

How Degrees of Vape Use Relate to Illicit Substance Use by Youth Aged 13 To 17 in The United States

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Background

Neurobiology studies on co-occurrence of nicotine and addiction indicate that nicotine primes the brain for greater likelihood of experimentation with illicit drugs and increases risk of addiction. Young people, whose brains are still developing, may experience greater and longer lasting neurobiological changes upon addiction or even mere exposure to nicotine [1]. In laboratory experiments, mice pre-exposed with nicotine via cigarette or vape demonstrated addictive behaviors around THC; however, mice pre-exposed with normal air did not demonstrate these addictive behaviors [2]. Nicotine use can also increase the rewarding feeling derived from using other mind-altering drugs; therefore, vaping itself may be a dangerous gateway that increases the propensity for other types of substance use and addiction [3].

Studies of other drugs of abuse indicate that certain youth are more susceptible to trying addictive/harmful substances than their peers, and the unique characteristics that make them more susceptible are of great interest to the drug abuse prevention and addiction treatment fields. In this analysis, we examine the extent to which increased degrees of vape usage significantly relate to increases in other substances experimented with by youth. To explore this issue, we categorized our survey participants into four profiles with different levels of vape usage, comparing reported social and behavioral trends between these profiles.

Methodology

In May 2020, we contracted with a market research company to

recruit 1,100 English speaking youth between the ages 13 to 17 for a one-time survey to assess social and behavioral attitudes towards vaping. The market research company set guidelines to ensure an equal mix of age and gender and that race was nationally representative. Participants from across the United States completed the survey online.

Since we were interested in whether different levels of vape usage correspond with different levels of experimentation with other substances, we constructed four profiles of vape usage:

1. “never-users” are youth who reported never vaping and answered “not likely at all” in response to their likelihood of vaping in the next month,
2. “non-users” also reported never vaping and reported any value above “not likely at all” in response to their likelihood of vaping in the next month,
3. “casual-users” responded yes to having vaped and reported doing so nine or less days in the previous month,
4. “regular-users” indicated previous vaping and reported vaping in more than nine days in the previous month.

We performed two-sample t-tests to assess significant differences in age among the four user profiles and conducted chi-squared tests on the categorical variables for race, gender, ethnicity, and each substance of interest to assess significant differences in percentages of use across user profiles overall. Finally, we compared the four profiles with the use of alcohol, cigarettes, synthetic drugs, vaped THC, and smoked marijuana.

Table 1: Substance usage by profile of vape usage

Category		Never-Users	Non-Users	Casual-Users	Regular-Users	Significant Differences
Demographics	Average Age (years)	14.88	14.79	15.27	15.66	See results
	Female	53.07%	42.34%	47.95%	38.71%	*
	Caucasian	67.02%	71.08%	78.03%	85%	**
	Black	13%	10.06%	8.06%	1.06%	*
	Asian	8.04%	10.09%	3.02%	5%	*
Substance use	Cigarettes	1.01%	8.85%	35.75%	64.52%	**
	Alcohol	15.54%	33.63%	60.18%	75.81%	**
	Vaped THC	0.44%	2.65%	35.75%	59.68%	**
	Synthetic Drugs	0.29%	6.19%	7.69%	17.74%	**
	Smoked Marijuana	2.93%	5.31%	35.29%	59.68%	**

Source: KDHC AVOID wave 2 data 2020

*p<0.05, **p<0.01

Results and Discussion

Never-users were significantly younger on average than casual-users and regular-users with respective t-scores of -3.64 and -4.26, p values of 0.0003 and near zero. Non-users were also significantly younger on average than both casual-users and regular-users, with respective t-scores of -2.90 and -3.7, p values of 0.004 and 0.0003. Lastly, regular-users were significantly older than casual-users with a t-score of -2 and corresponding p value of 0.046.

Never-users were the only profile group with a female majority. Furthermore, regular-users consisted of significantly less females than any other usage profile. Differences between profiles in percentages of females were significant overall at the 0.05 level, with a p value of 0.02.

Caucasian respondents were the majority in every profile and increasingly so with each increased degree of vape usage. Alternatively, Black respondents had lower percentages with each increased degree of vape usage. Both Black and Asian respondents held larger percentages in the two profiles that had not vaped previously than in the two profiles that had already vaped. Percentages of Caucasian respondents were significantly different across profiles overall at the 0.01 level with a p value of 0.0001. Percentages of respondents who were Asian or Black were significantly different across profiles overall at the 0.05 level with p values of 0.03, and 0.02, respectively.

As seen in the two-way crosstab (Table 1), the percentage of respondents who tried each drug of interest rose with each increased degree of reported vape usage. The differences were larger between profiles of respondents who had never vaped and profiles of vape users, though even within respondents who had never vaped, non-users had markedly higher percentages of use than never-us

ers. The largest difference in percentages of respondents who tried illicit substances were between the never-users and regular-users. Percentages for each of the substances tried by respondents were significantly different across profiles overall at the 0.01 level, each with p values near zero. Age may explain part of this finding, as never-users were nearly a year younger on average than regular-users.

The positive relationship between the degree of vape usage and the tendency of trying other substances supports the hypothesis that nicotine addiction may increase youth's susceptibility to experimentation with other drugs, though the finding is limited without a pre and post analytic framework. Still, the finding is important because identifying youth at highest risk of drug use will aid efforts to stem future drug use by allowing for targeted interventions at the most susceptible youth.

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