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Adolescent cigarette-smoking perceptions and behavior: Tobacco control gains and gaps amidst the rapidly expanding tobacco products market from 2001 to 2015

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Abstract

Objectives—Determine whether adolescents' intentions to smoke, cigarette-smoking behavior, and specific perceptions of cigarette-smoking are different in 2015 versus 2001.

Methods—Data from two California school-based studies ($x_{age}=14$) were compared: one conducted in 2001–2002 (“2001”), N=395; the second in 2014–2015 (“2015”); N=282.

Results—In 2015 more participants reported it was very unlikely they would smoke (94% vs. 65%) and never-smoked (95% vs. 74%); they reported perceiving less likelihood of looking more mature (17% vs. 28%) and greater likelihood of getting into trouble (86% vs. 77%), having a heart attack (76% vs. 69%), and contracting lung cancer (85% vs. 78%) from smoking (p 's < .001). Perceptions of short-term health problems and addiction were similar in 2001 and 2015

Conclusions—Findings suggest that adolescents in 2015 perceived greater risks compared to 2001 even amidst the rapidly changing tobacco product landscape. In addition to continuing messages of long-term health risks, prevention efforts should include messages about addiction and short-term health and social risks.

Keywords

adolescents/youth; cigarettes; public health; risk perceptions; social norms; perceived addiction; tobacco control

INTRODUCTION

Adolescent cigarette use decreased significantly from 2001 to 2015,¹ due largely to smoke-free policies and public health campaigns aimed at increasing knowledge, heightening

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perceptions of smoking risks and changing social norms.² Given the link between smoking-related perceptions, social norms, and cigarette initiation³ one can hypothesize that tobacco control efforts would have increased perceived risks and decreased perceived acceptability. However, the recent proliferation of novel tobacco products such as electronic cigarettes (e-cigarettes) has public health professionals and tobacco control advocates fearing a “renormalization” of smoking that could erode decades of tobacco-control gains.⁴ Indeed, adolescents hold favorable attitudes towards e-cigarettes and believe they are a healthier alternative to cigarettes.⁵ It could thus be hypothesized that adolescents hold more favorable views of cigarettes, compared to in 2001.

These competing hypotheses question if and how specific cigarette-related perceptions differ between adolescents in 2015 and 2001. Knowing which adolescent smoking-related perceptions have changed is timely and important, and will inform health education messaging aimed at preventing adolescent tobacco use.² We aimed to determine whether adolescents’ specific cigarette-related perceptions of risks, benefits, and social norms; intentions to smoke cigarettes; and smoking behavior differed between 2015 and 2001.

METHODS

Participants and procedure

A convenience sample of large high schools with a stable and diverse student population was recruited; over 50% of invited schools agreed to participate. Sample size allowed sufficient power (80%) to detect the contrasts of interest in both 2001 and 2015. Participants in 2001–2002 (“2001”) were recruited from 9th grade in two Northern California high schools (N=395; 53% female; 48% white; X_{age} 14, SD = 0.4); they completed the survey during class.³ Participants in 2014–2015 (“2015”) were recruited from classes in 10 other high schools throughout California (N=282; 60% female; 36% white; X_{age} 14.1, SD = 1.6); they completed the survey online, via Qualtrics.⁵ Surveys contained nearly identical detailed measures of smoking perceptions, intentions to use, and ever-use of cigarettes, as described below.^{3,3,5}

Measures

The measures used in this study have been used in past studies; and reliability and predictive validity of these measures have been assessed.^{5,6,6}

Ever-smoked—Participants indicated how many times they had ever, in their entire life, smoked a cigarette, even one or two puffs.

Behavioral intentions—Participants indicated how likely they were to initiate smoking in the next 6 months, from “definitely will” to “definitely will not.”

Social norms—Participants were asked out of 100 teens their age, about how many they think had tried smoking a cigarette?

Perceptions—Participants read the following text: *Whether or not you have used any of these products, imagine that you JUST BEGAN USING cigarettes. You use it about 2 to 3*

times a day, every day. Sometimes you use it alone and sometimes you use it with friends. If you use cigarettes 2 to 3 times each day, what is the chance that... followed by several social and health short-term and long-term risks and benefits (see Table 1). Participants were asked to gauge the likelihood of experiencing each outcome from 0–100% given the above scenario.

Analyses

Sample means were compared using independent samples t-tests; chi-square test for significance was used to test differences in proportion. Unless noted, all reported differences are significant at $\alpha = 0.003$ pursuant to Bonferroni adjustment for multiple comparisons. Analyses were conducted using SPSS 23 or Epi Info 7.

RESULTS

Samples differed by ethnicity, but not by age, sex, or SES (maternal education). Intraclass correlations revealed no difference in ever-smoking by school (both overall and by year). Fewer participants in 2015 (vs. 2001) reported ever-smoking (by gender: 5% vs. 25% girls; 6% vs. 28% boys), and more participants in 2015 reported it was “very unlikely” they would try smoking in the next 6 months (95% girls and 93% boys vs. 65% for both). Compared to 2001, participants in 2015 perceived lower smoking prevalence among peers (49% vs. 39% girls; 40% vs. 27% boys); less likelihood of experiencing the benefit of looking more mature or grown-up; greater likelihood of getting in trouble, having a heart attack, and developing lung cancer; and similar likelihood of experiencing most short-term benefits and health problems, becoming addicted, and still smoking in 5 years (Table 1). In 2001 gender differences were found in perceived likelihood of friends being upset with them (85% girls vs. 74% boys) and of getting into trouble for smoking (81% vs. 73%).

DISCUSSION

Compared to 2001, fewer participants in 2015 had ever-smoked or intended to smoke. They perceived less likelihood of looking more mature or grown-up; less social acceptability of smoking; and greater likelihood of experiencing long-term health problems. These findings provide support for the hypothesis that amidst tobacco control efforts and health messaging of the past 15 years, adolescents would hold less favorable attitudes towards cigarettes. Efforts have included: (1) clean indoor air legislation and smoke-free policies;² (2) increased numbers of adults trying to quit smoking, reinforcing perceptions of smoking-unacceptability;⁷ (3) the 2009 Family Smoking Prevention and Control Act, which resulted in renewed tobacco control efforts;⁸ and (4) public health programming such as CDC’s Tips from Former Smokers that warned of smoking-related hazards and the addictive nature of nicotine.⁹

Our findings do not support the hypothesis that due to rapidly increasing e-cigarette use among adolescents, perceptions of cigarettes have become more favorable.⁴ However, given that adolescents hold more favorable attitudes towards e-cigarettes,⁵ are using e-cigarettes at high rates, are more likely to use cigarettes if they used e-cigarettes,¹⁰ and that e-cigarettes

are largely unregulated, it is possible that cigarette-smoking perceptions could reverse and lead to increases in adolescent cigarette-smoking.

Perceptions of short-term harm and addiction were unchanged, illuminating areas for improved messaging to prevent both cigarette and e-cigarette uptake. Such health messages are critical given the relationship between perceptions and tobacco use³ and that nicotine addiction is not well understood.¹¹

Both studies were conducted in California; results may not be generalizable throughout the United States or internationally. Nevertheless, this study uses data collected with nearly identical surveys from similar samples, 14-years apart, to report changes in specific cigarette-smoking perceptions amidst a rapidly changing tobacco product landscape. Though samples differed in ethnic distribution, post-hoc analysis revealed no difference in outcomes when controlling for ethnicity. Perceptions most changed correlated with the strongest and most common tobacco-control messages. Such perceptions, shown to be modifiable and to result in sustained change of cigarette-smoking perceptions, should continue to be targeted with expanded messages that include e-cigarettes. To better explain trends in perceptions and more succinctly relate them to tobacco control efforts or public health programming, shorter intervals between measurements are needed.

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IMPLICATIONS

More cigarette-related risk and less social acceptability were reported in a sample of 9th graders in 2015 compared to a sample of 9th graders in 2001. Perceptions that changed most correlated with the strongest, most common tobacco-control messages. Tobacco control efforts should continue targeting cigarette-smoking perceptions shown to result in sustained change with broad-based prevention programs including e-cigarettes.

Table 1

Sample demographics and differences in perceived social norms, long- and short-term risks/benefits, behavioral intentions, and behavior related to cigarette smoking among California 9th graders

DEMOGRAPHICS (n, %)	2001 (N = 395)	2015 (N = 282)	p value *
Age, Mean (SD)	14.0 (0.4)	14.1 (1.6)	0.49
Female	211 (53)	169 (60)	0.09
Maternal education level (college degree or higher)	183 (48)	118 (42)	0.24
Race/ethnicity			
White	189 (51)	78 (28)	0.00
Asian	67 (18)	79 (28)	0.00
Hispanic	58 (16)	79 (28)	0.00
BEHAVIOR (n, %)			
Never smoked a cigarette, not even a puff or two	292 (74)	265 (95)	0.00
BEHAVIORAL INTENTION (n, %)			
Very unlikely to try cigarettes in the next 6 months	251 (65)	263 (94)	0.00
PERCEPTIONS, mean			
Social norms			
Of 100 teens your age, how many do you think have tried smoking?	45	34	0.00
Benefits *			
You will look more grown up (2001)/mature (2015)?	28	17	0.00
You will feel relaxed after smoking?	42	37	0.05
You will look cool?	15	17	0.46
You will be more popular?	14	14	0.82
You will be thinner?	50	44	0.04
Social risks *			
You will get into trouble?	77	86	0.00
Your friends will be upset with you?	80	79	0.76
You will have bad breath?	88	90	0.41
Long-term health risks *			
You will have a heart attack?	69	76	0.00
You will get lung cancer?	78	85	0.00
You will get wrinkles on your face?	82	84	0.32
Addiction *			
You can quit smoking cigarettes if you want to?	43	35	0.01
You will become addicted to cigarettes?	77	79	0.48
You will still be smoking cigarettes in 5 years?	64	65	0.78
Short-term health risks *			
You will have a lot of trouble catching your breath?	76	77	0.53
You will have many really bad colds?	57	57	0.87

DEMOGRAPHICS (n, %)	2001 (N = 395)	2015 (N = 282)	<i>p</i> value *
You will get a bad cough from smoking?	76	76	0.72

* Bonferroni corrected (*p* **.003**) **bold** indicates significant difference