

April 2021

## College Students' Use of Social Media and E-Cigarettes: How Correctly Identifying Platform Type Influences Findings

Christopher M. Dunlap II

*University of Oklahoma*, [cmdunlap@ou.edu](mailto:cmdunlap@ou.edu)

Yu Lu

*University of Oklahoma*, [yu.lu@ou.edu](mailto:yu.lu@ou.edu)

Page D. Dobbs

*University of Arkansas*, [pdobbs@uark.edu](mailto:pdobbs@uark.edu)

*See next page for additional authors*

Follow this and additional works at: <https://newprairiepress.org/hbr>



Part of the [Public Health Education and Promotion Commons](#)



This work is licensed under a [Creative Commons Attribution-Noncommercial 4.0 License](#)

### Recommended Citation

Dunlap, Christopher M. II; Lu, Yu; Dobbs, Page D.; Khanal, Nisha; Oehlers, Julia S.; and Cheney, Marshall K. (2021) "College Students' Use of Social Media and E-Cigarettes: How Correctly Identifying Platform Type Influences Findings," *Health Behavior Research*: Vol. 4: No. 2. <https://doi.org/10.4148/2572-1836.1090>

This Research Article is brought to you for free and open access by New Prairie Press. It has been accepted for inclusion in Health Behavior Research by an authorized administrator of New Prairie Press. For more information, please contact [cads@k-state.edu](mailto:cads@k-state.edu).

---

## College Students' Use of Social Media and E-Cigarettes: How Correctly Identifying Platform Type Influences Findings

### Abstract

The purpose of this study was to examine how college students post or share JUUL-related content on social media. Using a sequential explanatory mixed-methods design, current JUUL users ( $n = 667$ ) completed a cross-sectional survey in March of 2019, then 51 participants completed in-person follow-up interviews in April of 2019. Survey questions asked about JUUL-related social media postings and commenting history as well as demographic questions. Interview participants were asked to explain their survey responses and were then shown the survey results and asked for reasons why they and others did not post or comment about JUUL on social media. Qualitative data were coded independently by two coders using NVivo, and analyzed for themes. Survey participant (ages 18-24, mean age 20 years, 50.5% female, and 80.6% white) responses showed 81% had not posted a JUUL-focused comment on social media and had not posted a picture of themselves JUULing in the past year. However, interviewees reported they had continued to post about JUUL on social media but moved away from more public social media accounts (e.g., Facebook); private Instagram and Snapchat accounts were used to post both JUUL use and JUUL-focused content without risk of damaging their personal image to family or potential employers. How social media use questions are asked is critical for understanding college student promotion of JUULing and social norms. Young adults protect their social media presence by not including themselves in JUUL-focused content; thus, the spread of JUULing through private social media like Snapchat or Finstas may not be identified and young adults normalize JUUL use through memes or images.

### Keywords

JUUL, social media, college students, e-cigarette, young adult

### Acknowledgements/Disclaimers/Disclosures

This study was funded by the Stephenson Cancer Center at the University of Oklahoma Health Sciences Center. The authors have no known conflict of interest to disclose, financial or otherwise.

### Authors

Christopher M. Dunlap II, Yu Lu, Page D. Dobbs, Nisha Khanal, Julia S. Oehlers, and Marshall K. Cheney

## **College Students' Use of Social Media and E-Cigarettes: How Correctly Identifying Platform Type Influences Findings**

**Christopher M. Dunlap, MS\***

**Yu Lu, PhD**

**Page D. Dobbs, PhD**

**Nisha Khanal, MS**

**Julia Oehlers**

**Marshall K. Cheney, PhD**

### **Abstract**

The purpose of this study was to examine how college students post or share JUUL-related content on social media. Using a sequential explanatory mixed-methods design, current JUUL users ( $n = 667$ ) completed a cross-sectional survey in March of 2019, then 51 participants completed in-person follow-up interviews in April of 2019. Survey questions asked about JUUL-related social media postings and commenting history as well as demographic questions. Interview participants were asked to explain their survey responses and were then shown the survey results and asked for reasons why they and others did not post or comment about JUUL on social media. Qualitative data were coded independently by two coders using NVivo, and analyzed for themes. Survey participant (ages 18-24, mean age 20 years, 50.5% female, and 80.6% white) responses showed 81% had not posted a JUUL-focused comment on social media and had not posted a picture of themselves JUULing in the past year. However, interviewees reported they had continued to post about JUUL on social media but moved away from more public social media accounts (e.g., Facebook); private Instagram and Snapchat accounts were used to post both JUUL use and JUUL-focused content without risk of damaging their personal image to family or potential employers. How social media use questions are asked is critical for understanding college student promotion of JUULing and social norms. Young adults protect their social media presence by not including themselves in JUUL-focused content; thus, the spread of JUULing through private social media like Snapchat or Finstas may not be identified and young adults normalize JUUL use through memes or images.

\*Correspondence author can be reached at: [cmdunlap@ou.edu](mailto:cmdunlap@ou.edu)

Although rates of youth and young adult tobacco-use recently reached historic lows, electronic cigarette (e-cigarette) use has exponentially risen in the past several years, with the 2019 National Youth Tobacco Survey reporting 5 million youth having used e-cigarettes in the past 30 days (Food and Drug Administration, 2019; Schaeffer, 2019). Despite e-cigarettes (e.g., JUUL) being positioned as a safer alternative to traditional tobacco products by the tobacco industry, long-term health risks of e-cigarette

use are uncertain and acute effects include potentially negative changes in airway physiology in never-smokers and harm to adolescent brain development (Food and Drug Administration, 2019; Palamidas et al., 2017; U.S. Department of Health and Human Services & Disease Prevention and Health Promotion, 2016). Moreover, research has raised caution over JUUL's potential to cause nicotine dependence among young users and increase risk of transitioning to traditional

tobacco products (Dobbs et al., 2020; Soneji et al., 2018).

JUUL currently leads the e-cigarette market with a 66.7% dollar share percentage in 2019 (Wu, 2019). JUUL's success is often attributed to younger generations' high uptake (Huang et al., 2019). While JUUL's early success in this age group started initially by grassroots advertising using social media, some of its continuing success has been maintained by users generating new content such as discussing daily-use patterns and incorporation into pop culture (Kavuluru et al., 2019). Most research to date has focused on analysis of user-generated posts to social media sites such as Reddit, Twitter, and Instagram to examine the online interaction of JUUL users and their uploaded content, such as comments about the product or reasons why they use it (Allem et al., 2018; Brett et al., 2019; Czaplicki et al., 2020). However, as JUUL use has increased among young adults, online discussion among peers has become more commonplace (Czaplicki et al., 2020). The objective of the present study was to examine college students' thoughts on both their use of JUUL and JUUL-focused content on social media, and to identify factors that influence their use of these platforms, using both surveys and interview responses.

## Methods

### Study Design

This analysis was part of an explanatory, sequential mixed methods design that used a cross-sectional survey with college student JUUL users (March, 2019) followed by individual interviews with a sample of respondents (April, 2019) to help researchers better understand survey findings.

**Cross-sectional survey.** Undergraduates from a large, southwestern public university were eligible to participate in the survey if

they were between 18 and 24 years old, owned a JUUL, and used their JUUL at least one day per week. A mass email containing a Qualtrics link was sent to 20,436 undergraduates in March of 2019. Overall, 3,048 (14.9%) students responded, and 702 eligible participants met the initial screening criteria; 35 incomplete survey responses were removed, resulting in 667 final participants. Participants received a \$5.00 electronic gift card for their participation in the study. All procedures were approved by the campus Institutional Review Board where data were collected.

The survey asked participants to respond to items about their basic demographics (age, gender, race/ethnicity, number of days per week they used JUUL, number of five closest friends who used JUUL, hours spent on social media each day, and use of social media platforms to post about JUUL). Additionally, students were asked about their involvement in a Greek organization (29% of undergraduate students on the campus where data were collected were involved in Greek life). Three survey questions were developed via a formative research process to assess how college students communicate about JUUL through social media: *“Have you ever posted a comment about JUULing on social media in the past year?”*; *“Have you ever posted a picture of yourself JUULing on social media in the past year?”*; and *“How much time (in hours) do you usually spend on social media each day?”* (Cheney et al., 2020)

**Follow-up individual interviews.** Following the survey, and in order to provide a diverse range of responses, every third participant and every ethnic minority (those who self-identified as African American, American Indian, Asian, or Hispanic) were contacted by email asking if they would be willing to participate in an in-person follow up interview. Of the 374 survey participants who were invited, 51 (13.6%) completed an

interview 1-2 weeks after the survey, with the average interview lasting 45 minutes. Interviews were conducted in private meeting rooms in the University library by three trained interviewers (MKC, PD, CD). Participants received a \$15.00 electronic gift card for their participation. Interviewees were asked about their response to the social media questions and to explain their response (*"Tell me about how you answered this question."*). Interviewees were then shown the results (frequencies) of the social media questions from the survey and asked to help the researchers understand the pattern of results (*"Here are the results from the survey. Help us understand why people responded this way."*).

### Data Analysis

SPSS statistical software v.24 was used to analyze the quantitative data. Frequencies were reported for all included variables. Two logistic regression models were used to explore associations between social media use (i.e., posting a comment about JUUL in the past year, and posting a picture of yourself JUULing in the past year) and predictor variables (i.e., JUUL use, age, gender, race/ethnicity, Greek status, hours spent on social media each day). Adjusted odds ratios (AOR), along with 95% confidence intervals (95% CIs) were reported.

The audio-recorded interviews were transcribed and then checked for accuracy and question consistency between interviewers by audio playback comparison. Interviews were coded using NVivo, v.11. Following a reading of the transcripts, the team developed the initial codebook in order to identify any discussion within the interviews regarding social media platforms in relation to participants' JUUL use; searching for terms such as "Facebook," "Snapchat," etc. or "post," "share," etc. Two

coders (CD, NK) coded four interviews together to establish consistency, revised the codebook, then coded the remainder of the transcripts independently (inter-coder reliability = 98.65). The coders then resolved differences in coding. Participant responses were also categorized by type of social media. Team members independently identified themes then met to discuss and determine overall themes and integrated quantitative data with the qualitative findings.

## Results

### Participant Characteristics

Survey participants ( $n = 667$ , ages 18-24,  $M = 20$  years) were 50.5% female and 80.6% white (see Table 1). In addition, 48.6% of participants used JUUL seven days per week, and 48.6% were members of a university Greek social sorority (22.2%) or fraternity (25.6%). The survey and interview participants were similarly distributed on gender, sexual orientation, and race/ethnicity as seen on Table 1.

### Survey Responses

Survey responses indicated 48.2% of participants used social media between two and four hours per day. However, 81% of participants had not posted a JUUL-related comment on social media and had not posted a picture of themselves JUULing in the past year. Participant history of commenting about JUUL on social media in the past year was associated with the days per week they used JUUL [adjusted odds ratio (AOR) = 1.175, 95% confidence interval (CI) = 1.055-1.309], identifying as female (AOR = 3.143, 95% CI = 1.676-5.896), and the number of five closest friends who used JUUL (AOR = 1.349, 95% CI = 1.135-1.603). Participant history of posting a picture of themselves

Table 1

*Participant Characteristics*

|   | Survey ( <i>n</i> = 667)<br>N (%) | Interviews ( <i>n</i> = 51)<br>N (%) |
|---|-----------------------------------|--------------------------------------|
| Age (M, SD)   | 20.3 (1.389)                      | 20.4 (1.567)                         |
| Gender  |                                   |                                      |
| Female  | 336 (50.4)                        | 24 (47.0)                            |
| Male  | 320 (48.0)                        | 26 (51.0)                            |
| Gender Variant/Non-conforming   | * 10 (1.5)                        | 1 (2.0)                              |
| Greek-Membership  |                                   |                                      |
| Sorority  | 148 (22.2)                        | 12 (23.5)                            |
| Fraternity  | 171 (25.6)                        | 14 (27.5)                            |
| Non-member  | 348 (52.2)                        | 25 (49.0)                            |
| Race/Ethnicity  |                                   |                                      |
| Hispanic  | 69 (10.3)                         | 4 (7.8)                              |
| Non-Hispanic Black  | 17 (2.5)                          | 1 (2.0)                              |
| Asian   | 62 (9.3)                          | 8 (15.7)                             |
| American Indian   | 20 (3.0)                          | 2 (3.9)                              |
| White   | 490 (73.5)                        | 33 (64.7)                            |
| Other---Mixed Race  | 6 (.9)                            | 3 (5.9)                              |
| Number of JUUL pods used in a typical week                                  |                                   |                                      |
| 1   | 154 (23.1)                        | 17 (33.3)                            |
| 2   | 120 (18.0)                        | 5 (9.8)                              |
| 3   | 119 (17.8)                        | 12 (23.5)                            |
| 4   | 130 (19.5)                        | 6 (11.8)                             |
| 5 or more   | 139 (20.7)                        | 11 (21.6)                            |
| Time spent on social media daily  |                                   |                                      |
| < 2 hours   | 108 (16.2)                        | -                                    |
| 2 ≤ 4 hours   | 323 (48.2)                        | -                                    |
| 4 ≤ 6 hours   | 153 (22.9)                        | -                                    |
| 6 ≤ 8 hours   | 51 (7.6)                          | -                                    |
| 8 or more hours   | 26 (3.9)                          | -                                    |
| How many of their 5 closest friends use a JUUL                              |                                   |                                      |
| 0   | 4 (0.6)                           | -                                    |
| 1   | 53 (7.9)                          | -                                    |
| 2   | 129 (19.3)                        | -                                    |
| 3   | 176 (26.4)                        | -                                    |
| 4   | 130 (19.5)                        | -                                    |
| 5 or more   | 169 (25.3)                        | -                                    |
| JUUL and social media use   |                                   |                                      |
| Had posted a comment about JUULing on social media in the past year         | 123 (18.4)                        | -                                    |
| Had posted a picture of themselves JUULing on social media in the past year | 122 (18.3)                        | -                                    |

\* Due to low sample size, 10 participants who identified as gender non-conforming, transgender, and other were removed from the quantitative analyses.

Table 2

*Logistic Regression*

|   | Posted a comment about<br>JUUL in the past year<br>AOR (95% CI) | Posted a picture of yourself<br>JUULing in the past year<br>AOR (95% CI) |
|---|---|--|
| Days/week used JUUL                     | <b>1.175**</b> (1.055, 1.309)                                   | <b>1.181**</b> (1.060, 1.315)  |
| Age                                     | 1.029 (.879, 1.206)   | .870 (.740, 1.024)   |
| Gender (ref: male)                      |   |  |
| Female                                  | <b>3.143***</b> (1.676, 5.896)                                  | <b>2.719**</b> (1.474, 5.016)  |
| Gender Variant/Non-<br>conforming       | 3.135 (.679, 14.479)  | 3.382 (.712, 16.056)   |
| Fraternity (ref: non Greek)             | .608 (.288, 1.285)  | <b>.445*</b> (.207, .954)  |
| Sorority (ref: non Greek)               | .719 (.420, 1.231)  | .601 (.349, 1.036)   |
| Race/Ethnicity (ref: NH<br>White)       |   |  |
| Hispanic                                | 1.259 (.657, 2.414)   | 1.086 (.554, 2.129)  |
| Asian                                   | .444 (.166, 1.186)  | 1.093 (.511, 2.336)  |
| Other ^                                 | .995 (.430, 2.302)  | .394 (.131, 1.185)   |
| Number of 5 closest friends<br>who JUUL | <b>1.349**</b> (1.135, 1.603)                                   | <b>1.468***</b> (1.229, 1.755)   |
| Social media use                        | 1.057 (.959, 1.164)   | 1.096 (.996, 1.206)  |

Note. AOR = adjusted odds ratio, CI = confidence interval, \* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$ .

^Due to small group sample size, participants who self-identified as non-Hispanic black, American Indian, and "other" were combined into one group for analysis.

JUULing on social media in the past year was associated with the days per week they used JUUL (AOR = 1.181, 95% CI = 1.060-1.315), identifying as female (AOR = 2.719, 95% CI = 1.474-5.016), and the number of five closest friends who used JUUL (AOR = 1.468, 95% CI = 1.229-1.755), but was negatively associated with being in a fraternity (AOR = .445, 95% CI = .207-.954) (see Table 2).

When participants were asked for more information about their survey responses during the follow-up interviews, there were noted differences in what students considered a "post" about JUULing. For example, participants who denied posting about JUULing in the survey later said they had posted pictures where they and others in the

picture were holding JUULs. They explained one reason that they did not consider this a post about JUUL was because the focus of the photo was not directly about JUULing but instead the product was just present.

*No one is taking a Snap of their JUUL and posting that. They'll take a Snap with them doing something while JUULing and they don't really consider that posting about JUULing. They post Snaps at the bar where they have their drink and their JUUL. #46*

Other reasons for the divergence in survey responses and later explanations were the type of social media platform and privacy protections used, participant definitions of

“sharing” versus “posting,” and their personal brand cultivation.

### Social Media Platform

Some participants who responded that they had not shared JUUL-related content did not consider some platforms “social media” due to their hidden, temporary, or exclusive nature (Table 3). At least a third of participants told interviewers they had Finstas (“fake” Instagram accounts) and other private accounts with a select group of users where they shared JUUL-related posts. Some of these participants had responded “no” to the question about posting and sharing on social media because they were thinking of their more public accounts in response to the question rather than their hidden social media accounts.

*Nobody’s gonna post it on Facebook where their grandma follows them and you know just like potential employers can see that whereas on Snapchat they’re probably not. I know everything is there forever, but I’m sure future employers in like a couple of years won’t hack into your Snapchat and find a picture of you JUULing or something so, I think yeah that social media platform definitely makes a difference.*  
#38

Participants also said they had posted pictures of themselves JUULing as temporary videos or images on Snapchat yet did not consider this to be directly sharing JUUL-focused content on social media due to the platform’s temporary nature (e.g., content is deleted automatically after 24 hours). When asked to explain further, they considered Snapchat “stories” to be social media because of the more permanent nature and curated social presentation of their activities; however, they did not consider

direct “Snaps” social media because they could only be seen for a short amount of time and were not publicly viewable. JUUL-related “Snaps” were only sent to a closed group of friends, whom they trusted would not make a permanent copy by taking a screenshot of their activity.

*If you post it to your Story I feel like that’s definitely social media. If you’re just sending a Snapchat to someone I wouldn’t 100% consider it social media just because it’s not for the public to view... it disappears after 24 hours, [if] it’s on your story a lot of people can see it. So, I would consider it social media. I send it a lot more on just private media ...I don’t post it on public or I’ll make a joke about it on Twitter but ... I don’t really promote the JUUL. #18*

### Sharing Media (Images, Videos, Memes) is not a Post

A group of interview participants commented that while they did not post about JUUL on social media, they had shared JUUL-related jokes or memes (humorous pictures or videos usually constructed with an insider comment about the behavior) on social media (Table 3). Many did not consider memes as sharing or posting in the survey because they were humorous and not meant to be taken seriously. They might also share the memes by texting rather than posting to social media. In the interviews, some participants who said they would not post or comment about JUUL still found JUUL-focused memes and humor to be acceptable to post or read, even if they would not share that content themselves.

*I: What about posting JUUL memes or anything like funny comments or anything like that?*



*P: That's fine. I think that's hilarious. Like on Twitter, different things about JUULs. There was a thing about, do you have a pod? Someone was like, JUUL or Tide? That went viral. It was a girl in my sorority that Tweeted that and I thought that was funny. I retweeted it. I retweet stuff like that, but it doesn't say I am JUULing currently right now. #34*

### Personal Brand

The importance of selecting what was posted on social media was described as a participant's "personal brand," or how they curated their online presence to others (Table 3). When asked why college students are not posting about their JUULing on their media, interview participants said they did not want people outside of their friend group (in particular family members) to know that they were engaging in an unhealthy behavior. They also did not want to promote an addictive behavior to others or to encourage others, particularly younger siblings, to start using JUUL.

*I think social media now is so used to brand yourself that people don't want their JUUL to be part of their brand and people don't want to be associated with their JUUL usage. So, I can kind of understand why they don't brag about it or post about it on social media. #36*

Most students felt that posting about JUULing would not be consistent with their current or aspirational 'personal brand' that they were promoting via social media platforms. Almost all (41/51) interview participants stated they had never posted JUUL-related pictures or comments featuring themselves JUULing on their more public social media platform because it could harm

their image to family or potential employers. They explained that JUUL-related posts would indicate that they engaged in unhealthy and addictive behaviors which could make family and future employers question their judgement. They also reported that potential employers were likely to search the Internet for information about them. In addition, members of social fraternities or sororities said their organizations specifically restricted postings on social media and closely monitored their public social media accounts as behaviors such as drinking, smoking, and JUULing could reflect negatively on the organization.

*I think a lot of people are focused on maintaining an aspect of professionalism in their social media, especially nowadays where colleges and recruiters are all looking at your social media for what you do and what you're up to. I think that a lot of people do think that JUULing and any form of drug use, probably excluding caffeine, is unprofessional and I wouldn't be surprised to see that people are ashamed to have that in photos that they are recognizable. #5*

Many JUULers dealt with these potential issues by creating closed group chats or Finstas where they could share these types of media, such as photos showing them JUULing or memes, to a small group of trusted friends without having to worry about their 'personal brand' being negatively impacted.

Students consistently shared that they were becoming much more cautious of what they posted to a public social media account because they were afraid if these pictures were found in the future, they could negatively impact their career. They related recent events where public figures' careers were impacted by photos taken and posts

Table 3

*Themes with Supporting Interview Quotes*

| <b>Social Media Platform</b>   |
|--|
| I don't know it's like maybe the phrasing of the question cause if you posted a picture that in my mind that makes me feel, think of Instagram like do you you know intentionally okay I'm gonna edit this picture and put it out and then instead of Snapchat you're just kind of like it's almost a text message. -28  |
| The most typical thing I see is like Snapchat I would say. It is definitely the most popular social media for it. It would be people, like, people at a party or it could just be a background thing. Not that they're trying to post that they're doing it but I can still see it. I just saw one this morning. One of my friends is driving from California back to Oklahoma and it's just like she's holding her JUUL in her hand and hitting it but the point of the story was that she was sad she was leaving California. -53  |
| I don't know if many of those people are considering Snapchat stories. It's not that they did that on purpose. I think they're thinking Instagram, Twitter, Facebook where it's permanent. Whereas with Snapchat stories is, a lot of people don't think of Snapchat as much as social media even though it is. They think of it just as a communication device. Almost like texting.... Yeah, it's weird how Snapchat is viewed especially in my generation. I think most people acknowledge its social media but don't view it or use it as one. -2  |
| <b>Sharing Media is not a Post</b>   |
| I've personally tagged people like some of my friends in posts about JUULing or funny posts about JUULing. Like, none of us really JUUL that much but we kind of like to joke about people and the JUULing culture I guess. We like to joke about that, so I'll tag some buddies in a post. I could see myself posting about it but only as a joke. -13  |
| I think [posting] is hilarious. Like on Twitter, different things about JUULs and, I don't know. There was a thing about, like, do you have a pod? Someone was like, JUUL or Tide? That went viral. It was a girl in my sorority that Tweeted that and I thought that was funny. Like, I retweeted it. I retweet stuff like that, but it doesn't say like, I am JUULing currently right now. -34   |
| <b>Personal Brand</b>  |
| I think people my age are terrified of what they put on social media. I think the more and more we see politicians, stars, movie stars, music stars, the more we see the things they posted when they were fourteen years old get dragged back, I think at least in my opinion, everything I post on social media I read three or four times. I look at the picture a lot before I choose it. So, I think that the JUUL is looked down upon by a lot of probably future employers and stuff like that... I think that people my age are very conscious of what's going online connected with our names. -1 |
| I guess I don't know but I feel like it would because I think people that were in Greek are much more likely to not post a picture because they know the Chapter is going to punish them whereas, if you're not in a House and you post that it's just going to make you look like an addict. It only negatively reflects on you and if you're comfortable with that part of yourself, I don't see why you wouldn't post it but, yeah, Greek students, at least females. I don't know about the frats. I don't know what rules they have but at least for the sororities, you don't post about it. -48     |

## Discussion

This study provides a unique perspective on how young adults view the role of social media in sharing content about JUULing. It also highlights the importance of how young adults are asked about social media use, as general questions may not represent more hidden sharing of JUUL-focused content and other tobacco use through more discreet channels.

The combination of both quantitative and qualitative methods used in this study highlight the need for clearer definitions and examples of social media components in surveys and the importance of asking young adults specific questions about social media, such as whether the platform is publicly accessible and what type of content is being sent to their peers. This pairing of methodology also underlined inconsistencies not only between our sample's survey responses and interview quotes, but also between our research and previously established social media and nicotine-use norms. For example, previous research has noted that those who identify as female experience more stigma from smoking due to social perceptions that more strongly marginalize women and will as a result hide their smoking habits (Triandafilidis et al., 2017).

Previous research found that tobacco use in public among female sorority members can be stigmatizing socially while male fraternity members experience less or no social shame (Cheney et al., 2017). However, our study's sample of those identifying as female were less likely to hide their JUUL use compared to their male counterparts. Additionally, membership in a fraternity resulted in a reduction of past year posting of a picture of themselves JUULing by those identifying as male by 39.3% compared to those not in a fraternity. Both of these differences may be explained by the unique

interaction between social media and JUULing social norms, specifically among Millennials and Generation Zs, who have moved away from platforms like Facebook and towards Snapchat and Instagram, which they may not consider social media (Anderson & Jiang, 2018). An additional possibility could be that e-cigarettes are often considered more socially acceptable than cigarettes among college students and past research on social norms may have focused more on traditional cigarettes (Noland et al., 2016).

Many of young adults' social norms regarding JUUL use are being strengthened through their online interactions, where our participants were mainly engaging with other friends who also used JUUL (Czaplicki et al., 2020). The positive relationship between the number of close friends who JUUL and sharing on social media is not surprising and could be attributed to a higher number of those in their online circle having a more positive opinion of JUUL use or having these friends in a "safe" closed group to share content. In addition, the online and offline interactions among friends are not disconnected, with social media interactions strengthening in person connections (Subrahmanyam et al., 2008), and may further strengthen and normalize JUUL use within these groups. While no study has specifically addressed how JUULing behaviors and JUULing social norms are impacted by social media, this has been explored for other health risk behaviors among college students, such as alcohol use (Fournier et al., 2013).

For many young adults, social media is an integral component of their social identity (Kranzler & Bleakley, 2019; O'Donnell, 2018). Avoiding posting negative behaviors on these platforms was a high priority for many of this study's participants to protect their perceived identities presented to both

contacts on their social media platforms as well as future professional opportunities. However, this does not mean that they did not engage via social media with traditionally stigmatizing behaviors, but instead indicated restricting access to those they trusted or posting limited-time content. Platforms like Snapchat and Instagram's temporary and restricted sharing allow for users to more comfortably share content that would be considered too risky for more mainstream platforms. Addressing the differences in disclosure of their behavior across different platforms may be tied to their presented identity and should be a high priority in combating the normalization of JUULing. Understanding differential use of social platforms and the divergence between the highly curated social identity and the transmission of health risk behavior messages within more closed groups is necessary to identify the impact of social media on the dissemination of JUUL-related content.

### **Limitations**

This study was a cross-sectional study in one geographic region. Findings may not represent other young adults, however previous research has shown JUUL use is disproportionately located in white, educated young adults with more financial resources (Ickes et al., 2019; Vallone et al., 2019). Also, the university IRB did not allow survey results to be linked to interview data for participant privacy protection, which limited a more direct analysis of survey-interview responses.

### **Implications for Health Behavior Methodology and Theory**

When researchers use closed-ended survey questions with pre-determined response options, it requires detailed

knowledge of how a health behavior is defined by the group being studied (Creswell & Plano Clark, 2018; DeVellis, 2012). Sequential data collection using mixed methodologies can expand understanding of the health behavior as well as provide multiple opportunities to detect where an assessment method has missed the mark (Bazeley, 2018). If pre-testing survey questions does not uncover important behavioral definitions or practices within a group, a follow-up interview as used in this study may detect different interpretations or uncover important behavioral definitions or practices within a subgroup (Creswell & Plano Clark, 2018; DeVellis, 2012). These findings can be useful in the modification of survey questions for more accurate question phrasing and inclusive response options in subsequent studies (Bazeley, 2018; Creswell & Plano Clark, 2018; DeVellis, 2012). A more accurate representation of the health behavior also ensures that we are not over- or under-representing the prevalence of a belief or health risk behavior.

While no theory was used in the development of this study, a useful theory to consider in future research examining how JUUL and other emerging health risk behaviors among adolescents and young adults are communicated on social media is social network theory/social network analysis. This framework has been used previously in adolescent tobacco use to understand how peer influence is related to smoking initiation and reinforcement, and provides a potential framework for understanding prevalence and spread of JUUL use among and between college-aged students (Ennett et al., 2006; Glanz et al., 2015). Within our study, several participants mentioned their peers' JUUL-focused content (both in person and on social media) influenced their initial and continued JUUL use.

## Recommendations for Practitioners and Researchers

Including more specific questions in surveys about sharing content, private social media accounts, novel social media platforms, and incidental inclusion of tobacco products in social media posts may yield a more accurate picture of JUUL-related sharing on social media. Also, clear definitions of more public social media platforms such as Facebook, Instagram, or Twitter and private platforms such as Snapchat, group messaging, and de-identified accounts (e.g., Finstas) should be incorporated in future surveys. Young adults may differentially construct social networks and share information on each of these different platforms to protect or promote their personal brand. Those who initially indicated they did not post about JUUL on social media explained that they interpreted the question as posting on public accounts but a majority disclosed they had additional private accounts with controlled membership to share more candid or compromising content. This is especially important as platforms with time-restriction like Snapchat or Instagram become more ubiquitous among youth (Anderson & Jiang, 2018).

Researchers should also consider asking young adults about different media types in regard to online social interactions. Future research should distinguish between and among different forms of posts and comments such as pictures and/or videos of themselves using JUUL, discussions about the product, sharing content such as memes or other humorous content, permanent or time-restricted nature of a post, and likelihood that they would post stigmatizing content and on which platform. Many participants did not consider sharing a meme to be a social media post, particularly if it was to their closed group platform (e.g., Finsta). Including specific questions about JUUL

memes may provide a better understanding of what information is being shared by young adults, how frequently, and through what platform. Humor allowed JUULers to not only share JUUL-focused content, but also maintain distance from any material that may reflect negatively on them, protecting their personal brand on more socially vulnerable platforms.

## Concluding Remarks

Due to the shift in online discussion of JUUL and its use moving from more public social media platforms like Facebook and Twitter to private mediums such as Snapchat and private Instagram accounts, young adult use patterns of JUUL and its discussion online may be underrepresented. This study highlights the need to more accurately ask young adults about their social media usage when attempting to understand JUUL's online presence and how young adults discuss and normalize use of the product in their everyday lives.

## Acknowledgments

This study was funded by the Stephenson Cancer Center at the University of Oklahoma Health Sciences Center. The authors have no known conflict of interest to disclose, financial or otherwise.

## References

- Allem, J.-P., Dharmapuri, L., Unger, J. B., & Cruz, T. B. (2018). Characterizing JUUL-related posts on Twitter. *Drug and Alcohol Dependence, 190*, 1-5. <https://doi.org/10.1016/j.drugalcdep.2018.05.018>
- Anderson, M., & Jiang, J. (2018). Teens, social media & technology 2018. Pew Research Center, Internet & Technology.

- <https://www.pewresearch.org/internet/2018/05/31/teens-social-media-technology-2018/>
- Bazeley, P. (2018). *Integrating analysis in mixed methods research*. SAGE Publications.
- Brett, E. I., Stevens, E. M., Wagener, T. L., Leavens, E. L. S., Morgan, T. L., Cotton, W. D., & Hébert, E. T. (2019). A content analysis of JUUL discussions on social media: Using Reddit to understand patterns and perceptions of JUUL use. *Drug and Alcohol Dependence, 194*, 358-362.  
<https://doi.org/10.1016/j.drugalcdep.2018.10.014>
- Cheney, M. K., Dobbs, P. D., Dunlap, C., Lu, Y., Oehlers, J., & Hodges, E. (2020). Young adult JUUL users' beliefs about JUUL. *Journal of Adolescent Health, 68*(1), 138-145.  
<https://doi.org/10.1016/j.jadohealth.2020.05.039>
- Cheney, M. K., Maness, S., Huber, J. K., Burt, T., Eggleston, L., Naberhaus, B., & Nichols, B. (2017). Social influences on sorority and fraternity member smoking. *Journal of American College Health, 65*(8), 525-533.  
<https://doi.org/10.1080/07448481.2017.1351444>
- Creswell, J. W., & Plano Clark, V. L. (2018). *Designing and Conducting Mixed Methods Research* (3rd. ed.). SAGE Publications.
- Czaplicki, L., Kostygina, G., Kim, Y., Perks, S. N., Szczypka, G., Emery, S. L., Vallone, D., & Hair, E. C. (2020). Characterising JUUL-related posts on Instagram. *Tobacco Control 29*(6), 612-617.  
<https://doi.org/10.1136/tobaccocontrol-2018-054824>
- DeVellis, R. F. (2012). *Scale development: Theory and applications* (3rd ed.). SAGE Publications.
- Dobbs, P. D., Hodges, E. J., Dunlap, C. M., & Cheney, M. K. (2020). Addiction vs. dependence: A mixed methods analysis of young adult JUUL users. *Addictive Behaviors, 107*, 106402.  
<https://doi.org/10.1016/j.addbeh.2020.106402>
- Ennett, S. T., Bauman, K. E., Hussong, A., Faris, R., Foshee, V. A., Cai, L., & DuRant, R. H. (2006). The peer context of adolescent substance use: Findings from social network analysis. *Journal of Research on Adolescence, 16*(2), 159-186.  
<https://doi.org/10.1111/j.1532-7795.2006.00127.x>
- Food and Drug Administration. (2019). Youth tobacco use: Results from the National Youth Tobacco Survey.  
<https://www.fda.gov/tobacco-products/youth-and-tobacco/youth-tobacco-use-results-national-youth-tobacco-survey>
- Fournier, A. K., Hall, E., Ricke, P., & Storey, B. (2013). Alcohol and the social network: Online social networking sites and college students' perceived drinking norms. *Psychology of Popular Media Culture, 2*(2), 86-95.  
<https://doi.org/10.1037/a0032097>
- Glanz, K., Rimer, B. K., & Viswanath, K. (2015). *Health behavior: Theory, research, and practice* (5th ed.). Wiley.

- Huang, J., Duan, Z., Kwok, J., Binns, S., Vera, L. E., Kim, Y., Szczypka, G., & Emery, S. L. (2019). Vaping versus JUULing: How the extraordinary growth and marketing of JUUL transformed the US retail e-cigarette market. *Tobacco Control*, 28(2), 146-151.  
<https://doi.org/10.1136/tobaccocontrol-2018-054382>
- Ickes, M., Hester, J. W., Wiggins, A. T., Rayens, M. K., Hahn, E. J., & Kavuluru, R. (2019). Prevalence and reasons for Juul use among college students. *Journal of American college health : J of ACH*, 1.  
<https://doi.org/10.1080/07448481.2019.1577867>
- Kavuluru, R., Han, S., & Hahn, E. J. (2019). On the popularity of the USB flash drive-shaped electronic cigarette Juul. *Tobacco Control*, 28(1), 110-112.  
<https://doi.org/10.1136/tobaccocontrol-2018-054259>
- Kranzler, E. C., & Bleakley, A. (2019). Youth social media use and health outcomes: #diggingdeeper. *Journal of Adolescent Health*, 64(2), 141-142.  
<https://doi.org/10.1016/j.jadohealth.2018.11.002>
- Noland, M., Ickes, M. J., Rayens, M. K., Butler, K., Wiggins, A. T., & Hahn, E. J. (2016). Social influences on use of cigarettes, e-cigarettes, and hookah by college students. *Journal of American College Health*, 64(4), 319-328.  
<https://doi.org/10.1080/07448481.2016.1138478>
- O'Donnell, N. H. (2018). Storied lives on Instagram: Factors associated with the need for personal-visual identity. *Visual Communication Quarterly*, 25(3), 131-142.  
<https://doi.org/10.1080/15458882.2018.1511111>
- Palamidas, A., Tsikrika, S., Katsaounou, P. A., Vakali, S., Gennimata, S. -A., Kaltsakas, G., Gratziou, C., & Koulouris, N. (2017). Acute effects of short term use of e-cigarettes on airways physiology and respiratory symptoms in smokers with and without airways obstructive diseases and in healthy non smokers. *Tobacco Prevention and Cessation*, 3(March).  
<https://doi.org/10.18332/tpc/67799>
- Schaeffer, K. (2019). Before recent outbreak, vaping was on the rise in U.S., especially among young people. Pew Research Center.  
<https://www.pewresearch.org/fact-tank/2019/09/26/vaping-survey-data-roundup/>
- Soneji, S. S., Sung, H.-Y., Primack, B. A., Pierce, J. P., & Sargent, J. D. (2018). Quantifying population-level health benefits and harms of e-cigarette use in the United States. *PLoS One*, 13(3), e0193328.  
<https://doi.org/10.1371/journal.pone.0193328>
- Subrahmanyam, K., Reich, S. M., Waechter, N., & Espinoza, G. (2008). Online and offline social networks: Use of social networking sites by emerging adults. *Journal of Applied Developmental Psychology*, 29(6), 420-433.  
<https://doi.org/10.1016/j.appdev.2008.07.003>
- Triandafilidis, Z., Ussher, J. M., Perz, J., & Huppatz, K. (2017). An Intersectional Analysis of Women's Experiences of Smoking-related Stigma. *Qualitative Health Research*, 27(10), 1445-1460.  
<https://doi.org/10.1177/1049731517711111>

<https://doi.org/10.1177/1049732316672645>

U.S. Department of Health and Human Services. (2016). *E-cigarette use among youth and young adults : A report of the Surgeon General*. Atlanta, GA: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health.

Vallone, D. M., Bennett, M., Xiao, H., Pitzer, L., & Hair, E. C. (2019). Prevalence and correlates of JUUL use among a national sample of youth and young adults. *Tobacco Control*, 28(6), 603-609.

<https://doi.org/10.1136/tobaccocontrol-2018-054693>

Wu, J. (2019, October 1). E-cigarette sales slowing, led by Juul, amid negative headlines. CNBC.

<https://www.cnbc.com/2019/10/01/e-cigarette-sales-slowing-led-by-juul-amid-negative-headlines.html>