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Brief report

Tobacco Product Promotions Remain Ubiquitous and Are Associated with Use and Susceptibility to Use Among Adolescents

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Abstract

Introduction: The decline in tobacco smoking among US adolescents has been exceeded by the exponential rise in nicotine vaping with an overall net gain in youth tobacco product use. While cigarette companies are restricted from advertising on television/radio, vaping promotions have been largely unrestricted. This study examined exposure to tobacco product promotions in a US sample of 1003 adolescents and its associations with product use and susceptibility to use.

Aims and Methods: Adolescents (13–17) were recruited online and anonymously surveyed in 2019 about their ever and current (past 30 days) tobacco smoking (cigarette and cigar) and nicotine vaping behaviors, and among never-users, susceptibility to vaping. Multivariate models tested associations with past-month exposure to tobacco product promotions controlling for demographic features, harm perceptions, and family and peer influences.

Results: Tobacco product use was 34% ever-use and 20% current-use. Most had seen cigarette (91%) and nicotine vaping (80%) product promotions in the past 30 days. A majority reported exposure at point-of-sale and on major (television and cinema) and social media. In adjusted multivariate models, greater exposure to tobacco product promotions was significantly associated with ever and current smoking and vaping; and among never-users, susceptibility to vaping (all $p < .01$, effect sizes 1.03–1.05). Family/peer use and attitudes also were significant correlates.

Conclusions: Tobacco product promotions remain ubiquitous and are significantly associated with adolescents' tobacco product use and susceptibility to vape. Peers and family are important social influences and may reflect indirect channels of tobacco marketing. Stricter regulatory restrictions on tobacco marketing to young people are warranted.

Implications: This study adds to mounting evidence showing that tobacco marketing remains pervasive and is associated with tobacco use and susceptibility to use. Most youth report seeing cigarette and nicotine vaping product promotions, with notable differences by channel: traditional media predominate for cigarettes and social media/email for e-cigarettes. Greater exposure to tobacco promotions is significantly associated with ever and current smoking and vaping, and among never-users, susceptibility to vaping. The accumulating findings support stricter regulatory restrictions on marketing of tobacco products in media channels accessed by youth.

Introduction

Declines in tobacco smoking among US adolescents have been exceeded by the exponential rise in nicotine vaping, resulting in an overall net gain in youth tobacco product use. Past-month e-cigarette use increased among high school students from 11% in 2016 to 28% in 2019.[1] Among 12th graders, 26% reported past-month e-cigarette use versus 6% for cigarette smoking.[2]

E-cigarette marketing has similarly grown exponentially, from $6.4 million in 2011 to $125 million in 2014.[3] From 2010 to 2014, e-cigarettes were the second most advertised product in magazines (16%) behind cigarettes (55%).[3] In the first half of 2019, JUUL alone spent nearly $104 million on marketing in the United States.[4] Increased youth exposure to e-cigarette marketing has accompanied the surge in promotional spending.[5] Alongside demographic and social influences on adolescent tobacco use, cigarette marketing is a major cause of youth tobacco initiation; e-cigarette and cigarette marketing are associated with adolescent vaping and tobacco use;[6] and cumulative e-cigarette marketing exposure is linked to current- and ever-use of e-cigarettes.[7]

While cigarette companies are restricted from television and radio advertising, e-cigarette marketing has been largely unrestricted in the United States. Absent regulations, e-cigarette companies have promoted flavors and highlighted celebrities and cartoons with attraction to youth.[8] Moreover, e-cigarette marketing leverages social media platforms to encourage user interaction, thereby blurring the line between industry and peers as well as communicating social norms.[9] Given the widespread online promotion of vaping and high youth usage of social media, these outlets have powerful reach and influence;[9,10] adolescent exposure to e-cigarette content on social media is associated with an increased willingness to vape and favorable vaping attitudes.[11]

Unexamined is how youth exposure to product promotions differs between combustible tobacco and nicotine vaping products across different channels. Understanding the varied channels through which youth encounter tobacco promotions is critical for designing prevention interventions and regulations. The current study had two aims: (1) examine and compare the frequency of adolescents' exposures to product promotions for cigarettes and e-cigarettes across different channels, and (2) controlling for demographic and social influences, assess the relationship between tobacco product promotion exposure and product use and susceptibility to use. We hypothesized that exposure to tobacco product marketing would be common and differ for cigarettes and e-cigarettes, and that marketing exposure would relate to product use and susceptibility to use even after controlling for sociodemographic correlates.

Methods

Sample Recruitment

Participants were 1003 adolescents recruited from a Qualtrics Online Sample panel. Inclusion criteria were aged 13–17 years old, English speaking, and residing in the United States. Recruitment was balanced on age and sex. Qualtrics obtained prior parental consent and adolescent assent, with an additional assent at study start. With 6398 individuals invited to participate, enrollment closed once 1000 completed the anonymous online survey. Qualtrics compensated participants for survey completion with e-rewards or points. Data were collected in 13 days in February 2019. Median survey completion time was 13 min. Stanford's Institutional Review Board approved the study.

Measures

Measures were informed by the PATH Survey.

Tobacco Use

Separate items assessed participants' ever-use, past 30–day use, and among past 30–day users, the number of days used for cigarettes, cigars, and e-cigarettes. Participants who had not heard of vaping were not asked further about vaping. Menthol smoking was assessed. Ever vapers were asked about product type(s), flavor(s), and source.

Vaping Susceptibility

Among never tobacco product users, vaping susceptibility was assessed with three-items[12]: (1) "How likely is it you will smoke an e-cigarette in the next year?"; (2) "Do you think you will try an e-cigarette soon?"; and (3) "If one of your best friends were to offer you an e-cigarette, would you smoke it?" Response options ranged from "Definitely not" to "Definitely yes," with "Definitely not" to all three questions coded as nonsusceptible; all others were coded as susceptible.

Tobacco Promotions

Participants reported how many times (0, 1, 2–3, 4+) in the past 30 days they saw promotions for cigarettes and e-cigarettes via nine different channels, plus billboards assessed for e-cigarettes only (Table 1). Anti–tobacco ads were excluded. Overall sum scores were derived, ranging from 0 to 27 (cigarettes) and 0 to 30 (e-cigarettes).

Harm Perceptions

On separate single items, participants' reported perceptions of cigarettes' and e-cigarettes' harmfulness to health, from not at all harmful to extremely harmful.

Social Influences

Participants' reported their family and friends' attitudes toward cigarettes (very negative to very positive) and household use of cigarettes (yes/no), with parallel measures for e-cigarettes. Participants reported how many of their closest friends (0–5) vaped in the past 30 days.

Descriptive Characteristics

Participants reported their age, sex, and race/ethnicity.

Analyses

Paired *t*-tests examined differences in participants' perceptions of cigarettes and e-cigarettes' harmfulness to health, and differences in exposure to cigarettes and e-cigarettes across media channels. *T*-tests assessed demographic differences in exposure to cigarette and e-cigarette promotions. Multiple logistic regression models examined correlates of combustible tobacco use (cigarettes and cigars) and nicotine vaping, with demographic and social covariates selected based on the existing literature. Among never-users of any tobacco product, a multiple logistic regression examined susceptibility to nicotine vaping, excluding respondents who had not heard of vapes ($N = 59$).

Table 1. Adolescents' (*N* = 1003) Past 30-Day Exposure to Promotions for Cigarettes and E-Cigarettes

	Cigarettes		E-cigarettes		
Channel	% Exposed	Intensity mean (SD)	% Exposed	Intensity mean (SD)	*p* value
In a movie	68	**2.33 (1.09)**	32	1.57 (.90)	<.001
In retail stores	71	**2.63 (1.21)**	55	2.20 (1.17)	<.001
On television	62	**2.21 (1.11)**	44	1.79 (.99)	<.001
In an online ad (banner ad, sponsored post)	53	**2.00 (1.09)**	46	1.91 (1.08)	.01
In a social media post by a user (Twitter, Facebook, Instagram, Reddit)	50	1.97 (1.11)	55	**2.24 (1.20)**	<.001
On Youtube	46	1.86 (1.06)	53	**2.08 (1.12)**	<.001
In a digital or video game	46	**1.88 (1.09)**	26	1.51 (.94)	<.001
In print media (magazine, newspaper)	39	**1.71 (1.00)**	28	1.52 (.90)	<.001
In email or text message	18	1.32 (.77)	25	**1.48 (.90)**	<.001
On billboards	—	—	37	1.70 (.99)	
Media Channel Sum Score (no billboards)	91	**8.85 (6.41)**	79	7.51 (7.14)	<.001
Media Channel Sum Score (with billboards)	—	—	80	7.97 (7.10)	

Note: Frequency of any exposure and mean (SD) ratings of exposure intensity (1 = none, 2 = 1 time, 3 = 2–3 times, 4 = 4+ times). Possible sum scores ranged from 0 to 27 (cigarettes) and 0 to 30 (vaping products). Paired sample *t*-tests assessed differences in intensity score means between cigarette and nicotine vaping product promotions. Bold values indicate the product with significantly greater mean exposure in that media channel.

Results

Sample Characteristics

The sample (*N* = 1003) was 75% female; averaging 15 years of age (SD = 1.42); identifying as 50% White/Caucasian and 19% Hispanic; 34% lived with a smoker, 20% lived with a vaper, and 42% reported at least one close friend who vaped in the past month (Table S1).

Tobacco Product Use

Cigarette or cigar use was reported by 21% as ever and 9% as current (cigarettes: 18% ever, 6% current; cigars: 11% ever, 6% current); 51% of ever–cigarette users had smoked menthol cigarettes. Current users averaged 11.20 days smoking cigarettes (SD = 11.56; median = 4, IQR:25) and 5.88 days smoking cigars (SD = 7.07, median = 3, IQR:4) in the past 30 days. Almost all (94%) respondents had heard of e-cigarettes; 28% reported ever-use and 17% current use. Among the 283 ever vapers in the sample, 231 adolescents listed 114 unique flavors tried. Many listed multiple flavors: 73% vaped a fruit flavor, 35% dessert/sweets/candy, and 31% menthol/mint. Current e-cigarette users averaged 10.33 days vaping in the past 30 (SD = 11, median = 4, IQR: 15.5). Among ever vapers, most had acquired vaping products from a friend (57%) and indicated they vaped at friends' houses (55%). Of participants reporting the type of vaping product(s) they use, 75% identified Pod Mod (e.g., JUUL, Suorin, and Phix), 48% Tank Type (e.g., Ego), and 44% a vape pen (e.g., Vuse, NJOY, and Blu). Among never-users of any tobacco product, 32% reported susceptibility to vaping.

Tobacco Marketing Exposure

Most had seen a cigarette (91%) or e-cigarette promotion (80%) in at least one media channel (Table 1). Frequency of exposure differed significantly between cigarette and e-cigarettes for every channel type. Youth were exposed to cigarettes significantly more than e-cigarettes through movies, retail stores, television, digital/video games, and magazines, while youth saw more e-cigarette than cigarette promotions through social media, YouTube, and in emails or text messages. Overall, exposure to cigarette promotions (excluding billboards) was higher than vaping promotions (8.85 vs. 7.51, $p < .001$). Overall exposure to e-cigarette promotions was greater among females than males (7.82 vs. 6.64, $p < .05$) and among participants aged 15–17 years versus 13–14 (7.89 vs. 6.96, $p < .05$). No demographic differences were observed for exposure to cigarette promotions.

Tobacco Harm Perceptions

While most participants (96%) considered cigarettes harmful to health ($M = 1.77$, SD = .69 on a scale of −2 [not at all harmful] to +2 [extremely harmful]) and most (79%) considered e-cigarettes harmful to health ($M = 1.11$, SD = 1.06), within subject comparisons indicated significantly lower ratings of perceived harm for e-cigarettes than cigarettes ($t(939) = 19.62$, $p < .001$). Similarly, participants reported important others held more positive attitudes toward e-cigarettes than cigarettes ($t(942) = -8.53$, $p < .001$).

Correlates of Combustible Tobacco Use

Ever having smoked tobacco was associated with greater media exposure to cigarette promotions (OR = 1.04, $p = .001$), older age (OR = 1.18, $p = .005$), living with a smoker (OR = 2.22, $p < .001$), and lower perceived harms of smoking held by participants (OR = .72, $p = .001$) and important others (OR = .74, $p < .001$), with the full adjusted model $R^2 = .10$, $p < .001$. Currently smoking tobacco was associated with greater media exposure to cigarettes (OR = 1.05, $p < .001$), living with a smoker (OR = 2.28, $p = .001$) and lower perceived harms of smoking (OR = .68, $p = .001$), with the full adjusted model $R^2 = .10$, $p < .001$ (Table 2).

Correlates of E-cigarette Use and Susceptibility

Ever vaping was associated with greater exposure to vaping promotions (OR = 1.03, $p = .008$), living with an e-cigarette user (OR = 3.07, $p < .001$), having friend(s) who vape (OR = 5.93, $p < .001$), and lower perceived harms of vaping held by participants

Table 2. Correlates of Adolescents' Combustible Tobacco Use (Cigarettes + Cigars) and Nicotine Vaping and Vaping Susceptibility

		Ever use			*Past month use*			*Susceptibility to use*		
Nicotine vaping		*N* = 942			*N* = 942			*N* = 665[2]		
		OR	95% CI[1]	*p* value	OR	95% CI	*p* value	OR	95% CI	*p* value
	Age	1.09	0.97,1.24	0.16	1.08	0.93,1.25	0.30	0.94	0.83,1.06	0.30
	Sex: Female vs. other	1.09	0.72,1.64	0.68	0.82	0.51,1.32	0.43	**1.61**	1.01,2.35	0.03
	Ethnicity: Caucasian vs. other	1.10	0.77,1.59	0.54	1.21	0.80,1.83	0.37	1.07	0.74,1.51	0.72
	Lives with someone who vapes nicotine	**3.05**	2.04,4.58	<.001	**3.15**	2.03,4.87	0.000	0.77	0.45,1.31	0.33
	Has friend(s) who vaped past 30 days	**5.72**	3.95,8.60	<.001	**9.25**	5.41,15.82	0.000	**1.94**	1.30,2.77	0.001
	Important others' vaping attitudes[3]	**0.82**	0.70,0.96	0.02	0.96	0.80,1.16	0.69	**0.78**	0.66,0.91	0.002
	Personal perceived harm of vaping[4]	**0.52**	0.44,0.61	<.001	**0.59**	0.49,0.70	<.001	**0.54**	0.43,0.67	<.001
	Media exposure to vaping promotions[5]	**1.03**	1.01,1.06	0.004	**1.05**	1.03,1.07	<.001	**1.04**	1.03,1.09	<.001
Tobacco (cigarettes and cigars)		*N* = 995			*N* = 995			—		
		OR	95% CI[1]	*p*-value	OR	95% CI	*p*-value			
	Age	**1.18**	1.05,1.33	0.005	1.16	0.99,1.37	0.07			
	Sex: Female vs. other	0.88	0.60,1.28	0.50	0.76	0.45,1.27	0.28			
	Ethnicity: Caucasian vs. other	0.87	0.62,1.20	0.378	1.11	0.71,1.80	0.65			
	Lives with someone who smokes cigarettes	**2.22**	1.57,3.15	<.001	**2.28**	1.37,3.74	0.001			
	Important other's positive smoking attitudes	**0.74**	0.64,0.85	<.001	0.84	0.69,1.03	0.09			
	Personal perceived harms of smoking	**0.72**	0.58,0.88	0.001	**0.68**	0.53,0.86	0.001			
	Media exposure to cigarette promotions	**1.03**	1.01,1.05	0.001	**1.05**	1.04,1.11	<.001			

[1]CI = confidence interval.

[2]Sample is never tobacco users who reported hearing about vaping products.

[3]Scored using a continuous sliding scale from very negative (−2) to very positive (2).

[4]Scored using a continuous sliding scale from not at all harmful (−2) to extremely harmful (2).

[5]Analyzed as continuous variable from summing media channel means and subtracting by number of channels; scores range from 0 to 27 (cigarettes) and 0 to 30 (e-cigarettes).

(OR = .52, $p < .001$) and important others (OR = .82, $p = .01$), with the full adjusted model $R^2 = .30$, $p < .001$. Current vaping was associated with greater exposure to vaping promotions (OR = 1.05, $p < .001$), living with an e-cigarette user (OR = 3.15, $p < .001$), having friend(s) who vape (OR = 9.25, $p < .001$), lower participant perceived harms of vaping (OR = .59, $p < .001$), with the full adjusted model $R^2 = .30$, $p < .001$.

Susceptibility to vaping was associated with greater exposure to vaping promotions (OR = 1.04, $p < .001$), being female (OR = 1.61, $p = .045$), having friend(s) who vape (OR = 1.94, $p = .001$), and lower perceived harms of vaping held by participants (OR = .54, $p < .001$) and important others (OR = .78, $p = .002$), with the full adjusted model $R^2 = .13$, $p < .001$ (Table 2).

Discussion

Tobacco product promotions are widespread and have accompanied a surge in adolescent e-cigarette use. In the current sample, nearly all adolescents were aware of e-cigarettes, most reported exposure to tobacco product promotions in a variety of channels, and the level of exposure to tobacco product promotions was associated with use and susceptibility to use. The channels through which adolescents encountered tobacco promotions differed by product: exposure was greater for cigarettes in movies, retail stores, television, digital/video games, and magazines, while greater for e-cigarettes in social media, YouTube, and in emails or texts. For e-cigarette promotions, females reported higher exposure than males, and 15– to 17–year-olds higher exposure than 13– to 14–year-olds.

In multivariate models, controlling for sociodemographic correlates, exposure to tobacco product marketing was associated with use, including ever and current tobacco smoking and nicotine vaping, as well as susceptibility to initiating vaping. The strength of marketing exposure effects was relatively weak, which may be due to advertising's intentionally subconscious rather than overt effects on tobacco use, as well as to the measure referencing recent exposure (past 30 days) to promotions, rather than accumulated exposure, which would be challenging to recall. Experimental studies indicate even brief exposure to tobacco advertising influences adolescents' attitudes and intentions to smoke.[11]

This study's findings further a growing body of research indicating high levels of youth exposure to cigarette and e-cigarette product promotions and a significant association with product use and susceptibility.[6,13] We also found friend and family use and attitudes significantly associated with adolescent tobacco use and susceptibility.[14,15] Beyond their direct effects, friends and family may be indirect channels of marketing; that is, tobacco marketing may

indirectly reach youth through their social connections. To the degree that tobacco industry marketing stimulates friends and family members to smoke, these influences contribute to adolescent smoking initiation.[16] In this way, friend and parental influences can act as mediating variables between advertising and adolescent tobacco use.

Study limitations include the cross-sectional design, which precludes causal inferences. Study measures were self-reported; objective measures of exposure to tobacco promotions would enhance future studies. In addition, future research may assess adolescent exposure to and usage of disposable e-cigarettes, which have increased in popularity among US youth since this survey was conducted in February 2019.[17,18]

Systematic review of longitudinal studies, the tobacco industry's own internal documents, and widely accepted principles of advertising and marketing support the conclusion that tobacco promotions recruit new users during adolescence.[19] Despite this, tobacco companies continue to deny that they market to youth.[20] Our findings are consistent with those of prior studies, suggesting a stable effect of tobacco promotions across samples, measurement items, and over time. While tobacco companies have avowed to self-police and not advertise to youth since 1964, American adolescents 55 years later continue to report exposure to tobacco promotions. Moreover, this exposure remains associated with ever and current cigarette, and now e-cigarette use, and susceptibility to initiating vaping.

While some governmental regulations exist for cigarette marketing, e-cigarettes have been largely unregulated. Our findings that the majority of youth encountered vaping products on social media sites underscore these outlets as potent channels of exposure and influence. E-cigarette companies capitalize on social media outlets that facilitate user interaction in ways that traditional marketing does not. Under new pressure, Facebook and Instagram have prohibited social media influencers from promoting vaping or tobacco products as "branded content," yet these regulatory restrictions may prove challenging to monitor. The accumulating findings support stricter regulatory restrictions on marketing of tobacco products in all media channels accessed by youth.

Supplementary Material

A Contributorship Form detailing each author's specific involvement with this content, as well as any supplementary data, are available online at https://academic.oup.com/ntr.

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Declaration of Interests

JPP has provided consultation to pharmaceutical and technology companies that make medications and other treatments for quitting smoking and has served as an expert witness in lawsuits against the tobacco companies. The other authors declare that they have no financial relationships with any organizations that might have an interest in the submitted work.

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