Price-related promotions for tobacco products on Twitter

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Abstract

Objectives—This cross-sectional study examined price-related promotions for tobacco products on Twitter.

Methods—Through the Twitter Firehose, we obtained access to all public tweets posted between December 6, 2012 and June 20, 2013 that contained a keyword suggesting a tobacco-related product or behavior (e.g., cigarette, vaping) in addition to a keyword suggesting a price promotion (e.g., coupon, discount). From this dataset of 155,249 tweets, we constructed a stratified sampling frame based on the price-related keywords and randomly sampled 5,000 tweets (3.2%). Tweets were coded for product type and promotion type. Non-English tweets and tweets unrelated to a tobacco or cessation price promotion were excluded, leaving an analytic sample of 2,847 tweets.

Results—The majority of tweets (97.0%) mentioned tobacco products while 3% mentioned tobacco cessation products. E-cigarettes were the most frequently mentioned product (90.1%), followed by cigarettes (5.4%). The most common type of price promotion mentioned across all products was a discount. About a third of all e-cigarette-related tweets included a discount code. Banned or restricted price promotions comprised about 3% of cigarette-related tweets.

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Conclusions—This study demonstrates that the vast majority of tweets offering price promotions focus on e-cigarettes. Future studies should examine the extent to which Twitter users, particularly youth, notice or engage with these price promotion tweets.

MeSH Keywords

Social media; humans; smoking/economics; marketing

The Family Smoking Prevention and Tobacco Control Act (FSPTCA) implemented price-related restrictions for regulated tobacco products, that is, cigarettes, cigarette tobacco, roll-your-own tobacco, and smokeless tobacco (Title 1, Sec. 102).[1] The act bans the mail-order redemption of coupons and distribution of free samples of cigarettes (see §1140.16).[2] Furthermore, it prohibits companies from offering branded non-tobacco promotional items and providing non-tobacco gifts in exchange for purchasing cigarettes or smokeless tobacco (see §1140.34).[2] E-cigarettes, which currently are not regulated unless marketed for therapeutic purposes,[3] are exempt from price-related restrictions.

Despite the new restrictions implemented by the FSPTCA, price promotions remain prevalent, particularly over the Internet. Price promotions account for almost a third of online tobacco industry-sponsored advertisements and feature both regulated (e.g., cigarettes, snus) and unregulated (e.g., e-cigarettes, cigars) products.[4] Moreover, data on Twitter suggest a third of commercially-motivated, e-cigarette-related tweets mention price or discounts.[5]

To our knowledge, no studies have characterized the price promotions disseminated on Twitter or the tobacco products for which promotions are offered. We investigate the types of price-related promotions being offered (e.g., free samples, discounts, promotional items, retail value-added promotions), types of tobacco-related products (i.e., tobacco and smoking cessation products) featured in promotions, and source of tweets.

METHODS

We obtained data from Gnip, Inc. (http://www.gnip.com), a licensed Twitter data provider that uses a data streaming process known as the "Firehose." The Firehose provides access to 100% of public tweets and metadata.[6] Tweets posted between December 6, 2012 and June 20, 2013 were collected on the basis of keyword rules.

Our team of experts in health behavior and tobacco control policy identified keywords associated with tobacco-related behavior (e.g., smoking, cigarette, e-cigarette, tobacco) and their abbreviated and plural variations. Using these keywords, we extracted 35,373,122 potentially relevant tweets from the Firehose. Drawing on previous research,[5, 7] we identified keywords associated with price-related promotions (e.g., coupon, promo). We applied these keywords and their variations as a filter for the potentially tobacco-related tweets to create a dataset of 155,249 tweets. To ensure sampling a variety of tweets, we constructed a stratified sampling frame based two strata: (1) whether the tweet contained a price-related keyword (including abbreviated and plural variations) and (2) whether the tweet contained one or multiple price-related keywords (see Appendix for full list of price-

and tobacco-related keywords). We randomly sampled from each stratum proportional to its size, resulting in an initial sample of 5,000 tweets (3.2%). Non-English tweets and tweets unrelated to a tobacco or cessation price promotion were excluded, leaving an analytic sample of 2,847 tweets.

Measures

Raters reviewed the analytic sample of tweets, assessing three domains: product type, promotion type, and tweet source.

Product type—We coded for whether tweets mentioned the following products: cessation products, cigarettes, cigars, e-cigarettes, and smokeless tobacco. For these product categories, we noted the brands mentioned, if any, and the type of product described: cigar (e.g., traditional size, little cigar/cigarillo); smokeless tobacco (e.g., moist snuff, snus, dissolvable tobacco); e-cigarette component (e.g., device, juice/e-liquid) and variety (e.g., flavor); and cessation product (e.g., nicotine replacement patch, gum). We also tracked when tweets mentioned products not included in previous categories or left the product type unspecified (e.g., "stop smoking aids").

Promotion type—Price-related promotions were defined as promotions that lower the real or perceived price of product use and may thus encourage product use. These promotions included but were not limited to those banned or restricted by the FSPTCA. We tracked mentions of free samples, retail value-added tobacco products (e.g., multi-pack offers like "Buy one pack of cigarettes, get another pack free"), retail value-added non-tobacco products (e.g., "Buy two packs, get a cigarette lighter"), duty-free promotions, branded non-tobacco items (e.g., t-shirt branded with a tobacco product brand name, logo, or other indicia), free shipping, and price comparisons relative to another product (e.g., suggestion that one product or brand is cheaper than another). We also coded for discounts by noting when tweets implied or stated that a product could be purchased for a price that was lower than usual (e.g., mentioning "discount" or a percentage or dollar amount off of a product). For these discount tweets, we additionally coded for the mention of discount codes. Discount code mentions represent a purchase cue and may encourage the purchase of a product beyond a general mention of a discount. Lastly, we tracked when tweets mentioned a promotion but did not specify the type (e.g., "Electronic Cigarette Coupons | E-CIG READY http://t.co/fTaMXr3sky," "Check Out The Newest E-cig Coupons! http://t.co/VWgQ1mt7yM").

Tweet source—Tweet source was comprised of two non-mutually exclusive measures: (1) whether or not the tweet was commercial and (2) whether or not the tweet was conversational. Using a measure of commerciality used in a previous study, we visited the websites embedded in the tweets.[5] Tweets that directly or indirectly linked to tobacco or cessation vendor websites were coded as "commercial." Commercial tweets linked to three categories of websites, which we tracked to capture the range of sites through which products are promoted: tobacco or cessation vendor sites, landing sites, and cross-industry promotional sites. Vendor sites (e.g., http://www.v2cigs.com, http://www.greensmoke.com) offered tobacco or cessation products for purchase. Landing sites (e.g., http://

www.esafecigarette.org, http://www.nitro-hq.com) provided information or reviews on multiple tobacco or cessation products and linked to tobacco or cessation vendor sites. Cross-industry promotional sites (e.g., http://oddcoupons.com, http://www.catalogspot.com) promoted both tobacco- and non-tobacco-related products and linked to tobacco or cessation vendor sites. To assess whether or not a tweet was conversational, we examined tweet content. Conversational tweets expressed a testimonial about one's experience with a price promotion (e.g., "I got a free pack of cigarettes! I gave the lady a coupon for $$1.50 off a box of cigarettes and when she punched in the code it was free!").

Coding Procedures

The tweets were divided among four trained coders, who coded the tweets using a Microsoft Access form, a detailed codebook, the tweet text, and the URLs of any websites embedded in the tweet. Pairs of coders double-coded 100 tweets for checking inter-coder reliability. The prevalence and bias adjusted kappa was found to be acceptably high (κ=0.64 to 1.00). [8] An additional coder adjudicated discrepancies.

RESULTS

We calculated descriptive statistics using Stata 12.1. Our analytic sample contained 2,847 tweets by 2,102 unique Twitter handles, which had an average of 3,951 followers (range: 1–320,902).

Product Type

Table 1 highlights that the majority of tweets mentioned tobacco products (97%) (95% CI 96.4 to 97.6) and that e-cigarettes were the most frequently mentioned product (90.1%) (95% CI 89.0 to 91.2), followed by cigarettes (5.4%) (95% CI 4.5 to 6.2). Few tweets mentioned smokeless tobacco or cigars (0.4%; 95% CI 0.2 to 0.7 and 0.2%; 95% CI 0.1 to 0.4, respectively). No tweets mentioned snus or dissolvable products. About 2% (95% CI 1.2 to 2.1) of tweets involved cessation products approved by the US Food and Drug Administration (FDA), like nicotine replacement patch and gum and non-nicotine medications (i.e., Buproprion/Zyban, Varenicline/Chantix). Non-FDA approved cessation products and methods, like hypnotherapy, were mentioned by 1% (95% CI 0.6 to 1.3).

Given the low occurrence of other product types, analyses of brands and promotion types focus only on e-cigarettes, cigarettes, and cessation products. Of e-cigarette tweets mentioning brands, V2cigs and Green Smoke were the most common brands (44.5%; 95% CI 42.7 to 46.3 and 40.6%; 95% CI 38.8 to 42.4, respectively). For cigarettes, Marlboro and Camel were the most common brands (31.8%; 95% CI 16.4 to 52.7 and 13.6%; 95% CI 4.7 to 33.3, respectively). Nicoderm and Nicorette each comprised 43.2% (95% CI 29.7 to 57.8) of brand mentions among cessation product tweets.

Promotion Type

Table 2 shows that discounts were the most common form of price promotion, with 61% to 89% of tweets in each product category mentioning discounts. About a third of e-cigarette-related tweets included a discount code (e.g., "Get 5% Off with coupon: disc5"). Duty-free

promotions, which were the second most common form of price promotion in the sample, focused exclusively on cigarettes. Free samples, retail value-added tobacco and non-tobacco products, and branded non-tobacco items each comprised less than 3% of tweets for each product category. There were measureable numbers of e-cigarette tweets mentioning free samples and retail value-added products.

Though not a traditional price promotion, between 5% and 8% of tweets in each product category compared the price of one product to another. Comparisons were made between product categories and between brands. Most e-cigarette tweets (83%) implicitly or explicitly compared e-cigarettes to cigarettes. For example:

> Joining the rest of the people on the electronic cigs! Save shit loads!!

> @[Twitter user #1] I've saved hundreds! These are just nicotine, few chemicals but not the 5000 that are in cigs, refill = 200 cigs costs 8.50 x

Nine of the ten cigarette tweets mentioning a price comparison favorably compared the price of dip to cigarettes. For example:

> RT @[Twitter user #2]: Can of dip = $2.17. Pack of cigs = $4.52. Half the price, twice as good, and 10 times healthier. Dont be dumb, save the lung

Tweet Source

Of the 2,682 tweets that included URLs, 95.7% were commercial in nature; that is, they linked to landing (55.6%; 95% CI 53.7 to 57.5), vendor (35.0%; 95% CI 33.2 to 36.8), or cross-industry promotional sites (5.1%; 95% CI 4.2 to 5.9). Sixty-one percent of commercial tweets mentioning a cessation product targeted specific Twitter accounts through user mentions:

> @[Twitter user #3] We're so proud of your decision to quit smoking! Here's a coupon for Nicorette to help you on your way: http://t.co/yFqaMCX0cI

> @[Twitter user #4] The great news is you CAN quit smoking. Use this coupon for Nicoderm CQ to help jumpstart your quit: http://t.co/YY5RlUUtSd

Fewer than 3% (95% CI 1.8 to 2.9) of tweets included a conversational mention of a price promotion, many of which discussed receiving unsolicited coupons for cigarettes or cessation products:

> I posted something on twitter about quitting smoking and Nicorette sent me a coupon. Bahahahahaha!!!!

> RJ Reynolds must've heard I quit smoking. They sent me Camel coupons in the mail today. #QUITTEMPTINGME

DISCUSSION

This study is the first to characterize tobacco-related price promotions on Twitter. As in other research,[5] the vast majority of tweets were commercial in nature. Our data indicate that price promotions for tobacco products regulated by the FDA (i.e., cigarettes, cigarette tobacco, roll-your-own tobacco, smokeless tobacco) are far less common than price

promotions for e-cigarettes. In our sample, we saw very few promotions for FDA-regulated tobacco products. Moreover, forms of promotion that are banned or restricted for these products (e.g., free samples, branded non-tobacco items, retail value-added non-tobacco products) were extremely rare.

In contrast, price promotions for e-cigarettes abound on Twitter. Tweets advertise discounts and discount codes as well as forms of promotion that are banned or restricted for regulated tobacco products. Twitter users comment on the lower price of e-cigarettes relative to cigarettes. Future studies should examine the extent to which Twitter users, particularly youth, notice and retweet price promotion tweets or follow the URLs within them. Twitter is used by 33% of teens,[9] and investigating the extent to which youth are engaging with these tweets could determine if Twitter plays any role in e-cigarette use initiation among youth.

Although this study focused on tobacco products, our analysis identified a number of cessation-related tweets, about a third of which promoted non-FDA approved cessation methods. Future research should investigate the spread of information about evidence-based and non-evidence-based cessation therapies through Twitter. Pharmaceutical companies also appear to market coupons via direct tweets to users, particularly those who mention quitting smoking.

Our study has several limitations. First, location information was not available for tweets in our sample, so we cannot be certain that they originated from within the US, which is covered by the FSPTCA, as opposed to another country. We did exclude non-English tweets, and we know that of all countries in 2013, the US represented the largest share of active Twitter users (24.3%).[10] The United Kingdom, the predominantly English-speaking country with the second largest share of active users, represents only about 6% of active Twitter users.[10] Still, the lack of valid location information remains a limitation for our study and a challenge for Twitter research as a whole. Previous research found that less than 1% of public tweets contained geographic information, and that such information, when disclosed, is often invalid (e.g., representing a reference from popular culture).[11]

Secondly, our sample may be limited by the keywords used to collect tweets. Although we included a number of e-cigarette brand names in our list of keywords, we did not include brand names for other tobacco products (see Appendix). We conducted a brief analysis, using Twitter Firehose data accessed through Topsy.com, to determine how adding more brand names could have affected our results. Of all the tweets available through the Twitter Firehose during the study period, only 132 tweets contained the words "coupon" or "coupons" and one of the top three cigarette brands:[12] "Marlboro," "Newport," "Newports," or "Camel." Twenty-one percent of these tweets would have been pulled from our original list of keywords because they contained a word like "cigarette" or "smoking," and an additional 37% were irrelevant (e.g., mentioning "Newport" in reference to "Newport Beach," the color "camel") and would have been excluded. These results suggest that adding product brand names likely would not have substantially affected our results. It is worth noting, however, that this analysis was conducted in January 2015, so the volume of tweets available through the Firehose then could have been lower than the volume of Firehose tweets on the date of extraction for the study. Tweets that have been deleted or that were

from users that have closed their accounts or made them private since the date of extraction would not have appeared in the January 2015 data.[13]

Social media data can be challenging to analyze given their dynamic nature and massive volume. Researchers and regulators alike must nonetheless embrace this challenge since this study and others[5, 14, 15] have demonstrated that the tobacco industry, especially e-cigarette companies, are using social media platforms to market their products. Our study provides one approach to sampling and analyzing these data that can be used when a relatively small volume of data is acceptable.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

Acknowledgments

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WHAT THIS PAPER ADDS

- Despite the price-related restrictions in the Family Smoking Prevention and Tobacco Control Act, people continue to be exposed to price promotions for tobacco products, especially over the Internet.

- No studies, to our knowledge, have characterized the types of promotions (e.g., free samples, discounts, promotional items, retail value-added promotions) disseminated on Twitter, taking into account the range of tobacco products.

- In contrast to price promotions for tobacco products regulated by the FDA, price promotions for e-cigarettes abound on Twitter. Future studies should examine the extent to which Twitter users, particularly youth, notice or engage with these price promotion tweets.

Table 1

Number of tweets and 95% CIs by product type (n=2847)

Product	n	% (95% CI)
Tobacco product	2761	97.0 (96.4–97.6)
Electronic cigarette	2564	90.1 (89.0–91.2)
Device	2274	79.9 (78.4–81.3)
Starter kit	223	7.8 (6.8–8.8)
Liquid/juice	77	2.7 (2.1–3.3)
Other electronic cigarette-related product (e.g., cartomizer, battery)	36	1.3 (0.9–1.7)
Flavor	25	0.9 (0.5–1.2)
Nicotine-free	0	0.0 (0.0–0.0)
Cigarette	153	5.4 (4.5–6.2)
Unspecified tobacco product	25	0.9 (0.5–1.2)
Other tobacco product (e.g., loose, roll-your-own)	16	0.6 (0.3–0.8)
Smokeless	12	0.4 (0.2–0.7)
Moist snuff	12	0.4 (0.2–0.7)
Cigar	7	0.2 (0.1–0.4)
Little	2	0.1 (0.0–0.2)
Traditional-size	4	0.1 (0.0–0.3)
Unknown	1	0.0 (0.0–0.1)
Cessation product	86	3.0 (2.4–3.6)
FDA-approved cessation product	46	1.6 (1.2–2.1)
Nicotine patch	20	0.7 (0.4–1.0)
Nicotine gum	20	0.7 (0.4–1.0)
Medication (i.e., Buproprion/Zyban, Varenicline/Chantix)	5	0.2 (0.0–0.3)
Nasal spray, inhaler, lozenge	0	0.0 (0.0–0.0)
Other cessation-related product (e.g., hypnotherapy)	28	1.0 (0.6–1.3)
Unspecified cessation product	13	0.5 (0.2–0.7)

Percentages may not add up to 100 because tweets can mention multiple products.

Table 2

Number of tweets by promotion type

	Discount		Discount code in promotion		Duty-free promotion		Free sample		Retail value-added tobacco product*		Retail value-added non-tobacco product*		Branded non-tobacco item		Price comparison relative to another product	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
E-cigarette (n=2564)	1803	70.3	796	31.0	0	0.0	22	0.9	19	0.7	4	0.2	1	0.0	120	4.7
Cigarette (n=153)	136	88.9	7	4.6	37	24.2	3	2.0	2	1.3	0	0.0	1	0.7	10	6.5
Cessation product (n=86)	52	60.5	3	3.5	0	0.0	2	2.3	0	0.0	0	0.0	0	0.0	7	8.1

Percentages may not add up to 100 because tweets can mention multiple promotions.

*
Retail value-added tobacco product includes promotions like "Buy one pack of cigarettes, get one free." An example of a retail value-added non-tobacco product promotion is "Buy two packs of cigarettes, get a cigarette lighter."