



Adolescents' perceptions of flavored tobacco products, including E-cigarettes: A qualitative study to inform FDA tobacco education efforts through videogames

Camenga D.R.^{a,*}, Fiellin L.E.^b, Pendergrass T.^b, Miller Erica^{a,c}, Pentz M.A.^c, Hieftje K.^b

^a Department of Emergency Medicine, Yale University School of Medicine, New Haven, CT 06519, USA

^b play2PREVENT Lab at the Yale Center for Health & Learning Games, Department of Internal Medicine, Yale Child Study Center, Yale University School of Medicine, New Haven, CT 06510, USA

^c Department of Preventive Medicine, University of Southern California, Los Angeles, CA 90032, USA

HIGHLIGHTS

- Adolescents discussed flavored tobacco products in focus groups.
- Adolescents report peer approval of flavored tobacco product use.
- Flavors are a salient aspect of tobacco product marketing for youth.
- They also perceive easy access to flavored tobacco products, including e-cigarettes.

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ABSTRACT

Introduction: Flavored tobacco products have been shown to appeal to youth, however tobacco control strategies have traditionally not focused on these products. To inform the adaptation of an existing videogame to focus on the prevention of flavored tobacco product use, this study explored adolescents' perceptions, beliefs, and social norms surrounding these products, including flavored e-cigarettes.

Methods: We conducted and analyzed transcripts from seven focus groups with 11–17-year-old adolescents (n = 33) from after-school programs in CT and CA in 2016. Participants discussed flavored tobacco product beliefs and experiences, and how these compared to traditional cigarettes.

Results: Thematic analysis of transcripts revealed that participants could name flavors in tobacco products, even though few discussed first-hand experience with the products. Most groups perceived that flavored tobacco product and flavored e-cigarette use facilitated peer approval and acceptance. All groups discussed how youth could easily access flavored tobacco products, including e-cigarettes. Flavoring was a salient aspect of e-cigarette advertisements; however the groups did not recall exposure to other types of flavored tobacco product counter-marketing.

Conclusions: These data can help inform the development of tobacco control strategies, novel interventions (such as videogames), and future FDA efforts to prevent adolescent tobacco product use through education and risk communication.

1. Introduction

The majority of U.S. adolescents who use currently use tobacco report using flavored tobacco products (Singh, Arrazola, Corey, et al., 2016). Although the 2009 Family Smoking Prevention and Tobacco Control Act bans the use of “characterizing flavors” (e.g., candy, fruit, and chocolate), other than tobacco and menthol flavor, in cigarettes,

flavored tobacco can be used in hookah, smokeless tobacco, cigars and cigarillos (U.S. Food and Drug Administration, 2013). Flavors can also be added to e-liquids that are used in e-cigarettes. E-cigarettes have been deemed by the Food and Drug Administration (FDA) to be subject to tobacco product regulation, however the 2016 FDA deeming rule does not include e-liquid flavors (Food and Drug Administration, 2016). Multiple studies have demonstrated that flavored tobacco products tend

* Corresponding author at: 464 Congress Avenue, Suite 260, Department of Emergency Medicine, Yale University School of Medicine, New Haven, CT 06519, USA.
E-mail address: deepa.camenga@yale.edu (D.R. Camenga).

to be used more by younger than older individuals, (Feirman, Lock, Cohen, Holtgrave, Li, 2015) and most US adolescents initiate tobacco use with a flavored product (Ambrose, Day, Rostron, et al., 2015; Harrell, Weaver, Loukas, et al., 2017). As of 2016, e-cigarettes were one of the most commonly used tobacco products with flavoring among youth, and their prevalence has surpassed that of traditional cigarettes (Jamal, Gentzke, Hu, et al., 2017; Singh, Kennedy, Marynak, et al., 2015).

The rising prevalence of e-cigarette use has been attributed to multiple factors, including the palatability and appeal of sweet flavors to youth (Hoffman, Salgado, Dresler, Faller, Bartlett, 2016; Kim, Lim, Buehler, et al., 2016) the availability of a variety of attractive e-liquid flavors, (Harrell et al., 2017) perceptions that flavored tobacco products are “safer” than cigarettes, (Kowitz, Meernik, Baker, et al., 2017) and aggressive and appealing marketing strategies (Duke, Allen, Eggers, Nonnemaker, Farrelly, 2016; Harrell et al., 2017; Kong, Morean, Cavallo, Camenga, Krishnan-Sarin, 2015; Pepper, Ribisl, & Brewer, 2016; Roditis, Delucchi, Cash, et al., 2016). Although the health risks of some flavored tobacco products are well-established, including those related to hookah or cigar use, (Baker, Ainsworth, Dye, et al., 2000; Kadhun, Sweidan, Jaffery, Al-Saadi, Madden, 2015; Kim, Kabir, & Jahan, 2016) there is ongoing debate within the scientific community as to whether e-cigarettes will have the same level of harm as other tobacco products (Middlekauff, 2015; Nutt, Phillips, Balfour, et al., 2016). Regardless, evidence suggests that adolescent e-cigarette use increases the risk for subsequent cigarette smoking (Barrington-Trimis, Urman, Berhane, et al., 2016; Hua & Talbot, 2016; Leventhal, Strong, Kirkpatrick, et al., 2015; Soneji, Barrington-Trimis, Wills, et al., 2017). Thus, there is a need to generate empiric evidence to determine how to prevent flavored tobacco use (including flavored e-cigarette use) in young adolescents; a population group inherently vulnerable to tobacco initiation and the development of life-long tobacco use (U.S. Department of Health and Human Services, 2012). Specifically, qualitative data on how adolescents perceive flavored tobacco products may help inform content development for youth-oriented prevention interventions. Although young adolescents are an ideal target for tobacco prevention, recent systematic reviews of the qualitative literature have demonstrated that existing studies are limited in that they focus on exploring perceptions of one specific type of flavored tobacco product (i.e. hookah) or older adolescents or young adults.

The overall epidemiology of tobacco use has greatly changed since the 1990s, when cigarettes were the preferred tobacco product among youth (U.S. Department of Health and Human Services, 2012). These epidemiological shifts are partly due to the implementation of comprehensive tobacco control strategies that target both the individual and their environment. The ecological systems theory of Bronfenbrenner highlights how immediate settings (including peers, family, school and neighborhood) as well as the larger social systems (culture, laws etc.) impact human development and behavior (Bronfenbrenner, 1992, 1994). Protective processes at different levels of the socio-ecological system can foster resilience and promote positive behaviors in adolescence. Not surprisingly, successful health promotion strategies, including those related to tobacco prevention, impact perceptions, beliefs and social norms within multiple levels of the adolescent's socio-ecological environment (Eisenberg, Toumbourou, Catalano, Hemphill, 2014; Ennett, Foshee, Bauman, et al., 2010). There are two types of social norms: “descriptive” norms refer to perceptions of what others do, and “injunctive” norms refer to perceptions of others' expectations and values of the behavior, and these have both been associated with behavioral intentions (Rimal, 2008). For example, tobacco prevention programs may influence descriptive norms and injunctive norms through smoke-free policies, and policy factors such as youth access laws, tobacco taxation, regulation of advertising, and mass-media campaigns (Kozlowski & Sweanor, 2017). These strategies have largely focused on traditional cigarettes, and, to date, have not comprehensively targeted flavored tobacco products, such as flavored hookah,

cigars, smokeless tobacco, and flavored e-cigarettes.

Videogames offer a unique opportunity to influence perceptions, beliefs, and social norms among adolescents. Through interactive gameplay and the simulation of real-world experiences, videogames offer the opportunity to engage and educate youth through skill building and role-playing (Fiellin, Hieftje, & Duncan, 2014; Hieftje, Edelman, Camenga, et al., 2013). The play2PREVENT Lab at Yale University has previously developed and evaluated in a large randomized controlled trial a videogame, *PlayForward: Elm City Stories* (*PlayForward*), aimed at reducing sexual risk behaviors among young adolescents (Fiellin, Kyriakides, Hieftje, et al., 2016). In an effort to inform the modification of key storylines and skill-based mini-games of *PlayForward* to focus on flavored tobacco, including flavored e-cigarettes, we conducted focus groups with the *PlayForward* target audience- young adolescents. This qualitative study aimed to inductively identify current perceptions, beliefs, and social norms within different levels of the adolescents' socio-ecological environment, namely the Intrapersonal (knowledge and risk perceptions), interpersonal (peer influences), community (i.e. sale locations), and policy (around marketing and counter-marketing) levels of the environment. These data add to the literature by focusing on young adolescents' perceptions of a wide variety of flavored tobacco products, and thus can help inform the FDA's efforts to improve existing tobacco control, education, and risk communication strategies that directly address flavored tobacco and flavored e-cigarette use.

2. Materials and methods

2.1. Participants

We conducted focus groups to explore young adolescents' perceptions of and experiences with flavored tobacco and flavored e-cigarettes. We chose to conduct focus groups (rather than individual interviews) as they are an excellent tool to gauge social norms and group perceptions (Harrell & Bradley, 2009). We recruited 11–17 year old adolescents who attended after-school programs that served secondary schools in New Haven, CT, and Los Angeles, CA with the assistance of afterschool program's leadership. Inclusion criteria were that participants were English-speaking and between 11 and 17 years old. Although we included a wide range of ages in our inclusion criteria to gather a wider range of perceptions, 88% of the participants were between the ages of 11 and 15, which was the target age group for the videogame intervention. The Institutional Review Boards at Yale University School of Medicine and at the University of Southern California approved the research protocol. All participants provided verbal assent, and participants' parents or legal guardians were provided a description of the study and were asked to contact the team if they did not want their child to participate in the focus group. Participants were reimbursed with gift cards.

2.2. Focus group procedure

We developed our focus group guide in an iterative process with input from members of our multidisciplinary research team, which included experts in qualitative research, adolescent development, and tobacco research. Two research team members conducted the focus groups using semi-structured focus group guides. First, participants were informed that we were interested in developing a videogame to prevent flavored tobacco product use in youth. The focus groups began with a warm up discussion wherein participants were asked to discuss traditional cigarettes. Participants were then asked to describe their understanding of e-cigarettes and their health and social impact, their experiences with e-cigarettes, and where they have seen e-cigarettes (Table 1). The same set of questions was then posed for “flavored tobacco products.” We used the example of flavored tobacco in hookah to start the conversation, and then asked if they knew of other products. Examples of focus group questions included, “What do teens think

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