



Enjoyment and other reasons for electronic cigarette use: Results from college students in New York



M.L. Saddleson^{a,*}, L.T. Kozlowski^a, G.A. Giovino^a, M.L. Goniewicz^c, M.C. Mahoney^{a,b}, G.G. Homish^a, A. Arora^a

^a University at Buffalo, State University of New York, School of Public Health and Health Professions, Department of Community Health and Health Behavior, Buffalo, NY, USA

^b Roswell Park Cancer Institute, Department of Medicine and Department of Health Behavior, Buffalo, NY, USA

^c Roswell Park Cancer Institute, Department of Health Behavior, Buffalo, NY, USA

HIGHLIGHTS

- Affective reasons for using electronic cigarettes may relate to the popularity of e-cigs.
- 72.1% of current (past 30-day) electronic cigarette users report using for enjoyment.
- Current daily electronic cigarette users are more likely to use for quitting purposes.

ARTICLE INFO

Article history:

Received 3 August 2015

Received in revised form 23 November 2015

Accepted 25 November 2015

Available online 1 December 2015

Keywords:

Electronic cigarettes

Vaping

Reasons for use

College students

Affect

ABSTRACT

Background: Young people are more likely to have experimented with e-cigarettes (e-cigs) compared with older adults. Few studies identify reasons for experimentation/use of e-cigs among young people; we sought to discover what drives college students to use e-cigs.

Methods: Undergraduate students (ages 18–23) at four universities in New York State were surveyed. Among e-cig ever users ($n = 429$), reasons for use were examined. A multinomial logistic regression model analyzed the relative risk of reasons for using e-cigs among discontinued, current non-daily and current daily e-cig users.

Results: Using e-cigs for enjoyment was associated with current non-daily (RR = 2.11, 95% CI = 1.18–3.75) and current daily use (RR = 19.1, 95% CI = 3.71–98.54). Non-daily use was related to use because e-cigs are less toxic than cigarettes (RR = 2.80, 95% CI = 1.75–4.50). More daily users reported use to quit smoking compared with either non-daily or discontinued users (53.3% vs. 12.2% and 13.3%, respectively; $p < 0.05$). Among current users, 72.3% used for enjoyment, compared with 42.9% of discontinued users ($p < 0.05$).

Discussion: In contrast to adults, who often report e-cig use to quit smoking, young people are less likely to use for this reason. The exception was daily e-cig users, who often reported use for quitting/reduction of smoking. Rather, college students report usage reasons related to affect (e.g. enjoyment). Overall, enjoyment was reported more often than was use for quitting smoking; affective reasons likely play a role in the popularity of e-cigs and should be considered in future assessments of e-cig users.

© 2015 Elsevier Ltd. All rights reserved.

1. Introduction

Among U.S. adults (≥ 18 years), cigarettes are the most commonly used tobacco product (Agaku, King, Husten, et al., 2014). More recently, non-cigarette tobacco products (e.g. little cigars/cigarillos, smokeless tobacco, hookah, e-cigarettes [e-cigs]) have become increasingly popular, especially among young adults (18–24 years); recent 2014 data among middle and high school students show that past 30-day use of e-cigs has surpassed past 30-day tobacco cigarette prevalence (Agaku

et al., 2014). The popularity of e-cigs has been rising among both adolescents and adults since they entered the market in 2007 (Ayers, Ribisl, & Brownstein, 2011; Camenga, Delmerico, Kong, et al., 2014; Dockrell, Morison, Bauld, & McNeill, 2013; Ramo, Young-Wolff, & Prochaska, 2015). With increases in use, there is concern among public health officials as to whether e-cigs represent a “gateway” to future tobacco cigarette smoking and whether e-cigs will lead to nicotine addiction among youth (Arrazola, Singh, Corey, et al., 2015; Dutra & Glantz, 2014; Riker, Lee, Darville, & Hahn, 2012). The other side of this argument supports the concept of e-cigs as a harm reduction product to reduce cigarette smoking; (Cahn & Siegel, 2010) e-cigs are often marketed as “safer” alternatives to cigarette smoking.

Surveys of U.S. adults indicate that the highest prevalence of e-cig use is among 18–24 year olds (Adkison, O'Connor, Bansal-Travers,

* Corresponding author at: Center for Interdisciplinary Research on Nicotine Addiction, Perelman School of Medicine, University of Pennsylvania, USA.

E-mail addresses: m1s38@buffalo.edu, meganlsa@upenn.edu (M.L. Saddleson).

et al., 2013; Agaku et al., 2014; King, Alam, Promoff, Arrazola, & Dube, 2013; Regan, Promoff, Dube, & Arrazola, 2013). College students are included in the age group shown to be at increased risk for using non-traditional tobacco products, including e-cigs (Cobb & Abrams, 2011; Pearson, Richardson, Niaura, Vallone, & Abrams, 2012; Regan et al., 2013). College students are often drawn to novel products (Choi, Fabian, Mottey, Corbett, & Forster, 2012) and are generally more accepting of e-cig use in public compared with cigarette smoking in public (Trumbo & Harper, 2013).

Among adult e-cig users, reasons for use most commonly include curiosity, influence of friends or family, to quit/reduce cigarette consumption, and cost (Caponnetto, Campagna, Cibella, et al., 2013; Dawkins, Turner, Roberts, & Soar, 2013; Etter & Bullen, 2011; Goniewicz, Lingas, & Hajek, 2012; Kralikova, Kubatova, Trunekova, Kmetova, & Hajek, 2012; Pepper, Ribisl, Emery, & Brewer, 2014; Vickerman, Carpenter, Altman, Nash, & Zbikowski, 2013). Reasons for use of e-cigs among young adults have not been studied in depth and primarily focus on beliefs or perceptions of e-cigs. In a study among young adults (ages 20–28), about one-half (45%) of those aware of e-cigs agreed the product could help people quit smoking, however, specific reasons for personal use/experimentation with e-cigs were not collected (Choi & Forster, 2013). A Canadian study among young adult smokers (16–30 years old) reported that e-cig users conveyed interest in using e-cigs to quit smoking (80.4%) or, as a replacement for combustible cigarettes (77.8%). Despite reported interest in use, this study did not ask users about particular reasons for their use/experimentation with the product (Czoli, Hammond, & White, 2014a).

About one-quarter to one-half of young adults surveyed (both users and non-users) believe e-cigs are safer than tobacco cigarettes (Choi & Forster, 2013; Goniewicz & Zielinska-Danch, 2012; Sutfin, McCoy, Morrell, Hoepfner, & Wolfson, 2013). The perception that a product is less harmful or has benefits over the use of another product has been shown to increase interest in trial (Choi et al., 2012), and there is evidence among young adults suggesting that those with lower e-cig harm perceptions are more likely to use e-cigs (Czoli, Hammond, & White, 2014b; Saddleson et al., 2015). Despite these beliefs and perceptions about e-cigs, again, there is limited research available about why college students themselves experiment with and/or continue to use e-cigs.

Two studies have reported on reasons for e-cig use among young adults. Among young adult cigarette smokers (18–25 years old; smoked ≥ 1 cigarette in past month), e-cig use for quitting purposes was more common in those who were more dependent on nicotine and those interested in quitting; reasons for use other than quitting were not asked (Ramo et al., 2015). Among middle, high school and college students in Connecticut, top reasons for experimenting with e-cigs were curiosity (54.4%), appealing flavor (43.8%), and peer influences (31.6%) (Kong, Morean, Cavallo, Camenga, & Krishnan-Sarin, 2014). Marketing e-cigs towards adolescents and young adults through the use of advertising and flavors likely influences experimentation with these products (Couch, Chaffee, Essex, & Walsh, 2014; Rigotti, Moran, & Wechsler, 2005; Trumbo, 2015). Although regulations have been proposed, currently there are no standing regulations on e-cigarettes by the Food and Drug Administration (FDA). Additional evidence about why young adults are interested in e-cigarettes could aid in informing regulation of these products.

The goal of the present study was to examine reasons for use among a college sample of e-cigarette users and to explore whether these differences varied by e-cig status (discontinued, current non-daily, and current daily e-cig users). We hypothesized that enjoyment of e-cigarettes would contribute to use among college students based on a *behavioral affective associations model*, which indicates that there are feelings and emotions associated with certain behaviors (Kiviniemi & Bevins, 2008). We were also interested in reasons for use among students who never smoked a tobacco cigarette. Understanding e-cig use

among never smokers could play a role in addressing concerns about e-cigs serving as a potential “gateway” product to future use of combustible tobacco products.

2. Materials and methods

2.1. Sample

Undergraduate students (ages 18–23) in selected classes (e.g., psychology/health behavior-related courses) at four New York State (NYS) (outside of New York City) universities participated in a web-based survey in the fall of 2013 ($n = 1437$), providing informed consent for this IRB-approved research. The survey instrument and procedures are described in detail in Saddleson et al. (2015) The sub-sample for this study ($n = 429$) included those who had ever tried e-cigs.

2.2. Demographics

Age was a continuous variable; the data set was restricted to 18–23 year olds. Gender was a binary variable (male/female); self-reported data on race/ethnicity was used to create a categorical variable based on responses to two items: 1) race, and 2) ethnicity (Hispanic/non-Hispanic); a three category variable was constructed: Non-Hispanic white/Caucasian, non-Hispanic non-whites (all races excluding white/Caucasian), and Hispanic (regardless of race).

2.2.1. Tobacco cigarette smoking status

Never smokers (never tried a tobacco cigarette, not even a puff), experimenters (have smoked < 100 cigarettes in lifetime, and did not smoke any cigarettes in the past 30 days), discontinued smokers (smoked ≥ 100 cigarettes in lifetime, but did not smoke any cigarettes in the past 30 days), and current smokers (have smoked at least 1 day out of the past 30). For multivariable analyses, smoking status was collapsed into three categories (never smokers, experimenters and ever smokers [current and discontinued smokers]), due to few discontinued smokers in our sample ($n = 17$).

2.2.2. E-cigarette status

Ever use, but not in the previous 30 days was classified as discontinued e-cigarette user. Current non-daily use included use on 1–29 days in the previous 30 days, current daily use included use on all 30 days.

2.2.3. Past 30-day non-cigarette tobacco use

A binary variable (any/none) based on reports of any use in the past 30 days of: cigars, pipes, chewing tobacco, snuff, snus, hookah, clove cigarettes, bidis, or other.

2.2.4. Past 30-day binge drinking

“Considering all types of alcoholic beverages, how many times during the past 30 days did you have 5 (for males)/4 (for females) or more drinks on an occasion?” Binary variable (any/none).

2.2.5. Marijuana use

“During the last 12 months, how often did you use marijuana (cannabis, weed, pot)?” was scored as a binary variable (any/none).

2.2.6. E-cigarette reasons for use

E-cigarette ever users were asked for a level of agreement (or disagreement) with statements describing their reasons for current or past e-cig use. The scale included: strongly agree, agree, neutral, disagree, and strongly disagree, adapted from Etter and Bullen (2011).

We asked all users about twelve reasons for use with the statement “I use/used an e-cigarette...”: ...because I enjoy(ed) it, ...to deal with my craving for tobacco, ...to quit smoking or avoid relapsing to

smoking, ...to avoid bothering other people with smoke, ...to reduce my tobacco consumption, ...to try something new, ...because it was/is less toxic than smoking tobacco, ...because it was/is cheaper than smoking tobacco, ...because I do/did not want to smell like smoke, ...because all other smoking cessation methods have failed, ...because I am/was addicted to the e-cig, ...to help control my appetite. Responses for each reason were recoded dichotomously into disagree/neutral versus agree (*Disagree/neutral* = strongly disagree, disagree or neutral; *Agree* = strongly agree or agree).

2.3. Analyses

Descriptive statistics were analyzed to summarize results using Stata 13 (Statacorp, 2013). Cross-tabulations and Chi-square tests assessed differences between reasons for use and the two category e-cig status variable (discontinued/current use). Use of e-cigs for enjoyment, because the e-cig is less toxic than tobacco cigarettes, and to reduce tobacco consumption were analyzed full scale (five-category) by e-cig status. Chi-square analyses tested for differences between ever (experimenters, former and current) and never smokers among reasons for using e-cigs. Cronbach's alpha was used to test the reliability of sub-groups of reasons for use.

A multinomial logistic regression model analyzed the relative risk of reasons for using e-cigs, among ever users: discontinued, current non-daily, and current daily users, controlling for variables shown in Table 2. Discontinued users served as the base comparison group (an ordinal logistic regression model was not used because the significance of proportionality tests using ologit and gologit2 procedures did not support an assumption of proportional odds). Relative risk ratios (RRR) and 95% CI's are presented; two-sided alpha level was 0.05.

Dichotomous categorizations for using e-cigarettes were used in the regression model for sample size purposes. Using e-cigs because they are less toxic than tobacco cigarettes and to reduce tobacco consumption were grouped dichotomously into disagree/neutral vs. agree. There were no current daily users who *strongly disagreed*, *disagreed* or were *neutral* about using an e-cig for enjoyment. Therefore, e-cig use for enjoyment was grouped as: strongly agree vs. any other response given (strongly disagree, disagree, neutral and agree).

3. Results

A sub-sample of 429 students (ages 18–23 years) from four colleges/universities in New York State who had ever used e-cigarettes (29.8%) were analyzed (overall sample: $n = 1437$). Mean age of this sub-sample was 19.0 years ($SD = 1.36$), the sample was 51.0% male and

69.9% were non-Hispanic whites. Cigarette smoking was common among e-cig users: 37.0% were current smokers (smoked in the past 30-days) (41% of non-daily e-cig users were current cigarette smokers and 68.8% of daily e-cig users were current cigarette smokers). Additionally, 59.9% used non-cigarette tobacco products in the past 30-days, 70.6% reported binge drinking in the past 30-days and 64.8% used marijuana in the past 12 months.

3.1. Reasons for experimentation/use of e-cigs ($n = 429$)

Table 1 shows reasons for e-cig use; one current daily user did not provide answers for any of the twelve reasons for use, thus, we report on a sample size of $n = 15$ for current daily e-cig users. The majority of e-cig users, regardless of current e-cig status either agreed or strongly agreed that they use(d) an e-cig "to try something new" (71.6%). The following reasons are not displayed in the table: *using an e-cig to try something new and to help control appetite* (9.1%) (reported equally among discontinued, current non-daily and current daily users), *because I am addicted to the e-cig and because all other smoking cessation methods had failed* (reported by 8.6% and 5.3% of all users reported, respectively).

These results focus on three groups of reasons for use, which were analyzed on a five-category Likert scale. *Using an e-cig for enjoyment* (57.9%) was the second most commonly reported reason for use. There were significant differences between e-cig status and those who used for enjoyment ($p < 0.05$); current users (daily and non-daily) more often reported use for enjoyment (72.3%) compared with discontinued users (42.9%) ($p < 0.001$). All current daily users ($n = 15$) agreed with using e-cigs because they enjoy the product. The remaining reasons for use were classified into two major sub-groups based on reliability analyses using Cronbach's alpha: quitting smoking/reduction reasons and other product advantages. *Quitting/reduction reasons included*: "...to deal with my craving for tobacco," "...to quit smoking or avoid relapsing to smoking," "...to reduce my tobacco consumption" and "...to avoid bothering others with smoke" (Cronbach's alpha = 0.92). *Other product advantages included*: "...because it is/was less toxic than tobacco cigarettes," "...because I do/did not want to smell like smoke," and "...because it is/was cheaper than tobacco cigarettes" (Cronbach's alpha = 0.84).

3.2. Reasons for e-cig experimentation/use among a sub-sample of never cigarette smokers ($n = 87$)

Among those who ever experimented with e-cigs, 20.3% ($n = 87$) never smoked a cigarette. Never smokers were not using e-cigs often;

Table 1
Reasons for e-cigarette use among college sample.

Reason for use:	Discontinued e-cig users ($n = 214$)	Current non-daily e-cig users ($n = 200$)	Current daily e-cig users ($n = 15$)	Total
"I use/used an e-cigarette..."	% (n)	% (n)	% (n)	$n = 429$
Because I enjoy(ed) it ^{^*}	42.9 (88)	70.3(140)	100.0 (15)	57.9%
Quitting/reduction reasons				
To avoid bothering other people with smoke ⁺	18.1 (37)	19.9 (39)	60.0 (9)	20.4%
To reduce my tobacco consumption ⁺	15.1 (31)	18.4 (36)	73.3 (11)	18.5%
To quit smoking or avoid relapsing to smoking ⁺	13.7 (28)	12.1 (24)	53.3 (8)	14.1%
To deal with my craving for tobacco ⁺	10.7 (22)	14.1 (28)	53.3 (8)	13.6%
$\alpha = 0.92$				
Other product advantages				
Because it was/is less toxic than tobacco cigarettes [^]	34.2 (70)	57.1 (112)	80.0 (12)	46.5%
Because I do/did not want to smell like smoke ^{^*}	31.7 (65)	44.1 (86)	80.0 (12)	39.2%
Because it is/was cheaper than tobacco cigarettes ^{^*}	19.0 (39)	28.4 (56)	71.4 (10)	24.9%
$\alpha = 0.84$				
Total	214	200	15	100.0%

Note: α = Cronbach's alpha level.

* Significant differences among all 3 groups ($p < 0.05$).

[^] Significant differences between total current and discontinued users ($p < 0.05$).

⁺ Daily users significantly different from both non-daily and discontinued e-cig users ($p < 0.05$).

48.9% were discontinued users and 50.0% had used on a non-daily basis in the past 30 days. Among never smokers who discontinued e-cig use, 41.7% were current users of other tobacco products, as were 56.3% of non-daily e-cig users in this sub-sample.

Never cigarette smokers reported using e-cigs “to try something new” (71.3%), “because I enjoy using the e-cig” (39.1%), “because the e-cig is less toxic than tobacco cigarettes” (31.0%), and “to avoid smelling like smoke” (21.1%). Less than 5% of never smokers reported using e-cigs “to deal with cravings for tobacco” (3.5%), “to quit smoking or avoid relapsing to smoking” (2.3%) or “to reduce tobacco consumption” (4.6%). Some never cigarette smokers who reported use for quitting/reduction reasons may have reported these reasons in regard to other tobacco use (“cigarette” was not specified in the terminology of the quitting/reduction reasons). 53.4% of current e-cig users (daily and non-daily) were currently using other non-cigarette tobacco products. Discontinued e-cig users may have been using other tobacco while using the e-cig, although we do not have measures of other tobacco use beyond past 30-day. All daily users who reported quitting/reduction reasons were current other tobacco users. Some current non-daily e-cig users (between 27.7% and 44.4%) who reported using for quitting/reduction reasons did not report current use of other tobacco products; this could be some level of misreporting error, unless they quit 31 + days ago.

3.3. E-cig experimentation and continued use

Distributions across the five category scale for selected reasons for use (*because I enjoy using the e-cigarette, because e-cigs are less toxic than tobacco cigarette and to reduce tobacco consumption*) are shown in Fig. 1. As an example, Fig. 1-A indicates that the majority of current daily users (85.7%) strongly agreed and 14.3% agreed with using an e-cig for enjoyment purposes. The majority of current non-daily users also either agreed (41.1%) or strongly agreed (29.4%) with using an e-cig because they enjoy it; 15.7% were neutral, 6.1% disagreed and 7.6% strongly disagreed with using for enjoyment. A smaller proportion of discontinued users strongly agreed (13.2%) and agreed (28.4%) with using an e-cig because they enjoy it; 32.8% were neutral, 8.3% disagreed and 17.2% disagreed with using an e-cig for enjoyment.

Results from the multinomial logistic regression model are shown in Table 2. Cigarette smoking status was not included in the final model because 80.0% of e-cig ever users were ever smokers (discontinued, experimenters or current smokers). The relative risk of current non-daily e-cig use, compared with discontinued use was higher among those who reported enjoyment of the product, those using e-cigs because they are less toxic than tobacco cigarettes, those who used any non-cigarette tobacco products in the past 30 days and those who did any binge drinking in the past 30 days. Relative risk of current daily e-cig use, compared with discontinued e-cig use was higher among those who strongly agreed with using an e-cig because they enjoy it.

4. Discussion

Surveys among young adults and college students have primarily focused on perceptions of e-cigs rather than reasons for experimentation/use of these products. Also, although most research on reasons for use has been generally conducted among adults (ages 18+) it has not specifically investigated among the 18–24 year old high risk age group (Choi et al., 2012; Czoli et al., 2014a; Kong et al., 2014; Ramo et al., 2015; Trumbo & Harper, 2013).

4.1. Enjoyment of e-cigarettes

Strongly agreeing with using an e-cig for enjoyment was common among current users. Among never smokers, using e-cigs for enjoyment (57.9%) was most frequently reported aside from wanting to try

something new (71.6%). It could be expected that one would discontinue using a product if it was not somewhat enjoyable to use; two-thirds of those in our sample who did not use for enjoyment were discontinued users. The full Likert scale variable shown in Fig. 1 depicts the importance of enjoyment, indicating that just 12.2% strongly disagreed and 7.0% disagreed with use for enjoyment and all others were either neutral or in agreement with this statement, including nearly one-quarter of users who *strongly agreed*. In addition, the full Likert scale variable highlights the important finding that all current daily e-cig users in our sample *strongly agreed* or *agreed* with using an e-cig because they enjoy the product. On the other hand, the largest percentage of ever users who *strongly disagreed* or *disagreed* (35.5%) with use for enjoyment, were among those who have not used in the past 30 days (discontinued users). Those who did not report use of e-cigs for enjoyment had stopped using the product or were using e-cigs less than monthly.

A recent study among adolescents and young adults reports experimentation with e-cigs because of appealing flavors (43.8% tried e-cigs for this reason); (Kong et al., 2014) the availability of flavors offered with e-cigs could influence enjoyment of e-cigs and make them more attractive, especially to young people. Additionally, it might be hypothesized that “other product advantages” in the present study (shown in Table 1) may also contribute to level of enjoyment. For example, using an e-cig because it is less toxic was commonly reported as a reason for use; it is possible that reduced toxicity of e-cigs, compared with cigarettes, could make this product more enjoyable for the user.

4.2. Quitting or reducing cigarette smoking

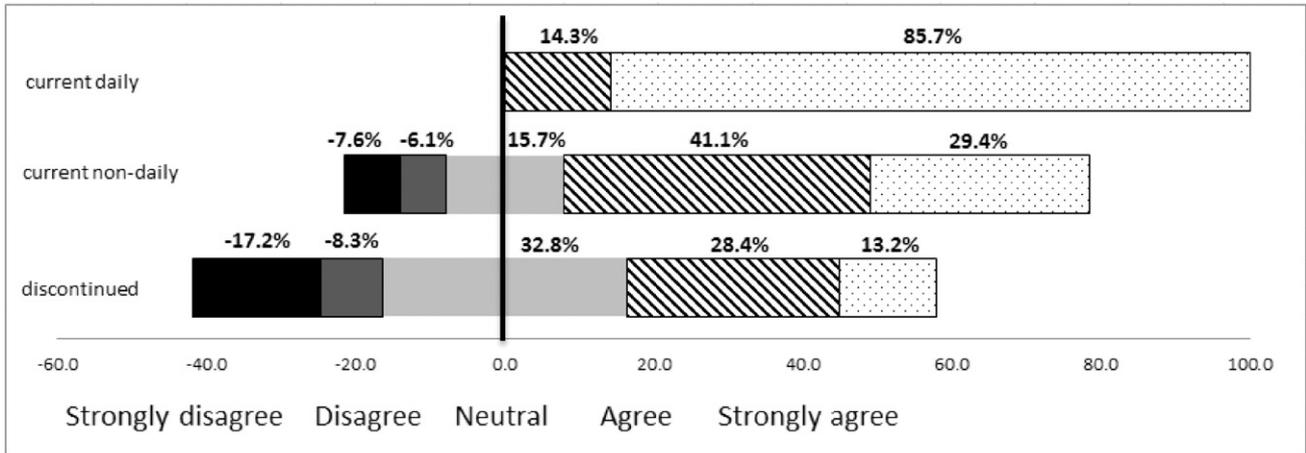
Using e-cigs for quitting/reduction reasons was uncommon aside from a very small sub-sample of users: current daily users, who, many were also current cigarette smokers (68.8%). The distribution of responses was very similar across all four reasons in the quitting/reduction group; we used “... to reduce my tobacco consumption” as the exemplar variable, but the other reasons work similarly in the regression models. The majority (72.7%) reported use to reduce tobacco consumption also reported using to quit smoking, suggesting most users were hoping to quit smoking.

Adult samples have generally reported use of e-cigs to quit smoking (Caponnetto et al., 2013; Dawkins et al., 2013; Etter & Bullen, 2011; Foulds, Veldheer, & Berg, 2011; Goniewicz et al., 2012; Kralikova et al., 2012; Pepper et al., 2014; Vickerman et al., 2013). A study among young adult never e-cig users (ages 18–25, at baseline), who were followed up one year later, found those who believed e-cigs can help people quit smoking had twice the odds of having ever used e-cigs at follow-up (Choi & Forster, 2014).

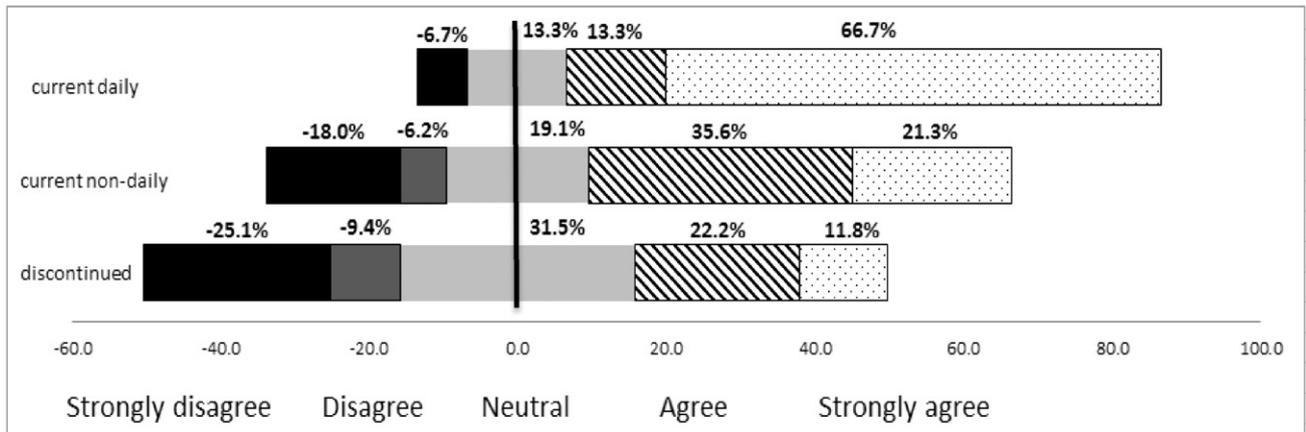
4.3. Experimentation and non-daily product use

The higher prevalence of non-daily e-cig use could be related to college students' interest in experimenting with multiple products, e-cigs included (Camenga et al., 2014; Saddleson et al., 2015; Sutfin et al., 2013). Additionally, e-cig use for reasons related to quitting smoking is common among adult smokers and those who are more nicotine dependent or interested in quitting smoking (Foulds et al., 2011; Ramo et al., 2015). When examining cigarette smokers in a previous analysis of these college students (Saddleson et al., 2015), 91.0% were non-daily smokers (had smoked between 1 and 29 days of the past 30 days). Lower smoking levels in our sample are consistent with previous research demonstrating that young adults smoke fewer cigarettes and generally smoke on a non-daily basis, compared with adult smokers (International R, America U.S.O., 2002; Johnston, O'Malley, Bachman, & Schulenberg, 2011). Often college students who smoke do not define themselves as “smokers.” (Berg, Parelkar, Lessard, et al., 2010; Levinson

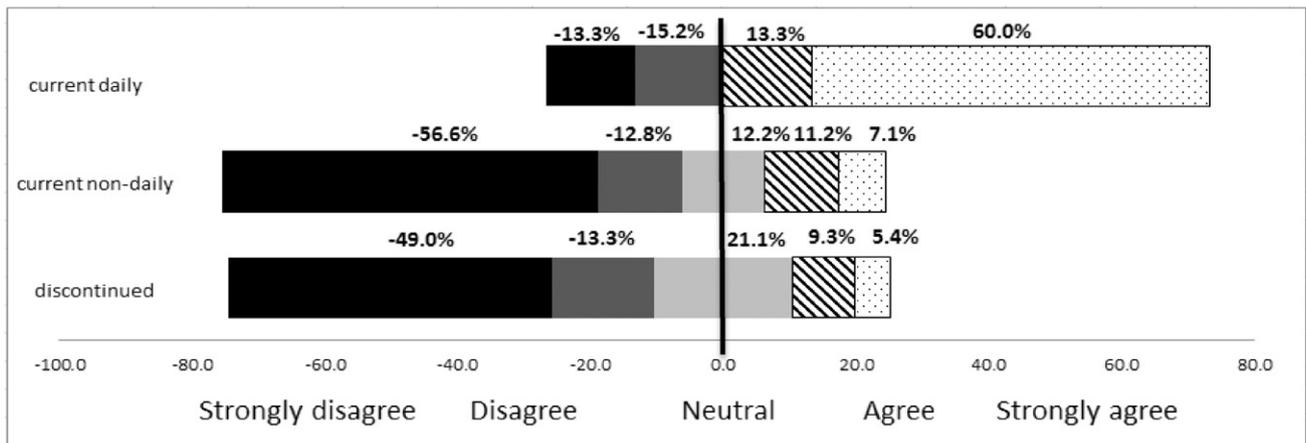
A.) “...Because I enjoy(ed) it”



B.) “...Because the e-cigarette is less toxic than tobacco cigarettes”



C.) “...To reduce my tobacco consumption”



Note: For interpretation purposes, negative percentages represent e-cig ever users who *strongly disagreed* or *disagreed* with the reasons for use presented in the figures.

Fig. 1. Reasons for e-cigarette use Note: For interpretation purposes, negative percentages represent e-cig ever users who *strongly disagreed* or *disagreed* with the reasons for use presented in the figures.

et al., 2007) Smoking less frequently might be indicative of being a “social smoker” and may be related to lower nicotine dependence levels (Levinson et al., 2007; Moran, Wechsler, & Rigotti, 2004; Schane,

Glantz, & Ling, 2009). Light smokers are likely less nicotine dependent, this may have influenced daily e-cig use and those using e-cigs to quit smoking.

Table 2
Relative risk of current non-daily (n = 200) and current daily e-cigarette use (n = 15).

	Discontinued (base)	Current non-daily	RRR	95% CI	Current daily	RRR	95% CI
	n (%)	n (%)			n (%)		
Age	n = 214	n = 200			n = 15		
18 years	93 (43.5)	108 (54.0)	1.00	ref	8 (50.0)	1.00	ref
19–23 years	121 (56.8)	92 (46.0)	0.63	(0.40–1.00)	8 (50.0)	0.58	(0.16–2.13)
<i>Gender</i>							
Male	93 (43.5)	117 (58.5)	1.00	ref	10 (62.5)	1.00	ref
Female	121 (56.5)	83 (41.5)	0.53*	(0.34–0.83)	6 (37.5)	0.44	(.12–1.61)
<i>Race</i>							
Non-Hispanic white	144 (70.9)	143 (74.5)	1.00	ref	14 (87.5)	1.00	ref
Non-Hispanic other	36 (17.7)	27 (14.1)	0.86	(0.46–1.61)	0 (0)	–	–
Hispanic	23 (11.4)	22 (11.4)	0.88	(0.44–1.79)	2 (12.5)	0.80	(0.13–4.86)
<i>Past 30-day non-cigarette tobacco use</i>							
None	110 (51.4)	58 (29.0)	1.00	ref	4 (25.0)	1.00	ref
Any	104 (48.6)	142 (71.0)	2.03*	(1.29–3.21)	12 (75.0)	3.58	(0.81–15.78)
<i>Past 30-day binge drinking</i>							
None	74 (34.6)	45 (22.5)	1.00	ref	7 (43.8)	1.00	ref
Any	140 (65.4)	155 (77.5)	1.92*	(1.16–3.18)	9 (56.2)	0.86	(0.23–3.18)
<i>Use e-cig to reduce tobacco consumption</i>							
Disagree/neutral	174 (85.3)	160 (81.6)	1.00	ref	4 (26.7)	1.00	–
Agree	30 (14.7)	36 (18.4)	0.89	(0.48–1.65)	11 (73.3)	8.60*	(2.02–36.64)
<i>Use e-cig because I enjoy it</i>							
Strongly disagree–agree	175 (86.6)	139 (70.6)	1.00	ref	2 (14.3)	1.00	ref
Strongly agree	27 (13.4)	58 (29.4)	1.85*	(1.05–3.25)	12 (85.7)	19.46**	(3.82–99.18)
<i>Use e-cig because less toxic than cigs</i>							
Disagree/neutral	135 (66.2)	84 (42.9)	1.00	ref	3 (20.0)	1.00	ref
Agree	69 (33.8)	112 (57.1)	2.56**	(1.59–4.13)	12 (80.0)	1.73	(0.36–8.38)

Note: Columns represent discontinued, current non-daily and current daily e-cigarette use. Results based on analysis of a multinomial logistic regression; model controlled for demographics (age, gender, race/ethnicity) and other variables shown in the model. RRR = Relative risk ratio. Discontinued e-cig users are the comparison base outcome measure. N's and percentages represent the number of respondents in the independent variable groupings who reported either current non-daily e-cig use or current daily e-cig use. Categories for e-cig use for enjoyment were grouped as: strongly agree vs. any other response given because there were no current daily e-cig users who strongly disagreed, disagreed or were neutral.

* p < 0.05.

** p < 0.001.

4.4. Cognitive and affective models of decision making

For a number of health-related behaviors, it is important to distinguish between cognitive and affective influences (Simons & Carey, 1998; Trafimow & Sheeran, 1998). For example, one might “know” or “think” that a hot-fudge sundae should be avoided for the sake of their diet, but “feel” that they would greatly enjoy a hot-fudge sundae. This model has also been applied to addictive behaviors (Kiviniemi & Bevins, 2007). In the case of reasons for using an e-cig, distinguishing between cognitive reasons (because e-cigs are less toxic or to quit smoking) and affective ones (because I enjoy using the e-cig) is important. A *behavioral affective associations model* gives attention to the idea that there are feelings and emotions associated with certain behaviors (Kiviniemi & Bevins, 2008). While public health researchers may be inclined to focus on the presumed practical reasons for use (e.g. quitting smoking), popularity is likely to be greatly influenced by the enjoyment, liking or satisfaction associated with using e-cigarettes which may also be related to their addictive potential (Kozlowski, 2013).

There are some limitations of this study. The sample is a cross-sectional convenience sample of college students in New York State and may not be representative of all college students on a state or a national level. The sample size of current daily e-cig users was small (N = 15); however e-cig use in the past 30-days was ample (n = 215), as was ever use of e-cigs (n = 429). Also, the sample of current smokers consisted mainly of non-daily smokers. More precise measures of non-daily smoking are needed to better differentiate smoking levels within this group (Kozlowski & Giovino, 2014). There currently is no validated method to assess heavy versus light e-cig use. The development of a tool to better measure levels of e-cig use, in addition to the number of days

used in the past 30-days would benefit future e-cig surveillance research. Reasons for using e-cigs related to quitting/reduction of smoking or tobacco did not specify “cigarette smoking,” and could have been interpreted as quitting or reducing any form of tobacco.

Strengths of this study include use of a demographically diverse sample and use of survey items based on previous research (Etter, 2010; Etter & Bullen, 2011). In addition, this study provides a comprehensive assessment of reasons for use among an at-risk population and survey items included assessment of risky health behaviors such as alcohol, combustible cigarette, other tobacco and marijuana use.

The present study indicates that college students and young adults may be more interested in using e-cigs for reasons associated with affect, or because they enjoy e-cigs. When investigating reasons for e-cig use, although it is important to understand quitting and toxicity as important reasons for use, attention should be given to use of this product for affective reasons like satisfaction or, pleasure that arises from e-cig use, as enjoyment or satisfaction of a product likely plays a role its popularity.

Author disclosure

There are no financial interest in this study and no conflicts of interests to disclose.

Author contributions

L. Kozlowski and M. Saddleson contributed to the development of the study concept. All authors contributed to the study design, conduct of the study analyses and interpretation of the data. M. Saddleson and L.

Kozlowski led the preparation of the manuscript and all authors contributed to the revision of the manuscript for important intellectual content and approved the final version of the article.

References

- Adkison, S. E., O'Connor, R. J., Bansal-Travers, M., et al. (2013). Electronic nicotine delivery systems: international tobacco control four-country survey. *American Journal of Preventive Medicine*, 44(3), 207–215.
- Agaku, I. T., King, B. A., Husten, C. G., et al. (2014). Tobacco product use among adults—United States, 2012–2013. *MMWR. Morbidity and Mortality Weekly Report*, 63(25), 542–547.
- Arrazola, R. A., Singh, T., Corey, C. G., et al. (2015). Tobacco use among middle and high school students—United States, 2011–2014. *MMWR. Morbidity and Mortality Weekly Report*, 64(14), 381–385.
- Ayers, J. W., Ribisl, K. M., & Brownstein, J. S. (2011). Tracking the rise in popularity of electronic nicotine delivery systems (electronic cigarettes) using search query surveillance. *American Journal of Preventive Medicine*, 40(4), 448–453.
- Berg, C. J., Parelkar, P. P., Lessard, L., et al. (2010). Defining “smoker”: College student attitudes and related smoking characteristics. *Nicotine & Tobacco Research*, ntn123.
- Cahn, Z., & Siegel, M. (2010). Electronic cigarettes as a harm reduction strategy for tobacco control: A step forward or a repeat of past mistakes? *Journal of Public Health Policy*, 32(1), 16–31.
- Camenga, D. R., Delmerico, J., Kong, G., et al. (2014). Trends in use of electronic nicotine delivery systems by adolescents. *Addictive Behaviors*, 39(1), 338–340.
- Caponnetto, P., Campagna, D., Cibella, F., et al. (2013). Efficiency and safety of an electronic cigarette (ECLAT) as tobacco cigarettes substitute: A prospective 12-month randomized control design study. *PLoS One*, 8(6), e66317.
- Choi, K., & Forster, J. (2013). Characteristics associated with awareness, perceptions, and use of electronic nicotine delivery systems among young US Midwestern adults. *American Journal of Public Health*, 103(3), 556–561.
- Choi, K., & Forster, J. L. (2014). Beliefs and experimentation with electronic cigarettes: A prospective analysis among young adults. *American Journal of Preventive Medicine*, 46(2), 175–178.
- Choi, K., Fabian, L., Mottey, N., Corbett, A., & Forster, J. (2012). Young adults' favorable perceptions of snus, dissolvable tobacco products, and electronic cigarettes: Findings from a focus group study. *American Journal of Public Health*, 102(11), 2088–2093.
- Cobb, N. K., & Abrams, D. B. (2011). E-cigarette or drug-delivery device? Regulating novel nicotine products. *The New England Journal of Medicine*, 365(3), 193.
- Couch, Elizabeth, Chaffee, Benjamin, Essex, Gwen, & Walsh, Margaret (2014). *More evidence why FDA should prohibit use of flavors in deemed tobacco products as part of the current rulemaking.*
- Czoli, C. D., Hammond, D., & White, C. M. (2014a). Electronic cigarettes in Canada: Prevalence of use and perceptions among youth and young adults. *Canadian Journal of Public Health*, 105(2), e97–e102.
- Czoli, C. D., Hammond, D., & White, C. M. (2014b). Electronic cigarettes in Canada: Prevalence of use and perceptions among youth and young adults. *Canadian Journal of Public Health. Revue Canadienne de Sante Publique*, 105(2), e97.
- Dawkins, L., Turner, J., Roberts, A., & Soar, K. (2013). 'Vaping' profiles and preferences: An online survey of electronic cigarette users. *Addiction*, 108(6), 1115–1125.
- Dockrell, M., Morison, R., Bauld, L., & McNeill, A. (2013). E-cigarettes: Prevalence and attitudes in Great Britain. *Nicotine & Tobacco Research*.
- Dutra, L. M., & Glantz, S. A. (2014). Electronic cigarettes and conventional cigarette use among US adolescents: A cross-sectional study. *JAMA Pediatrics*.
- Etter, J. -F. (2010). Electronic cigarettes: A survey of users. *BMC Public Health*, 10(1), 231.
- Etter, J. F., & Bullen, C. (2011). Electronic cigarette: Users profile, utilization, satisfaction and perceived efficacy. *Addiction*, 106(11), 2017–2028.
- Foulds, J., Veldheer, S., & Berg, A. (2011). Electronic cigarettes (e-cigs): Views of aficionados and clinical/public health perspectives. *International Journal of Clinical Practice*, 65(10), 1037–1042.
- Goniewicz, M. L., & Zielinska-Danch, W. (2012). Electronic cigarette use among teenagers and young adults in Poland. *Pediatrics*, 130(4), e879–e885.
- Goniewicz, M. L., Lingas, E. O., & Hajek, P. (2012). Patterns of electronic cigarette use and user beliefs about their safety and benefits: An Internet survey. *Drug and Alcohol Review*.
- International R, America USo (2002). *Results from the 2001 National Household Survey on Drug Abuse: volume I. Summary of National Findings.*
- Johnston, L. D., O'Malley, P. M., Bachman, J. G., & Schulenberg, J. E. (2011). *Monitoring the Future National Survey Results on Drug Use, 1975–2010. Volume I, secondary school students*Institute for Social Research.
- King, B. A., Alam, S., Promoff, G., Arrazola, R., & Dube, S. R. (2013). Awareness and ever-use of electronic cigarettes among US adults, 2010–2011. *Nicotine & Tobacco Research*, 15(9), 1623–1627.
- Kiviniemi, M., & Bevins, R. (2007). Affect-behavior associations in motivated behavioral choice: Potential transdisciplinary links. *Issues in the psychology of motivation* (pp. 65–80).
- Kiviniemi, M. T., & Bevins, R. A. (2008). Role of affective associations in the planning and habit systems of decision-making related to addiction. *Behavioral and Brain Sciences*, 31(04), 450–451.
- Kong, G., Morean, M. E., Cavallo, D. A., Camenga, D. R., & Krishnan-Sarin, S. (2014). Reasons for electronic cigarette experimentation and discontinuation among adolescents and young adults. *Nicotine & Tobacco Research*, ntn257.
- Kozlowski, L. T. (2013). Ending versus controlling versus employing addiction in the tobacco-caused disease endgame: Moral psychological perspectives. *Tobacco Control*, 22(Suppl. 1), i31–i32.
- Kozlowski, L. T., & Giovino, G. A. (2014). Softening of monthly cigarette use in youth and the need to harden measures in surveillance. *Preventive Medicine Reports*.
- Kralikova, E., Kubatova, S., Trunekova, K., Kmetova, A., & Hajek, P. (2012). The electronic cigarette: What proportion of smokers have tried it and how many use it regularly? *Addiction*, 107(8), 1528–1529.
- Levinson, A. H., Campo, S., Gascoigne, J., Jolly, O., Zakharyan, A., & Tran, Z. V. (2007). Smoking, but not smokers: identity among college students who smoke cigarettes. *Nicotine & Tobacco Research*, 9(8), 845–852.
- Moran, S., Wechsler, H., & Rigotti, N. A. (2004). Social smoking among US college students. *Pediatrics*, 114(4), 1028–1034.
- Pearson, J. L., Richardson, A., Niaura, R. S., Vallone, D. M., & Abrams, D. B. (2012). E-cigarette awareness, use, and harm perceptions in US adults. *American Journal of Public Health*, 102(9), 1758–1766.
- Pepper, J. K., Ribisl, K. M., Emery, S. L., & Brewer, N. T. (2014). Reasons for starting and stopping electronic cigarette use. *International Journal of Environmental Research and Public Health*, 11(10), 10345–10361.
- Ramo, D. E., Young-Wolff, K. C., & Prochaska, J. J. (2015). Prevalence and correlates of electronic-cigarette use in young adults: Findings from three studies over five years. *Addictive Behaviors*, 41, 142–147.
- Regan, A. K., Promoff, G., Dube, S. R., & Arrazola, R. (2013). Electronic nicotine delivery systems: adult use and awareness of the 'e-cigarette' in the USA. *Tobacco Control*, 22(1), 19–23.
- Rigotti, N. A., Moran, S. E., & Wechsler, H. (2005). US college students' exposure to tobacco promotions: Prevalence and association with tobacco use. *American Journal of Public Health*, 95(1), 138–144.
- Riker, C. A., Lee, K., Darville, A., & Hahn, E. J. (2012). E-cigarettes: Promise or peril? *Nursing Clinics of North America*, 47(1), 159–171.
- Saddleson, M. L., Kozlowski, L. T., Giovino, G. A., Hawk, L. W., Murphy, J. M., MacLean, M. G., ... Mahoney, M. C. (2015). Risky behaviors, e-cigarette use and susceptibility of use among college students. *Drug and Alcohol Dependence*, 149, 25–30.
- Schane, R. E., Glantz, S. A., & Ling, P. M. (2009). Nondaily and social smoking: an increasingly prevalent pattern. *Archives of Internal Medicine*, 169(19), 1742–1744.
- Simons, J., & Carey, K. B. (1998). A structural analysis of attitudes toward alcohol and marijuana use. *Personality and Social Psychology Bulletin*, 24(7), 727–735.
- Statacorp (2013). *Stata Statistical Software: Release 13.* College Station, TX: StataCorp LP.
- Sutfin, E. L., McCoy, T. P., Morrell, H. E., Hoepfner, B. B., & Wolfson, M. (2013). Electronic cigarette use by college students. *Drug and Alcohol Dependence*.
- Trafimow, D., & Sheeran, P. (1998). Some tests of the distinction between cognitive and affective beliefs. *Journal of Experimental Social Psychology*, 34(4), 378–397.
- Trumbo, C. W. (2015). The effect of electronic cigarette advertising on intended use among college students. *Addictive Behaviors*, 46, 77–81.
- Trumbo, C. W., & Harper, R. (2013). Use and perception of electronic cigarettes among college students. *Journal of American College Health*, 61(3), 149–155.
- Vickerman, K. A., Carpenter, K. M., Altman, T., Nash, C. M., & Zbikowski, S. M. (2013). Use of electronic cigarettes among state tobacco cessation quitline callers. *Nicotine & Tobacco Research*.