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## Beliefs about E-cigarettes: A Focus Group Study with College Students

**Sherri Jean Katz, PhD [Assistant Professor],**

Hubbard School of Journalism and Mass Communication, University of Minnesota, Minneapolis, MN

**Meghan Erkinnen, MA [student],**

Hubbard School of Journalism and Mass Communication, University of Minnesota, Minneapolis, MN

**Bruce Lindgren, MS [Senior Research Fellow],**

Masonic Cancer Center Biostat Core, University of Minnesota, Minneapolis, MN

**Dorothy Hatsukami, PhD [Director]**

Tobacco Research Programs, University of Minnesota, Minneapolis, MN

### Abstract

**Objectives:** In this study, we consider how best to prevent recreational uptake of e-cigarettes among tobacco nonusers; it is important to investigate the underlying beliefs that young adults have about e-cigarettes and package elements.

**Methods:** Using the focus group method of belief elicitation, we explore underlying belief structures that undergraduate students at a large Midwestern public university have about e-cigarettes. Beliefs are analyzed using the constant-comparative approach and categorized using the theory of planned behavior.

**Results:** Participants describe a dual view, wherein e-cigarettes are a cool and causal item to use at a party, while holding a negative stigma toward everyday use. They acknowledged confusion over nicotine and focused on the flavors and smoke tricks as attractions to the product. In response to package elements, participants describe the flavors and modified risk statement as undermining the health warning.

**Conclusions:** Findings suggest it may be useful to supplement the required warning labels with a public education campaign that improves understanding of nicotine and to regulate the amount of nicotine permissible in e-cigarettes in order to prevent addiction in recreational users, while at the same time supporting use of the product for smoking cessation.

### Keywords

e-cigarettes; warning labels; belief elicitation; theory of planned behavior

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Correspondence Dr Katz; sjkatz@umn.edu.

Conflict of Interest Statement

There are no conflicts of interest.

Electronic cigarettes (e-cigarettes) are a type of electronic nicotine delivery system (ENDS) that heats e-liquids. The e-liquids typically contain nicotine and flavoring, and an aerosol is inhaled when the e-cigarette is vaped.<sup>1</sup> Although e-cigarettes can be harm-reducing when used as a cessation product by smokers who quit using traditional cigarettes,<sup>2-4</sup> they may be harm-elevating when used recreationally by non-smokers because nicotine is addictive which may lead to further tobacco product use, because nicotine can harm the brain development of adolescents and young adults and because the e-cigarette aerosol may contain other harmful substances, including heavy metals like lead, volatile organic compounds, and cancer-causing agents.”<sup>1,5-9</sup>

Recognizing the growing popularity of ENDS, the US Food and Drug Administration (FDA) deemed regulatory control over them in 2016, and the FDA set the requirement that e-cigarette packages must include the warning: “This product contains nicotine. Nicotine is an addictive chemical.”<sup>10</sup> In July 2017, the FDA announced a plan for tobacco control that places nicotine and issues associated with addiction central to regulation efforts. Proposals include reducing the nicotine levels in traditional cigarettes so they are not as addictive, with e-cigarettes available to transition smokers away from traditional cigarettes.<sup>11</sup> Of course, central to this strategy is preventing uptake of tobacco products, such as e-cigarettes, by non-users, including young adults.<sup>1,12</sup> To know whether the required warning message will be effective in preventing uptake by nonsmokers and how best to regulate e-cigarette packaging, it is important to investigate the underlying beliefs that young adults have about e-cigarettes.

Drawing influence from the theory of planned behavior,<sup>13</sup> the goal of this study is to explore the underlying belief structures that young adults have about e-cigarettes and package elements. Understanding these belief structures will help us to know whether the FDA’s strategy will be effective at preventing uptake of e-cigarettes by non-tobacco users. Specifically, the central research questions we are addressing include: *What are the attitudinal, normative and behavioral control beliefs that young adults mention in regards to e-cigarettes?* and *What perceptions do they have about package elements, such as warning label text, fruity flavors, and modified risk statements?* Modified risk statements claim that the product is less harmful than traditional cigarettes (ie, *This product presents a lower risk of tobacco-related disease than traditional cigarettes*).

## Theory of Planned Behavior (TPB)

TPB states that attitudes, norms, and perceived behavioral control work together to predict behavioral intentions.<sup>13-16</sup> Underlying these proximal determinants are related beliefs, that can be researched to improve understanding of how individuals think about the behavior.<sup>14</sup> One of the most important, but sometimes overlooked, aspects of research involving the TPB is the process of belief elicitation.<sup>17</sup> As part of a reasoned-action approach, the belief elicitation process involves an open-ended inquiry into attitudinal, normative and control beliefs.<sup>14,17</sup>

Prior research has applied the focus group method of belief elicitation in relation to e-cigarettes and TPB, studying adult e-cigarette exclusive and dual-product users in order to

determine their attitudinal, normative, and control beliefs.<sup>18</sup> Attitudinal judgments can be evaluative or affective thoughts associated with engaging in the behavior.<sup>13</sup> Participants held mostly positive attitudes toward e-cigarettes for cessation, appreciating their role in reducing cigarette use, the fact they do not smell bad, the flavor options, and their ability to be used in different settings than cigarettes, however, they expressed disappointment that e-cigarettes do not have the same effects as traditional cigarettes and concern over the long-term effects.<sup>18</sup> Normative beliefs are ideas about what family and friends do or want you to do, and participants noted family and friends were supportive of their use of e-cigarettes to quit or reduce traditional cigarettes, and believe there is a lack of stigma associated with their use.<sup>18</sup> Control beliefs are associated with efficacy and how much control a person perceives having over a behavior.<sup>13</sup> Characterizing these underlying beliefs can help to highlight social and cultural factors that enhance understanding of a particular behavior.<sup>19</sup>

## Focus Groups and E-cigarettes

To our knowledge, the work mentioned directly above is the only one to apply the focus group method of belief elicitation in relation to e-cigarettes and TPB.<sup>18</sup> This approach is beneficial as it facilitates a nuanced understanding of beliefs associated with each of the proximal determinants of behavioral intentions. However, other focus groups on e-cigarettes have explored belief structures, without directly applying TPB. The attitudinal beliefs in these studies varied, with current smokers believing e-cigarettes are effective for cessation because they mimic traditional cigarettes,<sup>20</sup> heavy smokers favoring them as a less expensive and less risky alternative,<sup>21</sup> and adolescents and young adults viewing them as healthier than traditional cigarettes, but addictive and not useful for cessation.<sup>22</sup> Those using the product for cessation also described the flavors, the vaping community, and their new identity as a “vaper” as appealing.<sup>20</sup> For adolescents and young adults, normative beliefs include peer involvement and a perception that parents would not approve, and attitudinal beliefs include curiosity, interest in the flavors, and a safer perception.<sup>22,23</sup>

## E-cigarettes and Package Elements

Research on the belief structures underlying e-cigarette warning labels and other package elements, such as flavors and modified risk statements, is emerging. Prior work has found positive attitudes toward warning labels, particularly among those participants who have previously tried or used e-cigarettes.<sup>24</sup> However, the beliefs that these labels foster is related to several factors, including the frame of the message and other package elements.<sup>25</sup> Whereas adolescents believe e-cigarettes contain nicotine, certain flavors (fruit, candy, and menthol) fostered the belief that the product was less harmful than tobacco flavored e-cigarettes.<sup>26</sup> Modified risk statements on the packages encouraged focus group participants, who were smokers and e-cigarette users, to have stronger beliefs associated with the relative safety of e-cigarettes, compared to traditional cigarettes, however, they believed the wording of the statements was difficult to interpret.<sup>27</sup> Nonsmokers also were found to have higher ambiguity perceptions when a modified risk statement was included on the package, although smokers were not.<sup>28</sup> The current study is the first to use the focus group method of belief elicitation to explore the underlying attitudinal, normative, and control beliefs that undergraduates have about e-cigarettes and their package elements.

## METHODS

Four one-hour focus groups (N = 31) were conducted in spring 2017 with undergraduate students at a large Midwestern university. Participants received extra credit through the school's SONA system. They ranged in age from 18 to 23 (M = 20.03, SD = 1.25). Of the participants, 6 identified as men, and 25 identified as women. Participants were primarily Caucasian (N = 20) or Asian/Asian American (N = 8), with 3 students representing other races. Additionally, 3 students identified as Hispanic.

Participants entered a quiet focus group facility, featuring a conference table, a video recording system, a 2-way mirror, and microphones. They signed IRB-approved consent forms. They were informed the purpose of the study was to have a discussion about what people think about e-cigarettes. They were told they could volunteer their tobacco use status, but that they would not be pressed to do so. During the focus group discussions, several participants implied they were non-users or social users of e-cigarettes, and no participants revealed daily use of e-cigarettes or occasional or daily use of traditional cigarettes. For example, 6 participants directly discussed occasional use of e-cigarettes at a party. Whereas no participants outwardly stated they had never used e-cigarettes, several participants implied they had not tried them through their comments about tobacco in general or their perceptions of friends who use e-cigarettes. Two former traditional cigarette users participated in the study, one of whom had been a regular smoker, however, neither of these participants mentioned using e-cigarettes to quit smoking.

The first author, a faculty member trained in focus group facilitation, led all of the groups. She encouraged participants to share their thoughts openly, explaining to them that we were interested in what they thought but not in who said what. She explained that we would not tie their comments to their identifying information and that the video recording would be securely maintained on a password protected external drive and destroyed following completion of the study. We chose to use focus groups as our method of belief elicitation because this approach allowed us to consider how the beliefs resonated on the social landscape of the group. For example, we were able to capture some specific nuances as a result of participants refining one another's statements or bouncing an idea off of another participant's point. We highlight a few examples of these dynamics in the results section.

A focus group facilitation outline was developed iteratively over 3 months during lab meetings with 3 undergraduate students, one graduate student (the second author), and one faculty member (the first author). During lab meetings, possible questions were suggested, discussed to determine their suitability and how they fit within the TPB conceptual framework, and refined. When the facilitation outline was submitted to IRB for review, the individual questions were each positioned under the TPB construct they were designed to elicit. During the focus group, participants were encouraged to engage in an open discussion for one hour, and sometimes the themes mentioned below came up without direct prompting. The questions were used when there was a lull in the conversation or when a particular discussion point did not emerge organically. Therefore, all of the groups addressed all of the questions.

To encourage a discussion on attitudes, we asked: Why do you think that people use e-cigarettes? What are your thoughts on use by non-smokers? Do you think that e-cigarettes are safe? What comes to mind when you think about e-cigarettes? What is a compelling reason to try e-cigarettes? Are they just as bad as cigarettes? Do they have health consequences?

To encourage participants to discuss norms, we asked: Do you think your friends want you to use e-cigarettes? Do you think your family wants you to use e-cigarettes? What would you think if your friends used e-cigarettes? What would you think if your family used e-cigarettes? Do students like you use e-cigarettes? Are they popular on campus? Did you ever try one because somebody suggested it? What do people think about them? What about them is appealing?

To stimulate discussion on perceived behavioral control, we asked: Do you have control over whether or not you use e-cigarettes? Do you think people can control whether or not they use e-cigarettes recreationally? Do you think that people feel pressured to use e-cigarettes?

During the last 15 minutes of the focus groups, we projected onto a screen in the room 6 images of e-cigarette packages, displayed one at a time. Participants responded to each image by discussing it, as it was put up on the screen. First, we showed them Mark Ten, Vuse and Blu boxes, each with the FDA warning, a modified risk statement, and a flavor. The modified risk statement read: *This product presents a lower risk of tobacco-related disease than traditional cigarettes.* The flavors were all fruity: strawberrylicious, raspberry rave, and watermelon splash. Next, participants viewed the same boxes, but with an abstract warning label that stated: *The long-term health risks associated with this product are unknown* (Figure 1).

The video recordings of the one-hour sessions were sent to a service for verbatim transcription. Using a constant comparative approach, the belief statements mentioned in the transcripts were analyzed and categorized through an open coding process of identifying connections to and distinctions from other belief statements.<sup>29,30</sup> A series of categories, or concepts, that connected belief statements was identified from this batching process, and we added descriptive labels to these. Finally, each concept was positioned within the proximal determinant (attitudes, norms, control) that it belonged (Table 1). Throughout the analysis process, these concepts were further scrutinized, with additional connections and distinctions between belief statements arising.

## RESULTS

### Attitudes

**Younger than cigarettes.**—There was a general attitude that traditional cigarettes were dated, and e-cigarettes were younger, newer, modern, and technologically-savvy. As one participant stated: “like your parents or like your grandparents smoked cigarettes.” Participants mentioned the product was marketed as cooler. One participant noted: “when I think of cigarettes, I would think of the Marlboro man and like, kind of old.” For some, e-

cigarette users were also seen as more refined, with participants describing them as well-dressed and classier than traditional cigarette users.

**Just blowing smoke.**—Not all participants agreed that e-cigarette users are cool, and this idea emerged as a result of the group discussions, wherein participants corrected and refined each other's comments. There was a strong perception that e-cigarette users were people who think of themselves as cool, but as one user described: "just kind of fall short." This wanna-be sentiment was used to describe regular e-cigarette users, rather than the occasional party user. As one woman explained: "it's never people that are like legitimately like cool people." E-cigarette users are also perceived as vocal and visible. One woman explained: they are "kind of a showy thing." Smoke tricks were mentioned frequently as a way that users show off. Participants described being annoyed by second-hand vapor. One woman described a man she saw vaping at a concert as a "douche – who is blowing smoke in people's face." The fact that the vape clouds are large and that tricks are often done indoors at parties was also discussed.

**A social experience.**—E-cigarettes were described as a social experience, with college students watching smoke tricks and sharing flavors at parties. Smoke tricks were widely discussed as a draw, with one man stating that he thought the ability to "play with the smoke" was the reason they were so popular. Bouncing off of this point, flavors were also discussed as a reason to try e-cigarettes and as part of the social experience. As one woman explained: "it's like a fun thing because it's like, oh, look at this cool flavor." Participants mentioned that the flavors made e-cigarettes seem like a toy or like candy, and they described liking sweet ones, such as, vanilla marshmallow, cotton candy, watermelon, and pineapple. One woman even noted it is like eating dessert without the calories.

**Health risks.**—We asked participants to share their thoughts on a number of topics related to health risks. Whereas participants seemed to know a lot about the risks of traditional cigarettes, they seemed much less aware of risks associated with e-cigarettes. Some participants mentioned having heard there were risks, but aside from concerns over the product exploding, they had difficulty expressing them. Participants perceived e-cigarettes as less risky because of their role as a cessation product. As one man stated: "this is what they use to quit, so I'm not going to get addicted to what they use to quit." Some participants mentioned thinking about e-cigarettes as similar to cigarettes and transferring risks accordingly, while others disagreed with this perspective, noting that with e-cigarettes, there was no fear of disease and no harmful smoke. The flavors also made e-cigarettes seem less harmful, with one woman describing: "like, it can't seem dangerous at all. It's like marshmallows." They emphasized, e-cigarettes are "just water vapor." As one participant mentioned: "instead of smoke, it's a vapor and um I'm not sure if that gives extra health benefits, it seems like it would... not inhaling smoke, you're just inhaling water vapor."

Nicotine also seemed to be a source of confusion. Participants were aware people were concerned over becoming addicted to nicotine, but they were not personally concerned about becoming addicted, even when we showed them the FDA warning label. It also seemed like they did not understand what nicotine is. As one participant stated after viewing the images of the packages: "when I see nicotine on e-cigarettes, I'm like yeah, it's an addictive

chemical but like so is caffeine, technically, so it doesn't really scare me as much." This is related to the perception that e-cigarette use is very casual. In fact, one woman even distinguished between buying one or just trying somebody's.

Participants were uncertain of the source or accuracy of their information about e-cigarettes, making comments like: "I feel like I've also heard that it's less addictive than smoking too. I have no idea if that's true" and "I don't really know how accurate it was because I read it somewhere..on Facebook." Yet, they seem to be aware that there is a lack of information about e-cigarettes. This was expressed in several ways, with participants acknowledging the fact that the products are so new. For example, they stated: "we actually don't know if that's true or not," "I don't know that anyone knows for sure," "I just don't know," and "research hasn't been done yet." There was also suspicion as to the motives of the e-cigarette manufacturers, with one student noting: "they're trying to make it seem innocent. Kind of like, oh, well, it's just flavored like bubble gum or ice cream versus the actual sinister kind of health effects of it because when you think about, you just look at the flavor and then you just kind of don't really think as much." Overall, participants expressed confusion, uncertainty, suspicion, and ambiguity in regards to the health risks associated with e-cigarettes.

## Norms

In regards to normative beliefs, participants mentioned that e-cigarettes are more socially acceptable than traditional cigarettes because they are not associated with a lingering smell and because they don't have the same second-hand smoke or health risk. As one participant explained: "I feel like it's not as gross seeming to me as someone who's smoking a cigarette." Therefore, they seemed quite tolerant of friends using them occasionally at a party or while drinking. Yet, while there was not a social stigma associated with occasional use, the group discussions revealed that participants were less accepting of regular users. As one participant explained: "I'm just too like scared of the long term effects....I just don't want them to ruin their lives." In characterizing regular users, one group mentioned: skaters, long-boarders, video gamers, people who go to electronic-dance music raves, and hipsters.

This dichotomy was reflected in what participants thought their friends would think of them. They thought it would not be a big deal if they tried e-cigarettes occasionally, but that their friends would mock them if they used them regularly. Explaining this, one participant stated: "yeah, I don't think they'd, like, jump on my back and like pressure me to quit. With regular cigarettes, I think that would happen, but not like with e-cigs." Participants also discussed that their parents would think it was "pretty stupid" but would be less concerned than if they were smoking cigarettes. To highlight this point, one woman described how her parents were pleased when her sister quit traditional cigarettes to use e-cigarettes.

When reflecting on their high school experience, there was general agreement that there were "certain cliques of people" that used e-cigarettes, but the description of which cliques varied depending on which high school participants attended. For example, one group discussed how it was the popular kids and jocks who used e-cigarettes, but for others, it was the lower-income students, stoners, and outcasts. Participants also seemed to think that high schoolers use e-cigarettes because they can hide it from parents and it is a way to be

rebellious: “I feel like that’s the biggest thing is, like, they’re cool because they’re breaking some sort of social rule.” Additionally, the social pressure to try e-cigarettes seemed to vary depending on which high school participants had attended.

### Perceived Behavioral Control

With traditional cigarettes, perceived behavioral control is recognized as a challenge that prevents cessation.<sup>31</sup> Often smokers will say they want to quit, but they are unable to do so. However, participants recognize that e-cigarettes are different and make a strong distinction. They are not concerned about getting addicted to e-cigarettes because of a perception that they are safer and not as strong as regular cigarettes. As one participant described: “So you feel like more immune to the addiction...and you’re in control.”

The groups discussed the casual, social perception of e-cigarettes as something you can do occasionally for fun. They described e-cigarette use as a hobby, rather than a habit you have to do. E-cigarettes were seen as something you can do every so often at a party, rather than the habitual use of cigarettes. As one woman explained: “I feel like if you’re offered an actual cigarette, it’s like taking a step towards, like, becoming a smoker, whereas like if someone offered you an e-cigarette, people would be like, oh, I’m just doing this once, it’s no big deal.” Indeed, e-cigarette use was described as very temporary and context-specific, rather than permanent.

On the other hand, in reaction to this point, some students mentioned that regular users have less control. One participant described “hardcore vaper” friends, who “seem to spend a lot of time alone vaping.” Another participant described friends who started to use e-cigarettes to quit smoking but has “gotten to the point where, like, 24/7 when they’re in their room, they like, always had their vape in their hands.”

Participants did not report experiencing social pressure to use e-cigarettes. Although some participants described the hardcore hobbyist enthusiastically pushing them to try a flavor at a party, they also reported feeling comfortable in declining. A woman suggested there may be a difference in sex, with men being more likely to pressure you than women. One participant explained that friends have never said: “You gotta try this. You’re not like cool if you don’t.” They also agreed that they were not afraid of being left out of activities or parties if they did not use e-cigarettes. This was discussed in contrast to alcohol, which was described as more intrinsically linked to the college experience.

### Response to Warning Labels

As mentioned above, toward the end of each of the focus groups, we projected onto a screen in the room 6 images of e-cigarette packages, displayed one at a time. In response to the FDA warning, participants reiterated their lack of concern over addiction to nicotine, comparing the addiction to caffeine and sugar addiction. For example, one man stated: “it only says that it’s addictive. And if you say that something is addictive, then it’s still, it feels like you have volition to not become addicted.” Participants seemed to wonder why nicotine was a concern, making comments, such as: “I know I could get addicted to nicotine if I tried this, but it doesn’t tell me what will happen if I get addicted to nicotine” and “I don’t 100% know what nicotine does.”



In response to the packages mentioning unknown long-term health effects, participants seemed more concerned. As one participant explained: “I think this one’s scarier because at least with nicotine...I know what I’m getting myself into...With this one it’s like it could be anything.” Some even acknowledged the tobacco industry’s history with unknown risks, with one participant explaining: “I mean, if you think about the history of cigarettes a lot of people thought that they were completely harmless...” On the other hand, some participants minimized the long-term message, with comments like, “so they don’t know that there are any health risks at all.”

Overall, participants thought the modified risk statement undermined the warning labels, and found it ambiguous and contradictory. As one woman explained: “I feel like it’s saying, like, this product is bad for you, but it’s not like the worst.” Another idea mentioned was that people could use the modified risk statement as evidence to support their existing beliefs.

Participants remarked right away about the flavors, describing them as “kind of appealing,” “cute,” “playful,” and “intriguing.” They were distracted by the flavor, stating: “I keep trying to read the warning but I literally keep looking at the strawberry instead” and “my eyes go to the pretty strawberry and the fun cursive-y font right below it even before it goes to the nicotine.” There was a strong consensus through the group interaction that the flavors made the product appealing and were targeting adolescents and young adults. Many thought the packages looked like chewing gum.

## DISCUSSION

### Review of Findings

In our series of focus groups, e-cigarettes were perceived as more current than traditional cigarettes, but there were 2 perspectives on whether or not they were actually cooler. On the one hand, participants viewed casual use of e-cigarettes as fun and social (ie, trying flavors at a party, watching smoke tricks together); however, regular, everyday use was associated with a negative stigma. This distinction in normative beliefs is important to note in the context of quantitative work finding that normative beliefs are not predictive of actual product use; however, this work did not distinguish between daily and social use.<sup>32</sup> Participants did not view social use as a gateway to nicotine addiction. Additionally, participants expressed a great deal of uncertainty and confusion regarding the health risks; however, they perceived a great deal of control over whether or not to use e-cigarettes because they were perceived as not as addictive as traditional cigarettes. In response to package elements, participants believed the flavors made the products look more like gum, while the modified risk claim undermined the risk perceptions associated with the warning label. The abstract warning label fostered concerns about possible unknown risks and connections to the history of tobacco industry deception.

### Implications

According to TPB, understanding young adults’ attitudinal, normative, and control beliefs is key to identifying the factors that predict their intentions to use e-cigarettes. In our focus group study, young adults did not have strong health risk beliefs associated with e-cigarette

use, and perceived occasional, recreational use of the product as safe. This is particularly important to note in the context of quantitative studies that show that perceptions of these health risks negatively predict intentions to use the product,<sup>33</sup> as well as actual use of the product.<sup>32</sup>

As mentioned above, the FDA's deeming requires that e-cigarette packages contain a nicotine addiction warning. However, college students were not concerned about nicotine or addiction. Therefore, we might ask whether the required warning label will deter college students' recreational use. As mentioned above, one concern about recreational use of e-cigarettes is that it could lead to continued use or gateway effects, wherein nonsmokers develop an addiction to nicotine and transition from e-cigarettes to other tobacco products, such as cigarettes. Whether or not recreational e-cigarette users are at risk for these gateway effects is a debated topic.<sup>34</sup> On the one hand, researchers who express a concern for gateway effects point to a tremendous increase in e-cigarette use by never-smokers<sup>7</sup> and a meta-analysis that shows that the odds of cigarette use triples following any e-cigarette use.<sup>35</sup> On the other hand, researchers who discount the concerns over gateway effects point to a decrease in overall tobacco product use and suggest that while adolescents and young adults may experiment with e-cigarettes or use them socially, they do not become daily users.<sup>36</sup>

Regardless, young adults could benefit from a public education campaign that focuses on explaining what nicotine does to the body and the associated health effects, as they seemed to have little information. Furthermore, regulations that limit the levels of nicotine in e-cigarettes may permit social use of e-cigarettes in a way that would not increase the likelihood of daily use of nicotine, while at the same time, balancing the need for nicotine among those using e-cigarettes for smoking cessation. A concern is whether lower nicotine e-cigarettes would be able to provide sufficient nicotine to be a satisfactory substitute for smoking.

Young adults also viewed the modified risk claim and flavors as undermining the warning label by contradicting it, and therefore, permitting a modified risk claim on e-cigarette packages may work counter to public health goals to prevent e-cigarette use by non-users of tobacco products. This is further supported by prior work, in which a modified risk claim was found to have no effect on current smokers (the audience it is intended to support), but led to increased ambiguity perceptions and a greater likelihood of trying e-cigarettes for nonsmokers.<sup>28</sup>

### Limitations and Future Research

The strengths of our study are that it was guided by a clear theoretical framework and that we made every effort to be rigorous in our execution. However, there are some limitations. First, we combined social e-cigarette users and non-users within the same groups so that we could capture their ideas in relation to one another. However, whereas participants seemed comfortable discussing social e-cigarette use, none admitted to everyday use. Although it is likely that our participants were not daily users, it may be that they were uncomfortable admitting to it upon hearing the stigma other participants had of regular use. It is also important to note that the health implications of e-cigarette use differ for traditional cigarette smokers and non-smokers, as the former may view e-cigarettes as a harm-minimizing

cessation tool, while they are recreational and possibly harm-elevating for the latter group. Future research should directly measure participants' tobacco usage.

Our participants were undergraduate college students, describing the culture surrounding e-cigarettes on a large Midwestern, public university. Our sample was relatively small and primarily female and Caucasian, and the results may not directly transfer to students from different backgrounds. For example, it is likely that young adults who are not attending college might have different belief structures about e-cigarettes, and therefore, future research should replicate this study with other participant groups. Additionally, some focus group participants spoke more than others, and their beliefs are represented more. Therefore, future research also should include individual interviews with participants to capture beliefs without peer interaction. Additionally, future research should consider how individual personality factors further affect these belief structures.<sup>37</sup> Although these limitations are important to address in future research, key themes emerged in our work that can inform larger studies going forward.

As the FDA turns its attention to the issue of nicotine and addiction-prevention efforts, it will be essential for scholars and public health professionals to understand the belief structures that young adults have about e-cigarettes and their packaging. This study begins the process of identifying these. The belief elicitation process is one of many steps in developing health interventions and policies informed by TPB. The theoretical framework and methodological approach used in this study can be replicated in future research with adolescents and with different groups of young adults, including daily e-cigarette users, males, community college students, young adults not enrolled in college, and individuals from other geographical areas. This approach would foster a larger, more comprehensive analysis as well as future quantitative research.

### Human Subjects Statement

The Institutional Review Board at the University of Minnesota gave permission to collect data in February 2017. The study was reviewed and approved as exempt. All participants provided informed consent.

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**Figure 1. Examples of Packages that Participants Viewed**  
Note.

Focus group participants were shown 6 images – one at a time. First, they were shown the FDA warning label, with the modified risk statement and flavor on all 3 brands. Next, they were shown the abstract label (shown here on the Mark Ten box) with the modified risk statement and flavor on all 3 brands.

**Table 1**

## Belief Elicitations in Relation to Theory of Planned Behavior Constructs

| <b>TPB Constructs</b>      | <b>Key Concepts</b>  | <b>Beliefs Elicited</b>  |
|----------------------------|--|--|
| <b>Attitudinal Beliefs</b> | E-cigarettes are younger and cooler than traditional cigarettes. | E-cigarettes are new, modern, and tech-savvy.<br>Traditional cigarettes are for the older generation.<br>E-cigarettes are refined.   |
|                            | E-cigarette users are not really cool.                           | E-cigarette users are not really cool, they just think they are cool.<br>E-cigarette users show off with smoke tricks.<br>The daily e-cigarette user is not cool.<br>E-cigarette users are visible and annoying                        |
|                            | E-cigarettes are social and fun.                                 | E-cigarettes are fun to use socially on campus (at parties or with friends).<br>Watching smoke tricks is fun.<br>Sharing flavors is fun.<br>E-cigarette flavors make them seem like a toy or candy.<br>The sweet flavors are the best. |
|                            | E-cigarettes are risky.  | E-cigarettes are risky, but I don't know why.<br>E-cigarettes can explode.<br>E-cigarettes are like cigarettes, and both are risky for your health.<br>Other people are concerned about becoming addicted to nicotine.                 |
|                            | E-cigarettes are not as risky as traditional cigarettes.         | E-cigarettes are not risky because they are used for cigarette cessation.<br>The flavors make e-cigarettes seem harmless.<br>E-cigarettes are just vapor, not smoke, and vapor is harmless.  |
|                            | E-cigarette risks are confusing                                  | We don't really know the long-term risks yet.<br>I'm not sure what I know or where I heard it.<br>Research hasn't been done yet.<br>The flavors are trying to trick you.   |
|                            | <b>Normative Beliefs</b>   |  |

| TPB<br>Constructs      | Key Concepts                                      | Beliefs Elicited  |
|------------------------|---|---|
|                        | Occasional e-cigarette use is socially acceptable | <p>E-cigarettes are socially acceptable because they are not associated with a lingering smell.</p> <p>E-cigarettes are socially acceptable because they are not associated with second-hand smoke.</p> <p>E-cigarettes are socially acceptable because they are not associated with health effects.</p> <p>E-cigarettes are not gross.</p> <p>Popular kids and jocks use e-cigarettes.</p>   |
|                        | Daily e-cigarette use is not socially acceptable  | <p>Daily use of e-cigarettes can have long-term effects.</p> <p>My friends would mock me if I used e-cigarettes every day.</p> <p>My parents would think using e-cigarettes is stupid.</p> <p>Stoners and outcasts use e-cigarettes.</p>  |
| <b>Control Beliefs</b> | People can control their e-cigarette use.         | <p>E-cigarettes are different than traditional cigarettes.</p> <p>E-cigarettes are safer because they are not as strong as traditional cigarettes.</p> <p>You are immune to addiction with e-cigarettes.</p> <p>You are in control with e-cigarettes.</p> <p>E-cigarettes are a hobby, not a habit.</p> <p>E-cigarettes can be used every so often, like at a party.</p> <p>E-cigarette use is temporary.</p> <p>E-cigarette use is context-specific.</p> <p>You are not pressured to use e-cigarettes.</p> <p>You can decline e-cigarettes when offered.</p> <p>You won't be left out if you do not vape e-cigarettes.</p> |
|                        | Some people cannot control their e-cigarette use. | <p>Some people are hardcore vapers.</p> <p>Some people vape alone.</p> <p>Some people vape all of the time.</p>   |