likelihood to stop these addictive substances.

The results document a significant attitude to use C-light as a substitution product to replace (or reduce) the use of regular cannabis, tobacco, alcohol and medications. One out of ten respondents initiate C-light for substituting at least one of these substances. Among those who initiate use for health and wellness reasons, two thirds have the intention to reduce at least one of these harmful substances. Initiation for substance substitution is greater among employed females or individuals with low income. Being older, overweight or a daily tobacco smoker is also positively associated with C-light initiation for substance substitution as well as domestic cultivation. The proportion of those substituting other substances with C-light is greater among

those who have used it in the last month (so-called current users): one out of five did so, and about half among those are using C-light for health and wellness reasons. Smoking tobacco and frequent C-light use are also positively associated with substitution patterns. Age, income and expenditure on C-light are associated with the substitution of specific substances, whereas other factors have the opposite association, depending on the specific substance which is substituted, namely gender, employment, being a heavy tobacco smoker and using C-light orally through sublingual oils.

Overall, this chapter will attempt to clarify the many unknowns in the C-light market to facilitate the discussion on what could be a reasonable and proportionate response from policymakers. The results suggest that this emerging market has not only helped to satisfy the needs of some patients to relieve their symptoms through self-medication, but also to stop or reduce the use of other more harmful and addictive substances. These findings should be taken into consideration when setting the level of taxation for C-light. While its oral or inhaled consumption does not imply harm, the same cannot be said for its combustion, especially when combined with tobacco or regular cannabis. However, taxing harmful substances has different effects depending on substitution patterns and whether healthier substitution products are available. For instance, if smoking C-light is an effective way to substitute tobacco or regular cannabis, its taxation should be lower compared to more harmful substances. Moreover, the mandatory presence of C-light products in tobacco, alcohol or regular cannabis shops may be an effective way to nudge consumers towards healthier choices (Bucher et al., 2016). Together, differential taxation across C-light products based on their substitution potential across supply channels should be considered to maximize the incentive to switch from the most harmful substances to healthier ones.

The chapter begins with an overview of the literature related to the properties of CBD as a substitute for addictive substances. Then, we move to the institutional framework of the C-light market in Europe and North America. Next, we provide a cross-comparison of descriptive statistics between respondents in the whole sample and the French sample only. Afterwards, we perform a logistic regression on the factors related to initiating C-light to substitute other substances; then, we do a similar investigation to determine which factors affect the likelihood to reduce the consumption of these substances for C-light in the last month for the whole sample and only for smokers. We conclude with a discussion of the results.

3.2. Literature review on the substitution potential of light cannabis

CBD is the major compound contained in cannabis, and the WHO recommends that it should not be listed under the drug conventions. Along with other non-intoxicating compounds contained in C-light, it exerts a plethora of pharmacological effects that make it a highly attractive therapeutic entity in pain, inflammation, diabetes, cancer, autoimmune diseases as well as psychiatric and neurological disorders (Britch et al., 2021). By regulating emotions and emotional memory processing, it has potential for treating many anxiety-related and substance abuse disorders (Lee et al., 2017). It can support the reduction in the use and dependency of tobacco (Morgan et al., 2013), nicotine (Smith et al., 2021), alcohol (Turna et al., 2015), cocaine (Alegre-Zurano et al., 2022), opioids and psychostimulants (Calpe-López et al., 2019; Paulus et al., 2022). Fantozzi (2018) considers C-light as a potential instrument for harm reduction for a population of smokers willing to lower their cigarette consumption, but are not (yet) ready for full cessation, and are not interested in more conventional substitutes (vaporizers or nicotine-based drugs).

While there is a wide therapeutic potential for CBD, its effectiveness remains to be demonstrated for the low-doses found in the non-prescription products sold in the C-light market. Looking at popular websites in seven countries, McGregor et al. (2020) found that almost all of the “maximum dose” products yielded daily doses significantly below those which demonstrated efficacy in clinical trials. In other words, there is no evidence that C-light delivers therapeutic doses. Despite this, the opening of specialized C-light shops has proven to reduce the sales of prescription drugs, especially sedatives (Carrieri et al., 2020). Even the Italian market of illicit cannabis was affected. Based on law enforcement data, Carrieri et al. (2019) found a reduction in the number of seizures of regular cannabis in the provinces where specialized C-light retailers operated. The illicit market is estimated to have suffered a reduction in sales of cannabis and hashish of at least € 160 million annually.

Despite the hype of this market, there is very little published literature on consumers’ attitudes and motivations toward C-light consumption. In the US, C-light is more common among individuals using cannabis medically, particularly for pain, anxiety, depression and insomnia. Psychological conditions are more likely to be reported as the leading motivation from younger users, whereas pain is the most common reason within older C-light consumers (Corroon and Philips, 2018; Wheeler et al., 2020). Through interviews, Fedorova et al. (2021) studied patterns of C-light use among young adults in California using cannabis by dividing the sample

based on their relative consumption of CBD and THC products. Compared to THC-dominant users, those using mostly C-light were more likely to report (1) using cannabis medically and having at least one medical condition in the past year; (2) fewer cannabis days and hits per day; (3) more instances per day using non-inhaled cannabis products; (4) microdosing cannabis; (5) using cannabis to relieve pain; and (6) using other licit and illicit drugs, in particular e-cigarettes and psilocybin. The authors consider the consumption of cannabis for CBD-dominant users to be more “responsible, functional, and medicinally oriented” (p.6).

Other scholars have different views and are concerned that C-light users may not be consuming the product responsibly (Wheeler et al., 2020). In their survey, most respondents have experienced at least one unexpected side effect using C-light and reported neither an accurate framework for determining their dosage, nor to be knowledgeable about its legality. The lack of precise dosage is considered extremely problematic in view of the bell-shaped dose-response curve of CBD² and the fact that the optimal dosage depends on the specific condition which is treated. The use of other substances – even if not concurrent – is another source of concern given their potential interaction with CBD. Given the widespread use of C-light without prescription, the authors recommend healthcare providers educate their patients on the risk of using it as a replacement for other medications.

Other researchers have observed the introduction of C-light products with modes of administration mimicking tobacco products (Gammon et al., 2021). They are concerned these products could be consumed simultaneously, and may appeal to tobacco users or youth given their candy-like flavors. Indeed, adult cannabis users have significantly higher prevalence of tobacco use than non-users (Hall et al., 2019). Nevertheless, the mechanisms linking cannabis and tobacco use appear to be distinct from those contributing to co-occurring use of the substances (Agrawal et al., 2012; Ramo et al., 2012; Ramo et al., 2013). Schauer et al. (2016) found three major mechanisms for their co-usage of these products: sequential use, substitution and co-administration. Accordingly, tobacco use might increase with cannabis legalization if both cannabis and tobacco are consumed together as a ‘spliff’, or if cannabis acts as a gateway for cigarette smoking. On the contrary, the mere experience of smoking may link both cannabis and tobacco as substitutes. All-in all, no evidence of product complementarity was found after the legalization reforms which provide a legal supply alternative. On the contrary, Choi et al.

² For instance, only intermediate doses help lower perceived anxiety (Linares et al., 2019).

(2018) found a small reduction in tobacco cigarette smoking as a result of the enactment of a medical cannabis reforms in the US. The reduced cost of obtaining cannabis for both medical and recreational use is considered as the major substitution mechanism. Accordingly, cannabis legalization does not appear to generate high rates of cessation, but simply reduces days of smoking or number of cigarettes consumed per day among smokers.

The substitution between cannabis and tobacco may, however, be an outcome of US-specific regulation. In this context, not only cannabis retail channels are separated from those used to purchase tobacco, but ‘bundling’ of cannabis with nicotine products is also forbidden. On the contrary, tobacco and newspaper shops sell C-light and tobacco products in both Italy and Switzerland and most Swiss users have bought it in tobacco shops (Zobel et al., 2019). In Swiss shops, consumers can even find cigarettes containing a mixture of C-light and tobacco. The majority of C-light consumers declare that they are buying it for smoking. Whether this occurs with or without being mixed with tobacco, C-light is conceivable as a new tool for tobacco cessation strategies.

In Europe, there are currently two published articles which study the consumption pattern of C-light through online surveys. The first was conducted in Switzerland with approximately 1500 users (Zobel et al., 2019). In this study, the major reason for C-light use was related to wellness (e.g. stress, insomnia) and health (e.g. pain, depression, anxiety), despite only 1 out of 6 reporting being diagnosed with a medical condition by a physician. Consumers with health motivations had an older age profile and included respondents who do not trust ‘big pharma’ and prefer to self-medicate with non-synthetic products. The majority of users reported using regular cannabis, and lowering its consumption was the third major reason behind the decision of consuming light cannabis (between 15 and 22 percent users in the previous month). In parallel, only one out of ten C-light users reported the reduction of tobacco consumption as a main motivation. The second published study was conducted in the UK where C-light can only be purchased in oral form. Moltke and Hindocha (2021) found anxiety, stress, wellbeing and general health, pain and sleep as main indications for its use. While less than 5 percent of respondents used it to counteract the effect of THC, more than 5 percent reported a consequent lower the use of other medications.

3.3. Institutional Framework

In feudal times, fibre hemp³ production was widespread across Europe, reaching a peak in the seventeenth century due to the demands of the naval industry (Robinson, 1996). Hemp was an easy crop to grow and, exhibiting extremely vigorous growth, rapidly smothered weeds. Following the Single Convention on Narcotic Drugs of 1971, however, cannabis cultivation, possession, and sale became illegal except for its industrial and medical use. In spite of this, hemp production in many European countries has never been prohibited.

To diversify its agricultural base and encourage the production of alternative crops, the EU has been subsidizing its domestic hemp industry since the early 1970s. Hemp is covered by the Common Organization of Agricultural Markets in order to prevent that the market for hemp fibre becomes disturbed by regular cannabis crops. This regulation establishes import and export conditions for hemp and allows hemp to be grown from certificated seed that offer assurance regarding the content of intoxicating substances in the harvested product (Vantrees, 2002). The genetic diversity within the hemp germplasm available for breeding purposes is therefore limited. Cultivating non-certified hemp seeds or growing hemp without the required national authorization is often illegal and prosecuted. Furthermore, crossing the THC limit makes the cultivated crop illegal⁴. When law enforcement authorities find the output of hemp cultivation exceeding the THC limit, the judicial authority intervenes. Some states, however, support farmers by allowing a greater limit of THC in the raw material compared to what is accepted to be at the retail level, considering the inevitable instability of THC content even in certified seeds (Fortin et al., 2020).

Whereas the boundaries of the legality of the market for hemp fibre and seeds are well-defined, the legal status of the nonstem aerial parts, i.e. leaves and inflorescences, is more controversial. Until recently, this component was regarded to as crop residues. The only exploitable by-product that has been legally accepted is as an additive (i.e. taste enhancing substance) for beers or teas (Lachenmeier and Walch, 2006). Up until few years ago, its high CBD content was not considered by the market as valuable.

³ The terms ‘industrial cannabis’, ‘industrial hemp’, and ‘hemp’ are employed as synonyms. In general, whenever the purposes of use for derivatives of cannabis are not related to psychoactivity, it can be called ‘hemp’ (Riboulet-Zemouli, 2020).

⁴ The first threshold of THC equivalent to 0.5% was established in 1971; then reduced to 0.3% as from the year 1987/1988; and ultimately decreased at 0.2% from 2001/2002, by CE regulation 1251/1999, art 5 bis. From 1 January 2023, the minimum authorised level of THC in the EU will be 0.3%.

3.3.1. *Light cannabis in North America*

In the United States, CBD is available in three forms: hemp-derived, cannabis-derived, and pharmaceutical-grade products, but this article will mostly focus on hemp-derived CBD products, as they are no longer considered controlled substances and are the only available product in jurisdictions where cannabis is still illegal. Any food or dietary supplement containing hemp-derived CBD is considered illegal for the Food and Drug Administration (FDA); however, non-prescription CBD products are available in drug stores, through online vendors and in cannabis dispensaries. Given this, the FDA is currently considering the possibility of creating a specific regulatory pathway for such products (Mead, 2019). In contrast, the rules around the trade of C-light are rather clear in Canada, where all cannabis-based products require a federal license for production, distribution and sale. They may be categorized both as “Cannabis for Medical Purposes” and “Non-medical”, with producers requiring separate licensing based on the final purpose. Nevertheless, a parallel market also exists for illicit C-light sold by non-licensed firms to consumers who are likely unaware of the lack of compliance of these CBD products (McGregor et al., 2020).

3.3.2. *Light cannabis in Europe*

Despite the potential of CBD for a range of clinical applications, *Epidiolex*TM is the only prescription medication approved by the European Medicine Agency (EMA) which contains CBD and is used for the treatment of rare forms of epilepsies. Evidence of benefits from other ailments is limited, inconclusive and solely considers treatment using CBD as an isolated compound, rather than in its herbal form (Fedorova et al., 2021). With the exception of its pharmaceutical form, CBD is available in most countries without a prescription. Indeed, the regulation of C-light has been in flux, resulting in a variety of approaches to manage the access to CBD-containing products.

In Europe, the institutional change de facto opening the sales of C-light occurred in Switzerland, when the legal limit separating industrial hemp from regular cannabis was increased⁵. A few years later, Swiss producers started marketing C-light flowers as a tobacco substitute (Zobel et al., 2019). Today, C-light products are offered for open sale in tobacco shops, pharmacies, kiosks, specialized retail outlets and online vendors in the majority of EU

⁵ The new threshold of 1% is substantially higher than the 0.3% allowed in the EU and in North America. Another European country followed this step: through Act No. 366/2021, Czech Republic became the first EU member to raise the maximum THC limit to 1% following Brazil, Colombia, Costa Rica, Mexico and Uruguay.

countries. Sales have taken place based on the claim that these products are derived from industrial hemp varieties that been registered in the EU list and their output has no intoxicating effects. Thus far, Austria, Belgium and Luxembourg are the only EU country who has regulated the C-light market for inhalation as tobacco substitute, while other countries simply down-schedule *Epidiolex*TM without clarifying the classification of C-light products⁶. This change comes as EU member states are in the process of adjusting national regulations to align themselves with conflicting decisions taken from different EU agencies. On one hand, the EU has classified CBD as a novel food, which implies that it was not consumed significantly before 1997. The European Court of Justice has also declared that it is inconsistent to ban only organic CBD, de facto liberalizing the market for C-light (EMCDDA, 2020a). Other EU directives and regulations may apply to C-light products based on their specific nature, such as medicine, food (novel food, food supplements) cosmetics or non-food consumer products⁷ (EMCDDA, 2020a). Finally, there may be an intersection of different regulations imposed on C-light, and the confusion around its legal status may lead to repression in some jurisdictions, but not others⁸.

3.3.3. *Light cannabis in Italy*

Italy has a long historical tradition of the cultivation of industrial hemp, and was the second-largest producer in 1940 (Capasso, 2001). The prohibition of hemp cultivation for industrial purposes was banned in 1975. Only 23 years later, its cultivation was re-regulated and eventually supported with EU subsidies for fiber production. In 2017, a new reform increased the legal limit of THC in the field from the EU level of 0.2% to a threshold of 0.6%, de facto opening the Italian market for C-light. While the legislation was effective in removing a substantial layer of red tape⁹, it failed to regulate the production and commercialization of the most profitable part of the plant: flowers (Fortin et al., 2020). While not forbidden, C-light products have been sold in specialized shops and across different types of retailers inconsistently, through these products use labelling aimed at minimizing the risk of law enforcement rather than ensuring consumer awareness on content and dosage. For instance,

⁶ For instance, Slovakia was the last European country to remove CBD from the country's schedule of controlled substance (HempToday, 2021).

⁷ The assessment of the legislation applicable to specific products is a complex process and is carried out on a case by case basis.

⁸ For example, CBD products were banned in Cologne, and specialized shops were closed in Reims and Macerata provinces (Bisiou, 2019; McGregor et al.; 2020; Repubblica, 2019).

⁹ For instance, when the content of THC overcomes this threshold, the product is subject only to confiscation and destruction as long as the starting material are seeds from certified EU varieties.

flowers are not intended for consumption or inhalation, but just as home fragrance use, products for “collection” or “technical purposes”, and thus do not contain any health claims. These disclaimers are considered an attempt to shift responsibility for consumption to the user (EMCDDA, 2020a), as long as a specific regulation is put in place.

3.3.4. *Light cannabis in France*

Contrary to Italy, France has never completely stopped the cultivation of hemp. It was the first country – along with the Soviet Union - where breeding of hemp plants started in the 1970s (Lachenmeier and Walch, 2006) and French farmers cultivate the largest number of hectares in Europe. The cultivation of hemp is allowed only to use its fibers and seeds and is authorized on the basis of a contract with an authorized transformer through a Common Agricultural Policy file.

Nevertheless, the legal framework related to hemp flower has been extremely ambiguous (Bisiou 2021). Although there is no legislation which explicitly prohibits the commercialization of C-light, the government in its interpretation has excluded any commercialization of CBD extracted from the cannabis plant. In 2018, an inter-ministerial agency introduced strict rules against CBD oil in France and banned any traces of THC. As a result, only synthetic CBD was allowed. In some provinces, public prosecutors were ordering the closure of C-light shops, while in other areas the trade has been operating unhindered. This very restrictive interpretation was contested by several jurisdictions and justified the referral to the EU Court of Justice. The Court stated that CBD is “not a drug within the meaning of the 1961 Convention” (EMCDDA, 2020a, p.14) and should be thus freely traded across the EU, provided it is manufactured legally in the country of origin. As a response, the French government published a decree which prohibits the sale of flowers or raw leaves to consumers alone or in mixture with other ingredients, de facto putting in place a prohibition of C-light that is not transformed¹⁰. This decision was justified by the inter-ministerial agency only by reasons of public order as it is impossible to distinguish illicit cannabis from C-light for law enforcement without testing the seized flowers¹¹. The ban was suspended and then lifted in 2022 by the Council of State in view of its disproportionateness to the product’s harm and the possibility for law enforcement's to identify C-light using rapid tests (Casanova et al., 2022).

¹⁰ <https://www.legifrance.gouv.fr/jorf/id/JORFTEXT000044793213>

¹¹ <https://www.drogues.gouv.fr/actualites/cbd-nouvel-arrete-paru>

3.3.5. *Differences between France and Italian light cannabis market*

All in all, there are three major institutional differences which identify the French C-light market compared to the Italian at the time of the study: firstly, the legal THC threshold is lower (0.2% rather than 0.5%) which in turn determines lower levels of CBD in the resulting herbal products (Jikomes and Zoorob; 2018); secondly, the domestic production of C-light flowers has not been liberalized; and thirdly, there is no medical market for CBD products. On one hand, Italians suffering from a medical condition for which CBD may be effective can obtain a physician's prescription and purchase pharmaceutical-grade CBD products in pharmacies, sometimes even with reimbursement. On the other hand, French patients who may benefit from CBD could only obtain this active principle either through the C-light market (which does not manufacture according to pharmaceutical standards) by paying its full price or by purchasing it in pharmacies abroad (e.g. Germany, Italy).

3.4. Material and methods

An anonymous online survey based on a design close to Zobel et al. (2019) was conducted using Google Forms between April 1, 2020 and March 30, 2021 in France and Italy. Ethical approval was given by INSERM Ethics Committee (approval #20-677). A link to the survey was distributed online via media outlets specialized in cannabis-based products, emails of retail shops selling CBD as well as to an online community for people with chronic health conditions (only in France). It was also shared with CBD user groups on Facebook and other social networks. The survey had two inclusion criteria: to be above 18 years old and to have used C-light in the lifetime. The acronym "CBD" or "Cannabis CBD" was used to include all legal products marketed as containing CBD, irrespective of actual CBD content.

The survey collected self-reported characteristics, demographics, frequency of tobacco and cannabis use and pattern of C-light acquisition and use. Questions related to pattern of use included, among other information, delay since first C-light use, number of times using C-light in the last 30 days and principal type of C-light product.

Users answered a question about their primary reason for C-light use in the previous 30 days. Only one answer was allowed from a list of several options. Besides "to substitute other substances", other answers included those related to well-being, treatment of a medical condition, difficulty of finding regular cannabis and curiosity. Those who indicated "to substitute other substances" were asked four separate follow-up questions to declare which substance they were reducing the consumption of between regular cannabis, tobacco, alcohol

and medication. If they declared the substitution of one or more of these substances, they were then asked to report the perceived degree of reduction and the reasons for the substitution (multiple responses allowed). Additionally, those declaring to substitute medicines were also asked to identify which substances they were substituting (multiple responses allowed). People who ticked “for wellness” or “to treat a medical condition” as motivations for CBD use in the last month were then asked which effects were expected (multiple responses allowed). In each investigation on the substitution of C-light on regular cannabis, we excluded respondents who reported to have never used regular cannabis. See appendix 1 for additional details.

The study sample was constituted of respondents who declared using C-light in the previous 30 days and answered the question related to the primary reasons for using C-light. Descriptive statistics are provided for the entire sample. A total of 7646 and 1509 participants in Italy and France, respectively, completed the survey, of which 2608 and 1166 reported to use C-light in the previous 30 days.

3.5. Descriptive Statistics

Table 1 shows the main characteristics for those who have used C-light and for ‘current users’ who have used C-light within the previous 30 days. Almost all respondents lived in France (98%) and Italy (99%). The sample was predominantly male (76%) who graduated or are currently enrolled in universities or post-secondary degrees. The samples over-represent young adults, compared to the average population in these countries, with a median age of 23 (interquartile range 20-32) years. Given the young age of the sample, most respondents are not employed. Only one-fifth of the sample have prolonged experience with C-light (more than 100 instances of use).

Table 2 shows information related to the consumption of other substances. With the exception of alcohol use – which was only collected systematically for the French sample – the prevalence of use for these substances is higher than among the general population. Less than one out of twenty respondents uses e-cigarettes. Almost every respondent has used regular cannabis, and approximately three quarters have used it in the previous month. Finally, less than one-third of the sample used regular cannabis on a daily basis.

Table 3 illustrates the supply channel for accessing C-light the first time and within the previous month. In the first experience of use, the most common purchase locations were in specialized shops (45%), from acquaintances (25%), in tobacco shops (12%) or on the Internet (11%). The proportion buying C-light through the Internet increases substantially for current users (39%)

which is likely partly due to the difficulty of physically visiting shops due to COVID-19 restrictions. In the previous 30 days, specialized and tobacco shops were used for purchasing C-light for approximately one third (32%) and one out of ten respondents (10%), respectively. In parallel, a significant share of current users decided to cultivate C-light domestically (4%). Other channels identified by respondents were pharmacies, para-pharmacies, herbalists, vending machines and grocery shops.

TABLE 1
Socio-characteristics and life-time use of light cannabis among survey respondents

	Full Sample		Current Users	
	TOT	FR	TOT	FR
Gender				
Male	7034 (76.8)	1045 (69.3)	2839 (76.1)	799 (69.5)
Female	2121 (23.2)	464 (30.7)	890 (23.9)	351 (30.5)
Age (years)				
18-29	6661 (72)	500 (32.6)	2134 (56.5)	340 (29.2)
30-39	1504 (16.3)	497 (32.4)	907 (24)	399 (34.2)
40-49	687 (7.43)	339 (22.1)	478 (12.7)	273 (23.4)
50+	395 (4.27)	197 (12.9)	255 (6.76)	154 (13.2)
Higher education^H				
No	1488 (16.6)	506 (33.9)	984 (27.2)	370 (33.1)
Yes	7497 (83.4)	986 (66.1)	2630 (72.8)	748 (66.9)
Employment Status				
Without Unemployed	4673 (51.2)	544 (35.1)	1239 (33.4)	339 (29.3)
Employed	4459 (48.8)	1004 (64.8)	2473 (66.6)	819 (70.7)
Life-time CBD use				
Once	996 (11.2)	74 (5)	65 (1.80)	24 (2.1)
2-10 times	3705 (41.6)	348 (23.6)	805 (22.3)	174 (15.5)
11-50 times	1801 (20.3)	312 (21.2)	990 (27.4)	258 (23)
51-100 times	591 (6.64)	151 (10.3)	398 (11)	125 (11.2)
More than 100 times	1803 (20.3)	588 (39.9)	1351 (37.4)	539 (48.1)

Note: Frequencies and percentages (in parenthesis) were used for all categorical data. Current users refer to individuals who declared to have used light cannabis in the previous month.

^H Higher education was defined as attending third-level education.

TABLE 2
Consumption of other substances in the previous 30 days

	Full sample		Current users	
	TOT	FR	TOT	FR
Tobacco use currently	65.9	56.6	64.1	54.8
> 5 cigarettes daily	45.5	33.8	34.1	31.5
E-Cigarette use currently	4.6	6.7	4.4	6.9
Cannabis use ever	97.3	87.1	95.5	88.9
Cannabis use currently	76.4	54	73.6	51.6
Cannabis use daily	29.2	21.9	24.6	18.3
Alcohol use currently		69.3		69.8
Alcohol daily		5.9		5.8

Note: Percentages were used for all categorical data. Current users refer to individuals who declared to have used light cannabis in the previous month. Information on alcohol consumption was not collected systematically in the Italian survey.

TABLE 3
Light cannabis purchase locations

	<i>Full sample</i>		<i>In the last month</i>	
	TOT	FR	TOT	FR
<i>Internet</i>	11	38.5	39.1	66.5
<i>Bought/shared with acquaintances</i>	25.3	18.7	11.8	4.8
<i>Specialized shop</i>	45.6	30.9	32.4	20
<i>Tobacco shop</i>	12.5	2.8	10.2	1.4
<i>Domestic Cultivation</i>	1.9	3.1	4.4	3.7
<i>Others</i>	3.7	6	2	3.6

Note: Percentages were used for all categorical data. Current users refer to individuals who declared to have used light cannabis in the previous month.

Table 4 shows the consumption patterns in the previous 30 days. Over half of study sample had consumed C-light more than 10 days per month, whereas about one-third had used C-light for at least 20 of the previous 30 days. The most common modes of consumption were smoking (80%), inhaling through a vaporizer (7%) and ingesting CBD oil sublingually (6%). Dried flowers are the primary C-light product smoked by respondents (91%), whereas trim¹² and resins are smoked by approximately 4% of respondents. The modes of consumption are significantly different among French respondents, with a greater proportion using sublingual oils (18%) and e-cigarettes (4%).

TABLE 4
Light cannabis use patterns in the previous 30 days

<i>Days of consumption</i>	TOT	FR
<i>1-9</i>	47.3	31.5
<i>10-19</i>	18.4	18.6
<i>20-30</i>	34.2	49.9
<i>Primary mode of light cannabis use</i>		
<i>Smoking</i>	80.6	60.7
<i>Sublingual oil</i>	5.7	18.5
<i>Inhalation</i>	6.8	10.6
<i>Other (e-liquid, foodstuffs, etc.)</i>	6.8	10.2
<i>Light cannabis products smoked</i>		
<i>Flowers (or inflorescence)</i>	91.2	93.9
<i>Trim (chopped inflorescence and leaves)</i>	4.3	2.6
<i>Resin</i>	4.2	3.4
<i>Others (wax, etc.)</i>	0.3	0.1

Note: Percentages were used for all categorical data.

¹² After harvest, the cannabis plant is trimmed of its leaf matter to remove excess plant material and leave behind only the flowers. Trim refers thus to the leftover leaves, which can be used for making transformed products or sold directly to consumers.

TABLE 5
Motivations for light cannabis consumption (first-use and in the last month)

	<i>First-time</i>		<i>In the last month</i>	
	TOT	FR	TOT	FR
Curiosity and Taste				
<i>For curiosity</i>	10.2	27.2	3.53	1.89
<i>Taste and pleasure</i>	15	17.7	3.63	2.92
Motivations related to regular cannabis				
<i>Difficulty finding regular cannabis</i>	11.7	18.8	26.4	9.3
<i>To consume cannabis legally</i>	5.81	12.5	10.7	6.8
<i>To avoid the effects of regular cannabis</i>	11.5	3.70	4.00	6.79
<i>To obtain the effects of regular cannabis</i>	0.59	2.38	2.99	0.86
<i>To save money on regular cannabis</i>			4.53	6.27
Wellness and health reasons				
<i>Wellness</i>	10.8	6.55	21	26.7
<i>To treat my illness or to reduce its symptoms</i>	23.6	6.05	10.4	25.2
<i>To substitute other substances</i>	7.57	3.05	11	12.4
Other Motivations				
<i>To re-use the container</i>	0.13	0.23	0.1	0
<i>Others</i>	3.1	1.84	1.72	0.9

Note: Percentages were used for all categorical data.

TABLE 6
Substitution effects of CBD with other substances on the first use

	<i>Full sample</i>		<i>Current users</i>	
	TOT	FR	TOT	FR
Reduce or stop alcohol				
<i>Desired effect</i>	5.15	3.26	5.05	3.2
<i>Obtained effect</i>	16.1	9.32	15	9.4
Reduce or stop tobacco				
<i>Desired effect</i>	11.7	8.85	9.99	8.1
<i>Obtained effect</i>	29.4	21.6	29	21.6
Reduce or stop other medications				
<i>Desired effect</i>	7.99	8.54	7.73	7.9
<i>Obtained effect</i>	26.6	32.5	30	34.4
Reduce or stop regular cannabis				
<i>Desired effect</i>	10.8	8.54	10.5	8.27
<i>Obtained effect</i>	16.4	21	17.9	21.6
Reduce or stop other substances				
<i>Desired effect</i>	0.75	1.24	1	1.5
<i>Obtained effect</i>	2.39	4.5	3.1	4.9

Note: Percentages were used for all categorical data. The sample only includes respondents using light cannabis for wellness and health reasons. Current users refers to individuals who have declared to using light cannabis in the previous month. 'Desired effect' refers to those individuals who started using light cannabis to reduce the consumption of other substances, but have not obtained the desired effect.

Table 5 shows how the primary motivation to initiate and currently consume C-light depends partly on the institutional framework. The six most-cited primary reasons to initiate C-light use were “for curiosity, taste or pleasure” (25%), “to treat my disease or reduce associated symptoms” (24%), “because I had difficulties obtaining regular cannabis” (12%), “to avoid the

effects of THC” (11.5%), “for my well-being” (11%) and “to substitute other substances” (7.5%). The connection with regular cannabis is more marked among current users, as the pandemic made its access more difficult. “Difficulty to find regular cannabis” became the primary reason (26%), while the other most-cited motivations to currently consume C-light were “for my wellbeing” (21%), “to substitute other substances” (11%), “to consume cannabis legally” (10.7%) and “to treat my disease or reduce associated symptoms” (10.4%).

Table 5 shows that a substantial proportion of the sample uses CBD for health reasons. Among those who reported the primary reason for initiating use as well-being or to treat a medical condition, we have analysed which substances they wanted to substitute and the medical condition for which they are seeking treatment (multiple responses allowed). Respondents who initiated use of C-light for a specific effect could report whether or not their desired effects were obtained. Table 6 shows that the most-cited substances which were expected to be reduced when initiating C-light use were tobacco (41%), medications (34%), regular cannabis (27%) and alcohol (21%). Only about one out of 30 respondents initiated the use of C-light to substitute other psychoactive substances (3%), in line with the lower prevalence among the population using these illicit drugs.

3.5.1. Mechanisms behind the substitution effect

The respondents who used C-light in the previous month primarily to substitute other substances were asked two additional questions: (1) to what extent C-light had an impact on their substance use reduction; and (2) which CBD-related effects were involved in reducing the use of the substance (multiple responses allowed). More than 9 out of 10 of the respondents reported that C-light have been effective in reducing the consumption of tobacco and cannabis.

Table 7 show the mechanisms involved in the lowering the consumption of regular cannabis and tobacco with C-light. The most frequency cited C-light effects for the former were “reducing cannabis withdrawal symptoms”, “using less regular cannabis in joints” and “delaying first regular cannabis joint of the day”. Other cited mechanisms include “saving money on regular cannabis”, “increasing the time between smoking joints”, “better taste”, “lowering of the amount of regular cannabis consumed during working hours” and “perceiving C-light as less adulterated”. Other respondents mentioned other mechanisms such as (1) the similarities in term of habits and rituals which occur with the consumption of regular cannabis, but without issues in terms of addiction or psychoactive effects; (2) the purchase of a vaporizer

to consume CBD; (3) the similar taste; and (4) the balancing of the THC effect in the joint with the reduction of the THC:CBD ratio.

The mechanisms for lowering the consumption of tobacco were also multiple, namely its “better taste” and “lack of adulterants” compared to tobacco, “reducing tobacco withdrawal symptoms”, “using less tobacco in joints”, “lowering the *heavy lung* sensation” and “saving money on tobacco”. The greatest differences in terms of mechanisms of substitution between those using C-light to reduce tobacco use and those who use it to reduce the use of regular cannabis were the perception that C-light contains less adulterants (more common among those substituting tobacco) and has a better taste (more common among those substituting tobacco).

The major mechanism for lowering the use of medications (multiple response possible) was also “reducing medication withdrawal symptoms” (42%). Similar importance in the choice of using C-light to reduce the use of other medications was its perceived efficacy for treating their medical condition (42%) and its lower side effects (40%). The ability to purchase C-light (15%) and its lower costs compared to their medications (10%) were only minor reasons reported by respondents who substitute medications with C-light.

The respondents who used C-light in the previous month primarily to substitute prescription drugs were asked an additional question regarding which medications they were substituting (multiple responses allowed). The five most-cited medications were anti-inflammatory (55%), analgesics (51%), muscle relaxants (50%), anxiolytics and hypnotics (44%), and anti-depressants or psychostimulants (40%).

TABLE 7

Mechanisms to lower the consumption of tobacco and regular cannabis with CBD

<i>In common</i>	<i>Tobacco</i>		<i>Regular Cannabis</i>	
	TOT	FR	TOT	FR
<i>Reduction of abstinence symptoms</i>	41.5	39.2		43.9
<i>Better taste</i>	46.1	39.2	13.7	11.2
<i>More natural (lack of adulterants)</i>	52.6	38.2	9.7	15.9
<i>Lower consumption of joints</i>	28.6	31.4	25.2	21.5
<i>Saving money</i>	17.2	23.5	20.8	19.6
<i>Substance-specific</i>				
<i>Lower heaviness in the lungs</i>	37.5	24.5		
<i>Delaying the day's first joint consumption</i>			23.9	24.3
<i>More time is spent between joints</i>			14.1	16.8
<i>Lower consumption at work</i>			11	10.3

Note: Percentages were used for all categorical data. Information on the “reduction of abstinence symptoms related to regular cannabis” were not collected systematically in the Italian survey.

3.5.2. Health conditions

Expected effects of C-light among users declaring health motives are given in Appendix table 1. As in table 6, the study group was constituted by respondents who reported initiating C-light for wellness or for treatment of a medical condition. The majority of the study population expected multiple effects, but the most cited were reducing stress (72%), improving sleep (75%), relieving pain/inflammation (67%) and treating anxiety, depression and other mood disorders (56%). Interestingly, the treatment of migraine and headache was the fifth most cited expected effect (52%), and was not included by Zobel et al. (2019). The decision to include this effect was driven its high reported frequency in the Italian survey¹³. Interestingly, there were also a number of productivity-related effects expected by users, such as increasing energy (27%) and concentration (34%). Other expected effects were the management of nausea and vomiting (21%), treating injuries (10%) or skin problems (12%) and reducing appetite (8%).

One out of four of the respondents who initiated C-light use for health reasons was treating the symptoms of a condition diagnosed by a physician. When the decision to initiate C-light is advised by a specialist, individuals are also more likely to continue its use. Indeed, this is the only effect which is more statistically prevalent among current C-light users than among those who did not consume C-light in the previous 30 days. Moreover, this is also the only effect that is more prevalent among among French respondents compared to Italian respondents. The larger proportion of those using C-light under physician advisement is likely driven by the illicit status of medical cannabis in France at the time of the survey administration.

3.6. Econometric model and results

Our goal here is to study the differences across C-light users regarding the likelihood to substitute a specific substance. We do not explicitly model the details of competition between substances based on monetary cost. Instead, we use a parsimonious specification to examine how the likelihood to substitute a substance responds to differences between consumers characteristics, supply channels and patterns of consumption.

We proceed in three steps. First, we investigated which determinants affect the likelihood to initiate the use of C-light to substitute other substances. We performed a probit regression with ‘initiating C-light for substance use reduction’ as an outcome and socio-demographic

¹³ For some questions, respondents could write an alternative response if no option matched. As responses related to migraines and headache were very common, it was decided to add this motivation with the other multiple choice.

characteristics, patterns of consumption and supply channels as explanatory variables. As countries have substantially different institutional framework and market maturity, we only discuss the association between explanatory variables that are significant for the entire sample and at least one of the two sub-samples (appendix tables 2-3). Second, we examine the probability that a C-light consumer substitutes one or more substances in the previous 30 days. Compared to the regression on C-light initiation, we add dummies to distinguish across type of products (e.g. flowers, sublingual oils) and mode of consumption (inhaling) to see whether they are associated with the reduction of substances. Although there is an association between the outcome and several explanatory variables, there is considerable unexplained variance. This indicates that patterns of consumption, specific for different sub-products, play an important role. Accordingly, the empirical analysis is concluded with an estimation of how smoking C-light influences the likelihood of reducing the consumption of tobacco and regular cannabis.

3.6.1. Initiation with light cannabis to substitute other substances

In table 8, we perform logistic regressions to explain the factors associated with the initiation of C-light as a substitute for one or more substances (=outcome). The study sample was constituted of respondents who declared using C-light at least once and answered the question related to primary reason for initiating C-light use. Among the 9,155 respondents who have used C-light in their lifetime, 7,921 answered the question related to the primary reason why they use C-light and other covariates. Among these, 7,619 have reported lifetime regular cannabis use. The outcome was associated with being a woman (particularly for regular cannabis and medications), older age (particularly for medications and alcohol), being employed (particularly for tobacco and medications), being overweight (particularly for medications) and earning a low income. Smoking up to five cigarettes per day (low intensity) is positively associated with initiating C-light for reducing the use of regular cannabis, tobacco and alcohol.

Regarding supply channels, substituting alcohol and medications with C-light is negatively associated with purchasing C-light in a tobacco shop for first time use. Conversely, the association is positive for those who initiate C-light by (1) buying online (except for alcohol); (2) buying on shops specialized in C-light products (particularly for tobacco); and (3) cultivating it domestically. Finally, the r-squared tends to be the highest for the substitution of medications. As a robustness check, appendix table 2 shows the result of the regression for the two countries separately.

3.6.2. *Using light cannabis as a substitute in the previous 30 days*

Table 6 showed that the intention to reduce the use of substances with C-light occurs with different magnitudes for tobacco, alcohol, medications and regular cannabis. In table 9, we perform logistic regressions to explain the factors associated to C-light use as a substitution for any drugs or for a specific substance in the previous 30 days (outcome). The study sample was constituted of respondents who declared using C-light in the previous 30 days and answered the question related to primary reason to use C-light. Among the 3,772 respondents who have used C-light in the previous 30 days, 3,021 answered the questions related to the primary reason and other covariates. Among these, 2,843 reported lifetime regular cannabis use.

Respondents could report use of C-light to substitute more than one substance at the same time. Overall, using C-light to reduce the use of regular cannabis or alcohol increases the likelihood of substituting tobacco as well. Respectively, 64% and 75% of those substituting regular cannabis and alcohol with C-light were also reducing the consumption of tobacco. Conversely, only 9% and 11% of those reporting to not substitute regular cannabis or alcohol were also substituting tobacco. This outcome was associated with being a woman (only for alcohol), older age (especially for medications), being employed (only for medications), and earning a low income (only for tobacco and alcohol). Finally, those who report to be overweight are less likely to have used C-light to substitute regular cannabis in the previous month.

The usage patterns of C-light, regular cannabis, tobacco and alcohol in the previous month are included as a control and affect the likelihood to use C-light as a substitute. The outcome is associated with smoking tobacco with low intensity (especially for regular cannabis and tobacco) and with high intensity (except for alcohol), using regular cannabis daily (only for tobacco), days of C-light use in a month (especially tobacco and medications) and monthly expense on C-light (except for alcohol).

Regarding the specific means of consumption, those who report to inhale C-light (excluding those who vaporize e-liquid) are less likely to use it to substitute regular cannabis. The substitution of other drugs through sublingual oils is substance-specific: it is more likely to reduce the use of medications, but less likely to substitute tobacco and regular cannabis compared to inhalable products (flowers, trim and resins). Other types of C-light products (i.e. e-cigarettes, tinctures, foodstuffs) are more likely to be used to substitute medications. Finally, there is a positive association between the user satisfaction in terms of effect with the likelihood

to substitute other substances: its marginal effect is the highest for tobacco and the lowest for alcohol.

As a robustness check, appendix table 3 shows the result of the regression for the two countries separately. With the exception of medications (0.17), the explanatory power of the regressions (measured by the R-square) with the covariates for the substitution of any substance is very low. This suggests that, even after controlling for demographics, supply channels, patterns of use of C-light and other substances, there is a great deal of variation in the profile of respondents who decide to use C-light to substitute regular cannabis, tobacco, alcohol and medications.

3.6.3. *Smoking light cannabis to substitute regular cannabis and tobacco*

In table 10, we perform logistic regressions to explain the factors associated to C-light use as a substitution for any drug or for a specific substance in the previous 30 days (outcome) by only looking at those who smoke C-light. We added new covariates to explain whether specific factors related to its combustion affect the likelihood to substitute other substances. This subgroup is interesting, not only as smoking C-light is the most prevalent form of cannabis used in both samples, but also because this segment is the most likely to reduce the consumption of regular cannabis and tobacco. The results confirmed the positive association of some of the explanatory variables used in table 10. The study sample was constituted of respondents who declared smoking C-light in the previous 30 days and answered the question related to primary reason for using C-light. Among the 3,007 respondents who have smoked C-light in the previous 30 days, 2,276 answered the question related to the primary reason why they have used it and other covariates. Among these, 2,235 have reported lifetime regular cannabis use.

The outcome is associated with smoking with low intensity, monthly spending on C-light, drinking alcohol, days of use (for Italian tobacco smokers), being overweight (only for regular cannabis), and satisfaction with the effect of C-light. There are also new associations: being female is positively associated with smoking C-light to reduce the consumption of regular cannabis (in France), whereas there is a negative association with earning a high income (for regular cannabis), being employed (in France) and being overweight. Interestingly, using a substance at the intensive margin is associated only with reducing the consumption of this substance: daily use of regular cannabis is associated with C-light substitution, whereas being an intensive tobacco smoker is associated with substituting tobacco with C-light.

The supply channels used for the purchase of C-light appear to affect the likelihood to reduce the use of substances. Compared to online purchase, accessing C-light in a tobacco shop is negatively associated with reducing regular cannabis use, but positively associated with reducing the use of tobacco (in France)¹⁴. In parallel, specialized shops are positively associated with the substitution of tobacco with C-light (in France).

Turning to combustion-related covariates, *both* the portion of C-light used in the joint *and* trim are positively associated with consuming C-light to reduce the use of tobacco. In parallel, the number of varieties consumed in the last month increases the likelihood of reducing the consumption of regular cannabis with C-light in the French sample. Conversely, the combination of regular cannabis with C-light is negatively associated with the likelihood of using C-light as a substitute. In other words, if we divide the group of those smoking C-light without regular cannabis and those who include regular cannabis in the joint, the probability of using C-light to stop regular cannabis for the second group would be 30 percentage points higher.

To conclude, among those using C-light to substitute regular cannabis, about one out of four (26%) have not used the substance in the previous month. For those who used C-light to reduce tobacco, about one on six (15%) have not used either tobacco or e-cigarettes in the previous 30 days.

TABLE 8
Logistic regression on factors associated with initiating C-light to substitute other substances

	Any	THC	Tobacco	Medications	Alcohol
<i>Constant</i>	-2.280*** [0.000]	-2.488*** [0.000]	-2.106*** [0.000]	-2.778*** [0.000]	-2.268*** [0.000]
<i>Female</i>	0.210*** [0.000]	0.134** [0.035]	0.054 [0.325]	0.366*** [0.000]	0.041 [0.549]
<i>Age</i>	0.019*** [0.000]	0.013*** [0.000]	0.007*** [0.002]	0.021*** [0.000]	0.006** [0.015]
<i>High income</i>	0.181*** [0.003]	0.207** [0.010]	0.188*** [0.006]	0.024 [0.754]	0.125 [0.143]
<i>Low income</i>	0.204*** [0.000]	0.208*** [0.000]	0.227*** [0.000]	0.130** [0.019]	0.180*** [0.003]
<i>Employed</i>	0.200*** [0.000]	0.135** [0.039]	0.137** [0.016]	0.252*** [0.000]	0.023 [0.756]
<i>Underweight</i>	0.044 [0.597]	-0.008 [0.940]	0.023 [0.806]	-0.012 [0.907]	-0.094 [0.457]
<i>Overweight/obese</i>	0.097** [0.046]	0.064 [0.332]	0.048 [0.401]	0.184*** [0.002]	0.127* [0.061]
<i>Light tobacco smoker</i>	0.039	0.151**	0.175***	-0.001	0.167**

¹⁴ This result may be biased in view of the non-representative number of French C-light users purchasing in tobacco shops (16 observations).

<i>Heavy tobacco smoker</i>	[0.441] -0.068	[0.022] 0.030	[0.002] 0.065	[0.987] -0.093	[0.016] 0.064
<i>Previous-month THC user</i>	[0.148] -0.086*	[0.639] -0.010	[0.232] 0.039	[0.113] -0.180***	[0.341] 0.012
<i>Daily THC user</i>	[0.089] -0.125**	[0.884] -0.069	[0.525] 0.058	[0.003] -0.188***	[0.877] -0.052
<i>Online</i>	[0.023] 0.559***	[0.357] 0.512***	[0.373] 0.311***	[0.005] 0.447***	[0.522] 0.110
<i>Specialized shops</i>	[0.000] 0.155***	[0.000] 0.055	[0.000] 0.120**	[0.000] 0.038	[0.244] 0.070
<i>Tobacco shop</i>	[0.002] -0.154*	[0.392] -0.225**	[0.027] -0.182**	[0.540] -0.339***	[0.290] -0.262**
<i>Self-grown CBD</i>	[0.056] 0.591***	[0.041] 0.411***	[0.040] 0.551***	[0.004] 0.402***	[0.023] 0.447***
<i>Observations</i>	[0.000] 7.921	[0.009] 7.610	[0.000] 7.921	[0.007] 7.921	[0.004] 7.921
<i>R²</i>	0.090	0.057	0.031	0.135	0.023
<i>Log-likelihood</i>	-2.486	-1.306	-1.867	-1.469	-1.134
<i>Marg effect female</i>	0.035			0.030	
<i>Marg effect age</i>	0.003			0.002	0.0004
<i>Marg effect low income</i>	0.034	0.176	0.028	0.011	0.005
<i>Marg effect employed</i>	0.036		0.018	0.024	
<i>Marg effect overweight</i>	0.017			0.017	0.009
<i>Marg effect light tobacco smoker</i>		0.013	0.021		0.012
<i>Marg effect online</i>	0.092	0.042	0.037	0.037	
<i>Marg effect specialized shop</i>	0.026		0.014		
<i>Marg effect tobacco shop</i>				-0.028	-0.018
<i>Marg effect self-grown</i>	0.098	0.034	0.066	0.034	0.031

Notes: P-values are in brackets below estimated coefficients. *, **, and *** indicate significance at the 90%, 95%, and 99% levels, respectively. Coefficient estimates are generated by probit regression model. All estimates for marginal effects were calculated using the mean values for the independent variables, but are reported only if the factor is significant in at least one of the national sample. Income level was self-reported as subjectively assessed as compared to an “average level” estimated by the participants. Body mass index was calculated as the body weight (in kg) divided by the squared height (in m). A body mass index over 25 kg/m² denotes overweight or obesity.

TABLE 9
Logistic regression on factors associated with substituting CBD for other substances

	Any	THC	Tobacco	Medications	Alcohol
<i>Constant</i>	-1.707***	-2.239***	-1.929***	-2.822***	-1.997***
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
<i>Female</i>	-0.032	0.010	-0.130*	0.128	-0.310**
	[0.620]	[0.911]	[0.085]	[0.143]	[0.012]
<i>Age</i>	0.005*	0.001	0.001	0.007*	0.004
	[0.088]	[0.835]	[0.644]	[0.055]	[0.352]
<i>High income</i>	0.026	-0.017	0.008	0.074	0.021
	[0.753]	[0.873]	[0.932]	[0.516]	[0.866]
<i>Low income</i>	0.088	-0.019	0.116*	0.122	0.169*
	[0.148]	[0.808]	[0.083]	[0.158]	[0.074]
<i>Employed</i>	0.093	0.038	-0.080	0.225**	-0.169
	[0.177]	[0.673]	[0.311]	[0.011]	[0.142]
<i>Underweight</i>	0.016	-0.073	0.095	0.008	0.027
	[0.895]	[0.647]	[0.472]	[0.965]	[0.898]
<i>Overweight/obese</i>	-0.043	-0.244***	-0.090	0.027	0.039
	[0.510]	[0.007]	[0.224]	[0.761]	[0.696]
<i>Light tobacco smoker</i>	0.312***	0.289***	0.468***	0.138	0.151

	[0.000]	[0.001]	[0.000]	[0.188]	[0.148]
<i>Heavy tobacco smoker</i>	0.177***	0.196**	0.250***	0.268***	-0.155
	[0.009]	[0.027]	[0.001]	[0.004]	[0.151]
<i>Previous-month THC user</i>	0.018	0.078	0.175**	-0.058	0.151
	[0.792]	[0.378]	[0.027]	[0.535]	[0.194]
<i>Daily THC user</i>	0.048	0.089	0.180**	-0.076	0.141
	[0.536]	[0.374]	[0.040]	[0.474]	[0.259]
<i>Specialized shop</i>	-0.053	-0.120	0.082	-0.040	0.212**
	[0.377]	[0.118]	[0.215]	[0.627]	[0.023]
<i>Tobacco shop</i>	-0.236**	-0.359**	-0.056	-0.802***	0.147
	[0.020]	[0.011]	[0.605]	[0.003]	[0.346]
<i>Self-grown CBD</i>	0.208	0.086	0.357**	0.256	0.471**
	[0.146]	[0.646]	[0.021]	[0.160]	[0.022]
<i>Sublingual oil user</i>	0.223*	-0.354*	-0.413***	0.696***	-0.026
	[0.054]	[0.074]	[0.010]	[0.000]	[0.901]
<i>Vaporization</i>	-0.047	-0.263*	-0.005	0.160	-0.008
	[0.672]	[0.097]	[0.966]	[0.273]	[0.961]
<i>Other CBD products</i>	0.106	0.061	0.023	0.376***	-0.036
	[0.352]	[0.698]	[0.862]	[0.007]	[0.850]
<i>Three months experience</i>	0.046	0.117	0.075	0.033	-0.082
	[0.477]	[0.186]	[0.311]	[0.730]	[0.425]
<i>Days of use CBD</i>	0.012***	0.008**	0.009***	0.014***	0.001
	[0.000]	[0.040]	[0.005]	[0.000]	[0.884]
<i>High budget</i>	0.149**	0.157*	0.184***	0.093	0.304***
	[0.019]	[0.061]	[0.009]	[0.308]	[0.003]
<i>Labeling satisfaction</i>	0.025	0.150*	0.050	-0.021	-0.041
	[0.689]	[0.074]	[0.467]	[0.812]	[0.675]
<i>Taste satisfaction</i>	0.027	0.131	-0.034	0.036	-0.012
	[0.662]	[0.105]	[0.621]	[0.681]	[0.903]
<i>Effect satisfaction</i>	0.461***	0.509***	0.414***	0.571***	0.229**
	[0.000]	[0.000]	[0.000]	[0.000]	[0.020]
<i>Observations</i>	3.021	2.843	3.021	3.010	3.021
<i>R²</i>	0.069	0.077	0.059	0.172	0.047
<i>Log-likelihood</i>	-1.466.774	-809.036	-1.137.083	-660.366	-484.205
<i>Marg effect female</i>					-0.023
<i>Marg effect age</i>	0.001				
<i>Marg effect low income</i>			0.024		
<i>Marg effect employed</i>				0.023	
<i>Marg effect overweight</i>		-0.032			
<i>Marg effect light tobacco sm.</i>	0.087	0.04	0.96		
<i>Marg effect heavy tobacco sm.</i>	0.046	0.025	0.45	0.025	
<i>Marg effect daily THC user</i>			0.035		
<i>Marg effect days of use CBD</i>	0.003	0.001	0.002	0.001	
<i>Marg effect sublingual oils</i>		-0.04	-0.067	0.1	
<i>Marg effect vaporization</i>		-0.032			
<i>Marg effect other CBD products</i>				0.042	
<i>Marg effect specialized shop</i>					0.016
<i>Marg effect tobacco shop</i>				-0.074	
<i>Marg effect self-grown CBD</i>	0.067		0.078		0.040
<i>Marg effect high budget</i>		0.022	0.036		0.022
<i>Marg effect effect labeling</i>		0.021			
<i>Marg effect effect satisfaction</i>	0.129	0.073	0.084	0.053	0.017

Notes: P-values are in brackets below estimated coefficients. *, **, and *** indicate significance at the 90%, 95%, and 99% levels, respectively. Coefficient estimates are generated by probit regression model. All estimates for marginal effects were calculated using the mean values for the independent variables, but are reported only if the factor is significant in at least one of the national samples. Income level was self-reported as subjectively assessed as compared to an “average level” estimated by the participants. Body mass index was calculated as the body weight (in kg) divided by the squared height (in m). A body

mass index over 25 kg/m2 denotes overweight or obesity.

TABLE 10
Logistic regression on factors associated with substituting CBD for regular cannabis or tobacco in the sub-population of light cannabis smokers

	Regular Cannabis			Tobacco		
	Any	IT	FR	Any	IT	FR
<i>Constant</i>	-1.960*** [0.000]	-2.118*** [0.000]	-3.079*** [0.000]	-2.045*** [0.000]	-1.921*** [0.000]	-3.079*** [0.000]
<i>Female</i>	0.080 [0.410]	0.021 [0.870]	0.284* [0.075]	-0.078 [0.379]	-0.083 [0.436]	-0.020 [0.904]
<i>Age</i>	-0.002 [0.624]	-0.004 [0.537]	-0.012 [0.148]	0.002 [0.548]	-0.002 [0.726]	0.006 [0.374]
<i>High income</i>	-0.055 [0.642]	-0.485** [0.030]	-0.054 [0.750]	0.024 [0.820]	-0.002 [0.988]	0.015 [0.931]
<i>Low income</i>	-0.051 [0.573]	-0.116 [0.336]	0.021 [0.891]	0.122 [0.110]	0.108 [0.230]	0.205 [0.168]
<i>Employed</i>	-0.022 [0.832]	0.091 [0.526]	-0.365** [0.024]	-0.081 [0.382]	0.050 [0.665]	-0.386** [0.016]
<i>Underweight</i>	-0.020 [0.911]	-0.259 [0.278]	0.138 [0.628]	0.035 [0.814]	0.017 [0.923]	0.083 [0.776]
<i>Overweight/obese</i>	-0.202* [0.050]	-0.162 [0.267]	-0.242 [0.105]	-0.075 [0.383]	0.050 [0.629]	-0.312** [0.034]
<i>Light tobacco smoker</i>	0.205** [0.034]	0.331** [0.015]	0.112 [0.481]	0.381*** [0.000]	0.355*** [0.001]	0.446*** [0.007]
<i>Heavy tobacco smoker</i>	0.121 [0.224]	0.206 [0.155]	0.020 [0.898]	0.192** [0.027]	0.142 [0.176]	0.289* [0.080]
<i>Last-month THC user</i>	0.131 [0.190]	0.055 [0.711]	0.365** [0.015]	0.177** [0.047]	0.118 [0.324]	0.286** [0.049]
<i>Daily THC user</i>	0.116 [0.326]	0.055 [0.748]	0.385** [0.039]	0.171* [0.092]	0.156 [0.234]	0.150 [0.397]
<i>Alcohol user</i>			0.570*** [0.000]			0.365** [0.018]
<i>Specialized shop</i>	-0.089 [0.292]	0.120 [0.301]	0.019 [0.915]	0.110 [0.141]	0.059 [0.506]	0.300* [0.064]
<i>Tobacco shop</i>	-0.294** [0.044]	-0.051 [0.772]	0.614 [0.138]	0.002 [0.983]	-0.058 [0.645]	0.975*** [0.008]
<i>Self-grown CBD</i>	0.220 [0.354]	0.354 [0.276]	0.444 [0.257]	0.155 [0.500]	0.250 [0.339]	0.033 [0.941]
<i>Three months experience</i>	0.149 [0.126]	0.220 [0.121]	0.012 [0.937]	0.068 [0.418]	0.094 [0.353]	0.016 [0.921]
<i>Days of use CBD</i>	0.006 [0.144]	0.008 [0.179]	-0.001 [0.883]	0.010*** [0.009]	0.009** [0.035]	0.009 [0.183]
<i>High budget</i>	0.264*** [0.006]	0.061 [0.613]	0.551*** [0.002]	0.226*** [0.007]	0.185* [0.060]	0.405** [0.019]
<i>Price</i>	-0.004 [0.231]	-0.066 [0.385]	0.001 [0.759]	-0.001 [0.740]	-0.001 [0.785]	0.000 [0.961]
<i>CBD dosage</i>	-0.094 [0.141]	0.080 [0.372]	-0.128 [0.222]	0.087 [0.111]	0.117* [0.085]	0.081 [0.430]
<i>Mixed with substance</i>	-0.204** [0.029]	-0.021 [0.850]	-0.493** [0.016]	-0.014 [0.836]	-0.027 [0.735]	-0.094 [0.526]
<i>Trim user</i>	0.253 [0.219]	0.319 [0.195]	0.367 [0.378]	0.248 [0.154]	0.343* [0.078]	-0.020 [0.961]
<i>Hash user</i>	-0.394 [0.121]	-0.267 [0.404]	-0.144 [0.738]	-0.044 [0.805]	-0.057 [0.773]	0.270 [0.505]
<i>#Varieties used</i>	0.023 [0.810]	-0.101 [0.399]	0.290* [0.099]	-0.069 [0.399]	-0.080 [0.394]	0.010 [0.955]
<i>Effect satisfaction</i>	0.632***	0.614***	0.589***	0.479***	0.490***	0.478***

	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.001]
<i>Observations</i>	2.235	1.636	592	2.276	1.666	603
<i>R</i> ²	0.091	0.089	0.114	0.059	0.059	0.099
<i>Log-likelihood</i>	-653.245	-337.847	-264.560	-884.507	-615.268	-253.980
<i>Marg effect female</i>			0.072			
<i>Marg effect high income</i>		-0.03				
<i>Marg effect employed</i>			-0.085			-0.082
<i>Marg effect overweight</i>	-0.027					-0.067
<i>Marg effect light tobacco sm.</i>	0.029	0.027		0.08	0.07	0.101
<i>Marg effect heavy tobacco sm.</i>				0.035		0.06
<i>Marg effect last-month THC</i>			0.09	0.034		0.067
<i>Marg effect daily THC user</i>			0.096			
<i>Marg effect alcohol user</i>			0.145			0.085
<i>Marg effect days of use CBD</i>				0.002	0.002	
<i>Marg effect CBD dosage</i>					0.023	
<i>Marg effect mixed with subst,</i>	-0.3		-0.125			
<i>Marg effect trim user</i>					0.07	
<i>Marg effect #varieties used</i>			0.074			
<i>Marg effect specialized shop</i>						0.07
<i>Marg effect tobacco shop</i>	-0.043					0.228
<i>Marg effect high budget</i>	0.038		0.122	0.047	0.037	0.086
<i>Marg effect effect satisfaction</i>	0.092	0.051	0.15	0.101	0.098	0.11

Notes: P-values are in brackets below estimated coefficients. *, **, and *** indicate significance at the 90%, 95%, and 99% levels, respectively. Coefficient estimates are generated by probit regression model. All estimates for marginal effects were calculated using the mean values for the independent variables. Income level was self-reported and subjectively assessed as compared to an “average level” estimated by the participants. Body mass index was calculated as the body weight (in kg) divided by the squared height (in m). A body mass index over 25 kg/m² denotes overweight or obesity.

3.7. Discussion

In a large convenient sample of French and Italian C-light users (7921 and 3774 lifetime and previous-month users, respectively), we found that the substitution of other substances was the reason for using C-light for more than one out of five previous-month users (21%), and the primary reason for half of these users (11%). Moreover, consuming C-light to reduce the use of other substances is associated with different socio-demographic characteristics, modes of C-light use, or preferred supply channel – according to which substance is substituted with C-light.

To the best of my knowledge, this is not only the first survey that analyses C-light users in France and Italy, but also the first which specifically investigates the substitution effect of C-light on other substances.

3.7.1. Socio-demographic and physical characteristics

Gender predicts different likelihoods of reducing substances with C-light, depending on the specific substance that is substituted. Women are more likely to initiate C-light to substitute substances and, in particular, to reduce the consumption of medications. When we consider current users, however, females have a higher likelihood of smoking C-light to substitute

regular cannabis, but are less likely to reduce alcohol. Other studies on C-light use are inconclusive regarding the association between gender and the use of C-light. In the UK, Moltke and Hindocha (2021) found that females were less likely to declare use for general health and well-being, whereas we do not find such a difference in France (Fortin et al., 2021).

Age is positively associated with substance substitution. Older respondents are more likely to initiate C-light and currently use it for lowering the use of medications. This result is consistent with the results obtained in the Swiss study (Zobel, 2019) where individuals using it for health-related motivations had an older age profile, and in the UK (Moltke and Hindocha, 2021) where those aged more than 55 were more likely to substitute medications compared to younger generations. This finding is likely due to the higher prevalence of medical conditions among older individuals.

Turning to the economic characteristics, the positive association between low income and initiating C-light to reduce substance use loses significance when we look at current C-light consumption (in the previous 30 days). Only the reduction of tobacco is still associated with low income, but this is only significant in France. This may be driven by the higher corrective tax applied on cigarettes in the country, which leads respondents to cut tobacco-related expenditures through C-light. This finding is somehow unexpected, given the reduced probability for lower socioeconomic status to stop smoking following reforms aimed at discouraging this behaviour (Pinilla and Abasolo, 2017). Overall, the provision of financial assistance to obtain C-light as a substance cessation tool is likely to stimulate its reduction among low income individuals (van den Brand et al., 2017).

Similarly, unemployment is negatively associated with initiating C-light to decrease the use of other substances, especially tobacco and medications. Looking at previous-month C-light users, students and those who are unemployed have a substance-dependent association with C-light: higher likelihood of reducing tobacco and regular cannabis use, but lower likelihood of reducing medication use. This opposite direction may be due to the stigma associated with smoking C-light – the most common mode of consumption for those reducing tobacco and regular cannabis – compared to using sublingual oils to reduce medications, particularly when consuming it in a working environment.

Among the overweight respondents, there is a higher probability of using C-light to reduce the consumption of substances, but mostly to reduce the use of medications. This may be interpreted in two ways: people experiencing overweight and obesity are more likely to suffer

sleep and mood disorders and may be affected by comorbidities (e.g; hypertension, diabetes etc). This overmedication may increase the toxicity burden and quality of life of this group. C-light may then be used to reduce the side effects of specific medication, improve mood and sleep, reduce anxiety and ultimately reduce food cravings, which is associated with the latter (Cavalheiro et al., 2021). Among C-light smokers, there is a negative association between being overweight and reducing regular cannabis use. Two hypothesis can be made to explain such an association. They may find cannabis useful to manage some symptoms related to being overweight. Alternatively, this association may derive from the lower prevalence of overweight and obesity among young adult cannabis users (Hayatbakhsh et al., 2010).

3.7.2. *Patterns of use and product preferences*

Among C-light users, the patterns of use of tobacco and regular cannabis appear interconnected with their current substitution. On one hand, using C-light to reduce regular cannabis is associated with tobacco smoking; on the other hand, using regular cannabis is associated with the reduction of tobacco with C-light. The more frequent use of C-light with tobacco and regular cannabis to reducing tobacco usage can be explain by the lowering of the amount within joints. Regular cannabis smokers generally include tobacco in Europe (Hindocha et al., 2014). In parallel, heavy tobacco users are associated with the reduction of medications, but not alcohol.

Interestingly, being a cannabis or tobacco user in the intensive margin does not increase the likelihood to have initiated C-light to substitute these substances. The only positive predictor with their substitution during the first use is using less than 5 cigarettes per day. This low degree of use intensity for tobacco may be explained by use reduction overtime. There is indeed a positive association between reducing tobacco use and its heavy usage in the previous 30 days. Similarly, consuming regular cannabis daily is not associated with initiating C-light in an attempt to cut down or discontinue cannabis use. Conversely, daily and previous-month cannabis use is only associated with its current reduction in France. There may be two explanations for this association: it may be due either to the lower market maturity, with respondents on average having started use more recently, or to the inclusion of alcohol consumption in the specification. Other scholars found that regular cannabis is used less frequently among those using mostly C-light, rather than regular cannabis (Fedorova, 2021). Overall, the use of alcohol predicted a higher probability of consuming C-light to reduce cannabis and tobacco use (appendix table 3).

As we have shown previously (Fortin et al., 2022a), daily C-light use is associated with reducing the consumption of other substances. A greater number of days of use per month predicts a higher probability of substitution for every substance except for alcohol. Among tobacco smokers, the association with daily C-light use does not hold for reducing cannabis use. Perhaps, due to the higher addictiveness of tobacco (Lopez-Quintero et al. 2011), curbing nicotine addiction with C-light require a larger dosage of CBD. This hypothesis is confirmed by the positive association between the fraction of C-light in the joint and the substitution of tobacco, but not regular cannabis.

Using C-light more frequently and with higher dosage implies the purchasing a larger amount of CBD products. Unsurprisingly, a high monthly expenditure on C-light (more than €40) is associated with the reduction of tobacco, alcohol and regular cannabis use alongside C-light. Monetary considerations may lie behind the association between using C-light trim and curbing tobacco use. On average, this C-light sub-product is significantly cheaper (€ 7.1) compared to flowers (€ 8.2) and resins (€ 9.9). Conversely, C-light trim is not associated with a reduction in regular cannabis use. This may have two explanations: either the lower dosage needed due to the lower addictiveness of cannabis compared to tobacco (as seen in previous paragraph); or the different perception of quality between users. Those who want to reduce tobacco may be more pragmatic and unaffected by the lower aesthetic quality of trim (compared to flowers) as long as the amount of cannabinoids and thus the perceived effect are similar (Marijuana Policy Group, 2019).

The negative association between mixing C-light with regular cannabis and the probability of reducing cannabis use deserve further consideration. This pattern of use is also prevalent among cigarettes smokers, but smoking joints that mix C-light and tobacco does not affect the likelihood of reducing tobacco use. C-light is often mixed with tobacco because of its perceived quality and superiority regarding taste and absence of contaminants. These mechanisms are much less important for those who mix C-light with cannabis. Among those who substitute regular cannabis, almost half use C-light to help manage their abstinence symptoms. The remaining segment mixes C-light in the joint either to substitute tobacco, or as a form of polysubstance use to balance the effect of regular cannabis. Indeed, C-light may affect the acute effects of THC when mixed with regular cannabis. The presence of CBD in joints may reduce intense experiences of anxiety or psychosis-like effects of regular cannabis and may impact the benefits and harms of its use (Englund et al., 2013; Freeman et al. 2019). Accordingly, the size

of the user segment who enjoys mixing C-light with regular cannabis depends on two considerations: (1) the cost-benefit analysis between the effect of THC alone, compared to its effect combined with C-light; and (2) the differential price between C-light and tobacco. On one hand, the perceived benefit is likely to increase over time, as consumers become aware of the harm reduction potential of C-light and the consequent lower risk for mental health. On the other hand, C-light price per gram will decrease as the market matures and competition increases, but could also increase with an unreasonable corrective tax (or with the prohibition of inhalable C-light).

In Belgium - the first EU country which classified C-light as tobacco substitute - the taxation level is identical to tobacco at 30%. Switzerland was the first to take this approach by applying a tax of the same magnitude for tobacco, but the Swiss Federal Court revoked this tax, as C-light was not intended to be smoked in all forms¹⁵. Accordingly, policymakers should not impose a corrective tax on C-light products that may be ingested or vaporized, such as flowers. A corrective tax should only be imposed on products whose final means of consumption produce harms (e.g. pre-rolled cigarettes).

A clear classification of C-light based on the actual purpose of use will be beneficial for consumers, but this should be done without banning inhalable products. Our findings show that smoking C-light is the preferred means of consumption for those substituting tobacco and regular cannabis. Accordingly, reforms that restrict the use of flowers as raw materials would not only lower the number of individuals curbing or stopping the use of these substances, but is also likely to increase the product portfolio of the illicit market. As a consequence of the greater contact with illicit dealers, the initiation of C-light users towards more harmful substances may increase among C-light users, with repercussions for public health and public order (see next chapter for details).

The reduction of the use of medications was declared as a reason for using C-light by 7% of current users. Interestingly, this result is perfectly in line with the Moltke and Hindocha (2021) sample in the UK, despite the de facto ban of inhalable products in the country (Fortin et al., 2021). Other findings present several implications for healthcare practitioners interested in understanding the underlying reasons behind the choice of C-light users to substitute other medications. For example, the minimization of side effects appears to be as important for the

¹⁵ https://www.swissinfo.ch/eng/court-ruling_tax-on-legal-weed-repealed/45567738

patient as the effectiveness in treating the medical condition¹⁶. This elicited preference is in contrast with the current paradigm in evidence-based medicine, which investigates mostly the effectiveness of products for its marketing approval, rather than the degree of side effects¹⁷. Whether these preferences are specific to C-light users, or can be generalized to the general population should be the subject of future research. Another interesting aspect highlighted from this study is the potential of self-reporting surveys as a cost-effective tool to create a new epistemology for herbal medicines (Fortin et al., 2022b). Given the market failure in private investment on clinical trials occurring in this market (Fortin and Massin, 2020), this type of qualitative research may support not only the investigation of how different use patterns affect the effectiveness of herbal medicine for different illness, but also to decide for which medical conditions to allocate public resources in a way that satisfies the largest number of individuals in need of an effective therapy without substantial side effects.

3.7.3. *Varieties*

Among C-light smokers, 7 out of 10 have used more than one variety in the last 30 days. In France, this pattern of use is associated with curbing the use of regular cannabis, but not tobacco. This may be the consequence of high degree of brand stability among tabagists estimated at 90% (Cowie et al., 2014), and that the majority choose the first brand they smoked as their regular brand (DiFranza et al., 1994). In general, it is more likely that when users find a specific C-light variety with a taste or effect which is effective in reducing tobacco use, they tend to continue with the same variety. Conversely, those who substitute regular cannabis may have a preference for diversification of varieties and may have a tendency to continuously test new ones¹⁸. This difference may be partly due to the institutional differences between cannabis and tobacco markets. The latter is legal and has been standardized over a long period of time: tobacco shops sell relatively few varieties through different brands. As regular cannabis is illicit, consumers cannot consume the same variety for long periods, given the information asymmetry between dealers and producers – unless they self-grow at home. It cannot be excluded, however, that the specific nature of the two substances may be the most important explanation of the different preferences elicited by tobacco and cannabis users. Rahn et al.

¹⁶ It is even considered as the main motivation to substitute medications in the French sample.

¹⁷ This may be especially important for individuals which have to undergo therapies which require poly-drugs use (e.g. cancer treatment) as side effects are rarely investigated when multiple medications are taken together to treat different symptoms.

¹⁸ Both types tend to combine C-light in joints mixed with regular cannabis or tobacco (or both), or smoke C-light alone.

(2016) list more than 600 different varieties of cannabis and currently even the number of C-light varieties is increasing exponentially (Marijuana Business Daily, 2020) to not only satisfy heterogeneous consumer preferences, but also to account for the new therapeutic evidence of minor cannabinoids. A final explanation for the choice of using multiple varieties may be more pragmatic: consumers may attempt to reduce the loss of sensitivity or tolerance to the behavioural effect of CBD, or even to reduce cross-tolerance for the action of THC. By continuously changing the combination of active principles contained across different varieties, they may lower their average daily dosage of C-light and in turn reduce their cannabis-related expenditure.

In the EU, there is a substantial level of red tape that slows down varietal innovation on C-light. Only varieties listed in the common EU catalogues can be marketed, and these requirements are applied regardless of whether the final output is used as an input for industrial uses by other firms or is sold directly to the final consumers¹⁹. This market distortion may have two potential effects: first, to lower the substitution potential of C-light on regular cannabis if consumers do not find a variety that satisfies their preferences in terms of aroma and cannabinoid content (Gilbert and DiVerdi, 2018); second, to create a grey market of C-light flowers produced in countries which only require low levels of THC using varieties outside the EU catalogue. This may partly explain the high prevalence of inhalable products perceived to be produced in Switzerland from consumers in France (53%).

3.7.4. Supply channels

Most consumers in our sample purchase C-light, but some (4%) have decided to grow C-light plants domestically and have initiated use by consuming their own harvest. Our results suggest those initiating and currently using self-produced C-light are more likely to substitute other substances, compared to those purchasing it at retailers such as tobacconists or specialized shops. Two hypotheses may explain the positive association between home cultivation and the reduction in use of these substances. First, the greater availability of C-light post-harvest may increase daily consumption, as was found during COVID-19 lockdowns with users stockpiling cannabis (EMCDDA, 2020b). As a result, the increased amount of CBD may have lowered attentional bias toward substance-related cues and in turn reduced the use of these substances. Second, cultivating cannabis for medical reasons is a widespread practice among cannabis

¹⁹ https://ec.europa.eu/food/plant/plant_propagation_material/plant_variety_catalogues_databases_en

growers (Hakkarainen et al., 2015). Thus, the portion of C-light users motivated by health-related reasons may simply be greater among those involved in home cultivation compared to the general population of C-light users. Therefore, as production technology affects the perceived quality of cannabis (Belackova, 2020), users who consume what they grow may perceive their harvest as a better substitute for addictive substances than C-light bought at specialized or tobacco shops.

Among those who are not cultivating C-light, purchasing it the first time from specialized shop or on the Internet increases the likelihood of curbing the consumption of any substance, compared to purchasing C-light from tobacconists. For current users, purchasing C-light in tobacco shops predicts a lower probability of reducing the use of any substance compared to buying it from specialized shops (except for tobacco) or online (except for tobacco and alcohol)²⁰. The lower probability of curbing the use of substances among those who buy C-light from tobacconists compared to those buying from specialized shops may be explained through three mechanisms. First, the lower average price per gram of C-light flowers sold in specialized shops (€ 8.8) compared to tobacco shops (€ 9.8) will bring those who buy large quantities of C-light towards the former²¹. Second, retailers of tobacco shops are unlikely to be well-informed about the properties of C-light and provide useful advice to those using it to treat a medical condition or its symptoms. Those consuming C-light for substituting substances (or for other health motivations) may prefer to buy from specialized stores where sellers are more likely to be knowledgeable with the products and may provide advice regarding dosages, varieties or mode of consumption (e.g. vaping, ingestion) which may be beneficial for users. Third, many C-light users may not find their favorite product due to the lower diversification of C-light items and variety of flowers available in tobacco shops.

In terms of distribution channels, some EU countries have monopolized the sale of C-light products towards specific licensed distributors. This is the case in Finland, where CBD is classified as a medicinal product, restricting its access to pharmacies. Other regulatory approaches that limit the access of specific C-light products towards certain marketplaces would appear to be more appropriate. In Denmark, for instance, certain types of C-light

²⁰ There are some signs that purchasing from tobacconists may increase the likelihood of substituting tobacco in France, but the low variation in the sample demonstrates a need for further evidence.

²¹ This price differential is likely due to the higher quantity discount applied in specialized shops, whose main product sold is C-light, compared to tobacconists, where it is just one of dozens of products available.

products (e.g. oils) with a high dosage of CBD are considered to have a pharmaceutical effect, and are thus sold only through pharmacies (EMCDDA, 2020a), whereas other product types containing lower doses of CBD may be sold through other suppliers. From a public health perspective, policymakers may want to explore regulating the availability of specialty items to minimize poly-drug use and maximize the substitution of other substances. For instance, trim and pre-rolled cigarettes appear to be more appropriate than raw flowers to be sold in tobacco shops, whereas the contrary may be true for specialized shops. The impossibility of finding raw C-light flowers in tobacco shops would lower their co-use with tobacco, while pre-rolled C-light cigarettes may facilitate the switch towards C-light, given their similarity with tobacco cigarettes (e.g. presence of filters, no need to roll). Once these consumers become familiar with C-light, they may decide to try new varieties of C-light flowers through specialized shops, particularly if they can be found at cheaper price. There, consumers would have a lower risk of co-using C-light with tobacco, given the impossibility of purchasing cigarettes, thus increasing the likelihood of tobacco cessation.

3.7.5. Strength and limitations

This work has several strengths, including sample size, wide age range of the respondents, geographic representation of the sample and a focus on the specific motivations behind the substitution effect. In part, this was the result of using multiple recruitment methodologies and the time of launching during the first wave of COVID-19 lockdown.

This study has several limitations. First, the study population was a self-selected convenience sample of mostly young adult C-light users in Southern Europe, thus the results may not be generalizable to adult users in the general population. Second, the study was conducted in a setting with low access to cannabis products, as recreational cannabis use is not legal in France and Italy. Our findings may not be applicable to countries with more progressive legal environments surrounding the use of cannabis. Third, the French and Italian populations have a high prevalence of tobacco, alcohol and regular cannabis use, and the majority mixes tobacco with regular cannabis. Our findings on C-light smokers may not be applicable to countries with lower use prevalence and greater social stigmatization for drug use. Fourth, in the question regarding the motivation behind the consumption of CBD in the previous month, we only allow one choice. Therefore, it is likely that individuals who repond with “to use it legally” or “taste and pleasure” are lowering their consumption of other substances, particularly tobacco and THC. Despite this, we assume that those who consider substitution as their primary reason are

likely to be those for which C-light tends to be most effective, as proven by their high level of satisfaction with its effect.

3.8. Conclusion

The use of C-light for general wellbeing and to treat specific health conditions is widespread and will likely grow as cannabis markets evolve. One out of five current users use C-light as a substitute. These findings demonstrate its potential in reducing the use of more harmful substances, which may be influenced by several factors relating to socio-demographic characteristics, patterns of use and preferred supply channels.

Overall, a major contribution from the survey relates to identification of the patterns of use of inhalable C-light products. Rather than prohibiting these products, policymakers should put in place regulations based on the expected harms. One, by testing the presence of contaminants in the products. Additionally, by designing a distribution and taxation scheme. This could maximize the substitution of harmful substances with C-light through different types of products across different supply channels, and use a differential taxation level that is based on both composition of the products and on the expected mode of consumption to incentivise the usage of less harmful cannabis forms.

Together, (1) the differential interest for the diversification of varieties between those substituting tobacco and those substituting regular cannabis; (2) the positive association between using C-light trim and the reduction of tobacco use; (3) the negative association between tobacco shops and the reduction of the use of substances; and (4) the need to impose differential taxation based on the purpose of use calls for a rethinking of the most adequate distribution channels for specific C-light sub-products. Accordingly, C-light could be sold in tobacco shops when it is packaged in a way which discourages the co-use of the product. For instance, in pre-rolled cigarettes containing only C-light that cannot be easily mixed with tobacco. Their taxation should be lower compared to tobacco cigarettes, given their lower expected harm to consumers. On the other hand, specialized shops would offer an extensive number of C-light varieties, similar to the US framework. Given that C-light is also used for therapeutic reasons, it might be necessary to impose a mandatory education for personnel to guarantee a minimum level of expertise to advise customers purchasing through specialized shops. Given the diversification in their offering, tobacco shop owners are unlikely to have the adequate knowledge to help individual in choose the best C-light products/varieties for their condition or the proper dosage. Specialized shops selling only flowers and derivatives could

provide basic information to users, discourage the co-use of tobacco and perhaps incentivize its customers towards healthier modes of use (e.g. inhalation).

In conclusion, the reduction in the use of medications is driven by their perceived effectiveness as well as lower side effects. Future studies should investigate the efficacy of various forms and cannabinoid combinations for substituting specific substances in naturalistic settings.

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3.10. Appendices

Appendix 1: Details in Survey Design

The 52-item survey started with a question about the amount of times they have used CBD, if they responded with “Never”, they were exited from the survey. The second question was about age. If they responded “1-17 years old”, they were exited from the survey. If the respondents declared to have used CBD *and* to be at least 18 years old, they completed the first part of the survey related to their first consumption of CBD. The eighth question asked their motivation for their first consumption. If the respondents declared it was related to “wellness”, “to treat a medical condition” or “to substitute other substances”, they answered an additional question related to their desired effect. The next question asked how many days they used CBD in the previous 30 days. If the respondents did not use it, they were excluded from the questions related to consumption in the previous month and routed directly to the consumption of other substances. If they responded to have use CBD at least once in the previous month, they completed additional questions about when they used it and through which supply channel. If they declared to self-grow what they consumed, they were presented with an additional question about the reason for doing so and the provenience of the seeds/cuttings used. The next question asks which product they used the most in the previous month. If the respondents did not answer “flowers”, “resins” or “trim”, they were excluded from the questions related to

varieties, price, provenience as well as mean of consumption, and routed directly to questions related to budget. The 21st question asks about the principal means of consumption in the previous 30 days. If the respondents did not smoke light cannabis, they were excluded from the questions related to percentage of CBD smoked in their joint as well as the substance with which it was combined and routed directly to questions related to budget. If they responded with “combustion”, they completed all sections of the survey.

APPENDIX TABLE 1.

Desired and obtained effects of light cannabis on medical condition at the first use

	<i>Full sample</i>		<i>Current users</i>	
	TOT	FR	TOT	FR
Improve sleep and reduce insomnia				
<i>Desired effect</i>	13	13.2	12.3	12.8
<i>Obtained effect</i>	61.9	58.2	64	60.5
Reduce stress				
<i>Desired effect</i>	11.8	11.8	11.2	11.8
<i>Obtained effect</i>	60.15	48.1	59.5	48.7
Increase concentration				
<i>Desired effect</i>	8.36	5.28	7.73	5.8
<i>Obtained effect</i>	26.1	17.4	21.1	18.1
Increase energy				
<i>Desired effect</i>	9.33	4.5	8.06	4.89
<i>Obtained effect</i>	18.4	14.3	19.9	15.4
<i>Treat or reduce symptoms of a disease diagnosed by a physician</i>				
<i>Desired effect</i>	8.28	9.94	9.02	9.96
<i>Obtained effect</i>	17.7	22.3	20.6	24.62
Treat pain or inflammations				
<i>Desired effect</i>	11.6	13.7	11.1	13.2
<i>Obtained effect</i>	55.6	50.8	56.9	52.4
<i>Treat or reduce symptoms of my anxiety or depression or other mood problems</i>				
<i>Desired effect</i>	11	11.3	9.56	10.1
<i>Obtained effect</i>	45.2	39.6	47.7	40
Treat migraines and headache				
<i>Desired effect</i>	21.1	5.9	17.5	5.83
<i>Obtained effect</i>	26.6	19.25	26.9	19.7
Relieve my nausea or vomiting				
<i>Desired effect</i>	4.8	1.55	3.87	1.32
<i>Obtained effect</i>	16.1	7.14	16.3	7.71
<i>Treat injuries or fractures</i>				
<i>Desired effect</i>	4.63	2.33	4.19	2.26
<i>Obtained effect</i>	6.79	6.21	7.73	6.77
<i>Treat acne, psoriasis or other skin problems</i>				
<i>Desired effect</i>	5.37	3.26	4.73	3.38
<i>Obtained effect</i>	7.99	4.5	8.81	5.08
Reduce appetite				
<i>Desired effect</i>	6.19	1.24	5.91	1.5
<i>Obtained effect</i>	2.69	2.02	2.9	2.26

Note: Percentages were used for all categorical data. The sample only includes respondents using light cannabis for wellness and health reasons. Current users refer to individuals who declared to have used light cannabis in the previous month. 'Desired effect' refers to those individuals who started using light cannabis to reduce the consumption of other substances, but have not obtained the Desired effect.

APPENDIX TABLE 2. Robustness check on factors related to the initiation of light cannabis for substitution of other substances

	Any		Regular Cannabis		Tobacco		Medications		Alcohol	
	Italy	France	Italy	France	Italy	France	Italy	France	Italy	France
<i>Constant</i>	-2.105***	-1.890***	-2.327***	-1.958***	-2.110***	-1.566***	-2.514***	-2.245***	-2.205***	-2.347***
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
<i>Female</i>	0.122**	0.266***	0.082	0.147	0.103	-0.087	0.230***	0.440***	0.125	-0.216
	[0.041]	[0.001]	[0.332]	[0.159]	[0.113]	[0.389]	[0.003]	[0.000]	[0.106]	[0.117]
<i>Age</i>	0.008***	0.017***	0.004	0.003	0.003	0.001	0.009***	0.021***	0.002	0.010**
	[0.001]	[0.000]	[0.217]	[0.497]	[0.351]	[0.750]	[0.008]	[0.000]	[0.560]	[0.031]
<i>High income</i>	0.134	0.039	0.187*	0.028	0.143	0.118	-0.258*	0.054	-0.016	0.268*
	[0.102]	[0.684]	[0.088]	[0.825]	[0.112]	[0.303]	[0.065]	[0.627]	[0.890]	[0.063]
<i>Low income</i>	0.166***	0.304***	0.131*	0.339***	0.214***	0.211**	0.049	0.280***	0.161**	0.236*
	[0.002]	[0.000]	[0.077]	[0.001]	[0.000]	[0.042]	[0.482]	[0.005]	[0.020]	[0.083]
<i>Employed</i>	0.164**	0.071	0.065	0.017	0.167**	-0.017	0.208**	0.135	0.059	-0.101
	[0.010]	[0.400]	[0.483]	[0.874]	[0.016]	[0.864]	[0.011]	[0.160]	[0.495]	[0.458]
<i>Underweight</i>	0.126	-0.183	0.177	-0.431**	0.048	-0.158	0.125	-0.238	-0.094	-0.147
	[0.186]	[0.277]	[0.161]	[0.046]	[0.648]	[0.427]	[0.308]	[0.236]	[0.511]	[0.596]
<i>Overweight/obese</i>	0.119*	0.070	0.153*	-0.054	0.097	-0.009	0.225***	0.127	0.196**	0.028
	[0.056]	[0.392]	[0.075]	[0.611]	[0.156]	[0.928]	[0.005]	[0.159]	[0.014]	[0.823]
<i>Light tobacco smoker</i>	0.091	-0.044	0.184**	0.151	0.168**	0.195*	0.139*	-0.168	0.218***	-0.011
	[0.133]	[0.646]	[0.031]	[0.187]	[0.012]	[0.085]	[0.092]	[0.134]	[0.007]	[0.940]
<i>Heavy tobacco smoker</i>	-0.008	-0.143*	0.082	0.005	0.065	0.047	0.021	-0.164*	0.084	0.022
	[0.889]	[0.095]	[0.329]	[0.963]	[0.320]	[0.654]	[0.792]	[0.087]	[0.295]	[0.872]
<i>Previous-month THC user</i>	-0.010	0.026	-0.097	0.263**	-0.022	0.263**	-0.046	-0.134	-0.125	0.412***
	[0.878]	[0.765]	[0.295]	[0.013]	[0.764]	[0.014]	[0.594]	[0.180]	[0.147]	[0.002]
<i>Daily THC user</i>	-0.017	-0.065	-0.061	0.030	0.009	0.262**	-0.046	-0.122	-0.134	0.171
	[0.816]	[0.512]	[0.535]	[0.810]	[0.907]	[0.025]	[0.628]	[0.271]	[0.150]	[0.259]
<i>Alcohol user</i>		0.029		0.077		0.046		-0.159*		0.087
		[0.716]		[0.461]		[0.643]		[0.077]		[0.514]
<i>Online</i>	0.267**	0.347***	0.121	0.343***	0.302***	0.114	0.076	0.289***	0.018	0.131
	[0.014]	[0.000]	[0.432]	[0.005]	[0.008]	[0.327]	[0.605]	[0.008]	[0.907]	[0.405]
<i>Specialized shops</i>	0.185***	0.161	0.070	0.143	0.145**	0.136	0.013	0.115	0.039	0.294*
	[0.001]	[0.112]	[0.371]	[0.262]	[0.020]	[0.251]	[0.861]	[0.326]	[0.592]	[0.063]
<i>Tobacco shop</i>	-0.078	-0.169	-0.173	0.049	-0.125	-0.081	-0.284**	-0.387	-0.222*	0.000
	[0.370]	[0.505]	[0.161]	[0.867]	[0.190]	[0.781]	[0.022]	[0.296]	[0.062]	[.]
<i>Self-grown CBD</i>	0.670***	0.437**	0.297	0.505**	0.639***	0.321	0.273	0.502**	0.476**	0.395
	[0.000]	[0.039]	[0.175]	[0.038]	[0.000]	[0.164]	[0.196]	[0.028]	[0.014]	[0.146]
<i>Observations</i>	6.472	1.429	6.338	1.252	6.472	1.429	6.472	1.429	6.472	1.390
<i>R²</i>	0.027	0.059	0.018	0.036	0.025	0.024	0.034	0.114	0.022	0.047
<i>Log-likelihood</i>	-1.590.383	-804.806	-744.212	-486.326	-1.307.467	-520.726	-807.977	-591.031	-831.400	-280.860

APPENDIX TABLE 3.

Robustness check on substitution of substances with light cannabis in the previous month

	Any		Regular Cannabis		Tobacco		Medications		Alcohol	
	Italy	France	Italy	France	Italy	France	Italy	France	Italy	France
Constant	-1.426***	-2.332***	-2.200***	-2.269***	-1.743***	-3.023***	-2.716***	-2.830***	-2.039***	-2.836***
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Female	-0.125	0.101	-0.073	0.096	-0.122	-0.103	0.122	0.147	-0.085	-0.846***
	[0.168]	[0.309]	[0.553]	[0.450]	[0.202]	[0.411]	[0.385]	[0.188]	[0.530]	[0.002]
Age	-0.001	0.007*	-0.003	-0.011*	-0.001	0.003	0.004	0.005	-0.002	0.021***
	[0.885]	[0.095]	[0.568]	[0.071]	[0.874]	[0.562]	[0.512]	[0.288]	[0.719]	[0.007]
High income	0.038	-0.065	-0.335	-0.065	0.004	-0.002	0.231	-0.076	0.258	-0.338
	[0.753]	[0.568]	[0.109]	[0.639]	[0.975]	[0.988]	[0.237]	[0.583]	[0.107]	[0.105]
Low income	0.038	0.166	-0.098	0.069	0.085	0.257**	0.108	0.104	0.165	0.146
	[0.627]	[0.110]	[0.375]	[0.580]	[0.300]	[0.031]	[0.423]	[0.389]	[0.147]	[0.381]
Employed	0.031	0.054	0.119	-0.240*	0.040	-0.331***	-0.043	0.280**	-0.132	-0.152
	[0.752]	[0.601]	[0.375]	[0.063]	[0.699]	[0.008]	[0.799]	[0.016]	[0.397]	[0.407]
Underweight	-0.074	0.139	-0.257	0.000	0.055	0.161	-0.185	0.093	-0.148	0.386
	[0.645]	[0.501]	[0.268]	[1.000]	[0.736]	[0.499]	[0.545]	[0.720]	[0.576]	[0.288]
Overweight/obese	0.023	-0.104	-0.232*	-0.237*	0.019	-0.240**	0.080	-0.004	0.135	-0.113
	[0.799]	[0.283]	[0.091]	[0.058]	[0.839]	[0.047]	[0.575]	[0.969]	[0.276]	[0.496]
Light tobacco smoker	0.304***	0.282**	0.386***	0.222*	0.406***	0.575***	0.191	0.072	0.149	0.108
	[0.001]	[0.016]	[0.002]	[0.097]	[0.000]	[0.000]	[0.229]	[0.626]	[0.233]	[0.607]
Heavy tobacco smoker	0.107	0.253**	0.258**	0.155	0.179*	0.348***	0.240	0.279**	-0.222*	-0.017
	[0.235]	[0.018]	[0.049]	[0.240]	[0.063]	[0.010]	[0.129]	[0.023]	[0.096]	[0.926]
Previous-month THC user	0.061	0.087	0.021	0.261**	0.144	0.194	0.113	0.003	0.164	-0.058
	[0.553]	[0.385]	[0.877]	[0.030]	[0.189]	[0.111]	[0.512]	[0.979]	[0.307]	[0.745]
Daily THC user	0.097	0.144	0.034	0.311**	0.145	0.252*	0.055	0.011	0.104	0.130
	[0.392]	[0.233]	[0.824]	[0.028]	[0.224]	[0.070]	[0.774]	[0.936]	[0.540]	[0.485]
Alcohol user		0.234**		0.337***		0.386***		0.088		0.314
		[0.015]		[0.008]		[0.002]		[0.414]		[0.128]
Specialized shops	-0.008	0.137	0.050	0.096	0.017	0.322**	-0.026	0.188	0.083	0.533***
	[0.923]	[0.204]	[0.641]	[0.477]	[0.834]	[0.012]	[0.828]	[0.137]	[0.462]	[0.002]
Tobacco shop	-0.162	-0.038	-0.153	0.236	-0.118	0.760**	-0.855**	-0.377	0.088	0.000
	[0.150]	[0.911]	[0.361]	[0.521]	[0.320]	[0.037]	[0.011]	[0.484]	[0.588]	[.]
Self-grown CBD	0.308*	0.243	0.257	0.194	0.430**	0.237	0.308	0.459*	0.421	0.676*
	[0.090]	[0.307]	[0.290]	[0.508]	[0.022]	[0.414]	[0.259]	[0.080]	[0.104]	[0.051]
Sublingual oils user	0.165	0.098	0.000	-0.509**	-0.035	-0.357**	1.059**	0.525***	0.438	0.052

	[0.729]	[0.472]	[.]	[0.018]	[0.951]	[0.049]	[0.041]	[0.000]	[0.441]	[0.856]
<i>Vaporization</i>	-0.121	-0.054	-0.540*	-0.256	-0.127	0.149	-0.036	0.143	-0.015	0.015
	[0.446]	[0.739]	[0.056]	[0.209]	[0.452]	[0.434]	[0.889]	[0.449]	[0.947]	[0.954]
<i>Other CBD products</i>	-0.075	0.169	-0.063	0.090	-0.073	0.177	0.224	0.369**	-0.029	-0.027
	[0.680]	[0.270]	[0.818]	[0.653]	[0.709]	[0.354]	[0.387]	[0.028]	[0.909]	[0.935]
<i>3 months experience</i>	0.038	0.030	0.155	0.026	0.092	0.054	-0.024	0.065	-0.069	0.027
	[0.652]	[0.780]	[0.215]	[0.844]	[0.309]	[0.688]	[0.862]	[0.606]	[0.559]	[0.893]
<i>Days of use CBD</i>	0.008**	0.015***	0.009*	0.003	0.008**	0.010*	0.003	0.019***	0.001	0.003
	[0.044]	[0.000]	[0.100]	[0.586]	[0.043]	[0.075]	[0.678]	[0.000]	[0.860]	[0.691]
<i>High Budget</i>	0.142*	0.152	-0.050	0.311**	0.118	0.364***	0.121	0.043	0.385***	0.127
	[0.081]	[0.147]	[0.665]	[0.021]	[0.172]	[0.007]	[0.380]	[0.718]	[0.002]	[0.498]
<i>Labeling satisfaction</i>	0.037	-0.055	0.199*	0.115	0.034	0.055	0.021	-0.114	-0.071	0.146
	[0.642]	[0.607]	[0.090]	[0.382]	[0.681]	[0.670]	[0.879]	[0.366]	[0.536]	[0.452]
<i>Taste satisfaction</i>	-0.113	0.131	-0.088	0.187	-0.127	0.165	-0.161	0.040	-0.033	0.082
	[0.154]	[0.213]	[0.424]	[0.174]	[0.127]	[0.217]	[0.235]	[0.747]	[0.772]	[0.661]
<i>Effect Satisfaction</i>	0.488***	0.399***	0.572***	0.417***	0.474***	0.316**	0.549***	0.580***	0.270**	0.177
	[0.000]	[0.000]	[0.000]	[0.001]	[0.000]	[0.019]	[0.000]	[0.000]	[0.017]	[0.391]
<i>Observations</i>	2.002	1.007	1.944	881	2.002	1.007	1.993	1.005	2.002	992
<i>R²</i>	0.047	0.063	0.077	0.084	0.051	0.118	0.091	0.115	0.054	0.129
<i>Log-likelihood</i>	-841.475	-593.699	-385.191	-372.433	-740.767	-373.622	-238.494	-395.873	-335.791	-129.048

