

“Smoking Evolved?” Perceptions and Use of JUUL Products Amongst College Students¹

By

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Abstract: In recent years, there has been a surge in the number of electronic-cigarette users in the United States. One brand, in particular, has been on the forefront of society’s attention. JUUL products have come to dominate the e-cigarette market and seem to be especially popular amongst youth. The popularity of JUUL is cause for concern, due to the relatively easy access to this product and the associated adverse health effects of nicotine on youth. Additionally, the expansion of e-cigarette use through JUUL has certain parallels to the tobacco industry’s marketing strategies in the past. Through a survey conducted on an eastern college campus, the author explores perceptions and use of JUUL. The survey provides data that can be added to the current body of literature surrounding e-cigarettes and youth. The lack of education of youth on JUUL products is a cause for public health concern that this paper addresses.

Keywords: JUUL products, health effects, college students, tobacco industry

Introduction

In the past few years, the United States has seen a rise in the use of electronic cigarette products. While there is a wide array of e-cigarettes, one product, in particular, has been on the forefront of society’s attention. That product, which is rapidly becoming a household name, is called JUUL (pronounced “jewel”). JUULs can be seen in the hands of many, allowing people to emit small clouds of smoke seemingly wherever they are. JUULs are frequently seen on college and high school campuses and have been the subject of many news headlines in recent months. The controversy surrounding this product is notable, making for an intriguing topic of study.

What is a JUUL?

Initially created by PAX Labs in 2015, JUUL is a type of electronic-cigarette device. In the summer of 2017, JUUL Labs, Inc. became a new entity from PAX

Labs which now oversees the production of JUUL products (JUUL Labs, Inc. 2018). A JUUL has a similar appearance to a flash drive and consists of two main pieces. One is referred to as a ‘JUUL device.’ This piece consists of a heating mechanism and a battery that is rechargeable via a USB port. The second piece, known as a ‘JUULpod’, is a cartridge that fits into the JUUL device, and which contains ‘E-liquid’ (JUUL Labs, Inc. 2018). The ‘E-liquid’ is a salt-based nicotine formula that is heated to produce the vapor users inhale. In addition to nicotine, the ‘E-liquid’ contains chemical components, including propylene glycol, glycerine, benzoic acid, and various flavorings (JUUL Labs, Inc. 2019).

To appeal to a wide array of users, ‘JUULpods’ come in a variety of flavors and concentrations. They also come in different strengths-- either 3% or 5% nicotine by weight (JUUL Labs, Inc. 2019). Flavors range from traditional smoking tastes like menthol, mint, and Virginia tobacco, to less conventional ones, such as mango, fruit, and cucumber.

Popularity Amongst Youth

There is no doubt that the popularity of JUUL has been

¹The author thanks Martha Gardner, PhD. for her continual support and mentorship throughout the creation of his paper.

on the rise. Since 2017, JUUL sales have been greater than those of any other e-cigarette manufacturer, and the sales gap is growing. JUUL sales alone account for over half of the e-cigarette market share (Herzog & Kanada 2018). With a number like this, questions arise as to which demographic groups are contributing to the sales. In terms of overall youth e-cigarette use, in 2017, the National Youth Tobacco Survey reported that 11.7% of high school students and 3.3% of middle school students, a total of over 2.1 million youth were e-cigarette users (Bach 2018). In 2018, usage was even greater. Amongst high school students, there was a 78% increase (from 11.7% to 20.8%), and a 48% increase for middle school students (from 3.3% to 4.8%) (Cullen et al. 2018). The total number of youth e-cigarette smokers in 2018 was over 3.6 million.

As concerning as these values are, there is speculation that they may not tell the whole story because there is conflicting terminology over how JUUL use is described. Whereas some refer to it as e-cigarette use or vaping, the popularity of this product has led to the creation of a new verb, 'JUULing' (Huang et al. 2018). A study conducted by the Truth Initiative helps to highlight this point: 34% of participants referred to the product as a JUUL, whereas 63% called it an e-cigarette or a vaping device (Willett et al. 2018). Because of this difference in terminology, the number of youths who are e-cigarette users is likely higher than estimated.

There are a variety of reasons why young people, under the legal purchasing age of 21, are using JUUL products. Perhaps the most significant is the inclusion of flavorings in the 'JUULpods'. As opposed to a general tobacco taste, flavored e-cigarettes are preferred by youth e-cig users by over 70%, and they are highly associated with first time use (Harrell et al. 2016). Eight out of 10 (81%) of young e-cigarette users cited flavors as being their primary reason for use (Villanti et al. 2017).

Also, increasing attraction of Americans, especially youth, to new technology has played a part in the current rise of e-cigarette use. There is a risk factor that public health researchers refer to as 'technophilia.' Technophilia is defined as a positive orientation towards a new technology, a characteristic that is increasingly common in the current youth generation (Barrientos-Gutierrez et al. 2018). Today, many teens are typically interested in getting their hands on the newest technology and devices. The study conducted by Barrientos-Gutierrez et al. (2018) demonstrated that technophilia was indeed correlated to e-cigarette use among youth. Technophilia, in combination with a

diverse assortment of flavors, can be enough of a draw to lure in people who are not current or former smokers to try JUUL products.

Health Effects

The rise of youth e-cigarette smokers is of concern for several reasons. Foremost, the product is intended to be a safer alternative to cigarettes for current smokers (JUUL Labs, Inc. 2019). In the hands of people who are nonsmokers, especially youth, adverse health effects can occur as a result of JUUL smoking. Although e-cigarettes are known to have fewer of the carcinogens typically associated with cigarettes, JUUL still contains nicotine. This chemical alone poses a wide array of health concerns, particularly amongst young users.

The 1988 Surgeon General's report stated definitively that nicotine is an addictive substance (US Department of Health and Human Services 2014). Therefore, smoking JUUL increases the possibility that youth who have never smoked before can become addicted to the product, making JUUL use a potential gateway for further addiction or cigarette use. In fact, adolescents are more likely than adults to become addicted to nicotine, due to differences in the reward centers of their brains (England et al. 2015). Nicotine use has also been correlated with other poor health outcomes. Particularly relevant to youth is that nicotine produces adverse effects on the central nervous system during adolescence.

Although not strictly comparable to humans, rodent studies have shown that nicotine exposure has much more significant effects during adolescent development than at other times in their lifespan (US Department of Health and Human Services 2014). The main consequences of nicotine exposure in rodents include reduced size and number of cells in the cerebral cortex, midbrain, and hippocampus. These brain areas are associated with a variety of functions, such as auditory and visual processing, higher thought processes and decision making, and emotion and memory control (US Department of Health and Human Services 2014). The effects of reductions in these areas can be long-lasting. They are also correlated with problems in both cognitive function and overall development.

The other chemicals involved in e-cigarettes are typically viewed as non-toxic in low levels and safe to consume. However, it is not possible to say conclusively that these other chemicals are incapable of generating long-term, negative health effects. For example, heating

and inhaling the ‘E-liquid’ may cause adverse problems that have yet to be seen. Similar to how cigarettes were not initially viewed as a harmful habit, it is possible that future research will demonstrate that using JUUL products is much worse for health than initially believed.

A Familiar Road?

For those who are versed in the history of the cigarette industry, some parallels to the current state of e-cigarettes stand out. An examination of the course of cigarette smoking in the United States since the 1960s reveals a trend among adults that contrasts with that of youth. There has been a steady decrease in the number of adult cigarette smokers, which differs from the trajectory of smoking amongst high school aged youth. Specifically, there was a significant spike in the percentage of high school and middle school smokers in the 1990s, followed by a subsequent drop and continual decrease (Centers for Disease Control and Prevention 2016). These statistics raise the questions of what exactly caused the rise in youth smoking during that time period and the decrease afterwards.

During the 1990s, big tobacco companies utilized several strategies, although denied at the time, which appealed to youth. Most notable was the Joe Camel campaign from R.J. Reynolds. This campaign featured images of a suave cartoon camel that smoked cigarettes (Brandt 2009). Another example was the Marlboro Man, a rebel cowboy of sorts, used by Philip Morris to promote one of their brands (Brandt 2009). The tobacco industry used these and other ads to portray smokers as youthful and independent (Pampel & Aguilar 2008). This type of marketing strategy made cigarettes seem attractive to youth and contributed greatly to the increase in young adult smoking rates in the 1990s.

Today, it appears that the causes of the rise in e-cigarette smoking may be quite similar to those of traditional cigarettes from roughly 30 years ago. Whether this increase is directly or indirectly the fault of companies like JUUL Labs is worth considering. The modern-day version of Joe Camel ads may be those on social media. The official JUUL account on Twitter and Instagram, JUULvapor, was responsible for a large number of posts in 2017, when the popularity of JUUL really started to surge. This growth in popularity that JUUL saw while other e-cigarette providers faltered can be attributed to marketing strategies used by JUUL Labs (Huang et al. 2018). Although the company states on its website that their product is for adult smokers, the use of

social media advertisements seems to suggest otherwise (JUUL Labs, Inc. 2019). This marketing campaign would have more directly reached and appealed to youth, who are the principal users of these platforms. Similar to the cigarette companies of the past, the words of JUUL Labs may not match the actions that they are taking.

During the subsequent drop in youth smoking that took place after the rise in the 1990s, a large number of internal tobacco industry documents became public, thus exposing the intentions of the tobacco companies. Philip Morris, for example, was found to be directly targeting young smokers, despite the company’s public position that this was not the case (Johnson 1981). Bans on advertising, tobacco taxations, and anti-tobacco efforts were largely successful in reducing the number of youth smokers. Healthcare providers and school programs helped to provide information on the dangers of smoking and also offered cessation advice (US Department of Health and Human Services 2012). Measures such as these may also be useful in assisting with reducing the current surge of e-cigarette use.

Recent News

Over the past few months, JUUL has dominated headlines across various news outlets. Their popular electronic cigarette device has been a controversial topic. The heightened attention to JUUL has its roots in late July of 2017, when the Food & Drug Administration (FDA) put a plan in place to decrease nicotine addiction in future generations, a plan which included a framework for regulating e-cigarette devices and lowering their nicotine levels (US Food & Drug Administration 2017). The FDA developed this plan further and, in April of 2018, released a statement about improvements to the plan. This second statement was centered on reducing youth access to e-cigarettes, and specifically cited JUUL as having sold their products to youth illegally. Warning letters were issued along with a request for information to JUUL Labs for documents that might shed light on the high youth consumption of their products. The FDA was seeking documents such as marketing and research reports (US Food & Drug Administration 2018). The FDA issued its most notable warning letter a few months later. On September 12th of 2018, the letter received by JUUL Labs was similar in that it requested the company to take steps to address the rate of youth use. However, this letter also included the stipulation that company had 60 days to produce a detailed plan as to how they would address the problem

(Gottlieb 2018). By setting this deadline, it appeared that the FDA was quite serious about insisting that changes occur at JUUL Labs.

Soon after receipt of this letter, JUUL Labs CEO, Kevin Burns, released a public statement affirming JUUL's commitment to preventing underage use and their eagerness to comply with the FDA (Burns 2018). Burns' statement left out the steps the company would take to make headway in decreasing the rate of youth use. Weeks later, in November, JUUL announced that the company would suspend sales of some of their flavored pods in stores and terminate social media promotions (Kaplan & Hoffman 2018). The company would stop stocking their mango, crème, cucumber, and fruit flavors, while continuing the sales of their mint, menthol, and tobacco flavors (Truth Initiative 2018). Even so, these products can still be purchased online from their website with age-verification. While this move made it seem like JUUL Labs was being responsive to the demands outlined by the FDA, it still raises questions as to how effective these changes will be. This voluntary action may not be enough.

Another interesting development occurred a month later, in December, when JUUL Labs made a deal with Altria Group, Inc. Altria is one of the world's largest tobacco companies, and maintains control over Philip Morris USA, the makers of Marlboro (Altria 2018). Altria paid JUUL Labs nearly \$13 billion in exchange for a 35% stake in the company (Kaplan & Richtel 2018). Until this point only parallels could be drawn between the trajectory of JUUL and the plight of big tobacco companies in the past. Now, however, the two became integrally linked. After the decision to cease social media advertising and remove some flavored pods, it appeared that JUUL might comply with the FDA, and set their sights on a better public health initiative. However, JUUL now possesses the resources to further combat the FDA regulatory imposition. Regardless of the true intent of the deal, from a public-relations stand point, this agreement will hurt JUUL (Kaplan & Richtel 2018). Most recently, the FDA has continued its offensive by accusing JUUL Labs of going back on their promise to keep e-cigarettes away from minors while engaging in backroom financial agreements with Altria (Kaplan 2019). The magnitude and effect of this new business agreement waits to be seen.

College Survey

Student perceptions and usage of JUUL products

were measured through a survey conducted on MCPHS University's Boston campus in the spring of 2019. This survey shows how successful JUUL's efforts have been in reducing youth access to their product, as well as increasing awareness among the students surveyed. The survey also provides greater evidence for the popularity of JUUL among youth, along with information about the knowledge they have of the product.

A sample of 109 students, ranging in age from 18 to 27, was used. The sample was obtained by going into a range of classes at MCPHS University and asking interested students to participate voluntarily. Those students who provided a name and email address received a closed link to the survey. Of the students who participated, four did not provide their age. One hundred fell within the traditional undergraduate age range of 18-22 and comprised the sample.

The majority of respondents were female (78%), which is characteristic of MCPHS University's roughly 70% female student body. The sample represented a variety of academic programs and majors offered by the university. In order to complete the main body of the survey, it was necessary for respondents to have at least a relative familiarity with JUUL products. One hundred participants met this criterion and were included in the data analysis.

Amongst the students surveyed, 64.0% responded that they had used a JUUL product. More males (77.3%) than females (60.3%) had previously used a JUUL. Usage differed slightly by age. Specifically, 72.7% of the 18 year olds surveyed, 66.7% of 19 year olds, 69.0% of 20 year olds, 52.6 of 21 year olds, and 54.5% of 22 year olds report having used a JUUL prior to the survey.

As stated previously, JUUL products are intended to be a smoking cessation device. However, of the 64 individuals who had used a JUUL product, only nine were former smokers. Therefore, 85.9% of JUUL survey respondent users were not using JUUL as an alternative to conventional cigarettes. Their usage may have been due to a lack of knowledge about JUUL in general, as only 50.5% correctly identified that JUUL products are not intended for people who are not current smokers.

Looking into the reasons behind first-time usage, a few that stood out. The most notable finding was that 50 students said they first used a JUUL product because a friend or family member was using one. This finding lends support to the idea that people around youth can play a direct or indirect influence on e-cigarette use. Eight participants said that the flavor options played a role, and 14 cited that that they had wanted to try a

new technology. These reasons reinforce the previous literature that has claimed these were influencing factors in youth e-cigarette use. Only four individuals said their first-time use was because they wanted to try an alternative to conventional cigarettes.

In terms of classification, 85 participants referred to JUULs as e-cigarettes. About 12% of students did not consider JUULs to be e-cigarettes via a close-ended question. Therefore, rates of youth e-cigarette smoking might actually be higher than currently reported. If some students do not consider their JUULs to be e-cigs, then they are less likely to report e-cigarette smoking, making the number of youth smokers appear lower than what it truly is.

Regarding other perceptions that college students have of JUUL products, the large majority surveyed was aware that these products contain nicotine (94.8%) and are addictive (90.7%). There was some uncertainty as to whether JUUL products contain tobacco, as 15.5% believed incorrectly that they did, and 17.5% were unsure. Despite the relatively high proportion of participants who had tried a JUUL product, there were questions about their safety. When asked if JUUL products are safe to use, in their opinion, 69.1% responded no.

DISCUSSION

The survey yielded some interesting findings. The large majority of students were familiar with JUUL products, and a sizeable portion had tried smoking JUUL themselves. Both men and women had tried the product at similar rates. Regardless of both age and gender, the college students surveyed seem to use JUUL products at high levels, even though many are not former smokers.

Prior research has demonstrated that flavoring and ‘technophilia’ played major roles in first-time use of e-cigarette products. While this survey supported these factors as having influence on the decision of students to try JUUL products, one specific factor stood out. Fifty participants cited that their first use was because a family member or friend was already using. This finding warrants more research into the effect of familiarity of JUUL products through the household and in social settings on smoking behavior. Perhaps an indirect sort of peer pressure may also be playing a role.

Participants’ attitudes towards, and perceptions of, JUUL products raises some questions. For example, nearly 70% of survey participants believed that JUULs

are not safe. This seems to be a high percentage, especially given how many students had reported using them. The number of people who had faulty perceptions of the product was also concerning. Just over half of the participants were aware that JUUL products are not intended for those who are not former smokers. While a relatively high percentage was aware that JUUL products contain nicotine and are addictive, the number of those who cited JUULs as addiction causing was slightly lower. This lends support to the fact that there is a portion of students who are unaware that nicotine is addictive. Given that this survey was conducted at a health science school, there is speculation that the number of youth members who know that JUUL products are addictive is actually lower than what was reported. There is also a general lack of knowledge in terms of the contents of a JUUL, as demonstrated by the number of people who believed that they contained tobacco.

This survey has a few limitations. First, because it is based on a convenience sample, the students surveyed may *not* represent the student body at MCPHS University or the entire universe of college students in general. On the same note, college students alone are not representative of all youth. Second, the sample size is small. Because the sample is both small and non-random, the results should *not* be generalized to all youth or all college students, but merely used to suggest possible trends.

CONCLUSIONS

In the hands of former smokers, JUUL products can be highly beneficial in aiding in smoking cessation. Unfortunately, these products are becoming increasingly common amongst youth, and are being utilized by a population for whom they are not intended. Young people who are not current smokers may be ignorant to the harm that nicotine poses to them, and unaware of its addictive properties. This potential lack of knowledge may increase the possibility that young people will use JUUL.

In reviewing the rise of JUUL products, it becomes clear that there are a lot of factors at play. It would be remiss not to acknowledge the potential benefits of JUUL products. It is necessary to consider whether conventional cigarette smoking rates amongst youth would be higher if JUULs did not exist. This may very well be the case, as one recent study has demonstrated an inverse relationship between vaping and conventional cigarette smoking (Levy et al. 2018). It is possible that,

if JUULs were never created, the rate of youth cigarette smoking would be higher than it currently is.

However, higher e-cigarette smoking rates are still a cause for concern. Although JUUL Labs publicly claim their product to be a public health measure, aspects of their marketing, especially marketing strategies that target youth, seem to undermine this goal (Huang et al. 2018). Greater action needs to be taken by the FDA and other governing bodies to prevent further damage by JUUL Labs, Inc. Some may argue that the harm has already been done because JUUL Labs dominate the e-cigarette industry and has penetrated the youth market by utilizing social media and by getting enough of a following to spread their popularity by word of mouth.

Nevertheless, it is still possible to create a plan to decrease the number of young JUUL users. To see what can be done to do so, a look back at the 1990s is helpful. As discovered by the decline in smoking among youth that took place then, tactics such as educational measures, restricting access, reducing flavorings, and other interventions were effective (US Department of Health and Human Services 2012). Currently, the FDA is working to reduce young people's access to JUUL products, as well as limiting the flavorings. Although these tactics are beneficial and should perhaps even be stepped up, they alone may not be sufficient to lessen the impact that JUUL has on today's youth.

Overall, JUUL Labs needs to assume more responsibility for the health of the general public. This is particularly true because of JUUL Labs' public claims that JUULs are meant to help smokers to quit. Based on students' perceptions of e-cigarettes from the survey conducted at MCPHS University, those studied lack knowledge about the risk of JUUL products, and indicate that, among those surveyed, a high percentage of young people have tried this product. Possible educational campaigns should take into account these perceptions and actions. If they do, they could go a long way toward ending smoking on all fronts.

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