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Abstract

Vape shops specialize in the sales of e-cigarettes and other vaping products. In recent studies, young adults who use e-cigarettes have tended to identify with at-risk peer crowds. This is the first study to examine vape shop customers' clientele. Composed primarily of young adults and persons in early middle adulthood, we speculated that a relatively high prevalence of those who appeared to bystanders as radical/extreme (at-risk) customers would be identified as such at these shops. We recruited vape shops throughout Southern California (N = 44 shops), and trained teams of data collectors visited each of the consented vape shops, making note of 451 customers' appearance, including features such as manner of dress, presence of tattoos, and hairstyles. Customers were then coded as either belonging to a conventional, progressive, or radical/extreme crowd based on outward appearance. Of the customers observed, 223 (49%) were rated as appearing to be in the conventional crowd; 169 (38%) were rated as appearing to be in the progressive crowd, and only 59 (13%) were rated as appearing to be in the radical/extreme crowd.

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The conventional crowd tended to appear older. Clientele may reflect that more conventional young and early middle age adults are tempted to visit vape shops due to perceptions of greater acceptability or safety of e-cigarettes. E-cigarette mass media campaigns aimed at protecting potential vape shop customers from harm may need to depict more conservative-looking characters.

Keywords

peer crowds, e-cigarettes, vape shops

Introduction

Peer crowd identification is a concept that refers to the tendency to identify with, or be observed to belong to, discrete groups with differential lifestyle preferences. As of 2007, in a systematic review of the literature, 44 peer-reviewed empirical studies were located that examined peer crowd identification among adolescents and young adults (Sussman et al., 2007). Only three of the studies in that review pertained to young adults, although some additional studies with adolescents have been completed since then (e.g. Doornwaard et al., 2012). In previous studies involving adolescents or young adults, those who identified with, or were identified by raters, as being in a high-risk/alternative lifestyle group (e.g., “frat boys” in one of the young adult studies) were relatively likely to use tobacco, alcohol, or other drugs, as compared to “academics,” “elites,” “athletes,” or “others” (Sussman et al., 2007). That is, high-risk youth were more likely to be cigarette smokers in 13 of 14 studies that compared groups on tobacco, more likely to be alcohol drinkers in 15 of 18 studies, more likely to be marijuana smokers in 8 of 9 studies, and were more likely to be illicit drug users in 13 of 13 studies.

Within the last five years, more peer crowd identification research has examined young adults to investigate tobacco and electronic cigarette (e-cigarette) use, primarily among bar patrons. In these newer studies, counter-culture young adults (e.g., hipster, hip hop, skaters, gamers) were found to be most likely to use tobacco products (e-cigarettes or combustibles), particularly compared to young professionals (Kim et al., 2020; Lisha et al., 2016; Moran et al., 2017; Nguyen et al., 2019). For example, Lisha et al. (2016) found that “partier,” “country,” and “homebody” category young adult crowds (18–26 years old, mean = 24 years old) were more likely to use tobacco products (e-cigarettes or combustibles) than the young professional group. Last 30-day smoking varied from 32.4% to 34.2% in these three groups compared to 28.9% among the young professional group. Last 30-day vaping varied from 17.7% to 20.7% in these three groups compared to 15.4% among the young professional group.

In these more recent studies, group identification was established by having participants select photos of young adults that best fit their main group of friends, and photos of youth that least fit their main group of friends. Photos that most fit their group determined the group to which they were assigned. The photo selection method is relatively new (e.g., Lisha et al., 2016). Most previous studies involved either self-identification with discrete group names, or other-rated identification such as data collector or third party ratings (Ashmore et al., 2002; Brown et al., 1993; Dolcini & Adler, 1994). Self-, other-, and the photo-group identification methods converge on indicating that “alternative” lifestyle (at-risk) adolescents or young adults were among those most likely to use tobacco (and other drugs), particularly compared to the “brains” crowd among adolescents (Sussman et al., 2007) or the “young professional” crowd among young adults (Kim et al., 2020; Lisha et al., 2016).

Adolescents, and young and early middle age adults, have reported a dramatic increase in the uptake of e-cigarettes in recent years (e.g., Galimov et al., 2020) and last 30-day use has increased among 19-to-28-year-olds (young adults) from 6.5% in 2017 to 15% in 2019. Among 29-to-40-year-olds (early middle age adults), while no data were collected in 2017, last 30-day use was approximately 7% in 2019 (see Schulenberg et al., 2020). Vape shops—brick and mortar retail businesses that focus on the sales of e-cigarette devices, juices, and related products (Galimov et al., 2020)—are one outlet for young and early middle age adults to purchase their e-cigarette products and thus far, there has been no study on peer crowd identification among consumers at vape shops (Sussman et al., 2016). Yet peer crowd identification research could possibly inform targeted interventions to prevent young and early middle age adult uptake of e-cigarettes at the points of sale (e.g., Kim et al., 2020). Based on the previous peer crowd research with adolescents and the recent work with young adults, one may speculate that high-risk/alternative lifestyle groups would be at highest risk for e-cigarette use and would be among the most prevalent attendees at vape shops. It is possible that targeted campaigns to prevent initiation or facilitate cessation of e-cigarette use among early middle age adults may be similar to young adults, as both age groups do use e-cigarettes for similar reasons (e.g., as a source of recreation; Cooper, Harrell, & Perry, 2016).

Methods

Data Collectors and Measure Development

The data collectors were three female college graduates in their mid-20s of differing ethnic backgrounds (Armenian, Hispanic/Latino, and Hispanic/Latino-White-multi-racial). Prior to beginning the formal data collection protocol, data collectors examined customers’ physical appearance (e.g., clothing, hairstyle, presence of tattoos) to pilot categorizing customers into different peer crowds. They grouped 20 customers from

two business locations into one of six categories based on previous work (e.g., Lisha et al., 2016), followed by discussion among raters after each rating. Inter-rater agreement was approximately 75%. The categories were then collapsed into three broader groups. The data collectors then categorized another 20 customers from two other locations into one of three mutually exclusive peer crowds, with inter-rater agreement increasing to .95.

Concurrently, data collectors established a list of descriptors for each of the three groupings using stock photos online, showing various ages, genders, and ethnic groups reflecting representative people for each of the three peer crowd types. They discussed the nuances of ethnicity-related physical appearance and the importance of being culturally non-judgmental. Independent card sorting of groups with photos indicated high agreement (over 95%) among the data collectors to confirm the linking of the photos with the groups. Formal data collection included forced-choice coding the vape shop customers into one of the established three categories based solely on appearance, using between four and six photos for each group to anchor judgments.

The first group was labeled the “conventional crowd” (e.g., ordinary, standard, professionals). The conventional crowd included customers that dressed casually or formally (no flashy clothing), had no visible tattoos or outlandish piercings, and appeared to look clean and strait-laced. The second group was labeled the “progressive crowd” (e.g., trendsetters, hipsters) and included customers whose appearance tended to differentiate them from convention. They wore clothes that maintained a popular status in social media (brand/styles), which suggested interest in entertainment, fashion and/or music, and may have appeared to be “artsy” or “flashy” in appearance. They also may have had a few visible tattoos. Finally, the “radical/extreme crowd” referred to those customers that openly pushed socially accepted boundaries in appearance and demeanor (e.g., heavy party or raver groups). This group consisted of those customers who wore clothes appearing relatively extreme (e.g., marijuana leaf shirt), may have had more outlandish tattoos (e.g., explicit or full-sleeve arm tattoos, facial tattoos), extreme piercings, and/or unconventional or brightly colored hairstyles.

Demographic Data. Demographic data on the full sample of customers observed ($N = 451$) were also collected through naturalistic observation (as in a previous study; Sussman et al., 2016). To establish an estimate of race/ethnicity, the observed customers were placed into the following categories: Asian, Hispanic/Latino, African American/Black, White/Caucasian, or Other. If the “Other” category was selected, the data collector specified the response in an open-ended format (e.g., Pacific Islander, multiracial). Gender was coded as a binary response of either male or female. The estimated age of the customer was listed as an exact number (no age ranges were used).

Vape Shop Protocol

We studied a cohort of vape shops that were located and identified using Yelp and Google Maps in neighborhoods with a high proportion of residents from heterogeneous racial/ethnic neighborhoods in Southern California (see Galimov et al., 2020, for details). Shops in our sample represent a cohort that has been followed over time with several waves of data collected and had remained open for business. Selected vape shops did not sell any combustible tobacco products at time of initial selection/recruitment. From July 2019 - March 2020 (prior to COVID-19 shutdowns) trained data collectors visited 44 vape shops during workdays with permission to recruit customers from shop owners/employees. Teams of two data collectors collected all data simultaneously; as one data collector interviewed the customer, the other data collector conducted naturalistic customer observations (coded the number of customers that entered the shop, as well as their estimated age, estimated ethnicity, and peer crowd). That data collector observed and coded all individual customers that were present during the duration of data collection within the shop and categorized them into peer crowd category groups.

Additionally, to ensure that observational estimates were reliable throughout data collection, the one data collector conducting interviews also conducted customer observations at 37 of the shops, along with the data collector engaging in the customer observation assessment. One customer per each of 37 shops was selected to establish inter-rater agreement on customer observation data (e.g., $N = 37$ customers; 8% of the total sample). Inter-rater reliability was evaluated using Cohen's Kappa (k) for gender ($k = .93$, almost perfect agreement), ethnicity ($k = .84$, strong agreement), and group identification ($k = .61$, moderate agreement), while the intra-class correlation coefficient (ICC) was calculated for age (ICC = 0.93, strong agreement) (McHugh, 2012).

Self-Rating Assessment. A subsample of approximately one customer per vape shop ($N = 53$ approached, 47 agreed) participated in a self-rating peer crowd assessment, while all vape shop customers present at the time of data collection were naturalistically observed and coded (other-rating assessment) at the 44 vape shops. The first customer approached in the shop was selected to engage in the peer crowd self-rating assessment.

Three pages of stimulus materials were provided to the subsample of 47 self-rating assessment participants. Each page contained six photos which were inconspicuously labeled "Group 1", "Group 2", or "Group 3" (one peer crowd/group per page). Participants were asked the following: *Each of these three pages contain photos of peer groups. Which of the three groups (Group 1, Group 2, or Group 3) do you identify with most?*

Results

A total of 451 customers were observed from the 44 vape shops (range: 6–20 customers; mean of 10 customers per shop). Of them, 76% were coded as males; and customers’ mean age was estimated to be 32.4 years (SD = 10.6). In addition, 49% (n = 220) were coded as White/Caucasian, 18% (n = 82) were coded as Hispanic/Latino, 19% (n = 83) were coded as Asian, 9% (n = 42) were coded as African American/Black, and 5% (n = 24) were coded as Other (e.g., American Indian, Pacific Islander, multiracial) ethnicity. Gender, age, and ethnicity prevalence coding outcomes were consistent with our previous work (Sussman et al., 2016).

Of the total sample of 451 customers observed, 49% (n = 223) were rated as appearing to be in the conventional crowd; 38% (n = 169) were rated as appearing to be in the progressive crowd; and only 13% (n = 59) were rated as appearing to be in the radical/extreme crowd. A majority of all three subgroups were males (conventional crowd, 78%; progressive crowd, 78%; radical/extreme crowd, 63%; χ^2 (2 df) = 6.1, $p = .05$). Customers coded as being in the conventional crowd appeared to be older than the other two groups (conventional crowd mean age = 35.4, SD = 12.3; progressive crowd mean age = 28.2, SD = 6.2; radical/extreme crowd mean age = 32.8, SD = 9.6; $F(2,442) = 24.4$, $p < .01$). As shown in Table 1, a greater proportion of those coded as African American/Black customers were categorized as the progressive crowd (i.e., 55% of African American/Black customers) than the other two peer crowds (38% conventional and 7% radical/extreme); whereas those coded as the other four ethnic groups showed a similar distribution for the prevalence of peer crowd

Table 1. Vape Shop Customers Characteristics for the Total Sample and by Peer Crowd Groups^a.

	Total (n = 451)	Conservative (n = 223)	Progressive (n = 169)	Radical (n = 59)	p Value ^b
Total	100%	49%	37%	14%	
Gender:					
Male	341	173 (51%)	131 (38%)	37 (11%)	.05 ^c
Female	110	50 (45%)	38 (35%)	22 (20%)	
Ethnicity					
Asian	83	40 (48%)	38 (46%)	5 (6%)	.03 ^c
Black	42	16 (38%)	23 (55%)	3 (7%)	
Hispanic	82	39 (48%)	28 (34%)	15 (18%)	
Other	24	15 (63%)	8 (33%)	1 (4%)	
White	220	113 (51%)	72 (33%)	35 (16%)	
Age, mean (SD)	32.4 (10.6)	35.4 (12.3)	28.2 (6.2)	32.8 (9.6)	<.01 ^d

Notes. ^aData are expressed as No. (%) unless otherwise indicated.

^bFor the difference between three peer crowd groups.

^cCalculated using the χ^2 test.

^dCalculated using the ANOVA test.

categories with the conventional crowd being most common (51% conventional vs. 33% progressive and 16% radical/extreme among Whites/Caucasians; 48% vs. 34% and 18% among Hispanics/Latinos; 48% vs. 46% and 6% among Asians; and 63% vs. 33% and 4% among Others ($\chi^2(8) = 17.5, p = .03$)). Interestingly, 85% of customers coded as the radical/extreme crowd ($n = 59$) were categorized as White/Caucasian or Hispanic/Latino.

Among the subset of customers who engaged in the self-rating assessment, all of them were e-cigarette users. Of these customers, 23 (49%) rated themselves as Group 1 (conventional crowd), 18 (38%) rated themselves as Group 2 (progressive crowd), and 6 (13%) rated themselves as Group 3 (radical/extreme crowd). Unfortunately, the agreement between the data collector ratings with the customer self-ratings on these 47 customers was low (Cohen's Kappa = .37); 62% of this subsample showed agreement among rater and customer. Among those ratings that matched, 52% ($n = 15$) were of the conventional crowd, 34% ($n = 10$) were of the progressive crowd, and 14% ($n = 4$) were of the radical/extreme crowd. Thus, even though the agreement was not high, both other and self-perceptions of crowds favored the conventional crowd as the majority.

Discussion

To our knowledge, this is the first study to apply the concept of peer crowds at vape shops, who are primarily young and early middle age adults. This vape shop customer age group is older than those in previous peer crowd research, with most customers falling between 22 and 42 years of age. While lower than among young adults, the overall increase in use among early middle age adults still is disconcerting and is not primarily due to switching from combustible to noncombustible products (Dai & Leventhal, 2019; Galimov et al., 2020).

Half of the customers who attended vape shops in our sample were rated by observers as being in the conventional crowd, and in the subsample of customers, approximately 50% of them also rated themselves as being in the conventional crowd. These results are inconsistent with previous studies of bar patrons (e.g., Lisha et al., 2016) but are consistent with some studies that suggest that e-cigarettes have been reaching relatively lower risk persons compared to users of combustible products (Hong et al., 2019; Wills, 2017). Perceptions of e-cigarettes as being relatively safe and acceptable may possibly attract relatively conventional young and early middle age adults. One limitation of both types of studies is that only one group could be endorsed; it is possible that young and early middle age adults identify with, or are identified as, belonging to different groups in different settings (e.g., Moran et al., 2017). In addition, our sample was an average of eight years older than the sample of bar patrons, with a wider age range. Being older may possibly account for identification with a more conservative clique or shift to a more conservative clique over time.

Future studies are needed with larger samples across more shops in different regions and states to check external validity of our findings. In addition, it would be useful to be

able to triangulate self-ratings, perhaps using the newer photo method, with observer (“other”) ratings of crowd identification and ethnicity among the larger samples, as it is possible that different methods could lead to varying results (though previous work appears consistent across methods; Sussman et al., 2007). For example, it is not clear why persons rated as being of White/Caucasian and Hispanic/Latino ethnicity, who accounted for 67% of the total sample, also accounted for 87% of those also rated as being in the radical/extreme crowd. Clearly, more research is needed to address methodological as well as substantive issues here.

Public Health Implications and Future Research Directions

Messages to warn of the dangers of vaping may need to be tailored for different groups in different contexts. Peer crowd identification methods might help to match health messages to different social media users (Kim et al. 2020); and images in the messaging may need to highlight specific peer crowds to be most effective. In a bar-like environment, health messages may need to be tailored primarily for the most-current trendy grouping such as hip hop and hipsters crowds (Lisha et al., 2016). However, for those who frequent vape shops, messages might need to be tailored to include a broad range of groups, particularly to appeal to mainstream, conventional young and early middle age adults with a conservative outer appearance.

More research is needed regarding peer crowd identification and vape shops, including examination of purchasing patterns by category, as well as patterns of consumption of specific electronic products, flavors, or devices. This could lead to more campaigns aimed at more segmented groups to reduce use of products that may contain higher levels of nicotine (for example), or that may be more appealing to certain age groups by race/ethnicity, as well. Further support for the differences seen may have implications for public education campaigns that aim to prevent not only young adult, but also early middle age adult uptake of electronic cigarette products.

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