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Cartoon-based e-cigarette marketing: Associations with susceptibility to use and perceived expectations of use *

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Abstract

Background: Manufacturers of e-cigarette-related products are using cartoons as a marketing strategy, despite restrictions on cartoon marketing for combustible cigarettes. Here, we examined associations between exposure to e-liquid packaging with cartoons (operationally defined as recognition of actual marketing images) and e-cigarette use, susceptibility to use, and expectations of benefits and risks of use.

Methods: U.S. adults completed online surveys assessing e-cigarette use. In Study 1, participants (N=778; Mean age = 23.5 years; 62% women) completed a questionnaire assessing expectations about benefits and risks of use. Then they were presented with 22 e-liquid package images (with and without cartoons) and were asked to endorse whether they recognized the products. In Study 2, participants (N=522; Mean age=30.4; 55% women) were presented with 24 e-liquid images (with and without cartoons) and asked to rate product appeal.

Results: For Study 1, among never users, cartoon recognition was associated with greater likelihood of being susceptible to use e-cigarettes, and with expectations of taste enjoyment and social facilitation. For Study 2, there was no significant difference between cartoon and non-cartoon images on appeal ratings.

Conclusions: Cartoon-based marketing exposure – as measured by recognition of e-liquid package images – was associated with susceptibility to use e-cigarettes, which is consistent with previous research on the use of cartoons to promote combustible cigarettes. These data suggest that restrictions on the use of cartoon-based marketing strategies for e-cigarettes should be similar to those for cigarettes, to reduce susceptibility and perceived benefits among non-users.

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Contributors

MGK and JPA conceived of, and received funding for, the study. SS and JH collected the data and reviewed the literature. MGK and JPA analyzed the data and drafted the initial manuscript. TBC and JBU revised the manuscript for important intellectual content. All authors approved the final manuscript.

Conflict of Interest

No conflict declared.

Keywords

E-cigarette use; susceptibility to use; cartoons; tobacco marketing; young adults

1. Introduction

Over the past century the tobacco industry has used a range of marketing strategies that specifically target adolescents and adults (Biener and Siegel, 2000; Lovato et al., 2011; Pierce and Gilpin, 1995). The use of cartoons in product advertisements has been particularly effective. For example, previous research in children, adolescents and young adults indicates that the cartoon character Joe Camel (developed by RJ Reynolds as a mascot for its brand) was effective at increasing awareness and appeal of combustible cigarettes, as well as increasing uptake and continued use of these products (DiFranza et al., 1991; Fischer et al., 1991; Pierce et al., 1999). In the U.S., the Master Settlement Agreement (MSA) restricted the use of cartoons (legally defined as drawings of an object, person, or animal with comically exaggerated features, anthropomorphic technique, and/or attribution of unnatural abilities) for major combustible cigarette and smokeless (chew) tobacco brands (MSA, 1998) and the World Health Organization Framework Convention on Tobacco Control (Article 13) recommends that youth-oriented entertainment (such as cartoons) do not depict tobacco products. However, there are currently no such restrictions for electronic cigarette (e-cigarette) related products. Given the rise in – and risks associated with – e-cigarette use in adolescents and adult non-smokers (Arrazola et al., 2015), it is important to understand the e-cigarette-related marketing strategies that may – or may not – affect adolescents and adults.

During our ongoing research, we have observed cartoons being used to market e-cigarettes on publicly accessible social media sites (e.g., Instagram, Twitter). First, we found that e-cigarette vendors were using Pokémon Go (a cartoon-based augmented reality game) to market their products on Twitter (Kirkpatrick et al., 2017). Next, in an analysis of Instagram images (using the hashtags #ejuice and #eliquid) we found that e-liquid manufacturers and vendors were using cartoons to market their products and many of these companies' logos were cartoons (i.e., among all analyzed posts, 21% contained a cartoon, and 14% were coded as a cartoon because of the logo), suggesting that the cartoon image is integral to their brand identity and recognition strategy (Allem et al., 2018).

While these initial findings suggest that some e-liquid manufacturers and vendors may capitalize on the appeal of the cartoon imagery to market their products, there is a dearth of data regarding the impact of exposure to cartoon-based marketing, particularly whether this marketing strategy is associated with perceptions of benefits and risks of use, susceptibility to use, and current use of e-cigarettes. To help address this gap in the literature, we conducted two separate online surveys (Study 1 and Study 2). For Study 1 we examined the associations between cartoon-based marketing exposure and past-month e-cigarette use and susceptibility to use e-cigarettes in young adults. Exposure was operationally defined as recognition of images of e-liquid label/packaging using previously validated procedures (Sargent et al., 2002). For Study 2 we examined the appeal of e-liquid product images with

and without cartoons among young and older adults. Findings should inform surveillance targets (i.e., tobacco survey efforts that assess population exposure to tobacco marketing) and tobacco control policies pertaining to e-cigarette marketing.

2. Methods

2.1. General Study Overview and Participants

We conducted two separate online surveys (Study 1 and Study 2) between July 13th and August 10th, 2018. For both Study 1 and 2, participants were asked to provide their age (in years as well as month and year of birth) and gender ("With which gender do you most identify?" Response options included: female, male, transgender female, transgender male, not listed, prefer not to answer) and answered questions about their e-cigarette use history, and their level of exposure to e-cigarette marketing in general (see further description below). In Study 1, participants (n=802) completed a questionnaire assessing their perceptions of the expected benefits and risks of e-cigarette use, followed by a task assessing recognition of several cartoon- and non-cartoon-based e-liquid marketing images. In Study 2, participants (n=522) completed a task designed to assess the appeal of e-liquids with and without cartoons on the packaging. Participants in each respective study reviewed a brief study description and then provided informed consent. Each survey took approximately 10 minutes to complete. At the end of the survey participants were paid $2.50. The authors' Institutional Review Board approved all consent forms, surveys, and protocols of the study.

Participants who were fluent in English and resided in the United States were recruited through Amazon's Mechanical Turk (MTurk), a web-based platform commonly used for experimental and survey research that has been shown to provide reliable, valid data (Kim and Hodgins, 2017) and has been successfully used to recruit populations of adult tobacco product users and non-users to assess perceptions of risks and benefits, and self-reported use of tobacco products, as well as immediate subjective responses to tobacco-related stimuli (Cameron et al., 2015; Hall et al., 2014; Rass et al., 2015). We did not include additional mTurk performance-based restrictions (for example, restricting the sample to mTurk users with a greater than 95% approval rating) in order to include a potentially wide range of mTurk participants (not just highly experienced survey takers), and to alleviate the potential concern that these restrictions may generate a sample that is systematically different from a substance-using population (Strickland and Stoops, 2019). Because the primary purpose of Study 1 was to examine the associations between recognition of cartoon-based marketing and e-cigarette use (or susceptibility to use) in a priority population (i.e., young adults), we restricted inclusion to those aged 18–25. Because the primary purpose of Study 2 was to examine the potentially broad appeal of cartoon-based marketing images regardless of age, we included individuals aged 18 and older.

2.2. Measures

2.2.1. E-cigarette use (Study 1 and Study 2).—Participants were asked whether they had used "electronic nicotine devices" (defined in the survey as "any device that has nicotine, such as electronic or e-cigarettes, vape pens, e-hookah, e-cigars, or e-pipes") in their lifetime, in the past 6 months, and in the past 30 days. Participants responded 'Yes' or

'No' for each of the following devices: "disposable device," "vape pen or pen-like," "rechargeable device (such as eGO or small startup kit)," "mod or mech-mod rechargeable device," "box mod," "Juul," "other pod mod," and "another type of electronic nicotine device." Individuals who had not used any of the above products in their lifetime were categorized as Never Users (coded '0'). Those who had used at least one product in their lifetime (including those who had used in the past 6 months) but not in the past 30 days were categorized as Lifetime Users (coded '1'), and those who had used at least one product in the past 30 days were categorized as Past Month Users (coded '2')(Barrington-Trimis et al., 2015).

2.2.2. Susceptibility to use e-cigarettes (Study 1 and Study 2).—Susceptibility to use e-cigarettes in the future was only examined among participants who reported never using any vaping device in their lifetime (n=286 for Study 1; n=225 for Study 2) and was assessed with a 3-item survey based on previous research (Barrington-Trimis et al., 2018; Pierce et al., 1996). The three items were: "Have you ever been curious about vaping (that is, using an e-cigarette or other electronic nicotine device)?" "Do you think that you will try vaping soon?" and "If one of your best friends were to offer you an electronic nicotine device for vaping, would you use it?" For each question, the response options were: "Definitely Not," "Probably Not," "Probably Yes," and "Definitely Yes." Susceptibility to use e-cigarettes was dichotomized as either not susceptible (coded '0' if all three responses were "Definitely Not") or susceptible (coded '1Γ) as in prior work (Chuang et al., 2017; Gibbons et al., 1998; Pierce et al., 2005).

2.2.3. Exposure to e-cigarette marketing in general (Study 1 and Study 2).—Given the ubiquity of marketing and advertising materials on social media and other online platforms (De Vries et al., 2012; Shankar and Batra, 2009), in the retail environment, and on signage outside stores, and the association of these types of exposure with subsequent use (Cruz et al., 2018), we assessed e-cigarette marketing through these three channels using single items adapted from the 2013 Population Assessment of Tobacco and Health (PATH) Wave 1 Youth Module (Hyland et al., 2017). For the Internet we asked: "When you are using the Internet, how often do you see ads for these products?" Products included: "Electronic or e-cigarette (device or e-liquid)," "Other electronic nicotine device (such as e-hookah or e-cigars)," and "Other vaping device." The response options were: "Never" (0), "Rarely" (1), "Sometimes" (2), "Most of the time" (3), and "Always" (4). For stores we asked: "When you go to a convenience store, supermarket, or gas station, how often do you see ads for these products?" For signage outside stores we asked: "How often did you see an ad for these products that was outdoors on a billboard or could be seen from outside a store?" Total marketing exposure (calculated as the sum of all product responses for all three marketing channels) was included as a covariate in all analyses.

2.2.4. Perceptions of expected benefits and risks of e-cigarette use (Study 1).—Participants completed a questionnaire modified from the 25-item Brief Smoking Consequences Questionnaire-Adult (BSCQ-A) (Rash and Copeland, 2008), designed to assess various domains of smoking outcome expectancies associated with smoking behavior in regular smokers. Each item on the modified questionnaire was a statement describing the

possible positive (i.e., benefits) and negative (i.e., risks) consequences if the participant were to vape in the future. Examples of items included: “When I’m angry, vaping would calm me down,” “I would enjoy the flavor of an e-cigarette,” “Vaping would help me enjoy people more.” Participants rated the likelihood of the consequence occurring on a 5-point scale ranging from 0 (extremely unlikely) to 4 (extremely likely). Subscales from this questionnaire included: Negative Affect Reduction, Stimulation, Health Risks, Taste Enjoyment, Social Facilitation, Boredom Reduction, Bad Social Impression, and Aversive Physical Feelings (Cronbach’s alphas=0.75–0.89, which are comparable to validity data from the original BSCQ-A [alphas=0.68–0.88]).

2.2.5. Cartoon exposure task (Study 1).—At the end of the survey in Study 1, participants were presented with 22 actual e-liquid packaging images (i.e., images of bottles with labels) and two mock images (as ‘ringers’ to be used to assess respondent attentiveness as a quality check; mock images resembled cartoons used in e-cigarette advertisements but were original designs created by the authors). Eleven of the actual product images contained cartoons on the packaging and 11 contained a non-cartoon image. Selection of these images was based on prior research from our group in which we examined the use of cartoon-based marketing on Instagram (Allem et al., 2018). Additionally, prior to survey development we conducted an audit of the 50 top online vendors of e-liquids (i.e., the top 50 results from a Google Search using the most frequently used search terms: “buy e-liquid” and “buy e-juice”), and selected products with and without cartoons that were most frequently represented across these vendor’s websites. Figure 1 shows representative images of product packaging with and without a cartoon (and online Supplemental Table 1* lists all brands used in each study). Images were presented one at a time and in one of four possible orders (randomly generated) to control for potential order effects. Each of the four orders was presented to approximately 25% of the sample. For each image, participants were asked to endorse whether or not they had seen the product by choosing one of three options: “No,” “Yes,” or “Yes, but slightly different label/package” (to account for recognition of the brand regardless of slight differences in package design, including differences in flavor). Either “Yes” response was coded as endorsed. The two primary variables for analysis were Cartoon Recognition and Non-Cartoon Recognition (each variable was dichotomized due to right-skewed distributions: No products endorsed = 0; At least one product endorsed = 1).

2.2.6. Product appeal task (Study 2).—At the end of the survey in Study 2, participants were presented with 24 actual e-liquid packaging images. Half of the images contained cartoons and half contained no cartoons (cartoon images were matched with non-cartoon images with regards to e-liquid bottle size and the stated flavor profile of the product). Image selection and presentation were similar to Study 1; however, there were no mock images for Study 2. Participants were asked to look at each label and then rate how much they liked the product (“Based on this product label, how much do you LIKE this product?”) and how likely they were to buy the product (“Based on this product label, how likely would it be for you to BUY this product?”). Ratings were on 100-point visual analog scales, anchored by “Not at all” (0) and “Extremely” (100).

*Supplementary material can be found by accessing the online version of this paper.

2.3. Data Quality Checks

Two quality checks were used to identify potential inattentive participants and/or participants who false reported recognition of product package images. First, in both Study 1 and 2, participants were asked to answer an arithmetic question ("What number do you get when you take one from eight?") at the end of the survey, before receiving the validation code needed to redeem compensation. Second, in Study 1 only, participants were presented with two mock images during the cartoon exposure task. For Study 1, participants who failed the arithmetic question and/or endorsed both mock images were removed for final data analysis (n=24, 3% of the total sample), which resulted in a final sample of n=778 participants. For Study 2, participants who failed the arithmetic question were removed for final data analysis (n=7, 1% of the total sample), which resulted in a final sample of n=515 participants.

2.4. Statistical Analyses

2.4.1. Study 1.—To examine the associations between recognition of cartoon and non-cartoon images and e-cigarette use, we conducted a multinomial logistic regression with Cartoon Recognition and Non-Cartoon Recognition as primary predictors and User Status (Never User, Lifetime User, Past Month User) as the dependent variable. Covariates included age, gender, total marketing exposure, and order of image presentation. To examine the associations between recognition of cartoon and non-cartoon images and susceptibility to use, we conducted a logistic regression with Susceptibility Status (Susceptible, Not Susceptible) as the dependent variable while restricting the sample to Never Users.

To examine the associations between recognition of cartoon and non-cartoon images and perceived benefits and risks of e-cigarette use in Never Users, we conducted separate regression analyses for each benefit/risk subscale dependent variable. For each analysis, Cartoon Recognition and Non-Cartoon Recognition were the primary predictors, and covariates included age, gender, total marketing exposure, and order of image presentation.

For all analyses, p values (alpha=0.05) were considered statistically significant after correction for multiple testing using the Benjamini-Hochberg method (Benjamini and Hochberg, 1995).

2.4.2. Study 2.—To examine the impact of cartoon imagery on measures of product appeal (i.e., ratings of 'like' and 'buy'), we conducted separate repeated-measures ANCOVAs with Image Type (Cartoon, Non-Cartoon) as a within-subjects factor, either User Status or Susceptibility Status as a between-subjects factor, controlling for age, gender, total marketing exposure, and order of image presentation. Post hoc comparisons were conducted for significant main effects of Image Type or User Status, or significant interactions between Image Type and User Status (or Susceptibility Status). For all analyses, p values were considered statistically significant after correction for multiple testing using the Benjamini-Hochberg method.

3. Results

3.1. Study 1

Of the 778 participants in the analysis, 303 (39%) were Never Users, 220 (28%) were Lifetime Users, and 255 (33%) were Past Month Users. Among the Never Users, 202 (67%) were susceptible to e-cigarette use in the future and 101 (33%) were not susceptible. Participants reported recognizing a greater number of non-cartoon images (Mean±SD = 1.64±2.22) compared to cartoon images (1.08±1.83; paired t-test t[777]=l1.27; p<001). Overall, 311 (40%) participants did not recognize any of the cartoon or non-cartoon images, 136 (17%) participants recognized at least one non-cartoon image but no cartoon images (i.e., Non-Cartoon Recognition only), 36 (5%) participants recognized at least one cartoon image but no non-cartoon images (i.e., Cartoon Recognition only), and 295 (38%) participants recognized at least one of each.

Table 1 shows associations between image recognition and e-cigarette use and susceptibility to use. Among never users, individuals who reported Cartoon Recognition were more likely to be susceptible to use in the future (versus not susceptible: OR=4.61; 95% CI=1.64, 12.97; p=.004). Among all participants, following correction for multiple tests there were no significant relationships between Cartoon Recognition or Non-Cartoon Recognition on the likelihood of self-reporting being a Lifetime User or Past Month User (versus being a Never User). There was no relationship between Non-Cartoon Recognition and susceptibility.

Furthermore, Table 2 shows that among never users, Cartoon Recognition (but not Non-Cartoon Recognition) was significantly associated with greater expectations of Taste Enjoyment (p=.002), and Social Facilitation (p=.005), but was not associated with Negative Affect Reduction, Stimulation, Health Risks, Boredom Reduction, Bad Social Impression, or Aversive Physical Feelings.

3.2. Study 2

Of the 508 participants in the analysis, 226 (44%) were Never Users, 155 (31%) were Lifetime Users, and 127 (25%) were Past Month Users. Among the 226 Never Users, 79 (35%) were susceptible to e-cigarette use in the future and 147 (65%) were not susceptible.

Among all participants, there was a significant main effect of User Status on both ratings of liking (F[2,499]=72.25; p<0.001) and likelihood of buying (F[2,499]=102.22; p<0.001) the presented e-liquids. That is, regardless of whether the images had cartoons or not, Past Month Users reported significantly greater liking ratings (Mean [SE]=45.7 [1.6]) compared to Lifetime Users (Mean [SE]=32.9 [1.4]), who in turn reported greater liking compared to Never Users (Mean [SE]=21.9 [1.2]; p<0.001 for all comparisons). Results for ratings of likelihood of buying followed a similar pattern: Past Month Users (Mean [SE]=44.4 [1.6]) reported significantly greater ratings than Lifetime Users (Mean [SE]=28.8 [1.4]), who reported significantly greater ratings than Never Users (Mean [SE]=15.6 [1.2]; p<0.001 for all comparisons).

Among never users, there was a significant main effect of Susceptibility Status on both ratings of liking (F[1,222]=52.44; p<0.001) and likelihood of buying (F[1,222]=30.64;

$p<0.001$) the e-liquids that were presented, such that those who were susceptible to use reported significantly greater ratings (liking: Mean [SE]=26.7 [1.3]; buying: Mean [SE]=18.8 [1.3]) compared to those who were not susceptible (liking: Mean [SE]=9.7 [1.9]; buying: Mean [SE]=6.1 [1.9]).

There were no significant main effects of Image Type (cartoon versus no cartoon) on ratings of liking or likelihood of buying the presented e-liquids for analyses including either all participants or the sub-sample of Never Users. Additionally, there were no significant Image Type and User Status (or Susceptibility Status) interactions.

4. Discussion

The first study presented here demonstrates that exposure to cartoon-based marketing of e-cigarette-related products (i.e., e-liquids) may be related to an increased potential of e-cigarette use in the future. That is, among never users, recognition of actual cartoon-based marketing images – but not recognition of non-cartoon-based marketing images – was associated with a greater likelihood of participants reporting susceptibility to use e-cigarettes. Further, recognition of cartoon-based marketing images was positively associated with two perceived benefits of e-cigarette use: taste enjoyment and social facilitation. In general these findings are consistent with previous work investigating the impact of cartoon-based marketing on the purchase and use of a range of products, from combustible cigarettes to healthy and unhealthy foods (Arnett and Terhanian, 1998; Callcott and Phillips, 1996; DiFranza et al., 1991; Mizerski, 1995; Roberto et al., 2010). The current data extend this work by examining cartoon-based marketing for e-cigarettes among young adults, an at-risk population for e-cigarette use (Health and Services, 2016; Johnson et al., 2018), and suggest that policies need to extend restrictions on cartoon-based marketing of cigarettes to include marketing for e-cigarettes.

While it is unclear based on the current results why cartoon recognition – but not non-cartoon recognition – would be associated with susceptibility to use, previous research suggests several possible mechanisms. Prior research has shown that relative to text or other visual cues, cartoons may be a simple communication of ideas (fun, exciting, welcoming) that can increase attention to the advertising and/or product packaging – thus ultimately increasing product recognition – and also more efficiently alter attitudes (Callcott and Phillips, 1996; Mizerski, 1995; Roberto et al., 2010). For example, in young children, the presentation of a cartoon brand character improves name recall of a breakfast cereal and results in both more favorable brand evaluations and greater intent to request the brand's purchase (Macklin, 1994) Additionally, several studies have shown that the cartoon-based Joe Camel campaign resulted in an increased risk for smoking experimentation and uptake (Pierce et al., 1999), potentially through increased brand awareness (DiFranza et al., 1991; Fischer et al., 1991), and perceived subjective appeal and "coolness" (DiFranza et al., 1991), as well as decreased perceived risks of smoking (Fox et al., 1998).

It is also important to note that contrary to our expectations, we did not find that cartoon recognition was associated with recent or past e-cigarette use or that cartoon images on e-liquid labels increased ratings of 'liking' or likelihood of 'buying' relative to e-liquid labels

without cartoons, suggesting that cartoon marketing is only one of several potential factors leading to subsequent use. It is unclear why there was no difference in ratings between the two types of images, but several possibilities exist. First, it is likely that among young and older adults, several other features impact the perceived appeal of an e-liquid product. These features (such as the brand name, listed nicotine concentration or PG/VG ratio, or other non-cartoon visual features that may evoke perceptions of natural ingredients or sophistication) may have been more salient for these participants. One limitation of this study is that the cartoon and non-cartoon images were not matched with regards to other features that may affect appeal (such as color, brightness, and novelty). Future studies could systematically evaluate the impact of cartoon versus non-cartoon images while controlling for all other visual stimuli. It is also possible that the two self-report visual analog scale items used here are not sensitive to a cartoon versus non-cartoon manipulation, and thus may not capture the impact of cartoon images on actual product appeal and/or actual purchasing and use of the product. Given that self-report about drug-related appeal is not always linked to drug-taking behavior (Kirkpatrick et al., 2012), it will be important for future research to explore the potential impact of cartoon imagery on actual e-cigarette product purchase and use.

These results should be considered in the context of several additional limitations. First, given the nature of MTurk recruitment, which is restricted to adults, the sample may not be representative of the general population in the U.S. or other countries (Walters et al., 2018). While prior research has relied on samples from Amazon's MTurk (Coppock, 2018; Kraemer et al., 2017), future research should include representative samples across age groups and international regions. Second, our study design was cross-sectional and thus causality of the relationship between recognition of cartoon images and susceptibility to use (or perceptions of the benefits and risks of e-cigarette use) cannot be determined. Future longitudinal research will be needed to determine whether recognition of cartoon images (or more general exposure to cartoon marketing in a range of settings) plays a causal role in susceptibility to use and subsequent e-cigarette use. Third, we did not control for current use of other tobacco products, frequency and amount of use (e.g., using "even one puff' on a single occasion to using multiple times a day), and flavor preferences. Finally, the visual stimuli used in both Study 1 and Study 2 were restricted to images of labels on e-liquid bottles. Online and in stores, many e-liquids are presented and sold in additional packaging that more prominently feature cartoons (or other key aspects of the product's graphic identity), and thus our stimuli did not include the full marketing context seen in the natural ecology.

5. Conclusion

Cartoon-based marketing has been shown to be effective at increasing product recognition and/or altering attitudes about products across a wide age range, including in adolescents, and young and older adults (Callcott and Phillips, 1996; DiFranza et al., 1991). Given that tobacco product use starts in adolescence and young adulthood (Rath et al., 2012), and that brand loyalty is relatively stable (as in the case of combustible cigarettes) (DiFranza et al., 1994), features that make advertising/marketing more effective can have a lasting impact on future tobacco-related behaviors. By examining relationships between cartoon-based advertisement and logos and e-cigarette-related outcomes among young and older adults, the

present study could motivate policies aimed at reducing cartoon-based e-cigarette advertising similar to the restriction established in the Master Settlement Agreement. In the interim, future research should try to expand the present findings to include longitudinal examinations of the potential causal impact of exposure to cartoon-based marketing on subsequent e-cigarette initiation among adolescents.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Highlights

- Manufacturers of e-cigarette products are using cartoons as a marketing strategy
- Recognition of cartoon marketing was associated with susceptibility to use
- Recognition of cartoon marketing was associated with perceived benefits of use

Figure 1.
Representative images without a cartoon (a) and with a cartoon (b).

Table 1.

Associations between e-liquid image recognition (Cartoon, Non-Cartoon) and e-cigarette use (all participants) and susceptibility to use (in Never Users)

	Predictor			
	Cartoon		No Cartoon	
Outcome	**OR (95% CI)**	***p***	**OR (95% CI)**	***p***
e-Cigarette Use				
Past 6-month versus Never	1.15 (.67, 1.97)	.62	1.74 (1.06, 2.83)	.03
Past 30-day versus Never	1.60 (.95, 2.69)	.08	1.86 (1.13, 3.08)	.02
Past 30-day versus Past 6-month	1.39 (.82, 2.36)	.22	1.07 (.64, 1.80)	.79
Susceptibility to Use				
Susceptible versus Not Susceptible	4.61 (1.64, 12.97)	.004 *	2.11 (.98, 4.57)	.06

Note: Covariates include age, gender, total marketing exposure, and order of image presentation. N=303 Never Users.

* significant after Benjamini-Hochberg correction for multiple tests.

Table 2.

Associations between e-liquid image recognition (Cartoon, Non-Cartoon) and measures of perceived benefits and risks of e-cigarette use (in Never Users)

	Predictor			
	Cartoon		No Cartoon	
Outcome	**B (95% CI)**	***p***	**B (95% CI)**	***p***
Taste Enjoyment	.64 (.23, 1.06)	.002*	.06 (−.31, .43)	.75
Social Facilitation	.48 (.15, .82)	.005*	−.03 (−.33, .26)	.82
Negative Affect Reduction	.45 (.04, .86)	.03	.34 (−.03, .70)	.07
Stimulation	.20 (−.16, .56)	.27	.04 (−.28, .36)	.81
Health Risks	.25 (−.12, .61)	.18	−.05 (−.37, .27)	.77
Boredom Reduction	.29 (−.17, .74)	.21	.33 (−.07, .72)	.11
Bad Social Impression	−.24 (−.63, .15)	.23	−.06 (−.41, .28)	.72
Aversive Physical Feelings	−.27 (−.68, .12)	.17	.04 (−.32, .39)	.84
Negative Affect Reduction	.45 (.04, .86)	.03	.34 (−.03, .70)	.07

Note: Covariates include age, gender, total marketing exposure, and order of image presentation. N=303 Never Users.

*significant after Benjamini-Hochberg correction for multiple tests.