



Original article

Engagement With Online Tobacco Marketing and Associations
With Tobacco Product Use Among U.S. Youth

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A B S T R A C T

Purpose: Youth who engage with online tobacco marketing may be more susceptible to tobacco use than unengaged youth. This study examines online engagement with tobacco marketing and its association with tobacco use patterns.

Methods: Cross-sectional analysis of youths aged 12–17 years who participated in wave 1 of the Population Assessment of Tobacco and Health Study (N = 13,651). Engagement with tobacco marketing was based on 10 survey items including signing up for email alerts about tobacco products in the past 6 months. Logistic regression was used to examine the association of online engagement with tobacco marketing and susceptibility to use any tobacco product among never-tobacco users, ever having tried tobacco, and past 30-day tobacco use.

Results: An estimated 2.94 million U.S. youth (12%) engaged with \geq one forms of online tobacco marketing. Compared with no engagement, the odds of susceptibility to the use of any tobacco product among never-tobacco users was independently associated with the level of online engagement: adjusted odds ratio (AOR) = 1.48 (95% confidence interval [CI], 1.24–1.76) for one form of engagement and AOR = 2.37 (95% CI, 1.53–3.68) for \geq two forms of engagement. The odds of ever having tried tobacco were also independently associated with the level of online engagement: AOR = 1.33 (95% CI: 1.11–1.60) for one form of engagement and AOR = 1.54 (95% CI, 1.16–2.03) for \geq two forms of engagement. The level of online engagement was not independently associated with past 30-day tobacco use.

Conclusions: Online engagement with tobacco marketing may represent an important risk factor for the onset of tobacco use in youth.

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IMPLICATIONS AND
CONTRIBUTION

Findings from this nationally representative sample suggest that youth who engage with online tobacco marketing may be more susceptible to tobacco use than unengaged youth. Continued monitoring of online engagement may help identify those at risk for future tobacco use.

Conflicts of Interest: The authors have no conflicts of interest to disclose.

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Tobacco advertising expenditure on the Internet including tobacco company Web sites grew more than 30-fold, from \$0.7 million dollars in 1999 to \$23.1 million dollars in 2013 [1,2]. In addition to marketing on tobacco company Web sites, tobacco brand and product promotions abound on social media platforms such as Facebook, Twitter, and YouTube [3–6]. Online advertising affords new opportunities to reach potential and current tobacco users and to offer product discounts in a largely unregulated environment [7–9]. Online marketing may be even more effective than traditional marketing in promoting tobacco use among youth because it provides consumers greater opportunities for engagement and interaction with pro-tobacco content [10–12].

We do not yet know the extent to which youth—both those who currently use tobacco and those who have never used tobacco—engage with online tobacco marketing. Current youth tobacco users may seek online venues to purchase tobacco products and bypass age verification measures [13]. Youth who have never used tobacco may engage with tobacco marketing while online, and this engagement may increase their susceptibility to tobacco use that may lead to experimentation with tobacco products. Although public education efforts aim to disrupt these attitudinal changes among youth, such efforts may be less effective against online forms of marketing. In addition, the voluntary Master Settlement Agreement between tobacco companies and state governments that restricted tobacco product marketing was developed for traditional products (mainly cigarettes) and traditional media channels (e.g., print media) and was implemented well before the proliferation of online marketing. Thus, quantifying the scope of youth exposure to online marketing and its relation with tobacco use intention and behavior can provide evidence for the development and implementation of future regulations [14].

This analysis examines this research gap with data from a large, nationally representative population-based study that assesses online engagement and the use of multiple tobacco products. It is hypothesized that, among youth, greater levels of online engagement will be associated with greater susceptibility to tobacco product use among never-tobacco users and higher likelihood of ever having tried tobacco, past 30-day use of tobacco, after accounting for sociodemographic and behavioral risk factors for tobacco use and exposure to marketing in traditional venues.

Methods

Data

Data are from wave 1 of the Population Assessment of Tobacco and Health (PATH) Study conducted from September 12, 2013 to December 15, 2014 [15]. The PATH Study is a nationally representative, longitudinal cohort study of 45,971 adults and youths in the United States, aged 12 years and older. The National Institutes of Health, through the National Institute on Drug Abuse, is partnering with the Food and Drug Administration's Center for Tobacco Products to conduct the PATH Study under a contract with Westat. The PATH Study used Audio Computer-Assisted Self-Interviews available in English and Spanish to collect information on tobacco use patterns and associated health behaviors. This analysis draws from the 13,651 youth interviews (all participants were aged 12–17 years). Parent interviews ($n = 13,589$) were conducted

with one parent of nearly every youth participant. Recruitment employed address-based, area probability sampling, using an in-person household screener to select youths and adults. Adult tobacco users, young adults aged 18–24 years and African-Americans were oversampled relative to population proportions. The weighting procedures adjusted for oversampling and nonresponse; combined with the use of a probability sample, the weighted data allow the estimates produced by the PATH Study to be representative of the noninstitutionalized, civilian U.S. population. The weighted response rate for the household screener was 54.0%. Among households that were screened, the overall weighted response rate was 78.4% for the youth interview. Further details regarding the PATH Study design and methods are published by Hyland et al. [16] and on the PATH Study's Web site [17]. Westat's Institutional Review Board approved the study design and protocol and the Office of Management and Budget approved the data collection.

Missing data on age, sex, race, and Hispanic ethnicity were logically assigned from household screener data, as described in the PATH Study Restricted-Use Files User Guide [17].

Outcomes

Three tobacco-related outcomes were examined: (1) susceptibility to tobacco use among never-tobacco users; (2) ever having tried any tobacco product among all respondents; and (3) past 30-day tobacco use among ever-tobacco users. Products of interest included cigarettes, electronic cigarettes (e-cigarettes), cigars (traditional, cigarillos, and filtered), pipes, hookah (water pipe), snus pouches, other smokeless tobacco, dissolvable tobacco, bidis, and kreteks. First, never-tobacco users were considered susceptible to tobacco use if they responded “definitely yes,” “probably yes,” or “probably no” to one of the following questions for one or more tobacco products: (1) “If one of your friends offered you a (cigarette, e-cigarette, etc.), would you try it?” (2) “Do you think you will smoke a (cigarette, e-cigarette, etc.) sometime in the next year?” and (3) “Have you ever been curious about smoking/using a (cigarette, e-cigarette, etc.)?” [18,19]. Second, respondents were considered to have ever tried tobacco if they responded affirmatively to queries on ever use of one or more tobacco products (e.g., “Have you ever tried cigarette smoking, even one or two puffs?”). Finally, respondents were considered to be past 30-day tobacco users if they responded “earlier today,” “not today but sometime during the past 7 days,” or “not during the past 7 days but sometime during the past 30 days” to use of one or more tobacco products within the past 30 days (e.g., “When was the last time you smoked a cigarette, even one or two puffs?”).

Online engagement and covariates

The primary variable of interest was the level of online engagement with tobacco marketing, which equaled the sum of affirmative answers to 10 items that assessed online engagement (Table 2 and Appendix Table 1; e.g., “In the past 6 months, have you ever signed up for email alerts about tobacco products, read articles online about tobacco products, or watched a video online about tobacco products?”). The level of online engagement was categorized into sum scores: 0 items, 1 item, and 2 or more items. Online engagement scores of 2 or higher were collapsed because

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