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Young adult dual combusted cigarette and e-cigarette users' anticipated responses to hypothetical e-cigarette market restrictions

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Abstract

Introduction: The aim of this pilot study was to assess young adult dual e-cigarette (EC) and combustible cigarette (CC) users' anticipated responses to hypothetical market restrictions regarding key e-cigarette characteristics.

Methods: Data came from 240 young adult dual EC and CC users recruited via Amazon Mechanical Turk in June 2017. Descriptive statistics were used to report sociodemographic, CC smoking, and EC use characteristics. McNemar's chi-square tests and chi-square tests were used to assess differences between groups in terms of anticipated responses to hypothetical EC market restrictions.

Results: Hypothetical regulations resulted in reported intentions to reduce EC use and increase CC use; the greatest impact was found for restrictions regarding e-liquid nicotine content, followed by flavor and ability to modify EC devices. Moreover, individuals reporting use of flavored e-liquid, high nicotine content e-liquid, and customizable EC were most likely to report intentions to reduce EC use and increase CC use.

Conclusions: This work provides preliminary evidence that restrictive regulations regarding key EC characteristics may increase intentions to increase CC use among young adult dual EC and CC users.

Keywords

ENDS; e-cigarette; cigarette; smoking; policy; tobacco regulatory science

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INTRODUCTION

Between 2011 and 2017, the prevalence of past 30 day e-cigarette (EC) use rose among adults (1.3% to 2.8%) in the United States (U.S.) (Glasser et al., 2017; Mirbolouk et al., 2018; T. W. Wang et al., 2018). During this time, the EC market has become increasingly diverse, with estimates of 460 EC brands and more than 7,700 different e-liquids available in 2014 (Zhu et al., 2014). Consumers can choose from a variety of devices, ranging from 1st generation (1G) “cigalike” devices to more advanced 3rd generation (3G) devices that users can configure (e.g., change the wattage) or modify (e.g., change atomizer) (Farsalinos, Gillman, Hecht, Polosa, & Thornburg, 2017), to self-administer a variety of e-liquids. The ability to select and modify e-liquid nicotine content (Bullen et al., 2010; M. W. Johnson, Johnson, Rass, & Pacek, 2017; Lopez et al., 2016; Perkins, Karelitz, & Michael, 2017; Ramôa et al., 2016; Talih et al., 2015; Tseng et al., 2016), flavor (Baggett, Campbell, Chang, & Rigotti, 2016; Cheney, Gowin, & Wann, 2016; Cooper, Harrell, & Perry, 2016; Farsalinos et al., 2013; Kong, Morean, Cavallo, Camenga, & Krishnan-Sarin, 2015; McDonald & Ling, 2015; Patel et al., 2016; Rutten et al., 2015; Sussman et al., 2014; Villanti et al., 2017), and device type (Baweja et al., 2016; Cooper et al., 2016; Kistler et al., 2017; McKeganey & Dickson, 2017; Simmons et al., 2016; Vandrevalla et al., 2017) may impact EC reinforcing effects, including nicotine pharmacokinetics and product satisfaction (i.e., ease of use, taste, throat hit, craving reduction, liking), and contribute to initiation, continued use, and substitutability for combusted cigarettes (CCs).

In 2016, the Food and Drug Administration (FDA) extended its regulatory authority over the manufacture, marketing, and distribution of all tobacco products, including ECs (Food and Drug Administration, 2016; United States Congress, 2009). The potential impact of regulation of this market is noteworthy: regulations that would reduce the diversity and subsequent appeal of these EC characteristics have the potential to benefit segments of the population, but may have unintended consequences for others. For instance, restricting the nicotine content of ECs to low levels may reduce their reinforcing effects, thus reducing uptake and continued use. Given that some research indicates that EC use is associated with reductions in cigarettes smoked per day (CPD) (Adriaens, Van Gucht, & Baeyens, 2017; Brose, Hitchman, Brown, West, & McNeill, 2015; Farsalinos, Romagna, & Voudris, 2015; Lechner et al., 2015; Rass, Pacek, Johnson, & Johnson, 2015; Rutten et al., 2015) (though also see (Goniewicz et al., 2018) who found no difference in CPD between dual EC/CC users and CC-only smokers), decreasing the nicotine delivery of ECs may also render them a less effective substitute for CCs. Notably, substantial CC use reduction (i.e., short of cessation/complete switching to EC) may still be insufficient to reduce significant health risks (e.g., coronary artery disease and stroke) (Hackshaw, Morris, Boniface, Tang, & Milenkovi, 2018). Additionally, given that EC use is often initiated with non-tobacco flavored e-liquids (Cheney et al., 2016; Farsalinos et al., 2015; Harrell et al., 2017; Villanti et al., 2017), limiting flavors may reduce the appeal and subsequent initiation of EC use among youth and non-users, while potentially reducing continued use of ECs among established users in general, as well as among those trying to reduce (Cheney et al., 2016; Rutten et al., 2015) or quit smoking (Farsalinos et al., 2013). Indeed, prior research among exclusive CC smokers utilizing a discrete choice paradigm indicates that EC flavor

restrictions reduced the likelihood of selecting ECs from among ECs, CCs, and nicotine replacement therapy (Pesko, Kenkel, Wang, & Hughes, 2016). Lastly, limiting modifiability/customizability of EC devices may decrease the likelihood of battery malfunction (Rudy & Durmowicz, 2016), but may have a detrimental effect on the improved nicotine delivery that 3G devices confer over non-modifiable devices (Farsalinos, Romagna, Tsiapras, Kyrzopoulos, & Voudris, 2014; Talih et al., 2015; Wagener et al., 2017). In sum, while some EC product regulations may have benefits, they may also reduce palatability and user satisfaction.

It is important to consider the potential impact of regulations on the EC market to mitigate unintended negative consequences, particularly among at-risk populations such as young adult dual tobacco product users. Dual tobacco product users are a particularly high risk group: dual tobacco product use is associated with greater nicotine exposure (Bombard, Pederson, Nelson, & Malarcher, 2007; Bombard, Rock, Pederson, & Asman, 2008), nicotine dependence (Soule, Pomeranz, Moorhouse, & Barnett, 2015), and greater difficulties when attempting to quit as compared to single product users (Bombard et al., 2007; Wetter et al., 2002). When making a quit attempt, dual and multiple product use is associated with shorter time to relapse (Messer et al., 2015) and a decreased likelihood of cessation (Hamari, Toljamo, Kinnula, & Nieminen, 2013; Kasza et al., 2014; Tomar, Alpert, & Connolly, 2010; Wetter et al., 2002). It is worth noting that approximately 38% of current tobacco users are users of more than one tobacco product (Kasza et al., 2017). Moreover, dual use of EC and CC is the most prevalent two-product use combination among adult dual and multiple tobacco product users in the U.S. (Kasza et al., 2017), suggesting that this is a population warranting examination.

Moreover, young adulthood (i.e., age 18-29) represents a pivotal developmental period for the acquisition and escalation of tobacco product use and dependence (U.S. Department of Health and Human Services, 2014). Approximately 29% of young adults report CC smoking within the past 30 days (Kasza et al., 2017) and 13% are estimated to be current EC users, versus 6% of adults aged ≥ 25 (U.S. Department of Health and Human Services, 2016). It would be useful to anticipate how hypothetical restrictions on the EC market may impact EC and CC use in this population. We aimed to assess young adult dual EC/CC users' intended responses to hypothetical market restrictions regarding key EC characteristics.

METHODS

Data source

Methods for this research have been reported previously (Pacek, Oliver, Sweitzer, & McClernon, 2019), but briefly: data were collected on Amazon Mechanical Turk (MTurk), which provides a cost-effective, rapid method for conducting studies that span multiple disciplines (Carter, DiFeo, Bogie, Zhang, & Sun, 2014; P. S. Johnson, Herrmann, & Johnson, 2015; Pacek, Rass, & Johnson, 2017; Rass et al., 2015). Inclusion criteria were: reside in the U.S.; having a $\geq 95\%$ approval rating from previous MTurk tasks; age 18-29; smoking CCs for ≥ 3 months AND ≥ 1 day in the past week; and using ECs for ≥ 3 months AND ≥ 1 day in the past week. Eligible participants were given a code to access the survey, hosted by Qualtrics (Provo, UT). Participants were paid \$2 upon completion. The

survey was active from June 20-22, 2017. Participation was voluntary and anonymous. The Institutional Review Board at Duke University School of Medicine approved this study.

Measures

Sociodemographic, CC and EC history characteristics—Participants reported sociodemographic information and detailed CC and EC use history. The Fagerström Test for Nicotine Dependence (Heatherton, Kozlowski, Frecker, & Fagerström, 1991) (FTND) assessed CC dependence and a modified version of the FTND (eFTND) was used to assess EC dependence (Rass et al., 2015).

EC use characteristics—Participants reported the concentration/strength of nicotine that they used most often; Nicotine content was dichotomized (low [≤ 6 mg/mL] versus high [>6 mg/mL]). Participants also reported the “specific flavor that they use most often (e.g., cherry)” in their ECs; flavors were categorized as “flavored” versus “tobacco/menthol.” Participants uploaded a photo of their usual brand EC. Two coders categorized photos independently as 1G/2G/3G devices; disagreement was resolved by discussion. Given the relative lack of possibility for customizability in 1G and 2G devices as compared to 3G, device type was dichotomized (1G/2G versus 3G). A total of 20 participants’ devices could not be classified as 1G/2G/3G (e.g., uploaded photo contained multiple devices of various generations or were of a more advanced device type such as JUUL/pod devices).

Hypothetical EC market restrictions—Participants reported anticipated responses to three hypothetical EC regulations. Hypothetical scenarios were described to participants as follows: “Imagine that e-cigarettes available in the United States are like they are today BUT: 1) they are only available in nicotine-free (0 nicotine) e-liquid; 2) they are only available in tobacco/menthol flavors; and 3) they do not allow the user to modify or customize the device (e.g., wattage, air flow).” Under each scenario, participants indicated—separately for ECs and CCs—whether they would stop using ECs/CCs completely, use ECs/CCs a lot less often, use ECs/CCs a little less often, use ECs/CCs the same amount, use ECs/CCs a little more often, or use ECs/CCs a lot more often.

Statistical analysis

Descriptive statistics depicted the sociodemographic and CC/EC use characteristics of the sample. McNemar’s chi-square tests were used to assess differences between groups in terms of anticipated responses to hypothetical EC market restrictions (e.g., comparing anticipated EC vs. CC quitting, among the entire sample). Chi-square tests were also used when comparing anticipated use behaviors between subgroups (e.g., comparing anticipated quitting of EC use between high/low nicotine content users). Given the small number of participants ($n=5$) who used nicotine-free e-liquid, we could not evaluate whether a hypothetical regulation differentially impacts users of nicotine-free versus nicotine-containing e-liquids. Post hoc multinomial logistic regression analyses were run to assess whether EC and CC use frequency (i.e., days of use per week; EC bouts per day/CPD) or intentions to quit EC or CC use were associated with anticipated responses to hypothetical EC market restrictions.

RESULTS

Sociodemographic characteristics

Sample sociodemographic characteristics are presented in Supplemental Table 1. In total, 314 individuals initiated the survey, while 252 individuals completed the task in its entirety. Twelve were excluded for: not meeting EC use inclusion criteria (n=3); indicating that their data should not be used (n=8); and unreliable data (e.g., submitting photos of images that did not contain CC or EC products; n=4). These numbers do not sum to 12 due to overlap between categories. Analyses are based on a sample size of n=240. The sample was half male (49.2%), predominantly White (72.5%), had greater than a high school diploma/GED (87.5%), and was unmarried (76.3%).

Product use characteristics

CC and EC use characteristics are presented in Table 1. Approximately one-third (36.3%) were non-daily users of ECs and CCs, 25.4% used CCs daily but ECs non-daily, 17.1% used ECs daily but CCs non-daily, and 21.3% used ECs and CCs daily.

Responses to hypothetical EC market restrictions

EC nicotine content restrictions—In response to nicotine content restrictions (Figure 1), participants were more likely to report intentions to quit or reduce EC versus CC use (McNemar's $\chi^2(1, N=240)=46.6, p<0.001$; McNemar's $\chi^2(1, N=240)=22.3, p<0.001$), and were more likely to report intentions to maintain or increase CC use versus EC use (McNemar's $\chi^2(1, N=240)=6.6, p=0.010$; McNemar's $\chi^2(1, N=240)=60.5, p<0.001$, respectively). We observed differential responses based on use of high versus low nicotine e-liquids. Among individuals using high nicotine content e-liquids (Supplemental Figure 1A), participants were more likely to indicate that they would quit or reduce EC versus CC use (47.2% versus 5.6%: $\chi^2(1, N=72)=26.5, p<0.001$; 37.5% versus 15.3%: $\chi^2(1, N=72)=12.8, p<0.001$, respectively), and were more likely to report intentions to maintain or increase use of CC versus EC (31.9% versus 12.5%: $\chi^2(1, N=72)=10.9, p=0.001$; 47.2% versus 2.8%: $\chi^2(1, N=72)=28.4, p<0.001$, respectively). Among persons using low nicotine content e-liquids, participants were more likely to indicate that they would quit or reduce use of EC versus CC (27.6% versus 5.6%: $\chi^2(1, N=127)=15.2, p<0.001$; 37.5% versus 15.3%: $\chi^2(1, N=127)=7.7, p=0.006$, respectively) and increase use of CC versus EC (48.8% versus 11.8%: $\chi^2(1, N=127)=28.7, p<0.001$) (Supplemental Figure 1B).

Moreover, participants using high nicotine e-liquids were significantly more likely than those using low nicotine e-liquids to report that they would quit EC use (47.2% versus 27.5%: $\chi^2(1, N=199)=.78, p=0.005$). Additionally, users of high nicotine e-liquid were also less likely to indicate intentions to maintain or increase EC use (12.5% versus 25.2%: $\chi^2(1, N=199)=4.5, p=0.033$; 2.8% versus 11.8%: $\chi^2(1, N=199)=4.8, p=0.028$) (Supplemental Figure 2A).

EC flavor restrictions—In response to restrictions on e-liquid flavors (Figure 2), participants were more likely to report intentions to quit or reduce EC versus CC use (McNemar's $\chi^2(1, N=240)=8.8, p=0.003$; McNemar's $\chi^2(1, N=240)=14.5, p<0.001$) and

more likely to report intentions to maintain or increase CC use versus EC use (McNemar's $\chi^2(1, N=240)=13.1, p<0.001$; McNemar's $\chi^2(1, N=240)=13.5, p<0.001$). Moreover, we observed differential responses based on use of flavored e-liquids. Among users of flavored e-liquids, participants were more likely to indicate that they would quit or reduce their use of EC versus CC (18.7% versus 8.6%: $\chi^2(1, N=139)=6.1, p=0.013$; 52.5% versus 28.1%: $\chi^2(1, N=139)=15.2, p<0.001$), and maintain or increase CC versus EC use (44.6% versus 23.0%: $\chi^2(1, N=139)=15.5, p<0.001$; 18.7% versus 5.8%: $\chi^2(1, N=139)=9.5, p=0.002$) (Supplemental Figure 3). No differences regarding anticipated EC versus CC use were reported among users of tobacco/menthol e-liquid.

Participants who used flavored e-liquids were significantly more likely than those using tobacco/menthol e-liquids to report that they would quit or reduce EC use (18.7% versus 7.1%: $\chi^2(1, N=238)=6.6, p=0.010$; 52.5% versus 25.3%: $\chi^2(1, N=238)=17.7, p<0.001$), while tobacco/menthol flavor users were more likely to report that they would maintain their EC use (61.6% vs. 23.0%: $\chi^2(1, N=238)=36.2, p<0.001$) (Supplemental Table 4A). Users of flavored e-liquids were also more likely to report that they would quit CC use (8.6% versus 2.0%: $\chi^2(1, N=238)=4.6, p=0.033$) and were less likely to report that they would maintain CC use (44.6% versus 63.6%: $\chi^2(1, N=238)=8.4, p=0.004$) (Supplemental Figure 4B).

EC device type restrictions—In response to hypothetical restrictions on EC device type (Figure 3), participants were more likely to report intentions to quit or reduce EC use versus CC use (McNemar's $\chi^2(1, N=240)=6.1, p=0.014$; McNemar's $\chi^2(1, N=240)=26.2, p<0.001$), and more likely to report intentions to increase CC use versus EC use (McNemar's $\chi^2(1, N=240)=42.7, p<0.001$). Among users of 1G/2G devices, participants were more likely to report that they would quit or reduce EC versus CC use (10.3% versus 4.8%: $\chi^2(1, N=145)=4.0, p=0.046$; 33.8% versus 16.6%: $\chi^2(1, N=145)=12.3, p<0.001$), and more likely to report that they would increase CC versus EC use (15.9% versus 1.4%: $\chi^2(1, N=145)=17.6, p<0.001$) (Supplemental Figure 5). Among users of 3G devices, participants were more likely to report that they would reduce EC versus CC use (44.0% versus 18.7%: $\chi^2(1, N=75)=13.4, p<0.001$) and increase CC versus EC use (33.3% versus 0%: $\chi^2(1, N=75)=25.0, p<0.001$) (Supplemental Figure 5).

Additionally, 1G/2G device users were more likely than 3G users to report intentions to maintain EC use and CC use (54.5% versus 38.7%: $\chi^2(3, N=220)=4.9, p=0.026$; 62.8% versus 40.0%: $\chi^2(3, N=220)=10.3, p=0.001$) (Supplemental Figure 6A). Conversely, 3G EC device users were more likely than 1G/2G users to report intentions to increase CC use (33.3% versus 15.9%: $\chi^2(3, N=220)=8.9, p=0.003$) (Supplemental Figure 6B).

Associations between responses to hypothetical EC market restrictions and EC/CC use frequency and intentions to quit using EC/CC

In the hypothetical nicotine content restriction scenario, participants reporting a greater number of EC bouts per day were more likely to report anticipating an increase in CC use (RRR=1.02, 95% CI=1.01, 1.03). Regarding the hypothetical restriction of EC flavors, participants reporting a greater number of EC bouts per day were more likely to report

anticipating that they would reduce EC use (RRR=1.01, 95% CI=1.01, 1.02). In the flavor restriction scenario, participants reporting greater days of CC use per week were less likely to anticipate quitting CC use (RRR=0.66, 95% CI=0.51, 0.85). In response to hypothetical restrictions on EC device type, participants reporting greater CPD were more likely to report anticipating that they would quit EC (RRR=1.07, 95% CI=1.01, 1.14). Participants reporting greater EC bouts per day were also more likely to report anticipating that they would increase CC use (RRR=1.02, 95% CI=1.01, 1.03) if EC device type was restricted. Overall intentions to quit using EC and CC were not associated with anticipated responses to hypothetical EC market restrictions.

DISCUSSION

This work assessed young adult dual EC/CC users' anticipated responses to hypothetical regulations of key EC characteristics. Preliminary findings suggest that young adult dual users self-report their intention to reduce EC use and increase CC use. These findings are consistent with research wherein participants indicated that the restriction of e-liquid flavors would reduce the appeal of ECs by making them less enjoyable (69%) and more boring (46%), and lower their likelihood of reducing or quitting smoking (40%) (Farsalinos et al., 2013). In addition, flavor restrictions decreased the expected likelihood of selecting ECs versus CCs (Pesko et al., 2016). Though additional studies will examine the effect of these restrictions, limited research indicates that ECs—while conferring greater harm than nicotine replacement therapy or complete cessation of tobacco product use—generally offer a more favorable toxicant profile than CCs (D'Ruiz, Graff, & Robinson, 2016; Hecht et al., 2015). It is possible that regulations that deter complete switching to potentially lower-harm tobacco products, such as ECs and result in increases in the proportion of CCs used among dual EC/CC users may have a negative effect on public health. For example, a recent study found that, among dual EC/CC users in the U.S. general population, the frequency of CC use (i.e., daily use vs. use on some days) is positively correlated with tobacco toxicant concentration (Goniewicz et al., 2018).

Moreover, hypothetical restrictions regarding EC characteristics were most relevant for individuals who reported utilizing those characteristics in their typical EC use. For example, participants who typically use flavored e-liquids (other than tobacco/menthol flavor) were more likely to indicate intention to quit or reduce EC use and simultaneously indicate intentions to increase CC use in response to restricting available flavors to only tobacco or menthol. These findings are particularly noteworthy given that most EC users use flavored e-liquids (69.3%-97.9%) and modifiable EC devices (53.6%-73.5%) (Farsalinos et al., 2013, 2014). In some instances, responses to hypothetical EC market restrictions also varied based on participants' frequency of EC and CC use—both in terms of the number of days of use per week as well as CPD and EC bouts per day.

This work should be considered in light of several limitations. First, the results of this study have limited generalizability. Although recent work indicates that data from substance-using samples gathered via MTurk are valid, this study was limited to dual EC/CC users available in this database (Kim et al., 2016; Mortensen & Hughes, 2018); future work should investigate the impact of hypothetical regulations on product use intentions in more diverse

groups of tobacco users, including exclusive EC and exclusive CC users. Relatedly, data were collected only among young adult dual users whose intended and actual behaviors may differ from those of older adults or single product users. Second, the hypothetical regulations considered in the present analyses were negative in tone and would result in reductions in product diversity, which may have contributed to participants' intentions to decrease EC use following such regulations. To reduce response bias, future work should evaluate anticipated responses to hypothetical regulations of a more positive nature (e.g., new requirements for child-safety packaging; ensured ingredient purity) alongside those having a more negative focus. Third, data were collected via self-report; behavioral and biochemical verification of EC and CC use was not conducted. Fourth, participants' responses regarding EC and CC use were based on hypothetical scenarios concerning EC market regulation and may not reflect actual behavior. Future work may evaluate dual users' behavioral responses to regulations in the context of laboratory and/or clinical trials methodology. Fifth, though within this paper we discuss both cessation and reduction of CC use as being potentially desirable outcomes, it merits mentioning that reducing CC consumption to even very low levels confers significant health risks (Hackshaw et al., 2018). To date, though the overall health impact of dual use is not yet definitively known, accumulating research indicates that dual EC/CC use may confer greater negative health risks than CC use alone (Osei et al., 2019; J. B. Wang et al., 2018). In order to maximize health benefits, efforts to promote complete switching from CC to EC or total cessation from tobacco products should be prioritized. Nonetheless, reductions in CC smoking have been associated with increased quit attempts and cessation (Broms, Korhonen, & Kaprio, 2008; J. Hughes & Carpenter, 2006; Hyland et al., 2005) and may present an opportunity to re-engage smokers in supported cessation efforts (e.g., counseling, medication), which are associated with increased cessation success (Centers for Disease Control and Prevention, 2011; J. R. Hughes, 2003).

Lastly, the hypothetical scenarios were the most stringent possibilities (i.e., eliminating nearly all flavor categories, all nicotine, and all modifications) and were presented in isolation of each other. Although FDA has not proposed these regulations for EC, two recent advanced notices of proposed rulemaking have asked for public comment on the implications of 1) limiting nicotine levels in CC (Gottlieb & Zeller, 2017); and 2) limiting flavors in tobacco products. It is difficult to prospectively hypothesize if and how ECs may be regulated in these domains. Additionally, zero-nicotine is not a legal possibility (per the FSPTCA, the product standard cannot eliminate nicotine (United States Congress, 2009)). Future work may also evaluate the impact of differing levels of hypothetical regulation, independently and together, on EC and CC use. Limitations notwithstanding, to our knowledge, this paper represents one of the first to explore young adult dual EC/CC users' anticipated responses to potential regulations regarding the diversity of the EC market.

Findings from our study suggest that eliminating the availability of flavored e-liquid, nicotine content, and customizable EC devices may lead to intentions to reduce EC use and simultaneous intentions to increase CC use among young adult dual EC/CC users. Given that 38% of tobacco users are dual or multiple tobacco product users—and that 23% of this group specifically use CC and EC (Kasza et al., 2017)—these findings serve as a useful baseline indicator of what a significant proportion of tobacco product users believe they would do in response to regulations. These findings and additional studies—including those

that assess actual EC and CC use behavior—can provide useful information about the potential impact of EC regulatory actions on intended and actual tobacco use behaviors among dual EC/CC users in the U.S. In addition, determining the correlation between anticipated use behaviors and actual use behaviors, in response to product regulation, will be important for interpreting results of hypothetical measures such as this one.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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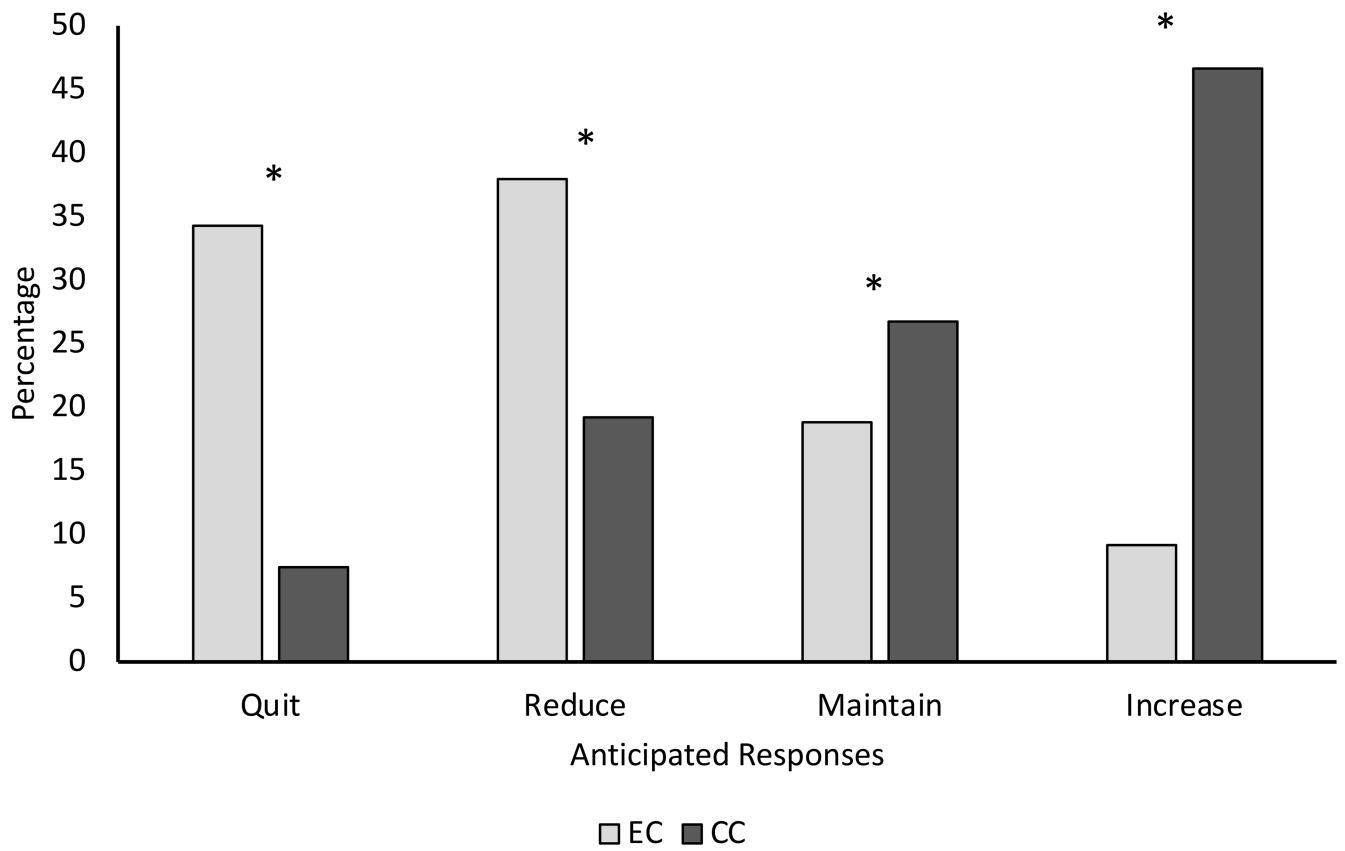


Figure 1.

Anticipated responses to hypothetical regulation of nicotine content in EC

Note: Asterisks indicate statistically significant differences between product use categories

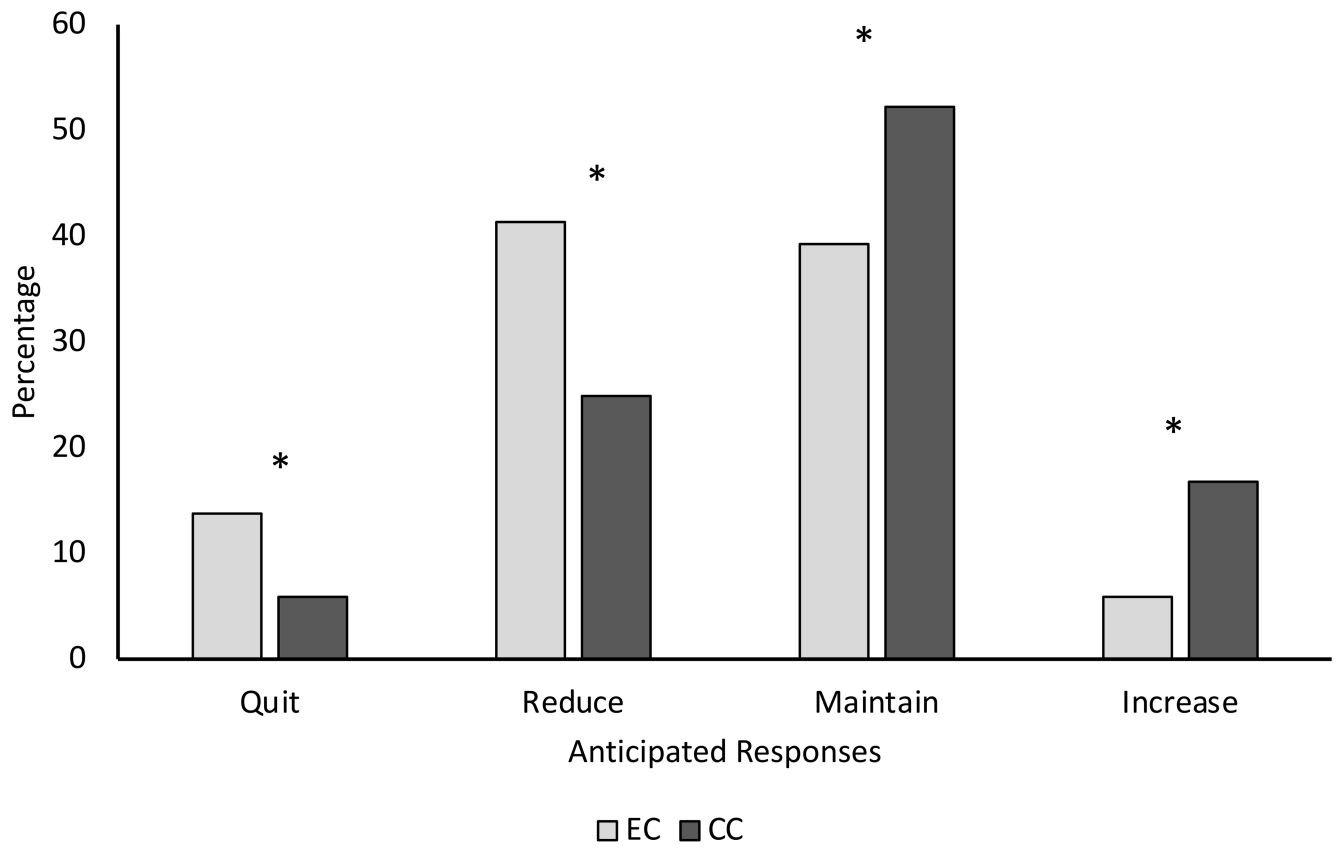


Figure 2. Anticipated responses to hypothetical regulation of e-liquid flavor
Note: Asterisks indicate statistically significant differences between product use categories

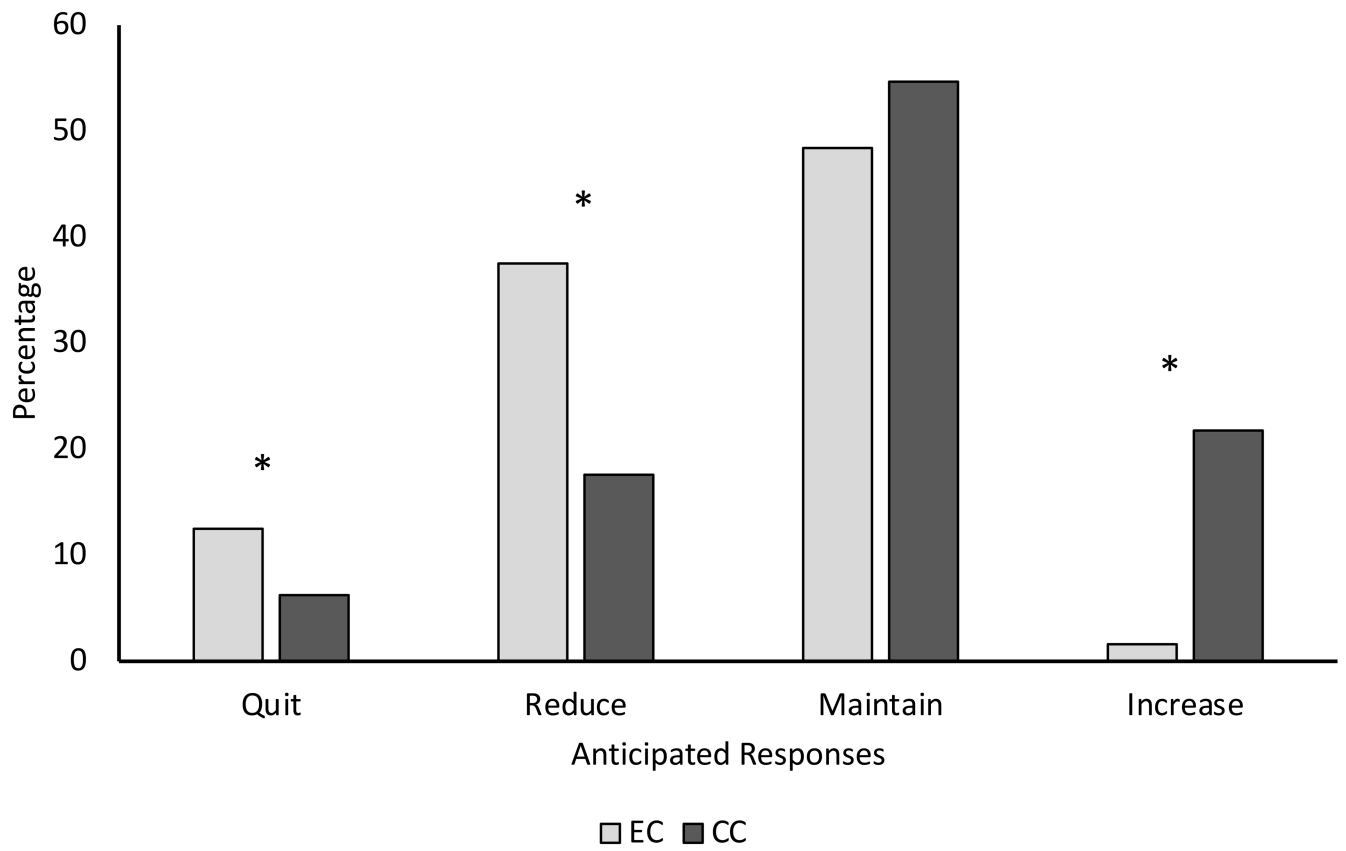


Figure 3.

Anticipated responses to hypothetical regulation of EC device customizability

Note: Asterisks indicate statistically significant differences between product use categories

Table 1.

E-cigarette and combustible cigarette use characteristics of dual users, age 18–29 (n=240)

Characteristic	EC	CC
Years used	1.7 (1.9)	5.8 (3.8)
Bouts per day/CPD	16.9 (29.5)	5.9 (5.4)
Days used per week	4.8 (2.1)	5.3 (2.1)
Daily use – n (%)	92 (38.3)	112 (46.7)
eFTND/FTND Dependence	2.7 (2.3)	3.0 (2.4)
Plans to quit in next month – n (%)	67 (27.9)	155 (64.6)
Menthol – n (%)	--	126 (52.5)
E-liquid flavor – n (%) ^a		--
Flavored	139 (58.4)	--
Tobacco/menthol	99 (41.6)	--
Nicotine concentration – n (%) ^b		--
Low (≤ 6 mg/mL)	72 (36.2)	--
High (>6 mg/mL)	127 (63.8)	--
Device type – n (%) ^c		--
1G/2G	145 (65.9)	--
3G	75 (34.1)	--

^aBased on n=238; 2 participants' self-reported flavor of choice unable to be classified^bBased on n=238; 2 participants' self-reported flavor of choice unable to be classified^cBased on n=220; 20 participants' photos unable to be classified as 1G/2G/3G devices