The Influence of Social Settings on E-Cigarette and Alcohol Use

Emily Fang

Received April 29, 2024
Accepted August 06, 2024
Electronic access August 15, 2024

Prior research in a study examining youth vaping has established that the use of e-cigarettes among teenagers is a social activity in which its initiation is often associated with friends and social settings. However, it is unclear if this due to most teenage drug use being a social activity or if there is something about the use of e-cigarettes that make their usage specifically more social than other drugs. The present study aims to explore the factors that cause people not only to begin using e-cigarettes but also to begin drinking alcohol. Furthermore, since previous research mostly utilized a younger sample, this study investigated these factors in an adult sample to find if the same patterns persisted. Adults (n = 296) aged 19 to 72 participated in an online questionnaire where they were presented with an array of questions pertaining to their use of e-cigarettes and alcohol including their frequency of use, age of initiation, impact on their life, and perceived peer use. Across the study, e-cigarettes were seen to be more linked to social settings among the younger sample as compared to the older sample while alcohol was more social among the older sample as compared to the younger sample. These results expand on the current knowledge about motives for the initiation of substance use and introduce new ideas about the impact of age on these motivations.

Keywords: E-Cigarettes, Alcohol, Social Settings, Substance Use, Statistics

Introduction

Alcoholism and vaping are two ubiquitous public health issues with varying yet interconnected consequences. Alcoholism is characterized by an unwavering addiction to the consumption of alcoholic beverages which can result in physical and psychological harm [1]. Vaping, in contrast, is the inhalation of aerosols from battery-powered devices containing nicotine and an array of other chemicals [2]. Although it was originally presented as a safer alternative to smoking cigarettes [3], increased usage has brought its potentially damaging effects to light [2]. The percentage of young people purchasing vapes and alcohol [4], is a cause for concern. Recognizing the connection between alcoholism and vaping has become of critical importance, especially when considering the risk factors associated with substance use. Our rapidly shifting public landscape makes it necessary to examine the differences between these public health concerns and where to proceed from here.

Alcoholism has existed around the world throughout history and while some aspects of the addiction have changed over time, it undoubtedly still exists [5]. One continuity is its severity. An excessive consumption of alcohol is often associated with both short-term and long-term cognitive dysfunction, making alcoholism more severe than other behavioral habits [6]. Due to the severity of alcoholism in our society along with its prevalence over time, there is a wider array of care and possible treatments for the physical and mental issues associated with alcoholism [7]. Vaping, in contrast, is rather new and a relatively unexplored addiction [2]. Although the addictive component, nicotine, is also found in cigarettes, the additional chemicals in e-cigarettes may have other unknown effects. While both vaping and alcohol present risks for all age groups and populations, youth vaping, in particular, has risen greatly to the point that it is considered an epidemic in some areas [8].

In recent years, the awareness and use of electronic cigarettes (vapes) have increased tremendously, especially among young adults. Specifically, 25.0% of 12th graders in 2018 reported having vaped nicotine or flavoring, a significant increase from 15.2% in 2017 [9]. There are many factors that may induce vaping from peer and family influence to the belief that vapes have no significant health effects [10], to advertisements and the media [11]. These factors have connections to the use of alcohol among young people as well. In a teenage sample, the 30-day prevalence rates for 8th, 10th, and 12th-graders were 8%, 19%, and 30%, respectively [12]. A concerning amount of college students (2 in 5) reported binge drinking [13]. These numbers introduce the question of how peer pressure may play a role in the start of the use of electronic cigarettes and alcohol.

Alcoholism and vaping stem from varying root causes. The overconsumption of alcohol is mainly a result of social and cultural contexts. There is evidence that "higher levels of alcohol use among parents and peers is associated with increased alcohol use among adolescents and young adults" [14]. Additionally, it has been found that "the sons of alcoholics were about four times more likely to be alcoholic than were the sons of nonalcoholics" [15]. From a social standpoint, according to the National

Library of Medicine, people with higher socioeconomic status tend to drink more frequently than others [14]. Social disparities are often an indicator of alcoholism especially due to different social networks and connections as well as the standard of living. Furthermore, different races and cultures are generally known to drink more than others. For instance, African Americans and Latinos have been found to have more cautious mindsets about drinking as compared to whites [14]. There exist many other complexities among racial norms, however, including family and peer influences. Adolescent drinking behavior and the roots of many alcohol-consumption issues lie in the people that youth spend time with: friends and family. The root causes of vaping are similar but slightly different in some ways. Due to the fact that vapes have been presented as a safer alternative to smoking, they have established a reputation in which there are few believed health effects related to vaping. Many report that they used e-cigarettes to quit smoking [16]. There has not been much research on the initiation of vaping, however, one study by Groom and colleagues [17] found friends and social settings to be the main source and setting for the initiation of e-cigarette use.

Similar factors have been linked to illicit drug use as vaping and alcohol abuse. Again, friends and family were found to be a major component in the initiation of illicit drug use. Both parents and peers have an impact on the decision-making and behavior of people; "peers are especially important for initiation into marijuana use, while parental factors gain in importance in the transition from marijuana use to the use of other illicit drugs" [18]. Many adolescents turn to drug use as an alternative to dealing with certain problems in life as it serves a variety of functions. Some include positive feelings and reduced pain that can be experienced through the use of drugs, being able to use drugs as a rationalization for misconduct, or as a stepping stone towards status, identity, or companionship [19]. Some of this research can be related to vaping and alcohol abuse among adolescents as the causes and effects of substance abuse are often interconnected. The influence of peers is undoubtedly a very strong factor in the initiation of vaping due to peer normalization of substances in which a mindset of invincibility is established [20]. Furthermore, other studies have shown the impact of friends and the opinion of peers on the use of vapes. Some people use e-cigarettes to improve their social image and fit in with trends [21]. Specifically, within the span of 6 months, one friend group completely changed their minds about vaping. While they originally were excited about their vapes and felt that it was something cool to do at parties, it quickly became outdated and somewhat passé [22]. Because those around them felt that vaping was no longer "cool," many adolescents ceased vaping in public. Alcohol is similar in that the people around someone also exert a great influence on the initiation. Social norms and parental drinking habits have a huge psychological effect on whether or not someone begins drinking [23]. Both influence public health issues of vaping and alcoholism, especially among adolescents, a population in which drinking and vaping have become trends.

This study aims to follow the study by Groom and colleagues [17] which found socialization to be a prominent factor in the initiation of teen vaping. This present research aims to determine if similar themes persist in an adult population and if the results found by Groom and colleagues [17] were found because all drug use is social in nature or if vaping in particular is more social than other substances. To our knowledge, this is the first study to center around these two substances, particularly in relation to socialization. By comparing vaping to another substance, namely alcohol, we can take a closer look at whether vaping specifically is a social activity among youth or if teenage drug use as a whole is social in nature.

There exist various theories explaining the reasons behind drug use, many indicating it to be largely influenced by social factors. Peer cluster theory, for one, ascertains those adolescents interact to form small groups known as "peer clusters" which have a significant impact on their development, and in some cases, their use of drugs. This theory shows the widespread impact of peers in particular as the main influence for prospective drug use, and other influences such as family, religion, and school as secondary [24]. Additionally, the theory of reasoned action states that the decisions made by adolescents when beginning to use drugs are based in part upon their perception of other people's opinions on the substance. If an individual believes that others want them to involve themselves in substance use, this belief will heavily sway their decision towards beginning to use the substance [25].

These theories show that drug use in general is extremely social, but we aim to ascertain if there is something particularly special about vaping that causes it to be more subject to social influences than other drugs. To date, there is little research on e-cigarettes as they are a relatively new technology. Therefore, it is difficult to confidently predict how social it is in comparison to alcohol. However, based on the finding in the study by Groom and colleagues [17] that e-cigarettes were social in nature, we hypothesize is that the initiation of vaping has a larger influence from friends and peer groups as compared to alcohol.

Additionally, both the peer cluster theory and the theory of reasoned actions both explicitly state they are an explanation of teenage drug use. Because e-cigarettes are a recent invention, many adults today who use e-cigarettes did not have access to them when they were a teenager. We aim to see if these theories hold up on this sample of participants who only had access to e-cigarettes as an adult. We predict that these theories will be specific to teens and thus e-cigarette users who did not have access to e-cigarettes as teens will not begin usage in social settings as often as younger users.

Methods

Participants

The participants in this study consisted of 296 adults (40.9% Female, 58.1% Male, 1.0% Other) ranging from ages 19 to 72 with an average of 38.9 (SD: 10.8). The distribution of participants' racial background was as follows: 5.1% Asian or Pacific Islander, 14.2% Black/African American, 4.7% Hispanic, 75.7% White/Caucasian, and 0.3% other. Participants were recruited through Amazon's Mechanical Turk and paid for their participation. The highest level of education completed by the participants was as follows: 6.4% associate degree, 41.9% bachelor's degree, 1.0% doctorate degree, 11.8% high school diploma, 23.6% master's or professional degree, 12.5% some college, 2.0% trade/technical/vocational training, and 0.8% other.

Measure

Each participant was presented with an array of qualitative and quantitative questions related to e-cigarettes and alcohol. This data was used to categorize participants into groups based on which product(s) they use, their age, and other variables.

Procedure

First, participants were asked to identify whether or not they used each of the three substances mentioned above (e-cigarettes and alcohol). They were asked, "Have you ever tried [product name] products (even one to two times)". If they answered 'yes' to any, they received the same five questions for each. First, they were asked "How frequently have you used [product name] products in the last year?" The answers ranged from (1) "Daily" to (5) "Have not used in the past year". Next, participants were asked "How old were you when you first used [product name] products?" For this question they selected an answer in one of the following five categories: (1) Under 12, (2) 12-14, (3) 15-17, (4) 18-20, and (5) 21 or Older. In order to examine influencers, two questions were taken from a different study pertaining to teen vaping (Groom et al, 2021). The first question was "Where did you get your first [product name] product? Choose one." Participants were given seven choices: (1) a friend, (2) a family member or relative, (3) a neighbor, (4) someone else, but not a friend or relative, (5) I bought it at a store, (6) other, and (7) I don't remember. They were then asked "Where were you when you first used [product name] products? Choose one." They were asked to choose one of the following answers: (1) hanging out with friends, (2) at parties, (3) by myself, (4) with my family, (5) school, (6) other, and (7) I don't remember. The previous study utilized the questions to examine social impacts on e-cigarette use specifically, which translated well into this study for the purpose of examining social impacts on e-cigarette and alcohol use. The following two questions were chosen in order to study the theory of reasoned action, which designate that peer approval is a major factor in the initiation of youth vaping. Participants were asked "On a scale of 0-100 how positive/negative of an effect do you think [product name] products have had on your life?" Participants were asked to answer with a number from 1-100, 1 being very negative and 100 being very positive. Finally, participants were asked to respond to the following question with a percentage of their peers that they believed used each given substance: "What percentage of people in your age group do you believe use [product name] products regularly (at least once a month)?" After the questions, participants were given demographic questions including education background, age, gender, and ethnicity at the end of the study. This data was compiled in a spreadsheet and analyzed from multiple angles utilizing R language in RStudio.

Results

Out of the 296 participants, 213 (72.0%) had used an e-cigarette at least once in their lives and 259 (87.5%) had drunk alcohol at least once in their lives. According to a binomial proportion test, it was found that these percentages were significantly different ($p < .001$). When asked about their frequency of usage, 53 (24.9%) reported using e-cigarettes at least once a week, 46 (21.6%) use e-cigarettes at least once a month, 44 (20.7%) use daily, 36 (16.9%) have not used in the last year, and 34 (16.0%) use less than once a month. For alcohol use, 96 (37.1%) drink at least once a week, 67 (25.9%) drink once a month, 39 (15.1%) drink less than once a month, 36 (13.9%) have not drunk in the past year, and 21 (8.1%) drink daily. Because this data was ordinal, we assigned numeric values to each response and performed a t-test to investigate the differences. According to the t-test, these values were not significantly different ($t(420) = 0.50$, $p = .62$). Of those who use e-cigarettes, most participants were over the age of 18 when they first used an e-cigarette, with 43 (20.2%) first trying one between the ages of 18 - 20 and 130 (61.0%) first trying one over the age of 21. Of the remaining participants, 1 (0.4%) first tried an e-cigarette before the age of 12, 13 (6.1%) between 12-14, and 26 (12.2%) between 15-17. This may be attributed to the more recent development of the electronic cigarette; since many of the participants in this study would have been past their teenage years during the time that it was released on the market in the mid-2000s[26] (all of those over the age of 37). For those who were under 37, 11 (9.1%) first tried an e-cigarette between 12-14, 21 (17.4%) between 15-17, 28 (23.1%) between 18-20, and 61 (50.4%) above 18. These numbers were much more evenly split above and below 18. The age for initiation of alcohol was also similarly split: 13 (5.0%) were under 12, 39 (15.1%) were 12-14, 73 (28.2%) were 15-17, 76 (29.3%) were 18-20, and 58 (22.4%) were over 21. We wanted to investigate the differences in age of initial use. We again assigned numeric values to each option in the ordinal

dataset and performed a t-test. We found that participants who used alcohol started at a younger age than those who vaped (t (470) = 8.96, $p < .001$).

When asked to answer how positive of an effect e-cigarettes and alcohol had on their lives on a scale of 1-100 (1 being extremely negative and 100 being extremely positive). Participants who used e-cigarettes reported the drug had a significantly more positive effect on their lives (57.4) than those who used alcohol (50.2; t (455) = 3.68, $p < .001$). Out of all the participants in the survey, when asked what percentage of people in their age group they believed to use e-cigarettes and alcohol at least once a month. Participants reported their response on a 0-100 scale. We analyzed this as a continuous variable and were interested in comparing means. The average percentage of perceived usage came out to be 42.1% for e-cigarettes and 65.8% for alcohol ($t(548) = 12.56$, $p < .001$).

Table 1 compares the average perceived usage among self-identified users and non-users. The table is based off of questions 3 and 4 (see Appendix 1), which asked, "What percentage of people in your age group do you believe use alcohol regularly (at least once a month)?" These numbers were compared based on whether or not the participant used either e-cigarettes or alcohol. Participants who use e-cigarettes reported feeling that a higher percentage of their peers also use e-cigarettes on a regular basis as compared to those who did not use e-cigarettes. While those who use e-cigarettes thought that an average of 47.1% of their peers also vape, those who did not use e-cigarettes thought that an average of just 29.5% of their peers vape, showing a 17.6 percentage point jump. Similarly, those who drink reported feeling that a higher percentage of their peers also drink on a regular basis. While those who drink thought that an average of 68.3% of their peers also drink, those who didn't drink thought that an average of just 48.2% of their peers drink, showing a 20.1 percentage point jump. For both drugs this average percentage usage jump was found to be significant (e-cigarettes: $t(295) = 5.89$, $p < .001$); alcohol: $t(295) = 4.31$, $p < .001$).

We wanted to investigate if the relationship between drug use and perceived drug use among peers was different among alcohol and e-cigarette users. Therefore, we built a hierarchical linear regression model with perceived use of drug as the dependent variable and drug type and whether or not the participant had used the drug as independent variables while allowing slopes to vary by participant. There was a somewhat significant interaction between type of drug and use ($b = 8.04$, $p = .07$) with a main effect of both drug type ($b = 18.17$, $p < .001$) and use ($b = 19.83$, $p < .001$). Although peer influence wasn't shown to have a significantly greater impact on either e-cigarette or alcohol use, it's clear that the use of both substances is influenced by social factors.

Table 2 shows the percent distributions of the source where participants got their first e-cigarette or alcoholic beverage. Table 3 shows this same percentage distribution but splits the sample between younger and older age groups. In the full sample, a chi-squared test showed a significant difference in the source of e-cigarettes and alcohol ($X^2 = 34.32$, $p < .001$). According to post-hoc comparison, the main source each differed in was purchasing the product at a store. For e-cigarettes, 19.7% of users bought their first e-cigarette at a store compared to only 4.2% of respondents for alcohol ($p < .001$). Among total survey responses, the most common source of the first e-cigarette or alcoholic beverage was friends (50.2% and 52.5% respectively). However, there was no difference in the percentage of participants who first acquired alcohol and e-cigarettes from friends ($p > .10$). The next most common e-cigarette sources included a store (19.7%) and a family member or relative (18.8%). For alcohol, the next most common sources included a family member or relative (28.2%) and a neighbor (7.0%).

Because many existing studies focused on substance use in teenagers under the age of 18, this study aimed to study the differences in the initiation of e-cigarette and alcohol use in relation to a wider range of ages, focusing specifically on those under and over 30 years old. In our study, among participants under 30 years old, there were no significant differences in the initial source of e-cigarettes and alcohol ($X^2 = 5.43$, $p = .37$). However, it is worth noting that friends were more likely to be the source for their first e-cigarette product than alcohol (77.0% for e-cigarettes vs. 61.7% for alcohol) and the non-significant effect could be the result of the relatively low sample size (Alcohol: N = 48; e-cigarettes: N = 47). Among respondents 30 and older, there was a significant difference in initial source ($X^2 = 34.79$, $p < .001$). Those who drank were more likely to identify friends as the source of their first drink as compared to those who used e-cigarettes (50.5% of those who drank vs. 42.4% of those who used e-cigarettes) though the difference was not significant according to post-hoc tests ($p > .10$). The main significant difference for older participants was those who used e-cigarettes were more likely to get their first e-cigarette from a store (23.7%) compared to those who drank (4.3%; $p < .001$). Especially among older adults, alcohol appeared to be more linked to socialization as compared to e-cigarettes. To test this, a hierarchical logistic regression model was used to predict a friend as the source of first drug use. We used a binary variable for whether "A friend" was the source of initial drug use as the dependent variable and drug type, age (as a continuous variable), and their interaction as independent variable while allowing slopes to vary by participant. There was a significant interaction between age and drug type ($b = 0.01$, $p < .001$). This showed that the effect of drug type on whether or not the initial source of the drug was a friend differed by how old the participant was.

Originally, it was predicted that socialization would be more linked with starting e-cigarettes rather than alcohol. An overall distinction was not found between the two groups in terms of their initial source being from a friend. However, there is an age

Table 1 Average Percentage of Peers Believed to Use E-Cigarettes and Alcohol, Based on Substance Use

	Alcohol			E-Cigarettes		
	N	M	SD	*N*	M	SD
User	259	68.3%	16.6	213	47.1%	25.7
Non-User	37	48.2%	27.7	84	29.5%	22.0

group difference in how social the initiation of each substance is. It is evident that both e-cigarettes and alcohol have a much stronger influence from friends in younger adults as compared to older adults.

Table 4 shows the percent distributions of the location where participants were the first time they used an e-cigarette or drank an alcoholic beverage. Similar to Table 3, Table 5 shows this same distribution split between younger and older age groups. There were significant differences in where participants were when they first used e-cigarettes vs. alcoholic beverages (X^2 = 30.57, $p < .001$). According to post-hoc comparisons, the one location with a significant difference was "By myself" where 34.3% of e-cigarette users reported they were during their initial experience compared to 14.7% of alcohol users ($p < .001$). Interestingly, this goes against our original predictions and the findings of the study by Groom and colleagues (2021) which show vaping to be a social experience. However, in our study, the most frequent response for either group was "hanging out with friends" (35.2% for e-cigarettes and 40.5% for alcohol). Overall, alcohol was first used in more social settings (with friends or at parties) as compared to vaping (61.7% of those who drank vs. 50.2% of those who used e-cigarettes). Furthermore, it was more likely for a participant to drink for the first time with family than for a participant to use an e-cigarette for the first time with family (22.4% vs. 13.2%) though the difference was not significant ($p > .10$).

For the location of initial use, there were significant differences between the two substances among participants under 30 (X^2 = 11.04, p = .02). Similar to the overall sample, among participants under 30, it was also more likely for a first drink to occur with family as opposed to a first vape (23.4% of those who drank vs. 4.2% of those who used e-cigarettes). In the under-30 sample, this difference showed a trend towards significance according to post-hoc tests (p = .06). As opposed to the overall results, however, a larger percentage of e-cigarette users under 30 first vaped in a social setting as compared to those under 30 who drank (70.8% vs. 61.7% respectively). However, the difference was not significant ($p > .10$). In the 30 and older sample there were also differences in location of initial use (X^2 = 30.95, $p < .001$). A participant of at least 30 years of age was also more likely to be alone when using an e-cigarette for the first time as opposed to a participant ($\geq$30) who drinks for the first time (38.7% vs. 16.6% respectively, $p < .001$). No other location showed a significant difference.

Again, among participants 30 and over, drinking was much more likely to have a greater connection to social settings as compared to vaping (61.8% of those who drank vs. 44.3% of those who used e-cigarettes). Similar to the source, this was tested using a hierarchical logistic regression model. In this model, for the dependent variable we created a binary variable labeled 1 if participants reported "Hanging out with friends"' or "At parties" as the location of their initial use and age and drug type as independent variables while allowing slopes to vary by participants. There was a significant interaction between age and drug type (b = 0.01, p = .001). This showed that for participants of different age groups, the social setting has a different effect depending on the type of drug.

Discussion

The goal of this study was to gain a better understanding of what motivates people of different age groups to begin using e-cigarettes and alcohol. This study investigated where participants obtained their first substance and where they first used it, specifically focusing on whether differences in substances and differences in age would impact the social setting of the substance initiation. It was found that the influence of friends is prominent across all age groups and for both substances. Comparatively, e-cigarettes were found to be more associated with sociability as opposed to alcohol among younger adults while alcohol was found to be more social among older adults as opposed to e-cigarettes. Our initial hypothesis was vaping would be more social than alcohol. We did not find support for this across all age groups, but instead we found that age also plays a role in the influence of friends on the initiation of a substance, not just the substance itself.

These findings are supported by the existing literature on theories regarding drug use, but at a deeper level through the implications about differences in age regarding social influences on substance use. In accordance with peer cluster theory, this study finds social events to be a major setting for initiation of both alcohol and drug use, which was expected because these peer clusters create social events within which the use of substances is spread. This theory, however, does not specify differences between age and substance found in this study, which opens the door to new potential observations that can be made regarding how peer clusters may differ across different age groups. Our results suggest this theory may have greater weight

Table 2 Sources of First E-Cigarette and Alcoholic Beverage

	E-Cig		Alcohol	
	N	Perc. 95% CI	N	*Perc.95%CI*
A friend	213	50.2% (43.5% - 56.9%)	259	52.5% (46.4% – 58.6%)
A family member or relative		18.8% (13.6% - 24.0%)		28.2% (22.7% – 33.7%)
A neighbor		7.5% (4.0% - 11.0%)		7.0% (3.9% – 10.1%)
Someone else, but not a friend or relative		3.3% (0.9% - 5.7%)		5.4% (2.6% – 8.2%)
I bought it at a store		19.7% (14.4% - 25.0%)		4.2% (1.8% – 6.6%)
Other		0.0% (0.0% - 0.0%)		1.2% (0.0% – 2.5%)
I don't remember		0.5% (0.0% - 1.4%)		1.5% (0.0% – 3.0%)

in explaining drug use among younger adults but is not as good of an explanation for why older adults may begin using a new drug. Existing papers on the theory of planned behavior also indicate that it supports the heavy influence of social settings on substance use[27]. This study found similar results in that vaping was subject to greater peer influence among younger adults.

Overall, social settings (being with friends and at parties) were the most common setting for the first usage of each substance. However, this sociability varies across substances and age groups. A younger adult is more disposed to start using e-cigarettes in social settings as compared to older adults, who are more likely to start drinking in a more social setting. A possible explanation for this outcome may be the growth of relatively high perceived peer approval of e-cigarette use among youth[28]. These results may also be impacted by generational differences. Since older adults did not grow up with the existence of e-cigarettes, they may find alcohol to be a more familiar mode of socialization because that was what they were exposed to in social settings when they were younger. In contrast, young adults, who generally mingle with their peers much more and who are more accustomed to the use of e-cigarettes in people around them. Older adults also tend to start using e-cigarettes whilst on their own much more than younger adults, which may be attributed to the attempts of older adults at quitting nicotine addiction using e-cigarettes. While smoking cessation is reported to be common among all age groups, older adults are more likely to be motivated by this intent than younger adults who may not yet have a commitment to quitting[29]. It may be beneficial for more research to be done on theories regarding this difference between the impact of social settings between age and substance use.

The results also show a pattern of the impact of peer influence on one's decision to use e-cigarettes and alcohol. Over both substances, it is clear that if a participant either used e-cigarettes or drank alcohol, they would be much more likely to believe that more people around them were also using the substance. These significant differences suggest that peer opinion and approval may be an important factor in the use of both e-cigarettes and alcohol. When using a substance, it is likely important to the user that they fit in with their peers, so they begin to believe that those around them do indeed use the substance with them. On the other hand, the assumption that a larger number of their peers use either e-cigarettes or alcohol may also be a motivator to begin using e-cigarettes or drinking themselves. While it was predicted that vaping would have more of a peer influence, these findings show that the initiation of the use of both substances is heavily impacted by a belief of peer use. These findings precisely parallel the observations of the theory of reasoned action, giving further support for the concept of the necessity of peer approval in the initiation of substance use.

Through an analysis of where participants first used both e-cigarettes and alcohol as well as of how peer influence impacts their decision to start vaping or drinking, it's clear that when it comes to the use of e-cigarettes and alcohol, people are greatly affected by those around them, especially during their youth. Although older adults were still influenced by their friends and peers to start using e-cigarettes, this effect was stronger for drinking compared to vaping. It's possible that drinking was more social among this group of participants during their youth. Furthermore, because they were not exposed to e-cigarettes when they were young and experimenting with new items of interest, fewer older adults may turn to vaping as a way to socialize. This might play a role in how the initiation of the use of e-cigarettes is much less social than the initiation of alcohol

Table 3 Sources of First E-Cigarette and Alcoholic Beverage by Age

	Under 30		30 and Over	
	$E-Cig$	Alcohol	E-Cig	$Alcohol$
N	48	47	165	212
A friend	77.0%	61.7%	42.4%	50.5%
	(65.1% – 88.9%)	(47.8% - 75.6%)	(34.9% - 49.9%)	(43.8% – 57.2%)
A family member or relative	8.3%	23.4%	21.8%	29.2%
	(0.5% – 16.1%)	(11.3% - 35.5%)	(15.5% - 28.1%)	(23.1% – 35.3%)
A neighbor	6.3%	6.4%	7.9%	7.1%
	(0.0% – 13.2%)	(0.0% - 13.4%)	(3.8% - 12.0%)	(3.6% – 10.6%)
Someone else, but not a friend or relative	2.1%	2.1%	3.6%	6.1%
	(0.0% – 6.2%)	(0.0% - 6.2%)	(0.8% - 6.4%)	(2.9% – 9.3%)
I bought it at a store	6.3%	4.3%	23.7%	4.3%
	(0.0% – 13.2%)	(0.0% - 10.1%)	(17.2% - 30.2%)	(1.6% – 7.0%)
Other	0.0%	0.0%	0.0%	1.4%
	(0.0% – 0.0%)	(0.0% - 0.0%)	(0.0% - 0.0%)	(0.0% – 3.0%)
I don't remember	0.0%	2.1%	0.6%	1.4%
	(0.0% – 0.0%)	(0.0% - 6.2%)	(0.0% - 1.8%)	(0.0% – 3.0%)

Table 4 Location of First E-Cigarette and Alcoholic Beverage Use

	E-Cig		Alcohol	
	N	Perc. 95% CI	N	$Perc.95\%CI$
Hanging out with friends	213	35.2% (28.8% - 41.6%)	259	40.5%(34.5% – 46.5%)
At parties	213	15.0% (10.2% - 19.8%)	259	21.2%(16.2% – 26.2%)
By myself	213	34.3% (27.9% - 40.7%)	259	14.7%(10.4% – 19.0%)
With my family	213	13.2% (8.7% - 17.7%)	259	22.4%(17.3% – 27.5%)
School	213	1.4% (0.0% - 3.0%)	259	0.0%(0.0% – 0.0%)
Other	213	0.0% (0.0% - 0.0%)	259	0.8%(0.0% – 1.9%)
I don't remember	213	0.9% (0.0% - 2.2%)	259	0.4%(0.0% – 1.2%)

among the sample of older adults. On the other hand, since e-cigarettes are recent and a new rising trend among younger generations and drinking has already been established as a mode of socialization, young adults tend to start using both e-cigarettes and alcohol in social settings. More research should be done on this topic and investigate how adults of different age groups view use of each of these drugs as a social activity or not.

Something to keep in mind for future research is the size of the young adult sample. Finding a larger number of younger participants likely would have produced more comprehensive data. However, although the study that this paper followed1 included a little over 1,500 participants, our sample size of 300 still yielded some interesting results. Another thing to consider about this study is the recent development of the e-cigarette, which has an impact since most of the participants were not aware of e-cigarettes growing up. Unlike youth today who mostly recognize the existence of e-cigarettes as teenagers, many of the adults in this study come in contact with vaping at different points in their lives, mostly after the age of 18. Because the previous study focused on these youth, there is a significant difference between adult and teenage experiences with e-cigarettes. However, this adult sample is also advantageous because it provides a new lens of comparison in solely a sample of those over 18. This adds to prior research about substance use in that it compares age differences in adults alongside not only one but two different substances to paint a clearer picture of how younger adults and older adults differ in their use of e-cigarettes and alcohol.

Finding the root causes of substance use is meaningful because it creates a basis upon which risky behaviors pertaining to substance use can be prevented. Today, in particular, as e-cigarettes and alcohol are growing in popularity, finding ways to minimize the number of young adults or children who are exposed to these substances is valuable as peer pressure is known to have an overwhelming impact on younger people especially. Future research can expand on these findings by investigating connections between socialization and the initiation of other substances that are of concern in today's world of health as well as between motivations for the initiation of substance use and current use. Furthermore, additional studies can also compare a wider range of age groups by focusing on the motivations for the initiation of solely e-cigarettes of those who grew up with the existence of e-cigarettes as well as those who did not. There is a

Table 5 Location of First E-Cigarette and Alcoholic Beverage Use by Age

	Under 30		30 and Over	
	E − Cig	Alcohol	E-Cig	*Alcohol*
N	48	47	165	212
	Perc.95%CI	Perc.95% CI	Perc.95% CI	*Perc.95%CI*
Hanging out with friends	58.3%	42.6%	28.5%	40.1%
	(44.4% − 72.2%)	(28.5% - 56.7%)	(21.6% - 35.4%)	(33.5% − 46.7%)
At parties	12.5%	19.1%	15.8%	21.7%
	(3.1% − 21.9%)	(7.9% - 30.3%)	(10.2% - 21.4%)	(16.2% − 27.2%)
By myself	18.7%	14.9%	38.7%	14.6%
	(7.7% − 29.7%)	(4.7% - 25.1%)	(31.3% - 46.1%)	(9.8% − 19.4%)
With my family	4.2%	23.4%	15.8%	22.2%
	(0.0% − 9.9%)	(11.3% - 35.5%)	(10.2% - 21.4%)	(16.6% − 27.8%)
School	6.3%	0.0%	0.0%	0.0%
	(0.0% − 13.2%)	(0.0% - 0.0%)	(0.0% - 0.0%)	(0.0% − 0.0%)
Other	0.0%	0.0%	0.0%	0.9%
	(0.0% − 0.0%)	(0.0% - 0.0%)	(0.0% - 0.0%)	(0.0% − 2.2%)
I don't remember	0.0%	0.0%	1.2%	0.5%
	(0.0% − 0.0%)	(0.0% - 0.0%)	(0.0% - 2.9%)	(0.0% − 1.4%)

wide range of variability between substances and ages that cause the initiation of e-cigarettes and alcohol to be very different, namely the recent development of the e-cigarette. To illustrate the full picture of why people use e-cigarettes, future research can focus on the differences between why young and older people vape to gain a better understanding of how different factors play into e-cigarette use in particular through the generations.

Acknowledgements

I'm grateful for the guidance of David Falco over the course of this project in data collection and analysis.

References

1 D. K. Flavin and R. M. Morse, *Alcohol Research and Health*, 1991, **15**, 266.

2 D. L. Palazzolo, *Frontiers in public health*, 2013, **1**, 56.

3 Associated Press, *Juul warned over claims e-cigarette safer than smoking*, `https://www.nbcnews.com/health/health-news/juul-warned-over-claims-e-cigarette-safer-smoking-n1051481`, 2019.

4 A. F. Harlow, R. S. McConnell and J. L. Barrington-Trimis, *Journal of Adolescent Health*, 2023, **72**, 260–266.

5 G. E. Vaillant, *The natural history of alcoholism revisited*, Harvard University Press, 2009.

6 A. P. L. Berre, R. Fama and E. V. Sullivan, *Alcoholism: Clinical and Experimental Research*, 2017, **41**, 1432–1443.

7 R. M. P. Mohamed, J. Kumar, S. U. Ahmad and I. N. Mohamed, *Current drug targets*, 2018, **19**, 1378–1390.

8 T. D. Becker and T. R. Rice, *European Journal of Pediatrics*, 2022, 1–10.

9 R. Miech, L. Johnston, P. M. O'Malley, J. G. Bachman and M. E. Patrick, *New England Journal of Medicine*, 2019, **380**, 192–193.

10 J. L. Barrington-Trimis, K. Berhane, J. B. Unger, T. B. Cruz, J. Huh, A. M. Leventhal and R. McConnell, *Pediatrics*, 2015, **136**, 308–317.

11 E. Park, M. Kwon, M. R. Gaughan, J. A. Livingston and Y. P. Chang, *Journal of pediatric nursing*, 2019, **48**, 82–91.

12 S. A. Ryan, P. Kokotailo, D. R. Camenga, S. W. Patrick, J. Plumb, J. Quigley and L. Walker-Harding, *Pediatrics*, 2019, **144**, year.

13 H. Wechsler, J. E. Lee, M. Kuo, M. Seibring, T. F. Nelson and H. Lee, *Journal of American college health*, 2002, **50**, 203–217.

14 M. Sudhinaraset, C. Wigglesworth and D. T. Takeuchi, *Alcohol research: current reviews*, 2016, **38**, 35.

15 D. W. Goodwin, *Annals of Behavioral Medicine*, 1986, **8**, 3–6.

16 A. P. Tackett, W. V. Lechner, E. Meier, D. M. Grant, L. M. Driskill, N. N. Tahirkheli and T. L. Wagener, *Addiction*, 2015, **110**, 868–874.

17 A. L. Groom, T. H. T. Vu, R. L. Landry, A. Kesh, J. L. Hart, K. L. Walker and T. J. Payne, *International journal of environmental research and public health*, 2021, **18**, 6784.

18 D. B. Kandel, *Advances in Alcohol & Substance Abuse*, 1985, **4**, 139–162.

19 C. R. Thorne and R. R. DeBlassie, *Adolescence*, 1985, **20**, 335.

20 E. L. Less, M. Mady, K. J. Beckman and J. H. Kingsbury, *Health Promotion Practice*, 2022, **23**, 1028–1038.

21 A. C. Villanti, S. E. LePine, J. C. West, T. B. Cruz, E. M. Stevens, H. J. Tetreault and D. Mays, *Addictive behaviors*, 2021, **115**, 106778.

22 N. McKeganey and M. Barnard, *International journal of environmental research and public health*, 2018, **15**, 1008.

23 J. Studer, S. Baggio, S. Deline, A. A. N'Goran, Y. Henchoz, M. Mohler-Kuo and G. Gmel, *International journal of drug Policy*, 2014, **25**, 700–708.

24 E. R. Oetting and F. Beauvais, *Journal of Counseling Psychology*, 1987, **34**, 205–213.

25 J. Petraitis, B. R. Flay and T. Q. Miller, *Psychological Bulletin*, 1995, **117**, 67–86.

26 US Department of Health and Human Services, *E-cigarette use among youth and young adults: A report of the Surgeon General*, 2016.

27 Q. Yang, *Health Communication*, 2023, **39**, 641–651.

28 K. East, A. McNeill, J. F. Thrasher and S. C. Hitchman, *Addiction*, 2021, **116**, 2953–2967.

29 M. Cooper, M. B. Harrell and C. L. Perry, *Health education research*, 2016, **31**, 429–438.

APPENDIX 1

Survey Questions

- **Question 1:** Have you ever tried electronic nicotine products (even one to two times)?
  - If Yes:
    1. How frequently have you used electronic nicotine products in the last year?
    2. How old were you when you first used electronic nicotine products?
    3. Where did you get your first electronic nicotine product?
    4. Where were you when you first used electronic nicotine products?
    5. On a scale of 0-100 how positive/negative of an effect do you think electronic nicotine products have had on your life?
- **Question 2:** Have you ever tried an alcoholic beverage (even one to two times)?
  - If Yes:
    1. How frequently have you used alcoholic beverages in the last year?
    2. How old were you when you first had an alcoholic beverage?
    3. Where did you get your first alcoholic beverage?
    4. Where were you when you first had an alcoholic beverage?
    5. On a scale of 0-100 how positive/negative of an effect do you think alcohol has had on your life?
- **Question 3:** What percentage of people in your age group do you believe use alcohol regularly (at least once a month)?
- **Question 4:** What percentage of people in your age group do you believe use electronic nicotine products regularly (at least once a month)?