



Gender differences in use and expectancies of e-cigarettes: Online survey results



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HIGHLIGHTS

- Gender differences in e-cigarette use and expectancies tended to be small.
- Females were more likely to initiate e-cigarette use due to social influence.
- Females tended to use e-cigarettes more for mood-management and weight control.
- Males, compared to females, rated e-cigarettes as more addictive.
- Gender differences in e-cigarette use were similar to those reported for cigarettes.

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ABSTRACT

Introduction: Given the rapid increase in e-cigarette use, it is important to understand factors that may contribute to their initiation and maintenance. Because gender differences in tobacco use, product preferences, and expectancies are well established, similar gender differences may exist with e-cigarettes. The aim of this study was to identify gender differences among e-cigarette users in patterns of use, reasons for initiation and maintenance, and outcome expectancies regarding e-cigarettes.

Methods: Participants ($N = 1815$) completed an online survey from August through November, 2013. We assessed sociodemographics, smoking and e-cigarette history and use, and expectancies about e-cigarettes.

Results: We found gender differences in type of e-cigarette used, flavors used, nicotine dosage, source of information about e-cigarettes, place of purchase, and use of e-cigarettes where smoking is prohibited. In addition, males were more likely to report initiating e-cigarette use to quit smoking due to health concerns, whereas females were more likely to report initiation based on recommendations from family and friends. Males reported higher attributions for maintenance of e-cigarette use related to positive reinforcement (enjoyment), whereas females reported higher negative reinforcement attributions (stress reduction or mood management). Males reported more positive expectancies about e-cigarettes, including taste, social facilitation, and energy, whereas women rated e-cigarettes higher for weight control. Males also reported greater addiction-related e-cigarette expectancy than females.

Conclusions: Many of the gender differences with e-cigarettes parallel those previously found with traditional cigarette smoking. Although effect sizes associated with these differences were small, the results may help advance research and intervention development with respect to e-cigarette initiation, maintenance and cessation.

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1. Introduction

Electronic cigarettes (e-cigarettes), also called electronic nicotine delivery systems (ENDS), are battery-operated devices that deliver nicotine via inhaled vapor. Although there is heterogeneity in e-cigarette product characteristics, the common feature across devices is an electrically powered heating element that converts liquid containing nicotine,

humectants, and flavorings into inhalable vapor (Benowitz & Goniewicz, 2013). Many brands of e-cigarettes resemble a conventional cigarette in multiple ways, including appearance, method of inhalation, and production of smoke-like aerosol vapor that is exhaled. However, e-cigarettes do not require combustion of tobacco and its toxic constituents (Benowitz & Goniewicz, 2013).

Awareness and use of e-cigarettes has increased considerably in the last few years among U.S. adults, particularly those who are current or former smokers (King, Patel, Nguyen, & Dube, 2014; Pepper & Brewer, 2014). Due to the exponential growth in awareness and use of these devices, it is important to explore factors that may promote initiation and maintenance of e-cigarette use over time. Specifically, the American Association for Cancer Research and the American Society of Clinical Oncology identified “understanding the perception and patterns of ENDS use” as a key research goal in their joint policy statement (Brandon et al., 2015).

Accordingly, a burgeoning area of research involves perceptions and beliefs (expectancies) regarding e-cigarettes. E-cigarettes have been used by adult smokers because of generally positive perceptions regarding the safety of these devices and their ability to be used to stop smoking tobacco cigarettes (Etter & Bullen, 2011; Goniewicz, Lingas, & Hajek, 2013; Harrell et al., 2015; Zhu, Gamst, Lee, Cummins, Yin, & Zoref, 2013). These perceptions of e-cigarettes provide a glimpse into the primary reported reasons why a growing number of cigarette smokers use e-cigarettes as a way to reduce or quit cigarette smoking (Etter & Bullen, 2011; Goniewicz et al., 2013; Zhu et al., 2013). However, a significant proportion of smokers who have tried e-cigarettes continue to smoke traditional, combustible cigarettes (Etter & Bullen, 2014; Giovenco, Lewis, & Delnevo, 2014). Therefore, exploring more nuanced factors associated with e-cigarette and cigarette use could elucidate differences between those who reduce or quit smoking using e-cigarettes and those who concurrently use both products (often referred to as “dual users”).

Tobacco companies have viewed women as a key US consumer base since 1920 (Fielding, 1987) and developed products such as long and ultra-long cigarettes to appeal to women by eliciting feelings of independence, liberation, slimness, success, glamor, and taste (Carpenter, Wayne, & Connolly, 2005; Hammond, Doxey, Daniel, & Bansal-Travers, 2011). More recently, distributors of e-cigarettes are beginning to use similar strategies to target female users (Richardson, Ganz, Stalgaitis, Abrams, & Vallone, 2014) with some e-cigarette distributors selling slim, pink, glamorous, and fashionable devices (Yao, Jiang, Grana, Ling, & Glantz, 2014).

There is a large body of literature describing gender differences in tobacco use and tobacco products, including differences in reasons for tobacco use (Perkins, Donny, & Caggiula, 1999; Perkins et al., 2001; Perkins, Jacobs, Sanders, & Caggiula, 2002; Westmaas & Langsam, 2005) smoking-related expectancies (Brandon & Baker, 1991; Copeland, Brandon, & Quinn, 1995), and success at quitting smoking (Perkins & Scott, 2008; Scharf & Shiffman, 2004; Wetter et al., 1999). In contrast, most preliminary evidence has found no clear association between e-cigarette use and gender, particularly among online samples (Hajek, Etter, Benowitz, Eissenberg, & McRobbie, 2014). However, other studies have found gender differences in prevalence and e-cigarette preferences. For instance, Zhu et al. (2013) reported that female current smokers were more likely to have tried e-cigarettes than males (38% vs. 27%), whereas Dawkins, Turner, Roberts, and Soar (2013) found that females preferred sweet flavors of e-cigarette liquids and brands that closely resembled tobacco cigarettes in appearance, preferences that corresponded to more positive perceptions of taste and their ability to reduce nicotine cravings. Taken together, these mixed findings suggest that more exploration into the role of gender in e-cigarette use is warranted.

Given that gender differences in tobacco use, tobacco products, and smoking expectancies have been well-recognized and established (Brandon & Baker, 1991; Eriksen, Mackay, & Ross, 2012; Grunberg,

Winders, Wewers, 1991; Perkins et al., 1999) it is possible that similar gender differences in e-cigarette use and in expectancies about e-cigarettes may exist and could play an important role in e-cigarette initiation, maintenance of e-cigarette use, and discontinuation of smoking traditional, combustible cigarettes. Previous research has found that the smoking behavior of women, compared to men, appears to be influenced less by nicotine per se and more by non-nicotine factors, including social and environmental cues. With respect to tobacco use itself, women tend to smoke fewer cigarettes per day than men, inhale less deeply, and prefer brands with lower nicotine and tar. Additionally, women hold stronger outcome expectancies about smoking for mood-management and weight and appetite control.

The aim of the current study was to examine gender differences across multiple domains of e-cigarette use. We expected to find gender differences in patterns of use, reasons for use, and expectancies about e-cigarettes. With respect to expectancies specifically, we expected to find gender differences that parallel those found in expectancies for traditional cigarettes, including expectancies related to weight control, mood management, social facilitation, and addiction (Brandon & Baker, 1991; Copeland et al., 1995).

2. Methods

2.1. Participants

The sample comprised 1815 e-cigarette users (“vapers”) who completed an online survey from August through November, 2013. Participants were eligible if they were at least 18 years old, were able to understand and read English, reported a history of daily smoking, had smoked tobacco cigarettes for at least one year, and had used e-cigarettes in the past month. From an initial sample of 2271 survey respondents, 91 cases were deleted for being from the same IP address, 130 were blank, 50 were respondents that indicated they had not smoked 100 or more cigarettes in their lifetime, and 185 did not complete all the expectancy questions.

Other results from this sample have been reported previously (Harrell et al., 2015).

2.2. Measures

The online survey was developed by the authors and consisted of five sections assessing the variables listed below.

2.2.1. Sociodemographic variables

Age, gender, race, education, income, and marital status.

2.2.2. Smoking history

Participants answered a series of questions about their current or past use of tobacco cigarettes. Participants who reported using tobacco cigarettes in the past 30 days were categorized as dual users; that is, users of both tobacco cigarettes and e-cigarettes ($n = 381$). The remaining participants, who reported smoking no tobacco cigarettes in the past month were categorized as e-cigarette users ($n = 1434$).

2.2.3. E-cigarette history

Participants answered several questions about their e-cigarette use, including date of initiation; frequency of use; characteristics of e-cigarettes currently using (brands, flavors of e-liquids, and nicotine concentrations of e-liquids); places of use; source of information about e-cigarettes; place of purchase; and, whether they participated in online e-cigarettes forums.

2.2.4. Expectancies for e-cigarettes

E-cigarette expectancies items were created based on prior research, as described elsewhere (Harrell et al., 2015). Items were adapted from the Smoking Consequences Questionnaire—Adult (SCQ-A; Copeland

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