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Developing a Mock Retail Cannabis Shop for Research: A Description of The CANNEX

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ABSTRACT

Objective: Cannabis retail dispensaries have proliferated in the United States in recent years, making it an important time for conducting research. Research is needed to learn more about consumer purchasing behaviors, including the impact of product marketing both inside and outside of retail spaces, and studies are needed to explore how both consumers and retail staff interpret the health benefits and potential risks associated with cannabis products within these environments. Current research on cannabis dispensaries often involves surveys or interviews with customers and dispensary staff outside of dispensary environments, but much can be learned through observational and experimental methods within dispensaries themselves. However, researchers have traditionally relied on surveillance methods, where researchers visit dispensaries to gain a deeper understanding of real-world encounters in these environments. Although these methods provide helpful insights into purchasing and selling behavior, as well as regulatory compliance, these studies are conducted in an uncontrolled environment, as products, messaging, and interactions are specific to the dispensaries in which the research is conducted. **Method:** We therefore created a mock cannabis dispensary to offer participants a retail experience that can be controlled and manipulated (e.g., adjustable cannabis product prices, placement of health and risk information in the dispensary, scripted interactions with dispensary staff) to help balance ecological and internal validity and answer questions about purchasing and selling behavior beyond what current methods allow. **Results**: We describe the process of developing and stocking the first known mock cannabis dispensary for research purposes, the Cannabis Annex ("The CANNEX"), including interior design, product selection, feedback solicitation from 20 cannabis industry workers, and plans for future research studies within the environment. **Conclusions:** By describing our process, we hope to aid researchers in developing their own similar mock dispensaries to continue learning about the health benefits, risks from use, and policy implications of cannabis in an increasingly legal recreational atmosphere.

Key words: = cannabis retailers; budtenders; dispensary; marijuana

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Cannabis has been available for legal purchase in the United States since 1996, when California began selling cannabis for medicinal purposes in licensed dispensaries (Department of Cannabis Control, n.d.). Since January 2014, when Colorado opened the first licensed recreational cannabis dispensary, cannabis retail dispensaries have proliferated in the United States. As of early 2024, there were over 15,000 cannabis dispensaries in the United States (Chapekis & Shah, 2024), with customer access to recreational, medicinal, or both types of cannabis varying by state. A recent Pew Research Center analysis reports that over half (54%) of Americans live in a state that has legalized cannabis for recreational sale and possession, and approximately four out of five Americans live in a county that has at least one cannabis dispensary wherein the substance can be purchased for recreational and/or medicinal purposes (Chapekis & Shah, 2024). The cannabis industry has vastly expanded in recent years, with projections that cannabis sales will reach nearly $40 billion in the United States by the end of 2024 (Statista, 2024). Moreover, the cannabis industry currently supports more than 440,000 jobs (Barcott & Whitney, 2024).

The rise of the legal cannabis market underscores the importance of research on individuals' purchasing behaviors and exposure to product marketing within cannabis retail environments. Inside cannabis dispensaries, consumers are exposed to a wide variety of products in packages that contain unique labels describing the required risk statements, recommended serving sizes, purported health benefits, and ingredients (cf. Leafly.com). Most brick-and-mortar retailers offer a wide variety of cannabis products, including flower (e.g., packaged flower, prerolled joints), concentrates, vape cartridges, extracts, edibles (e.g., gummies and beverages), and topicals (e.g., lotions and balms). Customers may also purchase cannabis use accessories, such as pipes, rolling papers, and vape cartridge batteries, as well as novelty items like coffee grounds and bath bombs containing cannabinoids. Researchers have begun to examine how cannabis consumers view and interpret cannabis product packaging, including consumer inferences about the products' purported health benefits and potential risk factors based on labeling (Goodman et al., 2019; Winstock et al., 2021), as well as how certain products may appeal to children through packaging that is intentionally similar to popular snacks and candies (Ompad et al., 2022; Tan et al., 2022). In addition, despite a lack of rigorous randomized control trials, the health benefits of cannabis are becoming more heavily researched (National Academies of Sciences & Medicine, 2017; Pratt et al., 2019; Walsh et al., 2017). Consumers are learning about research-backed health effects of cannabis from multiple sources (e.g., health providers, traditional media, Internet-based platforms), which have been associated with more favorable perceptions about cannabis use and increased perceptions about use safety (Ishida et al., 2020; Khademi et al., 2023; Lau et al., 2021). As such, consumers may be more likely to seek out cannabis retail dispensaries for a wide range of purposes, including intentions to use recreationally and/or for medicinal or wellness reasons. In these retail environments, individuals are likely to encounter additional, more direct health and risk marketing (e.g., promotional material on display, product packaging). Dispensary employees have also been shown to be an influential source of product messaging, including promotion of health benefits (Cameron et al., 2023; Peiper et al., 2017; Popova et al., 2017). Thus, it is important to examine how packaging, retail environments, and interactions with retail employees (i.e., "budtenders" or "cannabis consultants," herein referred to as budtenders only) affect purchasing behaviors.

Both survey and qualitative (e.g., focus groups, interviews) research can offer important insights into cannabis product sales (Carlini et al., 2022; Donnan et al., 2022; Donnan et al., 2023; Haug et al., 2016; Kepple & Freisthler, 2018; Merlin et al., 2021). Further, examining customer and budtender behaviors within actual cannabis retail environments can enhance ecological validity and offer a deeper understanding of real-world encounters. Researchers have generally adopted observational surveillance methods when studying cannabis selling and buying behavior. For example, these methods have been used to locate both licensed and unlicensed cannabis dispensaries to help explore the availability of cannabis retailers in specific cities and how such availability may be associated with use in a legalized environment (Pedersen et al., 2020; Thomas & Freisthler, 2016; Unger et al., 2020).

Researchers have also visited cannabis dispensaries to learn more about compliance with local regulations (e.g., age verification procedures, signage posted about risks), to observe how products are marketed within the dispensaries (e.g., price promotions, membership deals), and to document potency and prices of current products (Berg et al., 2017; Berg et al., 2023). Similarly, discussions with budtenders have been conducted with surveillance methods, such as "mystery shopper" methods in which researchers have learned about specific health claims offered by retail staff (Romm et al., 2024; Vastis et al., 2020).

Though much is learned from surveillance methods, these methods are subject to uncontrolled environmental conditions, and there is a lack of standardization across studies conducted in the real world. Currently, if researchers want to learn about customers' purchasing behaviors, they must either ask participants about their behaviors directly (e.g., asking about potential purchases based on hypothetical price points) or observe customers in real-world dispensaries with prices controlled by the dispensary. Having a research environment in which aspects of the retail experience could be controlled and manipulated (e.g., adjustable cannabis product prices) would balance ecological and internal validity to help answer questions beyond what current methods allow. Moreover, observing and studying the selling behavior of cannabis retail staff within an experimentally manipulated dispensary would offer valuable insights into how products are marketed to consumers.

The Present Study

We describe our process for developing a mock cannabis dispensary, which we named "The Cannabis Annex (The CANNEX)," including interior design, product selection, feedback solicitation from cannabis industry workers, and building a plan for research studies to be conducted within the space. We describe the development of this first known mock cannabis dispensary for research purposes in two phases. The first phase describes the design of the dispensary, including the rationale for the location and the strategy for stocking the dispensary, followed by the results from these procedures. The second phase includes the procedures and findings from a series of interviews with cannabis industry workers to finalize the dispensary and prepare it for future observational and experimental studies. Our hope is that our process descriptions will aid future researchers in developing similar mock dispensaries on their own campuses.

PHASE 1 METHODS

Location of The CANNEX

We built The CANNEX on the Health Sciences Campus of the University of Southern California (USC), located just northeast of downtown Los Angeles, California. This geographic location is uniquely suitable for The CANNEX. California has more cannabis dispensaries than any other state (Chapekis & Shah, 2024). It was the first state to open licensed medicinal cannabis dispensaries and among the first states to open licensed recreational cannabis dispensaries in 2018. Los Angeles County alone, which spans over 4,000 square miles, has more dispensaries than any single state (besides California itself).

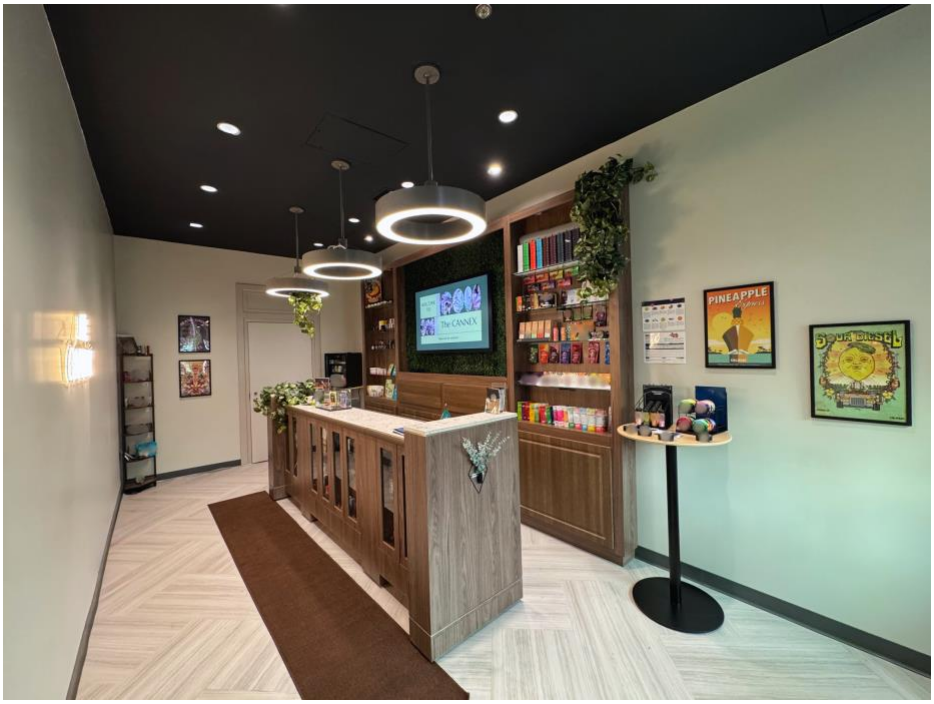
This dispensary is located within the Biobehavioral Simulated Research Environment Unit ("The BioSim") on campus. The BioSim, funded by the USC Institute for Addiction Science, is a series of multipurpose research participation suites, including rooms with one-way mirrors for observation and ventilation to clear smoke for inhalational drug administration studies, reception and waiting areas, offices and conference rooms, and private patient counseling and exam space. A central feature of the BioSim is an open space designed to simulate at least three environments: a bar, a convenience store, and a cannabis dispensary. It is approximately 240 square feet, with shelving, high ceilings with top-down lighting, a mounted flat screen television, high top tables, bar stools, and a reversible, movable bar/cabinet that can serve as either a bar for patrons to sit at or as a countertop with glass case shelving for products. It has a large closet for storage of any materials not necessary for one of the specific settings (e.g., bar stools can be stored when using The BioSim as a convenience store). The bar setting functions similarly to other simulated bar laboratories on college campuses, where participants can consume alcohol (or perhaps placebo) in a bar environment that closely

matches a setting where they would consume alcohol in real life (Corbin et al., 2015; Corbin et al., 2020; Marlatt & Rohsenow, 1981; Rung et al., 2024). Similar to other mock convenience stores (Grummon et al., 2019; Hall et al., 2021; Shadel et al., 2016), the convenience store setting can function as a point-of-sale observational space for risky products, such as cigarettes, nicotine vapes, and sugar-sweetened beverages, as well as the promotional material and advertisements one may see when checking out. Unique to The BioSim is the cannabis dispensary environment (i.e., The CANNEX), which seeks to replicate a typical licensed recreational cannabis dispensary, albeit without any real cannabis products containing psychoactive components that are still illegal at the federal level and not allowed on campus.

Design of The CANNEX

We visited multiple cannabis dispensaries in the area, including small, single-site retail stores and larger chain dispensaries. We aimed to create an inviting atmosphere that blended lush greenery with a minimalist modern aesthetic. Lifelike artificial plants were displayed throughout the space with stained glass window coverings, making the traditional windows more pleasing. This helped to soften the atmospheric lighting in The CANNEX, which also features dimmable top-down lights to create a more comfortable, adaptable environment. We purchased additional shelving for products that were placed around the perimeter of the room. Product packaging was also displayed on the existing counter space and in the glass door cabinets featured in the center of the room. In an effort to not overwhelm future participants with too many products placed together in a small space, we also integrated décor into the shelving units and counter spaces (i.e., small display cases, cards). Additionally, we bought frames and cannabis imagery posters, a small refrigerator for beverages and concentrates, and an artificial neon sign that reads "The CANNEX" (See Figures 1, 2, and 3.) Using the large, flat screen television in The BioSim space, we displayed two rotating images with The CANNEX logo and a menu with adaptable pricing for several of the products found in the store. We also provided a QR code at the front counter that allows customers to scroll through the menu (which can be manipulated by the researchers) on their mobile devices. Like many California cannabis dispensaries, the space was designed in a "grocery store" fashion, giving customers the ability to explore and handle the product packaging without all products locked behind counters. This also gives the customers more freedom to self-guide their product selection during their shopping experience.

Figure 1. *Front Right View of The CANNEX*



Note. We have attempted to blur and/or obscure product brand names in these photos. Certain branded materials have also been removed with photo-editing software.

Figure 2. *Front Left View of The CANNEX*



Note. We have attempted to blur and/or obscure product brand names in these photos. Certain branded materials have also been removed with photo-editing software.

Figure 3. *Front Center View of The CANNEX*



Note. We have attempted to blur and/or obscure product brand names in these photos. Certain branded materials have also been removed with photo-editing software.

Stocking The CANNEX

Of the initial 30 dispensaries we contacted, six (20%) responded and donated approximately 260 products across 19 different brands. In addition to offering product packaging, they invited us to visit their dispensary and provided us with advice on how to set up and stock The CANNEX. Packaging nearly always contained information just like one would see in the dispensary, such as the mix of cannabinoids, potency, and required California warning labels (Department of Cannabis Control, n.d.-b). However, some of the packaging received was blank except for the brand logo, making it easy to manipulate labels for future research studies.

The initial dispensary contacts encouraged us to reach out to the brands directly and gave us the names of popular brands, distributors, and parent companies, though we did not receive any direct contact information or specific names of people to contact. We used the online search engine, Weedmaps (cf. www.weedmaps.com), as the primary source to learn more about the popular brands being sold in local dispensaries. We contacted brands and distributors primarily by email, but we also reached out on the social networking website, LinkedIn. We continued to reach out to local dispensaries in the area using email and LinkedIn, providing our email and phone numbers for follow-ups.

In total, we contacted 54 brands known to be popular in Los Angeles dispensaries and recommended by the staff members (i.e., budtenders and store managers) from the local dispensaries. They were large, well-known brands but also more local, lesser-known brands that customers would often see in Los Angeles retail dispensaries. Of the 54 brands that we contacted, 18 (33.3%) of them responded. Thirteen independent brands provided us with packaging, and the other five operated under parent distribution companies that provided an additional 14 brands. All together, we received packaging from 32 brands. Including products from dispensaries (one brand of which overlapped with products sent to us by an independent company), the total number of different brands represented in the CANNEX is currently 51 (as of August 2024).

We ensured that The CANNEX would be well stocked with the variety of products that individuals would encounter in a local dispensary. Among the 51 brands, we received a total of 444 different cannabis products: 147 different edibles (including 9 different beverages and 3 syrups), 174 different kinds of flower (including prerolls and packaging/jars for bud), 81 disposable or "all-in-one" vapes (either empty or filled with simulated cannabis oil), 20 different concentrates, 16 different kinds of tinctures, and six different topicals. Within these different products, we often had multiples of the same products, which put our total number of products at 956 as of August 2024. This included 411 edibles (including beverages and syrups), 317 flower products (including prerolls and packaging/jars for bud), 176 vapes and concentrates, and 52 tinctures and topicals. All products in the CANNEX are donations.

We aimed to stock the CANNEX with products of varying potencies and cannabinoid combinations. We targeted inclusion of high and low THC products, THC-only products, and products with a mix of THC and other featured cannabinoids (such as products with THC and CBD). We sought products that also contained cannabinoids growing in popularity, such as THCA (tetrahydrocannabinolic acid), THCV (tetrahydrocannabivarin), CBG (cannabigerol), and CBN (cannabinol). Products often have "buzz words" on the packaging, and we aimed to also collect products that contained such phrasing within broader categories of pain (e.g., "recover," "alleviating"), sleep (e.g., "sedating"), social (e.g., "talkative"), calm (e.g., "relaxing," "tranquil"), intimacy (e.g., "passion," "arousal boost"), focus ("alert," "peak productivity"), happiness ("euphoric," "bliss"), and others (e.g., "creative," "energy," "introspective"). This allowed us to create a versatile inventory that is available to other researchers desiring to use The CANNEX. We also created a website with prices for the products that individuals visiting The CANNEX could access using a QR code on provided iPads or personal phones. Individual products did not contain price tags, as we expect these prices to change according to the needs of specific studies. Initial pricing was set using average pre-tax prices listed across stores on the Weedmaps site as of August 2024. If we could not find a price point for a particular product, we priced that product based on similar available products.

PHASE 1 RESULTS

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PHASE 2 METHODS

We invited employees from local cannabis dispensaries to visit The CANNEX and offer feedback via an audio-recorded interview and a brief online survey. For the feedback sessions, we displayed only a selection of products we received (primarily the products we had received first and that were the most popular) and often only put out one of the specific products, even if we had multiple of them. Products without labels were not displayed. We first contacted the staff who had initially provided us with packaging. We then cold-called and -emailed other local dispensaries. In two instances, contacts from the dispensaries we connected with referred us to other employees from additional local dispensaries. These processes led to 20 completed interviews, with 20 employees from 14 local dispensaries and one parent cannabis company visiting The CANNEX and participating in interviews. There were two occasions in which two employees from one dispensary came during a single visit (i.e., two worked in the same store, while the other two worked in separate stores under the same parent company), while the remaining 16 employees participated in individual interviews. Regarding their current position, seven participants were current budtenders, six were store managers, one was a regional manager, three were inventory managers, two were dispensary store owners, and one was a field marketing representative for their brand.

Each interview was facilitated within The CANNEX by one or two members of the research staff. All participants completed consent materials approved by the local Institutional Review Board. Online surveys were completed on provided iPads or participants' personal devices in a private room following the interview. For their participation, which lasted approximately 90 minutes for the interview and survey, participants were provided with a $100 gift card redeemable at a number of different retailers (e.g., Amazon, Target, Walmart, Starbucks).

Interview Questions

As participants entered The CANNEX, we asked for their initial impressions (e.g., tell us what you think), as well as more directive questions to garner their feedback (e.g., does this feel like a real dispensary, what do you think of the design/décor). We asked participants what they thought about the layout of The CANNEX (e.g., layout of shelves by product type). As participants walked around The CANNEX and offered their impressions, we asked how familiar they were with the products we had in the space, as well as whether we were missing any products (or specific popular brands) that customers would typically find in their own and other dispensaries. We also asked them how they become familiar with the products that they sell in their own dispensary. These conversations were focused on these main questions, but the discussions were semi-structured to allow the participant ample time to discuss certain aspects of The CANNEX that caught their attention. We also sought feedback on how to improve The CANNEX, including layout, products, and any other constructive feedback about marketing and product placement they could offer.

Survey Questions

After the interview, each participant filled out a brief survey with demographic information, work and training history, items about training to be a retail staff member, and items about how they get familiar with the products they sell in their own dispensaries.

PHASE 2 RESULTS

Description of the Sample

Table 1 details the demographics and work histories of the 20 cannabis staff participants. Participants were approximately 30 years old on average and split in terms of gender identification. About one-third were Hispanic/Latinx, one-third were White, and the other third were American Indian/Alaskan Native, Asian, African American/Black, or identified with multiple races/ethnicities. Participants had worked in the cannabis industry for a mean of 6.4 years (range 1 year to 18 years), and several had held multiple positions over that time period (e.g., budtender, store manager, marketing jobs). Just five participants had roles as budtenders only. Participants had much experience working specifically as budtenders (mean of 4.4 years, ranging from 1 to 18 years) across a number of different dispensaries (mean of 6 different dispensaries, ranging from 1 to 30

different ones). Half (50%) had worked in cannabis dispensaries when only medicinal cannabis was available for sale in the U.S. (i.e., prior to 2014, but recreational stores did not open until 2018), with all but one participant working only in California during their careers in the cannabis industry (one worked in a Colorado dispensary before moving to California).

Table 1. *Sample Demographics and Work History (N = 20)*

	Mean (SD)/Frequency	*Range*
Age	30.50 (6.61) years old	23 to 46 years old
Sex	11 male, 9 female	--
Gender	10 man, 10 woman	--
Race/ethnicity	7 Hispanic/Latinx 7 White 1 American Indian/Alaskan Native 1 Asian 1 African American/Black 3 other or multiple race/ethnicities[1]	--
Years worked in the cannabis industry	6.40 (4.72) years	1 to 18 years
Roles had in the cannabis industry	16 budtenders 11 store managers 8 marketing (including graphic design) 3 store owners 3 growers 3 store investors 2 inventory associate/buyer	--
Years worked as a budtender	4.40 (4.53)	1 to 18 years
Number of different dispensaries worked at	6.16 (7.39)	1 to 30 dispensaries

Note. [1]Of the three other or multiple race/ethnicity participants, one identified as Asian and White, one identified as Hispanic/Latinx and American Indian/Alaskan Native, and one did not specify.

Feedback About The CANNEX

The main function of the cannabis retail staff interviews was to gather general feedback on The CANNEX and how we could improve it for future research. Thus, as participants entered the space, we asked them for their general impressions. All participants said that it felt like a real dispensary, with a "mom and pop" or "boutique" feel shared by many dispensaries in Los Angeles. For example, one participant said, "*Honestly this is just what most modern dispensaries look like nowadays. You got your green, your plants [referring to decorative plants]. And then you got that background [referring to the welcome sign on the screen] … If I walked in and I didn't intend to buy marijuana, it wouldn't take long to figure out that I'm probably in a marijuana facility. But a very high end one.*"

Another said, *"It has a sophisticated vibe to it. Meaning the wood paneling, this granite marble-ish feel is very earth tone. There's not neon lights and house music playing. It's a very upscale and minimalist. But rustic in the sense – the foliage behind the TV. It all ties into the earth tones and the wood and the grains and everything. It has a very natural feel to it. Nothing's overly glossy, shiny. Everything has this subtle matte vibe*."

Participants reported liking the décor (e.g., hanging plants, wall art) and the layout by product type (e.g., edibles section, flower section with prerolls). One participant described two types of dispensaries in the Los Angeles area (i.e., boutique style and "*packed stores…almost like a Walmart or Costco*") and noted that The CANNEX had successfully implemented a boutique style by not packing the shelves full of products. This participant specifically noted that this style tended to be associated with higher quality products and more knowledgeable staff (e.g., "*And I think for the style that you guys chose, you could definitely expect walking in more expensive prices and maybe more knowledgeable employees*"). Participants liked the flow of the dispensary and the ability of the customers to shop without much contact from the budtender(s) unless desired. They noted that the small beverage refrigerator was well-placed, as were the items that tend to be less popular but one would want to push at the point of sale. Several participants expressed approval at the number of products on display, favoring how it would not feel excessive or overwhelming for customers (e.g., "*It's simple. It's nothing overwhelming … People don't like it when it's too crazy*").

All participants generally reflected that The CANNEX contained most of the main brands one would expect to see in a Los Angeles dispensary (e.g., "*You guys have majority brands. Like good brands, too*"), as well as all expected product types, with the exception of some emerging specialty products. When we were missing a brand that the participant thought we should have in stock, we were able to contact the brand's customer services to request packaging. Notably, several participants mentioned that The CANNEX did not have any actual flower/buds in the shop. They described that customers who buy flower do tend to at least like to see, if not also smell, the flower product before purchase (e.g., "*It does help move that product when you can see the bud. So maybe they're walking by and [the customer is] like, oh, 'that's so purple.' … and I always say the nose knows. So if it smells good, you're probably gonna at least think it tastes good or enjoy it a little bit. Sometimes people smell something and they're like, 'Ugh'*"). Participants also gave advice on restructuring the stock, which mostly related to placing several products at eye level and relocating higher-end products on a slightly higher shelf. Several also suggested that we increase our inventory of tinctures, topicals, and beverages, although they described that these products are generally the lowest in stock at dispensaries because of lower customer interest. A few participants also discussed how the space felt small and too quiet (i.e., no music playing in the space during interviews). Many participants also recommended organizing flower by quantity (i.e., distinguishing between eighths and the larger quantities like half ounces and ounces in product displays; e.g., "*For flower … a lot of people still don't even really know what an eighth is or how much they want … I would maybe keep the eighths together, the half and then the ounces at least that's what we do. We have all of our top shelf eighths and then we have cheaper eighths like [product name removeds]in a category. And then we have all our larger quantities in one area*").

Training and Familiarity with Products

Future studies using The CANNEX would necessitate having staff in the space to facilitate interactions with "customers" (i.e., research participants) and to act as budtenders to "sell" products. Thus, we asked participants in the survey to describe any formal budtender training they might have received, as well as how budtenders gain familiarity with the products sold in their dispensaries. Surprisingly, the majority of participants (n = 13; 65%) reported no formal training beyond what was taught in-house by their employer on the job. Of the seven who received training, three (15%) took an online course for a budtender certification, and four (20%) took an in-person budtender training. Regarding familiarity with products, participants tended to report on the surveys that they tried the majority of the products sold in their dispensaries. Participants estimated on the survey that they try a mean of 62.8% (SD = 35.95) of the products they

sell, with over half (55%) reporting they try 80% or more of the products that they sell. Three (15%) reported trying every product. On the survey, participants were asked about their strategies for responding to customers who ask about products they have not personally tried. Eight participants (40%) reported that they tell the customer they have never tried the product before, eight (40%) direct the customer to another employee who has tried the product, 12 (60%) offer anecdotes about the product that they have heard from other people, and seven (35%) refer to the packaging to help guide their description of the product. Only one participant reported pretending that they have tried the product before.

During interviews, participants seemed to be forthcoming about how they became familiar with their products. Most discussed personally trying the products so that they felt confident making certain recommendations (e.g., "*I need to try this … so I can be able to tell people what you feel*"). They would also gather information from talking with other budtenders who had tried the products. In addition, participants discussed talking with brand ambassadors and representatives that would come to their stores and offer free samples to the staff at the stores, as well as incentives (e.g., discounts on future product inventory purchases) for featuring their newer or less popular products. Participants reported looking at other dispensaries' websites and on dispensary and product search engines like Weedmaps and Leafly. They said they would look at the label on the product to help inform them about the effects, but also noted how the labels (e.g., cannabinoid concentration) often sell the products themselves, as they offer much information (e.g., "*So it sometimes is good to go off the packaging, but I feel like packaging usually does sell itself*"). Some of what they learned about products came from the customers themselves, who often share their personal experience of using products with budtenders. Lastly, participants discussed the importance of knowing their customer base and what products certain kinds of customers are more likely to seek out. They mentioned how customers are often more interested in trying other products from a brand they already like. For example, participants mentioned it would be important to stock The CANNEX with an entire catalogue from a brand's specific product, such as multiple flavors of edibles from the same brand (e.g., "*The people that are coming in to buy edibles want a variety of that brand … Like [brand name removed]. You have to have almost the entire lineup in order for it to make sense to the customer*"). They discussed how most customers will enter the dispensary with pre-formed ideas about how they want to feel from using the product (e.g., "*I ask people what are they looking to feel*"). If their store of choice does not sell a certain product the customer is accustomed to, participants described how they may offer the customer an alternate product they think will give them a similar feeling to what they are describing.

DISCUSSION

It has become increasingly important to examine cannabis purchasing behavior, including what attracts consumers to certain products and what health and risk messages they glean from product packaging. Beyond the messaging that the products alone convey to consumers, it is important to examine how storefront employees interpret product messaging and how they would convey such messaging to consumers. To expand beyond surveillance and observations methods currently used in cannabis dispensary research, we designed the first known mock cannabis dispensary laboratory as a place where researchers can conduct observational and experimental studies on cannabis purchasing and selling behaviors in a controlled and fully customizable environment. Through direct collaboration with local cannabis dispensary owners, staff, distributors, and brands, we were able to fully stock our mock cannabis dispensary, The CANNEX, with products that allowed us to model a modern cannabis dispensary representative of those found in the Los Angeles area. Cannabis retail staff participants offered constructive and generally positive feedback during interviews inside The CANNEX, which will help us make modifications to the environment in preparation for future research studies.

We encourage researchers at our institution and at others to collaborate with our research team and use The CANNEX for their own unique research ideas. Before we discuss some of the novel implications, there are important limitations to note regarding the use of a simulated environment. First, participants in The

CANNEX know the environment is a research setting, and that awareness could impact their behavior in myriad ways. The health campus setting could, for example, prime participants to attend more to health features of products than they ordinarily would. Perhaps more importantly, participants in a research mock dispensary such as The CANNEX are aware their behavior is being observed. While we took steps to establish a non-judgmental rapport with participants, self-presentation motivations likely remain. Research questions pertaining to behaviors that participants might feel would be judged unscrupulous (e.g., false claims directed at upselling) or that are illegal (e.g., selling to minors) are likely addressed better by other methods. We are also limited by the specific brands that are featured in The CANNEX and recognize that continual updates of the products on the shelves will be necessary to match novel and popular products sold in real dispensaries. Specific to the interviews conducted, our findings are limited by the geographical constraints of the cannabis industry workers in the Los Angeles area. Though their perspectives were extremely helpful in finalizing The CANNEX, which was designed to model a dispensary full of products one would see in a similar Los Angeles dispensary, nearly all had only worked in California dispensaries, which limits the generalizability of The CANNEX outside the local area.

However, despite the limitations, the ability to tightly control the environment in a simulated dispensary has important advantages for addressing many questions. First, The CANNEX can answer research questions related to purchasing decisions among individuals. Mainly, what about certain products draws an individual's attention to them and what environmental factors within a dispensary more generally influence individuals to buy certain products over others. Many environmental factors in The CANNEX can be controlled, such as the general floor plan layout (e.g., display cases along the wall or centered in the room, posters and décor can be changed), lighting (e.g., lights dimmed or bright, spotlights on certain items, windows open or closed), and sound (e.g., music on or off, different styles of music, varying volume). Video cameras can be installed to capture behavior in The CANNEX, and audio recording devices – either personal microphones or in-ceiling microphones – can be used to monitor and code discussions between customers and staff. Regarding inventory, in addition to choosing specific products and brands to display on shelves, the location of products and prices can be changed dependent on studies' needs. Products themselves can be manipulated, with size and placement of labels able to be changed. Warning labels and purported health effects on packaging can be altered to test how customers interpret a product's effects based on labeling alone. The concentration and potency of specific cannabinoids, perhaps also paired with purported health effects, can be modified. Product packaging can be manufactured to represent new and emerging products, including fabricated products with concentrations of cannabinoids not likely to be seen in regulated stores (e.g., if given the chance, would individuals purchase extremely high potency THC products that are not normally available in legal dispensaries).

Experimental and administration studies could also be conducted within The CANNEX and broader BioSim space. For example, researchers can test purchasing behavior when deals/promotions are presented to customers, such as buy-one-get-one deals or loyalty programs, where customers are offered discounted products after spending a certain amount in the store. On-counter displays, posters, or presentations with educational material about cannabis products can be created and tested in The CANNEX to learn more about how individuals interpret information about risks and effects of products, and how the presence or absence of these educational materials influence the purchase of specific products. Eye-tracking studies can be conducted in the tightly controlled environment to gather detailed data on what parts of product packaging customers are attending to most (e.g., do customers read warning labels, are they attracted to certain imagery or text on packaging). Moreover, participants may eventually be able to "purchase" actual products in The CANNEX and use them within the larger BioSim (which includes private spaces with ventilation), completing objective and subjective measures or taking part in experimental studies.

In addition to learning about the purchasing behavior of customers, The CANNEX can be used to study budtender messaging within the dispensary environment, as storefront staff

represent an important population that often provides both naïve and knowledgeable customers with details about products and their purported health benefits (Cameron et al., 2023; Peiper et al., 2017; Popova et al., 2017). Budtenders can be invited to The CANNEX to participate in interviews about how they sell certain products to customers, or scripts could be created for mock budtenders in The CANNEX to provide participants with recommendations or educational information when shopping in the store. The CANNEX could also be used to examine regulatory compliance (e.g., display of warnings) and help to inform policy about emerging high potency THC products, which are available in different formulations and methods of administration and have been implicated in rising rates of cannabis use disorder (CUD), particularly among young adults (Budney et al., 2019).

In conclusion, The CANNEX represents the first known mock cannabis dispensary laboratory in the country that allows for observation of participants in a fully customizable dispensary environment to fit the needs of researchers. We encourage partnerships with other researchers interested in cannabis dispensary research and with those who work in the cannabis industry as the field continues to learn about the health benefits and risks of use, as well as the policy implications of cannabis in an increasing legal recreational atmosphere.

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