




Exploring the Influence of E-cigarette Ad Features on Perceived Product Appeal and Use Interest Among Young Adults of Varying Tobacco-Use Behaviors

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Abstract

Introduction: Exposure to certain features in commercial e-cigarette ads may influence e-cigarette use perceptions. This study explored the reactions toward common features in e-cigarette ads among young adults of various tobacco-use behaviors.

Aims and Methods: We used data from in-depth interviews with U.S. young adults (ages 18–29) who do not use tobacco ($n = 26$) and who currently smoke cigarettes ($n = 26$). Participants viewed 30 print e-cigarette ads that included multiple features (eg, fruit flavors, price promotions, smoker-targeted messages) before discussing their perceived influence of memorable ad features. We used reflective thematic analysis to analyze interview data.

Results: Participants from both groups generally noticed fruit and multiple flavors displayed in the ads, which were seen as appealing and were reported to generate product-use interest because of bright colors, sensory appeal, and a variety of flavor options. Participants who smoke perceived price promotions and positive experience testimonials to be appealing, and some reported this generated use interest. Participants from both groups perceived smoker-targeted messages to be unconvincing, and reported this dampened ad and product appeal and use interest. Participants who do not use tobacco perceived nicotine warnings to be unappealing, resulting in reduced perceived appeal of other attractive features (eg, fruit flavors) appearing in the same ads.

Conclusions: Marketing features appearing in e-cigarette ads may be perceived by young adults of various tobacco-use behaviors in both similar and different ways. Communication and policy strategies that account for these differential perceptions towards various marketing features are needed to reduce the negative impact of e-cigarette marketing.

Implications: This study revealed evidence related to young adults' reactions to and perceived influence of commonly used marketing features (eg, fruit flavors, nicotine warnings, price promotions, smoker-targeted messages) in commercial e-cigarette ads. The results highlight the similar and differential perceived appeal and use interest of e-cigarette products promoted with various marketing features among young adults of different tobacco-use behaviors. The results have implications for informing the design of communication strategies and policies related to e-cigarette marketing aimed at promoting complete product switching among young adults who smoke while simultaneously deterring e-cigarette use interest among those who do not use tobacco.

Introduction

Cigarette smoking prevalence and product sales have significantly decreased over the past years in the United States.^{1,2} Many adults who smoked cigarettes or other tobacco products now have more options, including electronic cigarettes (e-cigarettes). Evidence has shown that completely switching from cigarettes to e-cigarettes may reduce exposure to harmful chemicals and may be beneficial to the health of those who exclusively replace cigarettes with e-cigarettes.³ Young adults who smoke cigarettes, in particular, may benefit from completing smoking cessation through using e-cigarettes before they become vulnerable to the severe health effects of long-term cigarette smoking.^{4,5} Conversely, e-cigarette

use among young adults who are new or naïve to tobacco products may cause respiratory health problems and lead to nicotine addiction and long-term tobacco-use behavior, causing irreversible harm to users' health.⁶

Therefore, it is important to examine common contributing factors for e-cigarette use among young adults who smoke and young adults who are naïve to tobacco. One such factor is exposure to e-cigarette advertising or marketing.^{7,8} Extensive evidence has shown that e-cigarette marketing continues to play an important role in influencing the perceptions and intentions of e-cigarette product use among young people of various tobacco-use behaviors.^{7–12} For example, longitudinal studies have found that among young adults who do not use

tobacco and young adults who smoke cigarettes, exposure to e-cigarette marketing in the past month was associated with subsequent e-cigarette use in 12-month follow-up.^{9,10} For those who smoke cigarettes, exposure was additionally associated with subsequent e-cigarette use to quit smoking.⁹

Less evidence is available,^{13,14} however, to assess which commonly used features (eg, nicotine warnings, human models, price promotions) of e-cigarette marketing are particularly influential in promoting e-cigarette appeal and experimentation among young people. The hierarchy-of-effects in advertising model suggests that ad exposure may lead to product use through ad features that create positive norms and appeals around the products.¹⁵ Because of commercial speech rights afforded by the First Amendment of the U.S. Constitution, the U.S. Food and Drug Administration (FDA), which regulates e-cigarette products, may not completely eliminate e-cigarette advertising.¹⁶ However, as the FDA takes marketing plans into consideration when making decisions on e-cigarette premarket tobacco product authorization,¹⁷ an understanding of the influence of e-cigarette advertising at the feature level among young people of various tobacco-use behaviors is critical.

Additionally, such an understanding can inform the FDA in restricting the marketing practices that appeal to young people (eg, restricting e-cigarette products packaged to look like toys, food, or cartoon characters),¹⁸ requiring warning labels that convey potential health risks from e-cigarette use, and regulating claims regarding harm reduction.¹⁹ Finally, such information could guide local legal actions towards tobacco companies for removing youth-appealing marketing features (eg, prohibiting the use of young, attractive models).²⁰

To provide evidence on the influence of e-cigarette ad features, we recently conducted two heatmap experiments to assess young adults' noticing of ad features and their associations with ad appeal and product-use interest. The studies found that noticing fruit flavors and price promotions increased e-cigarette product appeal and use interest among both young adults who do not use tobacco and who concomitantly use cigarettes and e-cigarettes.^{13,14} While these findings provide preliminary evidence on the influence of specific ad features on e-cigarette use perceptions and interest, there is still limited research on why and how these features influence changing perceptions or lead to similar and differential e-cigarette product appeal among young adults of various tobacco-use behaviors.

To address this research gap, we conducted one-on-one in-depth interviews with both young adults who do not use tobacco and those who smoke cigarettes to explore how various marketing features affect the perceived appeal and use interest related to e-cigarette products shown in commercial ads. The results from this study can be used to inform regulatory decisions on e-cigarette product authorization, marketing restrictions, and health communication strategies to reduce harm associated with tobacco use.

Methods

Participant Recruitment, Eligibility, and Screening

Between June and September 2022, young adults who do not use tobacco and young adults who smoke cigarettes were recruited through social media platforms (eg, Facebook, Craigslist) and flyers posted in the Central New Jersey area in the United States. To be deemed eligible, participants

had to be between 18 and 29 years old and proficient in reading and speaking English. Participants who do not use tobacco were those who reported never experimenting with any tobacco products or never regularly using any tobacco products before and had not used any tobacco products in the past 30 days.^{13,21} Participants who smoke were those that had smoked a cigarette in the past 30 days and at least 100 cigarettes in their lifetime.^{14,22} An additional tobacco-related eligibility criterion for all participants was e-cigarette use susceptibility among those who never used e-cigarettes, defined as having no firm commitment to not use e-cigarette products.²³ Those who reported eye movement or alignment abnormalities were deemed ineligible because of a mandatory eye-tracking research task.²⁴ Eligible individuals were contacted by the study coordinator to confirm eligibility and schedule an in-person visit to the office located in New Brunswick, NJ.

Study Procedure and In-Depth Interviews

During the visit, participants first read and signed the consent form and completed an online background survey to answer questions about their demographic backgrounds and tobacco-use history. Next, they completed the eye-tracking task on a computer screen where they viewed 30 static e-cigarette stationary ads (see [Supplementary Table 1](#) for example ads) in random order for as long as they liked (participants averaged approximately 9 seconds' viewing time per ad).

These ads, which were retrieved from Trinkets and Trash (trinketsandtrash.org)²⁵ and Kantar Media Intelligence, were published in magazines and direct consumer emails in 2019 and 2020, and marketed various cartridge-based or pod-based e-cigarette products and brands (eg, JUUL, Vuse, Logic, and Blu) commonly used at the time of data collection. These 30 ads were selected because they all included more than three distinct content features (defined as a discernable component of the ads), which allowed participants to view multiple features per ad.^{13,14} All e-cigarette ads were double-coded by study team members (JCS and ME) based on codes and their definitions were constructed to include an exhaustive list of visible features shown in the ads (see [Table 1](#) for a full list of ad features). These features also reflected commonly found e-cigarette marketing features from previous studies.^{26,27} After coding and defining the ad features, the team identified the locations of the features in the ads.

After viewing the ads, participants engaged in one-on-one in-depth interviews with two interviewers. The interviewers were trained in moderating in-depth interviews and identifying and naming various features appearing in the ad stimuli. Using a semi-structured in-depth interview guide developed by the research team, the interviewers asked questions to gather information on participants' reactions toward the various features displayed in the ads (see [Table 2](#) for interview questions). The interviews began by asking participants about their overall reactions to the ads and whether any specific ads stood out to them and why. Participants were then asked to describe any features or components of the ads that captured their attention. They were then asked to discuss how they thought each of the features they mentioned influenced their perceptions and interest in using the e-cigarette products shown in the ads. Probing was used throughout the interviews to fully understand participants' reactions and perceptions. The interviewers audio-recorded the interviews (~30 minutes) with participants' consent.

Table 1. Description of E-cigarette Ad Features

E-cigarette ad features	Feature descriptions
Fruit flavor	Fruit flavors (strawberry, cherry, melon) in product descriptions or on packages
Human model	People or human models shown in the ads
Menthol flavor	Menthol flavors in product descriptions or menthol-flavored product images or packs
Mint flavor	Mint flavors in product descriptions or mint-flavored product images or packages
Multiple flavors	Multiple flavors (a combination of some or all of fruit, tobacco, menthol, and mint flavors) in product descriptions or multiple flavored product images or packages
Nicotine warning	Nicotine warning statement displayed in the ads or on the packages (“This product contains nicotine. Nicotine is an addictive chemical.”)
No sales to minors	Statements related to no sales to underage minors (eg, “Not for sale to minors.”)
Pack image	E-cigarette pack images that do not show any flavors
Positive experience testimonial	Marketing messages that promote positive experiences and outcomes or other benefits from using e-cigarettes (eg, no smell, convenience) using personal testimonials
Price promotion	Price promotion information such as coupons, discounts, or bundled sales
Product descriptor	Descriptions of the e-cigarette products, including nicotine concentration, puff volume, battery life, etc., that do not include flavor descriptions
Product image	Images of e-cigarette products (including pods and refillable liquids) that do not specify particular flavors
Shopping information	Information including product sales website, shopping code, or other product purchasing-related information
Smoker-targeted message	Marketing claims that target those who smoke (“For smokers” or “Make the Switch”) and promote product switching from cigarettes to e-cigarettes
Tobacco flavor	Tobacco flavors in product descriptions or tobacco-flavored product images or packs

After the interview, participants engaged in additional tasks not relevant to this current study. At the end of the study visit, all participants were given a fact sheet with health education messages about the harm of tobacco and e-cigarette use as well as smoking cessation resources for those who smoke. The in-person visit consisted of a 90-minute single session for those who do not use tobacco and a 60-minute single session for those who smoke. The experiment for the former group was longer because they were given additional research tasks. Therefore, participants who do not use tobacco and participants who smoke were compensated with \$150 and \$100 Visa gift cards, respectively. This study was approved by the Rutgers University Institutional Review Board (Pro2021001722).

Interview Data Interpretation

This current analysis includes interview data from 52 participants (26 who do not use tobacco and 26 who smoke).

Table 2. In-depth Interview Questions Used for Current Analysis

In-depth interview questions
Question 1. What came to your mind when you saw those e-cigarette ads?
Q1.1 How did you like the ads?
Q1.2 What did you think about the e-cigarette products from the ads?
Q1.3 Did you find yourself interested in using the e-cigarettes from the ads?
Q1.4 Did you find yourself interested in completely switching to the e-cigarettes from the ads?
[only for participants who smoke cigarettes]
Question 2. Was there one ad that stood out to you the most? What do you remember from this particular ad?
Q2.1 Why did this ad stand out to you?
Q2.2 What did you think about the e-cigarette product(s) from the ad?
Question 3. Could you describe any features or components of those e-cigarette ads that stood out to you?
Q3.1 What did you think of [the feature]?
Q3.2 How did you like [the feature]?
Q3.3 Did [the feature] make you interested in using e-cigarettes from the ads?
Q3.4 Did [the feature] make you interested in completely switching to e-cigarettes from the ads?
[only for participants who smoke cigarettes]

Data saturation for reactions towards various e-cigarette ad features was reached around interview #26 for both groups, and no new additional information emerged from the interviews that followed thereafter.²⁸ All audio recordings were transcribed verbatim by a professional company and the transcripts were de-identified and imported to Dedoose, a qualitative data management and analysis tool.²⁹ We used Braun and Clarke’s six steps of reflective thematic analysis approach³⁰ to guide the data interpretation process.

Specifically, all members of the research team first familiarized themselves with the data by reading and re-reading the transcripts to develop a codebook that lists thematic and content codes with definitions. Three trained coders (MM, OM, and CU) from the team manually coded the first eight transcripts (four from each participant group) to revise and add additional codes to the codebook and confirm the completion of the codebook. The coders then double-coded all transcripts in pairs and reached a satisfactory average coding agreement across codes (Krippendorff’s alpha = 0.77, percent agreement = 86%).^{31–33} Coding disagreement was resolved by the third coder and the PI. The coders and the PI then independently grouped the coded data into broad categories with similar concepts so as to identify ad features that were most often discussed by the participants and had the most influence on participants’ e-cigarette product appeal and use interest. The team identified consistent thematic patterns among all participants but also differential patterns between participants who do not use tobacco and participants who smoke.

Based on these categories generated by the coders and the PI, the entire team then met to construct themes that appropriately addressed the research questions. The discussion process involved finalizing features that were most often discussed and deemed most influential when considering alternative interpretations of the data. The team agreed that participants most often noticed or recalled

fruit flavors, multiple flavors, price promotions, smoker-targeted messages, positive experience testimonials, nicotine warnings, human models, and product images or descriptors. Participants' perceptions of human models were not included in the themes as the team determined that this feature only influenced overall ad appeal but not e-cigarette product appeal or use interest. Product-focused features (eg, cartridge-based product images or descriptors such as battery life) were also excluded from this analysis as reactions to these features may differ significantly from ads promoting other types of e-cigarette products with different characteristics and appeal (eg, tank- and mod-based products or disposable products). The team also identified supporting quotes that represented the data for each theme followed by naming the themes and presenting them as a narrative to illustrate participants' reactions and perceptions toward the influential ad features. All generated themes, their narratives, and their represented quotes were reviewed and agreed upon by the research team before final reporting.

Results

Participant Characteristics

Table 3 presents participant characteristics. In our sample, there was an even split between young adults who do not use tobacco (50.0%) and young adults who smoke (50.0%). Half of the participants were male (50.0%), less than half were female (48.1%), and 1.9% identified as other genders. Additionally, 40.4% of participants were 18–21 years old, 23.1% were 22–25 years old, and 26.5% were 26–29 years old, and over half of the participants reported being non-Hispanic white (57.7%). Finally, about 60.0% had used an e-cigarette before, and over half of participants believed e-cigarettes to be equally (38.5%) or more (34.6%) harmful than cigarettes.

Themes

For all commonly noticed ad features that pose an influence on product appeal and/or use interest, their corresponding themes are described below. Table 4 provides representative quotes for each theme labeled with participants' gender, age, and tobacco-use behavior.

Fruit Flavors and Multiple Flavors are Appealing and Generate Use Interest

Participants of both groups often mentioned that they noticed and were attracted to the ads that displayed a variety of fruit flavors (eg, strawberry, cherry, orange, and mango) and multiple flavors (a combination of all or some fruit, mint, tobacco, or menthol flavors) mainly because they liked the flavor options that they could choose from. Many compared seeing the different flavor options in the ads to picking out flavors of fruits, candy, or gum and going shopping in general. Both groups were also attracted to ads with those features because of their bright colors and highly contrasting color schemes. Participants expressed that these were more visually appealing than other ads that did not promote various fruit or multiple flavors, using positive words such as “bright,” “vibrant,” and “refreshing” to describe them.

Most participants of both groups reported fruit flavors and multiple flavors to be appealing, and some stated that they were interested in trying the products because of those flavors. They described how various flavor options (especially those under the fruit flavor categories) made them feel curious about

Table 3. Participant Characteristics (*n* = 52)

Age	Total
18–21	40.4%
22–25	23.1%
26–29	36.5%
Race and ethnicity	
Hispanic	19.2%
Non-Hispanic white	57.7%
Non-Hispanic other ¹	23.1%
Gender	
Female	48.1%
Male	50.0%
Other ²	1.9%
Sexual orientation	
Heterosexual	78.8%
Other ³	21.2%
Subjective financial status	
Comfortable	30.8%
Meet needs	38.4%
Just meet needs	25.0%
Do not meet needs	5.8%
Comparative harm perceptions of e-cigarettes and cigarettes	
E-cigarettes more harmful	34.6%
Equally harmful	38.5%
E-cigarettes less harmful	26.9%
E-cigarette ever use	
Yes	59.6%
No	40.4%
E-cigarette current use	
Yes	26.9%
No	73.1%
Current cigarette smoking	
Yes	50.0%
No	50.0%

¹Non-Hispanic Others include non-Hispanic Black or African American, non-Hispanic Asian, non-Hispanic Native Hawaiian or Pacific Islander, and others not mentioned.

²Other genders include non-binary/third gender, prefer not to say, and other not mentioned.

³Other sexual orientations include homosexual, bisexual, prefer not to say, and other not mentioned.

the products and seemed to offer opportunities for them to experiment with the products. In addition to the excitement of having choices, the idea of trying fruit flavors, in particular, was interesting to some participants because these flavors reminded them of the taste of actual fruits corresponding with the flavors. Few participants mentioned harmful chemicals from flavored products after noticing fruit and multiple flavors.

Price Promotions are Appealing and Generate Use Interest Among Those Who Smoke

Many participants who smoke expressed e-cigarette product appeal after seeing the various price promotions, including coupons, discounts, and bundled sales. They often mentioned that seeing these price promotions made them

Table 4. Themes and Sample Responses Related to Participants' Reactions and Perceptions Toward E-cigarette Ad Features

Themes	Sample quotes
<i>Fruit flavors and multiple flavors are appealing and generate use interest</i>	<p>"I feel flavors are definitely an interesting factor because as kids, we would always choose a lollipop flavor, choose a gum flavor or something, you know? And then now it's choosing an e-cigarette flavor." -<i>Female, 19, does not use tobacco</i></p> <p>"They were very appealing to the eye, such as the Logic one that I saw - berry mint, and the colors were very vibrant, and it caught my eye." -<i>Female, 27, smokes cigarettes</i></p> <p>"They're just appealing, the colorful ones. That makes me think about my vape or which vapes I want to try. I like to try different flavors and experiment." -<i>Female, 25, smokes cigarettes</i></p> <p>"Well, I know what blueberry tastes like. I know I like blueberry. Maybe I'll like this blueberry too, you know? That would be a comforting factor more so than, 'Oh, I don't know what this is going to taste like at all.'" -<i>Female, 23, does not use tobacco</i></p>
<i>Price promotions are appealing and generate use interest among those who smoke</i>	<p>"Yeah. If it's cheaper than my regular cigarettes, then seems like a good investment." -<i>Female, 24, smokes cigarettes</i></p> <p>"I think one of them said buy 10, get 10 free or something like that. It was pretty cool. Pretty interesting. Seems like a good deal." -<i>Female, 25, smokes cigarettes</i></p> <p>"Well, because I already used them, so to find deals or to find new flavors would be enticing to continue to use them." -<i>Male, 26, smokes cigarettes</i></p> <p>"I would have to check about it, yeah, if it was like a lot cheaper than buying a pack of cigarettes, next time I might use that and buy a vape, yeah." -<i>Male, 23, smokes cigarettes</i></p>
<i>Smoker-targeted messages are unconvincing and reduce use of interest</i>	<p>"I feel nicotine companies, it's kind of giving a false solution to the problem, but really they're getting more money because if cigarette sales are going down, what can go up?" -<i>Female, 21, smokes cigarettes</i></p> <p>"And [smoker-targeted messages] kind of make me want to use e-cigarettes less because it's like, well, you are still bad. Like these are still bad products. They're not good for you. They're just an alternative. And so that, that seemed kind of sketchy. It's like, hey, make this switch, but is it really that much better?" -<i>Male, 19, smokes cigarettes</i></p> <p>"Very misleading because they're both nicotine products and switching really doesn't do much justice. No, because again I believe that they're both bad." -<i>Male, 21, does not use tobacco</i></p> <p>"These messages made me less interested because it's making such a bold claim with no proof. It's just saying it, so it doesn't convince me." -<i>Female, 23, does not use tobacco</i></p>
<i>Positive experience testimonials are appealing and generate use interest among those who smoke</i>	<p>"The ads were like, 'Oh, I can spend more time with my family.' So, if me and my mom both did that, we could both be inside more often." -<i>Female, 25, smokes cigarettes</i></p> <p>"I would say they did make me interested, especially when they had testimonials, for example from former smokers. Some of the claims that they made like the smell and the ability to not leave the house did appeal to me." -<i>Female, 27, smokes cigarettes</i></p> <p>"That really was what sort of started turning my opinion towards [wanting to try e-cigarettes], was the testimonials and some of the points made in them." -<i>Male, 23, smokes cigarettes</i></p> <p>"Well, I know I have a 2-year-old, so, I don't like to go out too much. And I noticed one that was, like, 'Save time' or, 'Spend more time with your family instead of smoking cigarettes.' So, that kinda, like, triggered me." -<i>Female, 27, smokes cigarettes</i></p>
<i>Nicotine warnings are unappealing and reduce use interest among those who do not use tobacco</i>	<p>"Less interested for sure because of the fact that they even had to put something like that [warning] on an advertisement shows you how harmful it is." -<i>Female, 19, does not use tobacco</i></p> <p>"The nicotine warning definitely deterred me from even indulging in that product. You know, it was kind of just like a gross label, you know? It was like a red mark, like, of death, like get away from that ad, you know?" -<i>Male, 21, does not use tobacco</i></p> <p>"Probably the one that said it's a better alternative, and then, while saying that, there is that warning right above. I think that makes it less appealing." -<i>Female, 23, does not use tobacco</i></p> <p>"I could see that [fruit flavors] could be enticing. However, with those claims, there was the warning right above, which defeats it entirely." -<i>Female, 23, does not use tobacco</i></p>

Participant quotes are labeled with participants' gender, age, and tobacco-use behavior

think about how much these affordable e-cigarettes would cost them in comparison to cigarettes. Some also mentioned that having price promotions would allow them to experiment with new e-cigarette products without wasting money. Some expressed product-use interest after seeing bundled sales because they liked the idea of paying less for more products; a few who currently used e-cigarettes even mentioned that purchasing bundles would help sustain their e-cigarette use. In contrast, noticing price promotions had less influence on those who do not use tobacco, with

only two stating that they would be interested in trying e-cigarettes at a lower cost.

Smoker-Targeted Messages are Unconvincing and Reduce Use Interest

Almost all participants mentioned that the smoker-targeted messages directly conveyed that the products shown in the ads were for people who smoke to reduce or quit smoking. The majority of participants, especially those who smoke,

expressed negative perceptions towards smoker-targeted messages (eg, “Make the Switch”), mainly because they perceived them as unconvincing. The most cited reason for this perception was that these messages appeared to be marketing scams or gimmicks used by the tobacco or e-cigarette industry to sell e-cigarette products and make a profit. Some participants were skeptical because they perceived both products (cigarettes and e-cigarettes) to be harmful and addictive and/or that e-cigarettes are equally or more harmful than cigarettes, so it would not benefit users’ health to switch from one to the other. Both groups further mentioned that these messages were unconvincing since the ads did not include scientific facts related to the absolute or relative harm of e-cigarettes versus and cigarettes and they thought that these facts needed to be included in the ads to support the messages. Some were also skeptical because of their negative experience from using e-cigarettes, including dry mouth and coughing, as well as their unsuccessful experience from using e-cigarettes to quit smoking. Some participants who do not use tobacco also mentioned that the ads with smoker-targeted messages were not relevant to them, which led them to feel indifferent about the ads with such messages.

Positive Experience Testimonials are Appealing and Generate Use Interest Among Those Who Smoke

Many participants who smoke reported product appeal in noticing the ads with positive experience testimonials from people who used to smoke, highlighting non-cessation-related benefits of e-cigarette use. They specifically liked the testimonials that described the advertised e-cigarette products as convenient to use, not smelling like cigarettes, and more socially acceptable than cigarettes, enabling users to spend more time with family instead of retreating to a smoking area. Several participants who smoke also reported use interest from noticing these testimonials for wanting to benefit from similarly positive vaping experiences that are superior to smoking cigarettes. Additionally, some participants who smoke as well as some who do not use tobacco favored the testimonials that highlighted successful smoking cessation stories, describing them as inspirational and encouraging.

Nicotine Warnings are Unappealing and Reduce Use Interest Among Those Who Do Not Use Tobacco

Most participants who do not use tobacco reported that nicotine warnings were unappealing to them because the warnings reminded them that e-cigarettes are also tobacco products, which contain nicotine and harmful chemicals. Some even shared that when appearing in the ads with nicotine warnings, some commonly attractive features (eg, positive experience testimonials, human models, fruit flavors) seemed to be less appealing to them, dampening their interest in trying the products shown in the ads. Some further expressed that the associated harm perceptions from seeing the nicotine warnings overwhelmingly reduced their interest in trying the e-cigarette products shown in the ads.

Discussion

To the best of our knowledge, this is one of the first in-depth interview studies to explore the reactions and perceived influence of e-cigarette ad features among young adults who do not use tobacco and young adults who currently smoke

cigarettes. Our findings suggest that some e-cigarette ad features (eg, fruit and multiple flavors, price promotions, smoker-targeted messages, positive experience testimonials, and nicotine warnings) may be especially attention-grabbing and memorable for young adults. These features may appeal to and generate use interest among young adults of various tobacco-use behaviors in both similar and different ways. Specifically, ads and products promoted with fruit and multiple flavors were perceived as appealing and were reported to generate use interest among both groups of participants, but those with price promotions were generally influential only among participants who smoke. Additionally, ads and products with smoker-targeted messages were perceived as unappealing among all participants, while nicotine warnings were perceived as unappealing and reduced use interest only among those who do not use tobacco.

We found that noticing fruit flavors in e-cigarette ads spurred product appeal (mainly curiosity towards the products) and use interest among young adults in both groups by enhancing sensory appeal through bright colors and familiar taste. Both groups also perceived having a variety of flavor choices as a strong appeal of e-cigarette products and expressed enhanced interest in trying the products with multiple flavors. Additionally, our study shows that when appearing in e-cigarette ads, tobacco flavors (the only e-cigarette flavor type currently authorized by the FDA for marketing^{16,34,35}) and menthol flavors (the only cartridge-based non-tobacco flavor allowed for sale¹⁶) may be less likely to catch young adults’ attention or increase product appeal compared to the ads that show fruit flavors or a combination of multiple flavor types. These findings may add complications to the FDA’s decision-making on e-cigarette product marketing authorizations regarding flavors¹⁷ as well as its policy decisions on restricting the sale of non-tobacco and non-menthol flavored cartridge-based e-cigarettes in the country.¹⁶

Additionally, price promotions were considered as appealing and generated use interest mostly among those who smoke, mainly through fortifying the knowledge that e-cigarettes are an affordable alternative to cigarettes and that e-cigarettes are a long-term investment. This result, together with our findings about flavors, suggests that policies restricting e-cigarette advertisements with fruit and multiple flavors and/or price promotions to locations or areas frequented by adults who smoke cigarettes (eg, adult-only tobacco retailers or vape shops)³⁶ could potentially reduce exposure to those ads among tobacco-naïve young people while keeping those who smoke interested in using e-cigarettes for product substitution and switching. Although our study did not find positive appeal or use interest from noticing price promotions among those who do not use tobacco, previous research has found such associations among tobacco-naïve young people.^{13,37} Therefore, continued monitoring and assessment of the influence of exposure to price promotions in e-cigarette ads among young people of varying tobacco-use behaviors is needed.

Furthermore, consistent with previous studies,^{38,39} our results showed that nicotine warnings may serve as the most influential appeal-reducing feature in e-cigarette ads among young adults who do not use tobacco. We also found that when appearing in the same ads with nicotine warnings, some attractive features (eg, fruit flavors and multiple flavors) were less appealing or no longer considered appealing for this group. These findings, however, were not found among

young adults who smoke, because they may be desensitized to nicotine warnings because of repeated exposure to the same feature from cigarette packs and products. In 2016, the FDA mandated e-cigarette nicotine warnings on various marketing channels such as print magazines, email correspondences, and social media sites.⁴⁰ Therefore, increasing nicotine warning compliance for all e-cigarette ads, especially those on social media where the compliance is currently low,^{41–43} is critical for reducing e-cigarette ad appeal and product-use interest among young adults who are naïve to tobacco.

We also found that smoker-targeted messages, which are designed to motivate pursuits to switch to e-cigarettes, were perceived as unappealing among those who smoke. Our results show that this is most likely due to this group's heightened skepticism towards industry profiting and lack of scientific facts (eg, absolute and comparative harm of products) in the ads to support such claims. This finding calls for enhanced communication strategies from non-industry sources that include science-based e-cigarette harm-related facts to promote complete switching among young adults who smoke. We also found that preexisting inaccurate beliefs about the relative harm of e-cigarettes versus cigarettes and a lack of knowledge about reduced chemical exposure from switching to e-cigarettes have served to reduce the interest in using e-cigarettes among young adults who smoke. These perceptions may have also hindered the ability to process and understand smoker-targeted messages among those who smoke.³⁴

Conversely, our results suggest that noticing positive experience testimonials highlighting successful switching stories and non-cessation-related benefits of vaping heightened the interest in using the promoted e-cigarette products exclusively for participants who smoke. Our participants may have had more favorable perceptions of positive experience testimonials compared to smoker-targeted messages because these testimonials included reasons for switching (eg, no cigarette smell) while smoker-targeted messages did not provide any rationale as to why e-cigarettes may be superior to cigarettes. Additionally, our results show that participants who smoke were also drawn to the testimonial style of the positive experience messages, which have been found to be effective in promoting smoking cessation among those who smoke,^{44,45} as testimonials are often perceived to be credible and trustworthy.⁴⁶ Therefore, future health communication strategies may adopt the testimonial or storytelling format with relatable “switching” stories to support smoking cessation through complete product switching.

This study has several limitations. First, we recruited a diverse rather than a representative sample to gather knowledge about how young adults of various tobacco-use behaviors perceive the influence of e-cigarette ad features, although sample representation is not a goal of qualitative work.³⁶ However, the sample size was too small to break down the data to explore thematic differences based on participants' e-cigarette use experience among those who smoke. Second, the ad stimuli that the participants viewed were restricted to cartridge-based or pod-based e-cigarette products of certain brands published in magazines and direct consumer emails. Using ads for other e-cigarette products (eg, flavored disposables), of other brands (eg, Puff Bar) or from other media sources (eg, social media sites) may elicit different reactions. Third, the study results may have been affected by recency bias as interview data was based on participants' immediate recall after ad exposure.

Conclusions

This study revealed evidence related to young adults' reactions to and perceived influence of commonly used marketing features (eg, fruit flavors, nicotine warnings, and smoker-targeted messages) in commercial e-cigarette ads. The results highlight the similar and differential perceived appeal of e-cigarette marketing features among young adults of various tobacco-use behaviors. This study has implications for the design of health communication strategies and national and local policies aimed at promoting complete product switching among young adults who smoke while simultaneously deterring e-cigarette use interest among young adults who do not use tobacco. Continued monitoring and evaluation of the use and influence of commonly used and emerging e-cigarette marketing features are greatly needed.

Supplementary Material

A Contributorship Form detailing each author's specific involvement with this content, as well as any supplementary data, are available online at <https://academic.oup.com/ntr>.

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Author Contributions

Kathryn La Capria (Formal analysis [Equal], Investigation [Equal], Methodology [Equal], Writing – original draft [Lead], Writing – review & editing [Equal]), Caitlin Uriarte (Data curation [Equal], Formal analysis [Equal], Investigation [Equal], Project administration [Equal], Supervision [Equal], Writing – review & editing [Equal]), Maryam Elhabashy (Formal analysis [Equal], Investigation [Equal], Project administration [Equal], Writing – review & editing [Supporting]), Madison Menkevich (Formal analysis [Equal], Investigation [Equal], Project administration [Equal], Writing – review & editing [Supporting]), Olivia Maxton (Formal analysis [Equal], Investigation [Equal], Project administration [Equal], Writing – review & editing [Supporting]), Josephine Awadalla (Formal analysis [Equal], Investigation [Equal], Project administration [Equal], Writing – review & editing [Supporting]), Andy Tan (Investigation [Supporting], Writing – review & editing [Supporting]), Meghan Moran (Investigation [Supporting], Writing – review & editing [Supporting]), and Julia Chen-Sankey (Conceptualization [Lead], Data curation [Lead], Formal analysis [Lead], Funding acquisition [Lead], Investigation [Lead], Methodology [Lead], Project administration [Lead], Resources [Lead], Software [Lead], Supervision [Lead], Validation [Lead], Visualization [Lead],

Writing – original draft [Supporting], Writing – review & editing [Supporting]).

Declaration of Interest

All co-authors have seen and agree with the contents of the manuscript and there is no financial interest to report.

Data Availability

Interview data might be shared upon request.

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