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Vaping to lose weight: Predictors of adult e-cigarette use for weight loss or control

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HIGHLIGHTS

- 13.5% of a sample of adult e-cigarette users reported vaping to lose/control weight.
- These adults were heavier vapers, overweight, and reported restricting calories.
- These adults also preferred coffee or vanilla-flavored e-cigarettes.
- These adults also reported poor impulse control.

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ABSTRACT

Introduction: Some traditional cigarette smokers are motivated to smoke to lose weight or control their weight. The current study evaluated whether a subset of adult e-cigarette users reported vaping to lose or control their weight and examined potential predictors of vaping for weight management.
Methods: Adult e-cigarette users (n = 459) who reported wanting to lose weight or maintain their weight completed an anonymous online survey. Participants reported on demographics, vaping frequency, e-cigarette nicotine content, cigarette smoking status, preferred e-cigarette/e-liquid flavors, current weight status (i.e., overweight, underweight), use of dieting strategies associated with anorexia and bulimia, lifetime history of binge eating, self-discipline, and impulse control. Binary logistic regression was used to examine whether vaping for weight loss/control was associated with the aforementioned variables.
Results: Participants who reported vaping for weight loss/control (13.5%) were more likely to vape frequently (adjOR = 1.15; 95% CI [1.00, 1.31]); be overweight (adjOR = 2.80; [1.33, 5.90]); restrict calories (adjOR = 2.23; [1.13, 4.42]); have poor impulse control (adjOR = 0.59; [0.41, 0.86]); and prefer coffee- (adjOR = 2.92; [1.47, 5.80]) or vanilla-flavored e-liquid (adjOR = 7.44; [1.56, 36.08]).
Conclusions: A subset of adult e-cigarette users reported vaping for weight loss/control, raising concerns about expanded, scientifically unsubstantiated uses of e-cigarettes. Identifying where individuals obtain information about vaping for weight loss (e.g., e-cigarette ads, Internet) and whether weight-related motives promote e-cigarette initiation among e-cigarette naïve individuals is important to informing regulatory efforts. Further research also is needed to better understand the link between e-liquid flavors and weight loss motivations.

1. Introduction

Current e-cigarette use among American adults rose from 0.3% in 2010 to 6.8% in 2013 (McMillen, Gottlieb, Shaefer, Winickoff, & Klein, 2015). Research attempting to understand these increases in vaping largely has focused on vaping motivations that are relevant to smokers (e.g., vaping helps users quit/reduce smoking) (Berg, Barr, Stratton, Escoffery, & Kegler, 2014; Rutten, Blanke, Agunwamba, et al., 2015). However, vaping motivations that are relevant to nonsmokers have received less research attention (Schoenborn & Gindi, 2015). This study focuses on an established motive for smoking that also may be applicable to both smokers and non-smokers who vape: weight loss or control. Although there is considerable evidence linking smoking to weight loss motives, (Granner, Black, & Abood, 2002; White, McKee, & O'Malley, 2007) to our knowledge, no scientific data have been published on vaping for weight loss/control. However, there are several reasons to believe that some individuals are vaping for weight-related reasons.

First, nicotine, which is contained in cigarettes and in many e-cigarettes, has appetite suppressant effects and can help curb cravings for

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sweet foods (Chiolero, Faeh, Paccaud, & Cornuz, 2008; Kluger, 1996). Further promoting weight loss, nicotine increases resting metabolic rate, leading to an increased daily caloric expenditure of approximately 200 calories (Audrain-McGovern & Benowitz, 2011). Second, the behavior of smoking a cigarette (and presumably of vaping) can serve as a distractor from or substitute for eating (Kovacs, Correa, & Brandon, 2014). Third, e-cigarettes uniquely are available in a plethora of appealing flavors, (Kong, Morean, Cavallo, Camenga, & Krishnan-Sarin, 2015; Shiffman, Sembower, Pillitteri, Gerlach, & Gitchell, 2015) many of which mimic high calorie/fat foods or beverages (e.g., candy, desserts, alcohol) that may be avoided during attempts to lose weight or control weight. Fourth, anecdotal evidence obtained via sources like YouTube and online message boards suggests some e-cigarette users rely on flavors to help manage cravings for high calorie/fat foods or are vaping as a food substitute. For example, e-cigarette forum users posted that vaping stops a "hand-to-mouth habit", "curbs appetite", "tricks my body into thinking I'm munching", and "stops cravings" (Unforgiven1222, 2014; Panther, 2015; JLC, 2014). Based on prior evidence linking eating disorders like anorexia or bulimia to smoking for weight-related reasons, (Clark, Hurt, Croghan, et al., 2006; Meyers et al., 1997; White, 2012) forums on several pro-eating disorders websites also were examined. Individuals posting on pro-anorexia websites reported that vaping helps curb cravings for food and/or reduces the frequency of binge episodes. For example, one user posted that, "When I feel like binging, I just [vape] a flavor close to my craving.". Posters also touted vaping as healthier than smoking and noted the added "benefit" of nicotine's appetite suppressant effects (Kiminokokoro & Electronic cigarettes and appetite?, 2015; Tidbit, 2015; Andrea). Finally, vaping companies have attempted to capitalize on the potential link between vaping and weight loss. For example, *Vapor Diet* advertises itself as the "USA's hottest diet" and entices potential customers to purchase e-juices like pizza, cupcakes, and cocktails with phrases such as "zero calories, zero guilt, tastes like you are eating your favorite foods" (VaporDiet.com). The defunct company *VaporTrim* used similar marketing tactics: "inhale flavor, curb cravings, lose weight" (Spooky, 2012).

Thus, in the current study we aimed to identify whether a subset of adult e-cigarette users reported vaping for weight loss/control within an online sample. Potential predictors for vaping for weight loss/control subsequently were examined. We anticipated that e-cigarette users who were vaping for weight loss/control would vape more frequently, use nicotine e-cigarettes, report being overweight, and prefer flavors that are analogous to high calorie/fat foods or beverages. Based on smoking research, we expected that smokers, females, and individuals who evidenced symptoms of eating disorders also would be more likely to report vaping to lose/control weight (Meyers et al., 1997; White, 2012). Finally, given that behavioral loss of control and impulsivity have been associated both with eating pathology and with cigarette smoking, we anticipated that individuals with high levels of trait impulsivity or poor self-control would be more likely to report vaping to lose/control weight (Latner, Mond, Kelly, Haynes, & Hay, 2014; Morean, DeMartini, Leeman, et al., 2014; Em, Grilo, & Gearhardt, 2016).

2. Materials & methods

2.1. Participants

Six hundred adult e-cigarette users completed an anonymous, online survey. As described below, the analytic sample comprised 459 participants (51.2% male, 73.0% White; mean age 34.42 [$SD = 9.69$] years) who had complete data for all study variables.

2.2. Procedure

The Institutional Review Board of Oberlin College reviewed all study procedures and materials and confirmed they were in compliance with ethical standards of conducting human research. During September of 2015, participants were recruited to complete the 15–20-minute survey via Amazon Mechanical Turk (i.e., MTurk), a crowdsourcing data collection site that produces valid scientific survey data (Mason & Suri, 2012). To ensure data quality, only MTurk workers age 18 years and older who had completed at least 5000 previous MTurk jobs (demonstrating platform familiarity) and had an approval rating of 98% or higher (demonstrating quality work) could view the study advertisement. 2344 of these individuals provided consent to complete a series of screening questions that ultimately were used to determine study eligibility. To be eligible, participants had to report: 1) past-month vaping (1460 participants were deemed ineligible based on this question); 2) currently trying to lose or maintain weight (101 additional participants were deemed ineligible based on this question); and 3) residing in the United States (156 additional participants were deemed ineligible on the final screener question). In total, 627 participants were eligible to complete the survey. Twenty-seven individuals never began the survey and 141 were missing data on a central study variable. This resulted in an analytic sample of 459 participants. Participants were compensated $2.00 for their time.

2.3. Measures

2.3.1. Demographics

Participants reported their age, biological sex, and race.

2.3.2. Cigarette smoking status

Participants reported their current cigarette smoking status as "never-smoker, former smoker, occasional smoker, or regular smoker".

2.3.3. Vaping to lose/control weight

Participants reported whether they currently were "vaping to lose or control [their] weight" (no/yes).

2.3.4. Frequency of vaping

Participants reported on how much time they spent vaping each day. Responses included: 1–10, 11–20, 21–30, 31–40, 41–50, 51–60, 61–90, 91–120, and + 120 min.

2.3.5. Nicotine content of e-cigarettes

Participants reported whether they typically use nicotine or nicotine-free e-cigarettes.

2.3.6. Flavor preferences

Participants reported which e-cigarette flavor categories they preferred: tobacco, menthol, mint, vanilla, fruit (like strawberry, blueberry, or peach), candy or dessert (like apple pie, chocolate, or Jolly Rancher), spice (like clove, cinnamon, or nutmeg), alcohol (like piña colada, strawberry daiquiri, or bourbon), and coffee (like espresso, latte, or cappuccino). These flavor categories were included in the current study based on their inclusion in prior research (Kong et al., 2015; Krishnan-Sarin, Morean, Camenga, Cavallo, & Kong, 2015).

2.3.7. Weight perceptions

Participants indicated whether they currently are overweight, underweight, or have no current weight problem.

2.3.8. Weight control strategies (Malinauskas, Raedeke, Aeby, Smith, & Dallas, 2006)

Participants reported whether they had engaged in three weight control strategies that are associated with eating disorders: calorie restriction, using laxatives after eating, and vomiting after eating.

2.3.9. Binge eating

Binge eating was defined as, "eating what others would consider an unusually large amount of food for the circumstances, accompanied by a sense of losing control over your eating" (Fairburn & Beglin, 2008).