The transition from cigarette smoking to the exclusive or partial use of e-cigarettes: A multi-stage mixed methods study among French university students

Shérazade Kinouani [a,b,*], Héléna Da Cruz [a], Maximilien Simon [b], Maëlys Abraham [a], Garance Perret [a], Emmanuel Langlois [c], Christophe Tzourio [a]

[a] *University of Bordeaux, Inserm, Bordeaux Population Health Research Center, Team HEALTHY, UMR 1219, Bordeaux, France*
[b] *Department of General Practice, University of Bordeaux, Bordeaux, France*
[c] *University of Bordeaux, CNRS, Emile Durkheim Center, UMR 5116, Bordeaux, France*

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ABSTRACT

Background: Few studies have estimated the frequency of e-cigarette use by smoking status among French young adults, and how those who smoke tobacco start and continue to use e-cigarettes. Our aim was to describe e-cigarette use among students who smoked tobacco.
Methods: A multi-stage, mixed methods study was conducted at the University of Bordeaux between September 2018 and March 2020. The study consisted of three different sub-studies: 1) a cross-sectional study across five campuses (n = 211), 2) a qualitative study (n = 30), and 3) an online cross-sectional study (n = 415). These were combined to form an explanatory sequential design (stage 1) and then a convergent parallel design (stage 2).
Results: Although 41 % of students had tried e-cigarettes at least once in their lifetime, only 7 % were current users. Both e-cigarette experimentation and current use (i.e. occasional or daily use) were mainly found among current and former smokers. Student smokers started using e-cigarettes out of curiosity, with other vapers. Two main factors were identified as intervening in the transition from smoking to sustained vaping: the perception of smoking as problematic and personal commitment to e-cigarette use (i.e. by buying their own device, acquiring technical skills, and increasing the frequency of use). Among current vapers, exclusive vapers and dual users differed in terms of their smoking goals, the role they attributed to e-cigarettes, their identity development and their perceived social or personal benefits.
Conclusion: This study highlighted the complexity of the decision-making process for transitioning from smoking to sustained vaping among university students. This required a socially supportive environment and some intrinsic factors, of which the problematization of smoking and personal commitment to vaping were key factors.

1. Introduction

The use of electronic cigarettes (or e-cigarettes, or electronic nicotine delivery systems) has spread worldwide among young people, especially young adults (Laverty et al., 2018; Tam & Brouwer, 2021; Tattan-Birch et al., 2023). Although users (also known as vapers) often report that they have reduced or even stopped smoking, this effectiveness has only been partially confirmed by epidemiological studies. E-cigarettes could facilitate long-term smoking cessation, alone or in combination with transdermal nicotine patches (Kalkhoran et al., 2020; Lindson et al., 2024; Myers Smith et al., 2022; Walker et al., 2020). However, some

studies have described vaping as promoting the initiation or continuation of tobacco use among young people (Epstein et al., 2021; Loukas et al., 2022; Yang et al., 2022). There is also little information on their long-term safety. Despite all these uncertainties, Europeans aged 15–24 trying to quit smoking were more likely to use e-cigarettes than traditional nicotine replacement therapies (Filippidis et al., 2019).

The French e-cigarette market was the largest in Europe (after the UK), accounting for €847.1 million in 2019 (Shah et al., 2022). E-cigarette experimentation was estimated at 41.2 % of French people aged 18–75 in 2022, and the prevalence of current use (defined as occasional or daily vaping) was 7.3 % (Pasquereau et al., 2023). In the same year,

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56.9 % of French people aged 17 had tried them (compared with 52.4 % in 2017). Their daily use of e-cigarettes increased from 1.9 % to 6.2 % over the same period (OFDT, 2023). This increase in e-cigarette use among adolescents occurred despite the implementation in 2016 of the European Tobacco Products Directive (TPD) (European Commission, n. d.). Indeed, the French context regarding vaping products reflects a position that can be described as both controlling in terms of their manufacture, marketing and sale, but moderately restrictive in terms of their use. E-cigarettes are neither medical devices nor tobacco products, but consumer products, which results in strict product quality standards while facilitating their availability. TPD requires sellers to report nicotine vaping products sold in the country to a national agency. Vaping is allowed everywhere except on public transport, in schools or universities, enclosed workplaces and indoor common areas. It is forbidden to sell e-cigarettes to minors, even on the internet, but the application of this measure is generally limited to a prior declaration of the date of birth of the visitor to the website. Health warnings and a list of ingredients used in the composition of the e-liquid must be available on the packaging. The nicotine content of e-liquid bottles must not exceed 20 mg/ml. This means that devices containing high nicotine solutions, which were particularly successful among US adolescents between 2017 and 2019, are banned in France. According to the literature, US adolescents showed more signs of nicotine addiction after using these devices than other e-cigarette models (Boykan et al., 2019; Tackett et al., 2021).

Surprisingly, we found no recently published data on the prevalence of e-cigarette use by smoking status among French university students. However, this seemed interesting to explore as these students are young people who had reached the age of majority (lifting of the sales ban), often living away from parental home (lifting of their control), beginning to gain financial independence, while living in the French regulatory context of e-cigarettes (common consumer products with $\leq$ 20 mg/ml of nicotine in e-liquids, controlled but accessible). We also wanted to interpret this pattern by taking into account their smoking history, their initial intentions to vape, how these changed over time, and how their e-cigarette use changed as their vaping experience progressed. A mixed methods study seemed more appropriate to achieve all these aims. Our overall aim was therefore to describe the use of e-cigarettes among students who smoked tobacco: how many and how did French students who smoked tobacco use e-cigarettes (concurrently or exclusively)? The specific objectives were to estimate the frequency of e-cigarette use

among these students, overall and by smoking status, and then to describe how e-cigarette use was part of the continuum of their tobacco use.

2. Methods

This article follows the Mixed Methods Article Reporting Standards (MMARS) published by the American Psychological Association Publications and Communications Board Working Group on Journal Article Reporting Standards for Qualitative Research (Levitt et al., 2018).

2.1. Design and setting of the research project

Electra-Share was conducted among volunteer students aged 18 and over at the University of Bordeaux. In the 2018–2019 academic year, the university had a total of 56,851 individuals enrolled at the University of Bordeaux and aged 18 or over. Electra-Share was a multi-stage mixed methods study based on the designs described by Creswell et al. (Creswell & Clark, 2007). It consisted of three distinct studies (Fig. 1): a cross-sectional study across five campuses, a qualitative study, and a cross-sectional online study. These were combined to form an explanatory sequential design (stage 1) and then a convergent parallel design (stage 2).

2.2. Data collection

All data were collected between September 2018 and March 2020 (Fig. 1). Announcements about the start of this ancillary research on electronic cigarettes were made on the i-Share project website and its social networks (https://research.i-share.fr/). The design comprised three sub-studies:

2.2.1. Cross-sectional campus study

Students, who had been trained to promote the study to their peers, visited five campuses between November 2018 and January 2019. During breaks between classes, they invited the students they met to participate in Electra-Share by completing a paper self-questionnaire. Participants had to be studying at the University of Bordeaux, at least 18 years old and a current vaper at the time of the survey. In each of the three sub-studies of Electra-Share, e-cigarette experimentation was defined as having used e-cigarettes at least once in their lifetime. In this
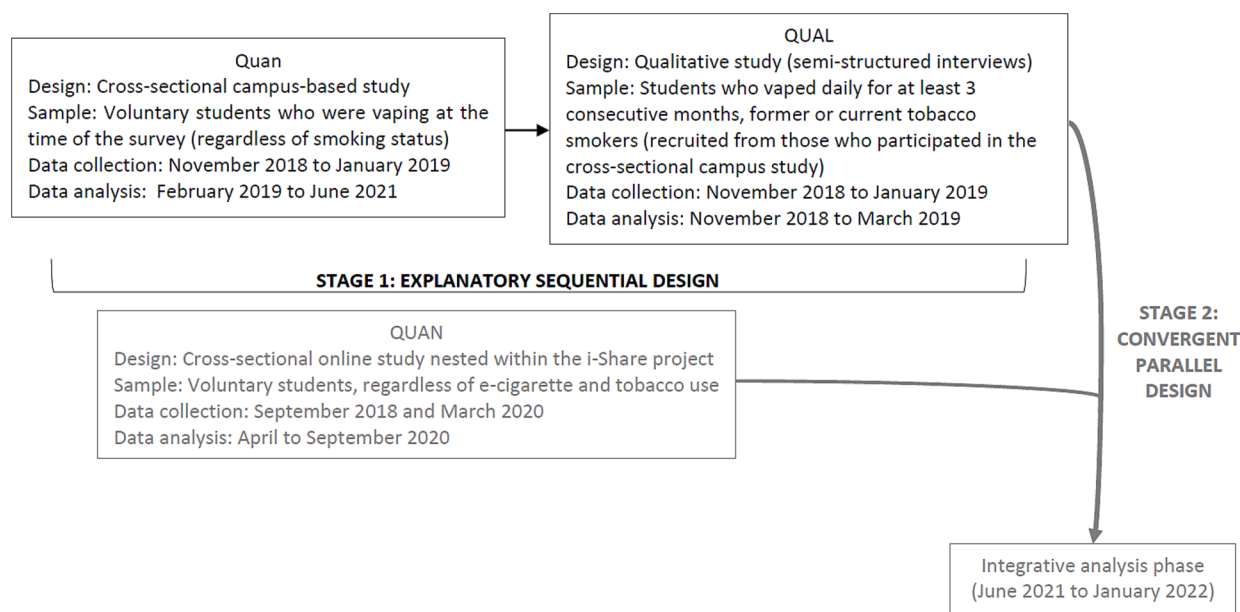

Fig. 1. Multi-stage mixed methods study in Electra-Share, France.

cross-sectional study, current vaping among experimenters was assessed with the following question: Do you use an electronic cigarette (or vaporizer or e-cigarette) every day or occasionally (less than once a day)? There were four possible answers: yes, every day; yes, but less than once a day; no, I no longer vape; no, I have never vaped. Only students who answered 'yes, every day' (daily vapers) or 'yes, but less than once a day' (occasional vapers) were included. After completing the self-administered questionnaire, daily vapers were invited for an additional face-to-face interview. Those who accepted were included in the qualitative study if they fulfilled the inclusion criteria.

2.2.2. Qualitative study

Volunteers had to have participated in the campus survey, be a daily vaper for at least three consecutive months, and be a current or former smoker. Data was collected through individual semi-structured interviews. They lasted between 49 and 104 min and were all conducted by a sociologist from our research team (MA). They were audio-recorded, transcribed, and supplemented with field notes. A theoretical sampling was carried out, diversifying the data collection and analysis according to age, sex, field of study and smoking status (current smoker *versus* former smoker). The initial guide, based on the existing literature, was drafted by the research team and modified during the interviews. This final version is available on request from the corresponding author. The transcripts were emailed to eight participants who made some minor corrections before analysis. All students interviewed received a €40 voucher as compensation for their participation in the study.

2.2.3. Cross-sectional online study

This last step used data collected for the i-Share project. i-Share was an open e-cohort whose aim was to study the frequencies and consequences of physical or mental illness among French-speaking students. To be included in our analysis, volunteers had to be at least 18 years old, have participated in the i-Share project, be able to read and understand French, and be enrolled at the University of Bordeaux. Data collected online at baseline between September 2018 and March 2020 were retained for analysis. Current vaping was assessed among experimenters with the following question: have you used an electronic cigarette in the last 30 days, either occasionally (less than once a day) or daily? Yes/No.

2.3. Analyses of the quantitative sub-studies

The main covariate in the two quantitative studies was smoking status. Tobacco experimentation was defined as having smoked at least 20 cigarettes at least once in life. Current smokers were those who had experimented tobacco and used it in the past 30 days. Former smokers were those who had experimented tobacco but had not used it in the past 30 days. Never-smokers had never experimented tobacco. Descriptive analyses were performed using median and interquartile range (IQR) for continuous variables and numbers and percentages for categorical variables. The association between two categorical variables was measured using Chi^2 or Fisher's exact test. All p-values were two-tailed and we considered $p < 0.05$ to be statistically significant. All statistical analyses were performed using R® (version 4.0.2) or SAS® (version 9.4).

2.3.1. Cross-sectional campus study

First, we described tobacco use: age of experimentation and smoking status. Second, we described e-cigarette use: age of experimentation, presence of nicotine in e-liquids, frequency of e-cigarette use (daily/occasional), reasons for experimentation and reasons for current vaping. Third, we estimated the association between frequency of e-cigarette use and smoking status. Finally, we compared the reasons for e-cigarette use among former smokers with those among current smokers.

2.3.2. Cross-sectional online study

First, descriptive statistics were performed for all participant characteristics. Second, we estimated the frequencies of e-cigarette experimentation and current e-cigarette use before and after weighting by calibration to the known margins of the student population at the University of Bordeaux for the 2018–2019 academic year (Deville et al., 1993). This calibration was carried out using a programme developed by the French National Institute for Statistics and Economic Studies that takes into account non-response bias: the macroSAS CALMAR® (raking ratio method) (INSEE, 2016). Calibration variables were sex, age in classes and field of study. The weighted frequency in the whole sample was presented with a 95 % confidence interval (95 % CI). We then calculated and compared the weighted frequencies according to smoking status.

2.4. Analysis of the qualitative sub-study

We described sample characteristics with continuous variables (using median, IQR) and categorical variables (using numbers and percentages). A pseudonym was assigned to each participant during interview transcription and used when attributing quotes. Three trained researchers conducted analyses manually (SK) or using QSR NVivo ® 11 (MA) or 12 (MS), in a constructionist approach. This means that the researcher analyses participants' discourse to make sense of their experience of a phenomenon (in this case, the decision to switch from smoking to vaping). To do this, he takes the view that the choices of the participants are influenced by their "particular temporal, social and situational conditions" (Charmaz, 2008). Each interview was coded individually by at least two researchers (SK, MS, MA), with iterative pooling times. A Grounded Theory analysis was carried out (Charmaz, 2008; Corbin & Strauss, 2008; Mills et al., 2006). The transcripts were deconstructed into the smallest possible units of meaning (open codes). These codes were then grouped into categories. Finally, the categories were grouped into emergent concepts and linked together (axial coding). The analysis was carried out in parallel with the data collection, respecting the principle of constant comparison. The final theorization was then discussed by all co-authors.

2.5. Integrative analysis of all sub-studies

Data from each sub-study were collected and analyzed separately (Fig. 1). The results of the cross-sectional campus study were deepened during the qualitative study (explanatory sequential design). The interpretation of this first stage was then merged with that of the cross-sectional online study for the final integrative analysis (convergent parallel design).

2.6. Ethics

Electra-Share followed the principles of the Declaration of Helsinki, and the collection, storage and analysis of data were in accordance with the General Data Protection Regulation (EU GDPR). The study was approved by the allocated ethics committee (*Comité de Protection des Personnes* CPP IDF VI, n°72-18) for studies involving human subjects. All subjects gave verbal consent at the beginning of the audio recording in the qualitative study or before completing the self-report questionnaire in the cross-sectional study within campuses. In the i-Share project, an information sheet was available on the website; it was mandatory to read it and tick the consent to participate box before accessing the inclusion questionnaire.

3. Results

3.1. Cross-sectional campus study

The data from 211 current vapers were retained for analysis (Figure S1), which corresponded to 0.37 % of the total adult student population of the University of Bordeaux. The median age was 21 years

(IQR: 20.0–23.0). Women made up 40.5 % of the sample, and 8.5 % of the sample worked in healthcare. Almost three out of four students were current smokers (Table S1).

The median age of smoking experimentation was 15 years (IQR: 14.0——16.0). The median age for e-cigarette experimentation was 19 years (IQR: 17.0–21.0). Nine out of ten current vapers (91.0 %) used nicotine e-liquids, with 11.5 % of them alternating nicotine-free e-liquids. There was a statistically significant association between frequency of e-cigarette use and smoking status, Chi^2 test: p < 0.0001: less daily than occasional vaping among non-smokers (46.7 *versus* 53.3 %), more daily than occasional vaping among former (92.5 *versus* 7.5 %) or current smokers (76.8 *versus* 23.2 %).

As shown in Table S2, the main reason former smokers gave for trying e-cigarettes was to quit smoking (72.5 %). This was followed by their lower cost (52.5 %) and lower perceived harmfulness (52.5 %) compared to tobacco. Current smokers said they had tried vaping for the same three reasons: to quit smoking (61.9 %), lower cost (45.2 %) and less harmfulness (40.6 %). The main reason for continuing to vape was to quit smoking for both current and former smokers. Former smokers were more likely than current smokers to report vaping to avoid relapse to smoking. Current smokers were more likely than former smokers to use e-cigarettes to reduce smoking without quitting completely, or for flavour appeal.

3.2. Qualitative study

Thirty interviews were conducted with 17 men and 13 women (Table S3). The median age was 21.5 years (IQR: 19.2–23.0). All participants were daily vapers. They had been vaping for a median of 12 months (IQR: 6.2–18.0). Half of them were former smokers, and the other half used both tobacco and e-cigarettes (dual users). The description of their different stages as smokers or e-cigarette users was based on objective (contexts and places of use, frequency of use, interactions with others) and subjective elements (rationalization process, perceived benefits, and representations).

Four stages in the smoking trajectory were identified (Figure S2): experimentation, occasional use, regular social use, and regular autonomous use. Smoking the first cigarette was a rarely planned event in adolescence and usually occurred in the presence of peers. Because of its opportunistic nature, the rationale for experimentation was not very elaborate. Students emphasized curiosity about an unknown practice and the influence of peer groups. Occasional use was defined as a stage of irregular smoking, highly contextualized to socializing moments. It was at this stage that the enjoyment of smoking really began. The peer group still played a central role in providing cigarettes and supporting learning. Cigarettes helped adolescents to form their self-image and facilitated social contacts. The stage of regular social use was characterized by daily consumption, which now included buying one's own packs. However, smoking remained linked to socialization contexts: school/university breaks, lunch, etc. The rationale for this stage was the feeling that it was easy to quit smoking. Their self-image was far from that of an addicted smoker. The final stage was regular autonomous use. A new increase in the amount and frequency of smoking was reported. Entering university facilitated this increase in frequency, due to greater independence from parents, organizational self-management, or free time. Students identified this phase as a transition to solitary and automatic smoking. They no longer waited for social opportunities to smoke but smoked to satisfy a need. Smoking and its economic or health consequences intruded into their lives, leading some to view tobacco use as problematic. Some took on the identity of a smoker while minimizing the risks. They adopted compensatory strategies (e.g. exercising to partially reduce health risks) or promised to quit in the distant future. They also justified smoking in terms of personal benefits: smoking helped them with mood management, punctuated their daily lives and reduced boredom.

The way in which e-cigarette use took hold during smoking was

described in three stages (Figure S2): experimentation, commitment to personal use and intensification of use. As with tobacco, the first try of e-cigarettes was opportunistic. Vaping was discovered through relationships. Relatives could be peers as well as family members, in contrast to smoking (Table S2, Figure S2). In a few cases, a cheap e-cigarette was bought just to try it. However, the main motivation for experimenting was curiosity. Experimenting with vaping had far fewer social and symbolic considerations than taking up smoking: trying an e-cigarette did not mean claiming membership of a particular group. In the rationalization process, many students compared e-cigarettes to tobacco to justify their experiment. They hoped to reduce their economic burden from tobacco. They could also justify the experiment not by wanting to control their tobacco consumption and its effects, but rather by the practical and fun aspects of e-cigarettes.

And so it was'cos, well, we were making smoke rings and stuff with it. It wasn't for smoking e-cigs. But it was the first time I got a taste. (Gaspard, 18, dual user).

The stage of commitment to personal use was the purchase of the first personal electronic device. This marked the beginning of autonomous use. However, the same relationships continued to play an important role in demonstrating technical skills or giving advice on equipment and where to buy it. Another important actor at this stage was the specialist retailer of vaping products. He provided new vapers with advice on how to improve their use.

They (the retailers) showed me right away. They showed me everything from A to Z. How to fill it, how to change the coils, how to clean it and so on. They spent half an hour explaining it to me. Even though there were people in the shop, they took their time. A very personal service. And they even taught me how to change the wattage and everything. They fixed it for me at the beginning, they told me "if you get really stressed, turn it up. It will give you more smoke, more nicotine and it will relax you and then you go back down and then you vape away all quietly". […] They explained a lot of things to me, they were a great help at the time. (Damien, 23, exclusive vaper).

When the first e-cigarette was bought online, the retailer continued to play an advisory role; some websites provided enough information to guide their customers in choosing and using the device. Skills acquired through previous tobacco use were useful for starting solo vaping. But they were not enough. New habits were acquired, such as recharging the e-cigarette regularly, filling the tank with e-liquid before leaving home, changing the atomizer according to the frequency of use and inhaling differently.

In fact, the first time I used it, I made a mistake when I put the liquid in, I put everything in… I can't remember what it's called, but I didn't put it in the tank. I put it somewhere else and so the problem was that when I vaped it went everywhere, even down my throat. I said "OK, this thing is a bit dangerous". And finally, today I realize that it's quite simple. (Vincent, 20, exclusive vaper).

It could take users several months or years from experimenting to buying the first personal e-cigarette. They needed to build a sufficiently solid rationale for this first purchase, which was perceived as expensive. They would ultimately base their decision on the lower long-term cost, the experience of relatives who had successfully quit smoking by vaping, the social acceptability of the practice (compared to smoking) and their feeling that e-cigarettes were more effective than nicotine replacement therapies. The final stage was intensification of use. It was characterized by a strong customization of their practice, facilitated by the variety of electronic devices and e-liquids available. Customization often involved buying a new device with more battery autonomy, a larger e-liquid tank, better flavour reproduction or a better throat hit. It could go as far as creating their own e-liquids by combining solvents, nicotine, and flavours *like a little chemist (Elina, 23, exclusive vaper).* This practice was called Do It Yourself or DIY.

I understood how it worked and that one there − I really made my choice based on a lot of features […] The wattage, the tank, the way it fills easily − the other one had to be unscrewed. This one, you just do this (she mimes filling). Now the batteries. That way I have several batteries, and I don't get stuck 'cos of no batteries. (Elina, 23, exclusive vaper).

Learning to use e-cigarettes led some students to vape much more often and in more places than when they smoked tobacco. They justified this on the basis of personal benefits such as cost reduction, skill development and enjoyment of vaping. These benefits were so important to some that vaping was not just about quitting smoking. It was about giving up tobacco use in favour of a new and more rewarding behaviour. Increased use also required a personal investment in researching information or sharing experiences with other e-cigarette users to develop knowledge and skills. However, this was not sought by all e-cigarette users, even daily users.

3.3. Cross-sectional online study

Between September 2018 and March 2020, 440 students from the University of Bordeaux completed the i-Share inclusion questionnaire. Of these, 415 were retained for analysis, representing 0.73 % of the total population (Figure S3). The median age was 21 years (IQR: 20.0–23.0). More than 4 out of 5 students were women. There were 35.9 % of students in healthcare field. More than a quarter of participants were current smokers (Table S4).

Two out of five students (weighted frequency: 41 %) had tried e-cigarettes. Experimentation was more common among former or current smokers than among non-smokers (Table 1). However, many current and former smokers tried e-cigarettes without continuing. The frequency of experimentation without use in the past 30 days was estimated at 33.9 % (95 % CI: 27.6–41.0). As shown in Table 1, 46.2 % of current smokers had tried e-cigarettes but reported no use in the past 30 days. Half of former smokers (50.6 %) had tried e-cigarettes but had not used them in the past 30 days. After weighting, 7.1 % of students (95 % CI: 4.2–12.0) were current vapers: 79.5 % were current smokers, 18.2 % were former smokers and 2.3 % were non-smokers, Chi^2 test: p < 0.001.

3.4. Mixed methods results

3.4.1. Explanatory sequential design phase: when, how, and why student smokers started vaping

The e-cigarette users interviewed in the cross-sectional campus survey were mainly concurrent tobacco users. Experimentation with smoking had very often preceded experimentation with vaping. Daily vaping and nicotine e-liquid use were more common among former and current smokers than among non-smokers. Nicotine vaping had therefore become an integral part of the daily lives of the current vapers in the cross-sectional campus survey, whether or not it was followed by smoking cessation. Quitting smoking was the most frequently cited reason for experimenting with e-cigarettes in this study, even among current smokers. However, a deeper exploration of the reasons for initiation through individual interviews underlined the role of curiosity. The qualitative study suggested that experimentation with e-cigarettes was more opportunistic. It was facilitated both by interactions with other vapers and by the students' consideration that tobacco use was becoming problematic in their own careers as smokers.

3.4.2. Convergent parallel design phase: Many e-cigarette experimenters but few really engaged in current vaping among student smokers

The cross-sectional online survey conducted as part of the i-Share project showed that being a former or current smoker was an important prerequisite for becoming a current vaper. There were significantly more current vapers among former or current smokers than there were among non-smokers. This confirmed the findings of the explanatory sequential design phase. Nevertheless, few e-cigarette experimenters in the cross-sectional online study used e-cigarettes in the past 30 days, regardless of smoking status. If being a former or current smoker seemed to be important, the cross-sectional online study suggested that it was not sufficient. For student smokers, factors other than tobacco use also played a role. The qualitative study provided some answers: continuing to use e-cigarettes after the experiment requires a personal commitment to use. E-cigarettes only became a real way to change some or all of their tobacco use once students had committed to buying their own device, acquiring new technical skills and increasing their frequency of use.

• Results of integrative phase

Thus, interaction with vapers, problematization of smoking and personal commitment to vaping were the key concepts explaining the switch from smoking to vaping among university students. Fig. 2 summarizes the final theorization developed at the end of this research. The levels of problematization of smoking and personal commitment to vaping allowed two broad groups of e-cigarette users to be distinguished: dual users (current smokers) and exclusive vapers (former smokers). These groups differed according to four key factors: their smoking goals, the role they assigned to the e-cigarette, their identity development, and their perceived benefits (Fig. 2).

Among dual users, customization was often limited to different flavours of e-liquids. They only slightly upgraded their electronic devices.

Table 1

Prevalence of e-cigarette use among university students in the cross-sectional online survey, overall and by smoking status. Electra-Share, France.

| Variables | Whole sample N = 415 | | | | Smoking Status[ε] | | | | | | | | | |
| | | | | | Non-Smoker, N = 261 | | | Former smoker, N = 30 | | | Current smoker, N = 124 | | |
	n	Crude %	Weighted %[γ]	95 % CI[*]	n	Crude %	Weighted %[γ]	n	Crude %	Weighted %[γ]	n	Crude %	Weighted %[γ]
No experiment with e-cigarettes[α]	240	57.8	59.0	52.0–66.0	195	74.7	73.0	10	33.3	32.2	35	28.2	33.3
Experiment with e-cigarettes (without current use)[β]	151	36.4	33.9	27.6–41.0	65	24.9	26.8	16	53.3	50.6	70	56.5	46.2
Current use of e-cigarettes[δ]	24	5.8	7.1	4.2–12.0	1	0.4	0.2	4	13.4	17.2	19	15.3	20.5

[α] No experiment with e-cigarettes: absence of e-cigarette trial.

[β] Experiment with e-cigarettes without current use: have tried e-cigarettes at least once in their life without current use afterwards.

[δ] Current use of e-cigarettes: having tried an e-cigarette and then used it occasionally (<once/day) or daily during the past 30 days prior to the survey.

[γ] Weighting by calibration on margins with the Macro SAS Calmar® program (raking ratio method), on the following variables: sex, age in classes and study fields.

[ε] Smoking status: former smoker = student who had experimented with tobacco but not in the past 30 days; current smoker = student who had experimented with tobacco and smoked at least one cigarette in the past 30 days.

[*] 95 % CI: 95 % confidence interval of weighted prevalence.
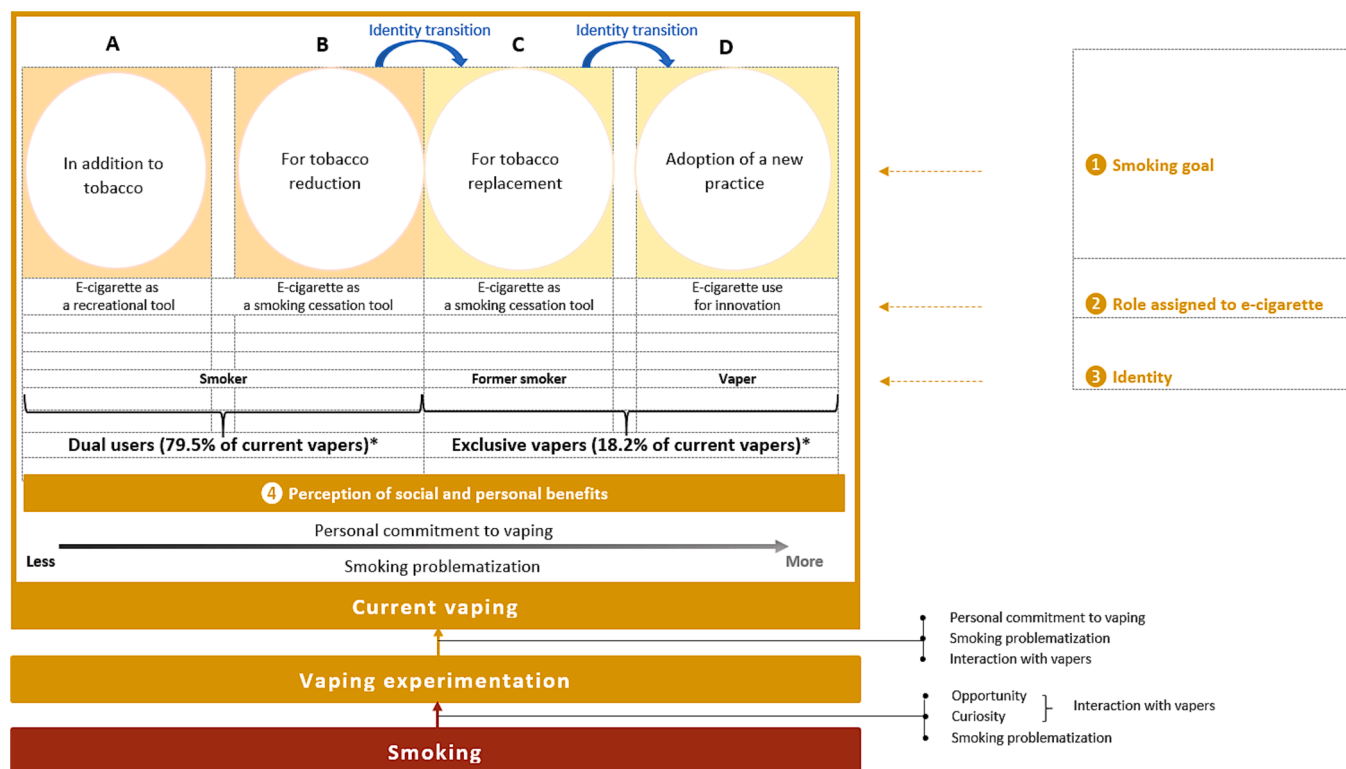
Fig. 2. Final theorization of the transition from smoking to vaping, with the description of four profiles of e-cigarette users among current student vapers, Electra-Share, France. A: Dual user with a smoker identity, supplementing their tobacco consumption with e-cigarettes. B: Dual user with a smoker identity, but in the process of gradually quitting smoking with the help of e-cigarettes. C: Exclusive vaper who identified as a former smoker and had completely replaced smoking with e-cigarette use. D: Exclusive vaper who was heavily involved in vaping to make it a new practice after completely quitting smoking. *Current vaping was defined as having tried an e-cigarette and then using it occasionally (<once/day) or daily in the last 30 days before the survey. In the cross-sectional online study at the University of Bordeaux, 7.1 % of students were current vapers after weighting: 79.5 % were current smokers, 18.2 % were former smokers and 2.3 % were non-smokers.

It (my e-cigarette) has always been the same. I don't think I'm going to buy a big e-cigarette because I don't really feel obliged to invest. Let's say it's more of a hobby. I don't think I'll spend €60 or even more. I don't even know how much it costs; I've never found out. (Simon, 19, dual user).

They asked very little about the regulatory framework, harmfulness or technical aspects. They were satisfied with the information they received from their immediate environment, social networks or from the retailer. Dual users were also characterized by a lack of DIY. If they were aware of its existence, they considered it as complex and time-consuming. Cigarettes were still preferred to e-cigarettes in social contexts. Although they vaped daily, they identified themselves as smokers first. However, it was necessary to distinguish dual users, who used e-cigarettes for fun and convenience, from those who used them to gradually reduce tobacco (Fig. 2).

Exclusive vapers invested in customizing their e-cigarettes by choosing flavours, varying nicotine levels and generally improving their device. They intensified their use of e-cigarettes, sometimes to the point of using them much more frequently than they had previously used tobacco. Factors that favoured this intensification included the convenience of the device, the lower cost (especially with DIY), the social acceptance by non-smokers and smokers alike, and the disappearance of the negative effects of tobacco on their health and the environment. Two subgroups of exclusive vapers stood out (Fig. 2). The first saw e-cigarettes only as a way to quit smoking. They planned to stop vaping after quitting smoking.

My goal… anyway, I really look at my vape as a weaning tool, not really something I got into, I found I liked it and I started. It's worse than smoking cigarettes, isn't it? (Raphaël, 27, exclusive vaper).

The second subgroup not only quit smoking but also adopted vaping as a new practice. Quitting smoking and discovering the pleasure of vaping gave them a new social and personal identity. Being a vaper could contribute to a positive reconstruction of the self-image, no longer tainted by the awareness of being a tobacco addict. Taken to the extreme, vaping could become a subculture among exclusive vapers who macerate their own e-liquid flavours, modify their devices technically and join specialized forums.

Some students among these exclusive vapers reported that they switched immediately from smoking to exclusive e-cigarette use. However, many students had a more or less long transition period of dual use, corresponding to a gradual change of identity from smoker to vaper.

4. Discussion

In this mixed methods study, 41 % of French students in this sample had tried e-cigarettes and only 7 % were current vapers. Current vapers were mainly current or former smokers, and to a lesser extent non-smokers. Experimentation with e-cigarettes was described as unplanned and opportunistic. Although many smokers tried e-cigarettes, few continued to use them. Thus, while tobacco use was a major factor in explaining subsequent e-cigarette experimentation, it was not sufficient to understand the persistence of vaping among student smokers. First, our results showed that student smokers who started vaping did not share an initial intention to quit smoking, but rather a sense that their tobacco use had become problematic. Second, this problematization of smoking, combined with personal commitment to vaping and interaction with vapers, favoured sustained concurrent or exclusive use of e-cigarettes. Third, current vapers were not a homogeneous population in terms of their smoking goals, the role they attributed to e-cigarettes,

their identity development, and their perceived benefits. Dual users were the most predominant group (more than 3/4). They justified vaping with the desire to diversify nicotine intake or to reduce consumption without quitting altogether. The other group consisted of exclusive vapers who used e-cigarettes either temporarily or as a new practice in their own right.

Previous studies have described opportunity, curiosity (Kong et al., 2015; Scheffels et al., 2023; Thoonen & Jongenelis, 2024; Vu et al., 2019) as well as close circles (Kong et al., 2015; McCausland et al., 2020; Urman et al., 2019; Vu et al., 2019) as factors that determine the initiation of e-cigarette use among young adults. Our findings highlight that another factor plays a role in the progression from e-cigarette experimentation to intensification: the problematization of smoking. Young adult smokers do not necessarily identify themselves as smokers (Berg et al., 2009; Levinson et al., 2007; Poole et al., 2022). A risk minimization mechanism often leads them to underestimate personal addiction or health risks, for example in response to public health messages (Levinson et al., 2007; Poole et al., 2022; Pourtau et al., 2019). We argue that some students began a process of smoking problematization when they reached the stage of regular autonomous tobacco use, but they vaguely expressed this as a desire to quit smoking. This confusion between smoking problematization and intention to quit would explain why many dual users in our campus study said that quitting smoking was their main reason for experimenting with e-cigarettes. Our findings also emphasized that smoking problematization was necessary but not sufficient to maintain vaping. Students needed to acquire new skills and routines and upgrade their electronic devices for a more satisfying practice. This need for personal commitment to maintain vaping was consistent with previous research (McCausland et al., 2020; Wilson et al., 2022; Yingst et al., 2019). Thus, the decision-making process of switching from cigarette smoking to e-cigarettes appeared to be complex, involving intrinsic issues (problematization of smoking, commitment to the practice, perceived benefits of e-cigarettes), a socially favourable environment, but also available and reliable information (Lee et al., 2023; McCausland et al., 2020; Notley et al., 2021; Romijnders et al., 2019; Yong et al., 2023). Students identified the specialist retailer as an important actor throughout their e-cigarette use. This was not surprising in a country like France where e-cigarettes are a consumer product. Although we did not find it in our research, the literature suggests that vapers had mixed feelings about the role of the specialist retailer. Vapers preferred advice from trained retailers based on scientific evidence (Galimov et al., 2021; Pattinson et al., 2018). Some did not always seek cessation advice in vaping shops. They perceived these venues as precisely non-medical and wanted them to remain so (Ward et al., 2018). Finally, the students said little about their nicotine addiction. They identified the stage of regular autonomous tobacco use, but rarely described themselves as dependent on tobacco. The concept of problematizing smoking in their speeches tended to combine both physical health and economic aspects. They also never asked about the possibility of becoming addicted to e-cigarettes. However, in other studies, vapers have expressed concerns about addiction to e-cigarettes. They noted that vaping is not so far removed from smoking in its rapid nicotine intake, similar gestures and routine (Ranjit et al., 2021; Rooke et al., 2016; Wilson et al., 2022). Some said that switching from one nicotine delivery method to another did not solve the problem of their nicotine addiction. Fears of e-cigarette addiction were mainly described by vapers who experienced an increase in their nicotine consumption when vaping, motivated by the possibility of vaping in places where smoking is prohibited or the use of e-liquids with high nicotine content (Arshad et al., 2023; Camara-Medeiros et al., 2021; Ranjit et al., 2021; Simpson et al., 2021). Our work did not deny the role of nicotine addiction as a potential explanatory factor for switching from smoking to vaping. It just suggested that these young participants were likely to have considered the social component and personal benefits of e-cigarette use as much as, or even more than the health issue. Among the student smokers who currently used e-cigarettes, vaping was perceived as a social practice rather than a health behaviour in the French regulatory context. We would have obtained different results regarding nicotine addiction if the study had been conducted with students who decided to stop vaping. These students, who were excluded from our research, are probably more exposed to the problematization of vaping.

This survey made it possible to examine e-cigarette use in relation to the use of tobacco that had preceded it. It allowed the estimation of weighted frequencies of experimentation and current vaping. It also highlighted the greater ability of mixed methods studies to explore the process of making the decision to use e-cigarettes. However, there were limitations to this research. The two quantitative sub-studies were conducted using convenience samples that were of very small size if compared to the total population of students and potentially not representative of this population. Voluntary participation in both quantitative sub-studies may have introduced a self-selection bias. The main objective of the cross-sectional campus study was to describe the reasons for initiating or continuing the use of e-cigarettes. All participants were included because they were current vapers at the time of inclusion. As there is no data regarding the socio-demographic characteristics of French young adults currently using e-cigarettes, we couldn't adopt a more detailed sampling strategy that would allow us to mimick a representative sample of this population. These potential selection biases were taken into account in the cross-sectional online study, by applying a calibration method during data analyses. Data collected in the quantitative sub-studies could also be exposed to recall or social desirability bias. Because of these potential biases, we cannot establish a causal relationship between e-cigarette use and smoking. This research, conducted within the population of a French university, can hardly be extrapolated to all French students, to the non-student population of French young adults, or to countries with different market regulation policies for vaping products. Finally, the regulatory policies on e-cigarettes vary from one European country to another and contextualize their accessibility, use and social acceptability. This study did not aim to assess the extent to which the French regulatory context influenced the switch from tobacco to e-cigarette use in the student population but to describe their e-cigarette use in this context.

5. Conclusion

In this multi-stage mixed methods study of student smokers we found that two in five had tried e-cigarettes. However, few continued to use them. The study highlighted the complexity of their decision-making process when switching from tobacco to vaping. It required intrinsic issues (problematization of smoking, personal commitment to vaping, perceived benefits of e-cigarettes) and a socially supportive environment (through the presence of other vapers and specialist retailers). Problematization of smoking and personal commitment to vaping were two key emerging concepts that determined the transition from smoking to sustained vaping. Assessing the level of these two factors (e.g. using Likert scales) among student smokers who vape may be a more accurate tool for carers than the level of intention to quit smoking alone. Because they perceived vaping as a social practice, social norm interventions appear to be a promising theoretical approach to tackling nicotine use among young adult smokers.

Declaration of generative AI and AI-assisted technologies in the writing process

During the preparation of this work the authors used DeepL Write® in order to copyedit the manuscript. After using this tool, the authors reviewed and edited the content as needed and take full responsibility for the content of the publication.

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Appendix A. Supplementary material

Supplementary data to this article can be found online at https://doi.org/10.1016/j.addbeh.2024.108205.

Data availability

All data cannot be freely shared as the authors must comply with French regulations for the Commission Informatique et Libertés and European regulations (General Data Protection Regulation).

References

Arshad, H., Jackson, S. E., Kock, L., Ide-Walters, C., & Tattan-Birch, H. (2023). What drives public perceptions of e-cigarettes? A mixed-methods study exploring reasons behind adults' perceptions of e-cigarettes in Northern England. *Drug and Alcohol Dependence, 245*, Article 109806. https://doi.org/10.1016/j.drugalcdep.2023.109806

Berg, C. J., Lust, K. A., Sanem, J. R., Kirch, M. A., Rudie, M., Ehlinger, E., Ahluwalia, J. S., & An, L. C. (2009). Smoker self-identification versus recent smoking among college students. *American Journal of Preventive Medicine, 36*(4), 333–336. https://doi.org/10.1016/j.amepre.2008.11.010

Boykan, R., Goniewicz, M. L., & Messina, C. R. (2019). Evidence of nicotine dependence in adolescents who use Juul and similar pod devices. *International Journal of Environmental Research and Public Health, 16*(12), 2135. https://doi.org/10.3390/ijerph16122135

Camara-Medeiros, A., Diemert, L., O'Connor, S., Schwartz, R., Eissenberg, T., & Cohen, J. E. (2021). Perceived addiction to vaping among youth and young adult regular vapers. *Tobacco Control, 30*(3), 273–278. https://doi.org/10.1136/tobaccocontrol-2019-055352

Charmaz, K. (2008). Constructionism and the Grounded Theory Method. In J. A. Holstein & J. F. Gubrium (Eds.), *Handbook of Constructionist Research* (pp. 397–412). The Guilford Press.

Corbin, J., & Strauss, A. (2008). *Basics of qualitative research: Techniques and procedures for developing grounded theory (3rd ed.).* Sage Publications, Inc.

Creswell, J. W., & Clark, V. L. P. (2007). *Designing and conducting mixed methods research.* Sage Publications Inc.

Deville, J.-C., Sarndal, C.-E., & Sautory, O. (1993). Generalized raking procedures in survey sampling. *Journal of the American Statistical Association, 88*(423), 1013. https://doi.org/10.2307/2290793

Epstein, M., Bailey, J. A., Kosterman, R., Rhew, I. C., Furlong, M., Oesterle, S., & McCabe, S. E. (2021). E-cigarette use is associated with subsequent cigarette use among young adult non-smokers, over and above a range of antecedent risk factors: A propensity score analysis. *Addiction, 116*(5), 1224–1232. https://doi.org/10.1111/add.15317

European Commission. *Electronic cigarettes*. Retrieved from https://ec.europa.eu/health/tobacco/product-regulation/electronic-cigarettes_en.

Filippidis, F. T., Laverty, A. A., Mons, U., Jimenez-Ruiz, C., & Vardavas, C. I. (2019). Changes in smoking cessation assistance in the European Union between 2012 and 2017: Pharmacotherapy versus counselling versus e-cigarettes. *Tobacco Control, 28*(1), 95–100. https://doi.org/10.1136/tobaccocontrol-2017-054117

Galimov, A., Meza, L., Unger, J. B., Baezconde-Garbanati, L., Cruz, T. B., & Sussman, S. (2021). Vape shop employees: Do they act as smoking cessation counselors? *Nicotine & Tobacco Research, 23*(4), 756–759. https://doi.org/10.1093/ntr/ntaa218

Institut National de la Statistique et des Etudes Economiques. (2016). [*La macro SAS CALMAR | Insee*]. Retrieved from https://www.insee.fr/fr/information/2021902.

Kalkhoran, S., Chang, Y., & Rigotti, N. A. (2020). Electronic cigarette use and cigarette abstinence over 2 years among U.S. smokers in the Population Assessment of Tobacco and Health Study. *Nicotine & Tobacco Research, 22*(5), 728–733. https://doi.org/10.1093/ntr/ntz114

Kong, G., Morean, M. E., Cavallo, D. A., Camenga, D. R., & Krishnan-Sarin, S. (2015). Reasons for electronic cigarette experimentation and discontinuation among adolescents and young adults. *Nicotine & Tobacco Research, 17*(7), 847–854. https://doi.org/10.1093/ntr/ntu257

Laverty, A. A., Filippidis, F. T., & Vardavas, C. I. (2018). Patterns, trends and determinants of e-cigarette use in 28 European Union Member States 2014–2017. *Preventive Medicine, 116*, 13–18. https://doi.org/10.1016/j.ypmed.2018.08.028

Lee, S. H., Han, D.-H., & Seo, D.-C. (2023). Toward a better understanding of adult dual use of cigarettes and e-cigarettes based on use intensity and reasons for dual use. *Addictive Behaviors, 137*, Article 107517. https://doi.org/10.1016/j.addbeh.2022.107517

Levinson, A. H., Campo, S., Gascoigne, J., Jolly, O., Zakharyan, A., & Vu Tran, Z. (2007). Smoking, but not smokers: Identity among college students who smoke cigarettes. *Nicotine & Tobacco Research, 9*(8), 845–852. https://doi.org/10.1080/14622200701484987

Levitt, H. M., Bamberg, M., Creswell, J. W., Frost, D. M., Josselson, R., & Suárez-Orozco, C. (2018). Journal article reporting standards for qualitative primary, qualitative meta-analytic, and mixed methods research in psychology: The APA Publications and Communications Board task force report. *The American Psychologist, 73*(1), 26–46. https://doi.org/10.1037/amp0000151

Lindson, N., Butler, A. R., McRobbie, H., Bullen, C., Hajek, P., Begh, R., Theodoulou, A., Notley, C., Rigotti, N. A., Turner, T., Livingstone-Banks, J., Morris, T., & Hartmann-Boyce, J. (2024). Electronic cigarettes for smoking cessation. *The Cochrane Database of Systematic Reviews, 1*(1), CD010216. https://doi.org/10.1002/14651858.CD010216.pub8

Loukas, A., Marti, C. N., & Harrell, M. B. (2022). Electronic nicotine delivery systems use predicts transitions in cigarette smoking among young adults. *Drug and Alcohol Dependence, 231*, Article 109251. https://doi.org/10.1016/j.drugalcdep.2021.109251

McCausland, K., Jancey, J., Leaver, T., Wolf, K., Freeman, B., & Maycock, B. (2020). Motivations for use, identity and the vaper subculture: A qualitative study of the experiences of Western Australian vapers. *BMC Public Health, 20*(1), 1552. https://doi.org/10.1186/s12889-020-09651-z

Mills, J., Bonner, A., & Francis, K. (2006). The development of constructivist Grounded Theory. *International Journal of Qualitative Methods, 5*(1), 25–35. https://doi.org/10.1177/160940690600500103

Myers Smith, K., Phillips-Waller, A., Pesola, F., McRobbie, H., Przulj, D., Orzol, M., & Hajek, P. (2022). E-cigarettes versus nicotine replacement treatment as harm reduction interventions for smokers who find quitting difficult: Randomized controlled trial. *Addiction, 117*(1), 224–233. https://doi.org/10.1111/add.15628

Notley, C., Ward, E., Dawkins, L., & Holland, R. (2021). User pathways of e-cigarette use to support long term tobacco smoking relapse prevention: A qualitative analysis. *Addiction, 116*(3), 596–605. https://doi.org/10.1111/add.15226

Observatoire Français des Drogues et des Tendances addictives. (2023). [Les drogues à 17 ans. Analyse de l'enquête ESCAPAD 2022]. *Tendances, 155*, 8 pages.

Pasquereau, A., Andler, R., Guignard, R., Soullier, N., Beck, F., & Nguyen-Than, V. (2023). Prévalence du tabagisme et du vapotage en France métropolitaine en 2022 parmi les 18–75 ans. *Bulletin Epidemiologique Hebdomadaire, 9–10*, 152–158.

Pattinson, J., Lewis, S., Bains, M., Britton, J., & Langley, T. (2018). Vape shops: Who uses them and what do they do? *BMC Public Health, 18*(1), 541. https://doi.org/10.1186/s12889-018-5467-9

Poole, R., Carver, H., Anagnostou, D., Edwards, A., Moore, G., Smith, P., Wood, F., & Brain, K. (2022). Tobacco use, smoking identities and pathways into and out of smoking among young adults: A meta-ethnography. *Substance Abuse Treatment, Prevention, and Policy, 17*(1), 24. https://doi.org/10.1186/s13011-022-00451-9

Pourtau, L., Martin, E., Menvielle, G., El Khoury-Lesueur, F., & Melchior, M. (2019). To smoke or not to smoke? A qualitative study among young adults. *Preventive Medicine Reports, 15*, Article 100927. https://doi.org/10.1016/j.pmedr.2019.100927

Ranjit, A., McCutchan, G., Brain, K., & Poole, R. (2021). "That's the whole thing about vaping, it's custom tasty goodness": A meta-ethnography of young adults' perceptions and experiences of e-cigarette use. *Substance Abuse Treatment, Prevention, and Policy, 16*(1), 85. https://doi.org/10.1186/s13011-021-00416-4

Romijnders, K. A. G. J., van Osch, L., de Vries, H., & Talhout, R. (2019). A deliberate choice? Exploring the decision to switch from cigarettes to e-cigarettes. *International Journal of Environmental Research and Public Health, 16*(4), 624. https://doi.org/10.3390/ijerph16040624

Rooke, C., Cunningham-Burley, S., & Amos, A. (2016). Smokers' and ex-smokers' understanding of electronic cigarettes: A qualitative study. *Tobacco Control, 25*(e1), e60–e66. https://doi.org/10.1136/tobaccocontrol-2014-052151

Scheffels, J., Tokle, R., Linnansaari, A., Rasmussen, S. K. B., & Pisinger, C. (2023). E-cigarette use in global digital youth culture. A qualitative study of the social practices and meaning of vaping among 15–20-year-olds in Denmark, Finland, and Norway. *The International Journal on Drug Policy, 111*, Article 103928. https://doi.org/10.1016/j.drugpo.2022.103928

Shah, A., Britton, J., & Bogdanovica, I. (2022). Developing a novel e-cigarette regulatory and policy control scale: Results from the European Union. *Drugs: Education, Prevention & Policy, 29*(6), 719–725. https://doi.org/10.1080/09687637.2021.1959520

Simpson, K. A., Kechter, A., Schiff, S. J., Braymiller, J. L., Yamaguchi, N., Ceasar, R. C., Bluthenthal, R. N., & Barrington-Trimis, J. L. (2021). Characterizing symptoms of e-cigarette dependence: A qualitative study of young adults. *BMC Public Health, 21*(1), 959. https://doi.org/10.1186/s12889-021-10945-z

Tackett, A. P., Hébert, E. T., Smith, C. E., Wallace, S. W., Barrington-Trimis, J. L., Norris, J. E., Lechner, W. V., Stevens, E. M., & Wagener, T. L. (2021). Youth use of e-cigarettes: Does dependence vary by device type? *Addictive Behaviors, 119*, Article 106918. https://doi.org/10.1016/j.addbeh.2021.106918

Tam, J., & Brouwer, A. F. (2021). Comparison of e-cigarette use prevalence and frequency by smoking status among youth in the United States, 2014–2019. *Addiction, 116*(9), 2486–2497. https://doi.org/10.1111/add.15439

Tattan-Birch, H., Jackson, S. E., Kock, L., Dockrell, M., & Brown, J. (2023). Rapid growth in disposable e-cigarette vaping among young adults in Great Britain from 2021 to 2022: A repeat cross-sectional survey. *Addiction, 118*(2), 382–386. https://doi.org/10.1111/add.16044

Thoonen, K. A. H. J., & Jongenelis, M. I. (2024). Motivators of e-cigarette use among Australian adolescents, young adults, and adults. *Social Science & Medicine, 340*, Article 116411. https://doi.org/10.1016/j.socscimed.2023.116411

Urman, R., McConnell, R., Unger, J. B., Cruz, T. B., Samet, J. M., Berhane, K., & Barrington-Trimis, J. L. (2019). Electronic cigarette and cigarette social environments and ever use of each product: A prospective study of young adults in Southern California. *Nicotine & Tobacco Research, 21*(10), 1347–1354. https://doi.org/10.1093/ntr/nty097

Vu, T.-H.-T., Hart, J. L., Groom, A., Landry, R. L., Walker, K. L., Giachello, A. L., Tompkins, L., Ma, J. Z., Kesh, A., Robertson, R. M., & Payne, T. J. (2019). Age differences in electronic nicotine delivery systems (ENDS) usage motivations and behaviors, perceived health benefit, and intention to quit. *Addictive Behaviors, 98*, Article 106054. https://doi.org/10.1016/j.addbeh.2019.106054

Walker, N., Parag, V., Verbiest, M., Laking, G., Laugesen, M., & Bullen, C. (2020). Nicotine patches used in combination with e-cigarettes (with and without nicotine) for smoking cessation: A pragmatic, randomised trial. *The Lancet. Respiratory Medicine, 8*(1), 54–64. https://doi.org/10.1016/S2213-2600(19)30269-3

Ward, E., Cox, S., Dawkins, L., Jakes, S., Holland, R., & Notley, C. (2018). A qualitative exploration of the role of vape shop environments in supporting smoking abstinence. *International Journal of Environmental Research and Public Health, 15*(2), 297. https://doi.org/10.3390/ijerph15020297

Wilson, G. L., Keenan, J., Grogan, S., Porcellato, L., Powell, S., & Gee, I. (2022). An investigation of factors encouraging and deterring EC use: A thematic analysis of accounts from UK adults. *Psychology & Health, 37*(11), 1379–1395. https://doi.org/10.1080/08870446.2021.1952583

Yang, Z., Berhane, K., Leventhal, A. M., Liu, M., Barrington-Trimis, J. L., & Thomas, D. C. (2022). Modeling the longitudinal transitions of electronic cigarettes and conventional cigarettes with time-dependent covariates among adolescents. *Preventive Medicine, 164*, Article 107294. https://doi.org/10.1016/j.ypmed.2022.107294

Yingst, J., Foulds, J., Veldheer, S., & Du, P. (2019). Device characteristics of long term electronic cigarette users: A follow-up study. *Addictive Behaviors, 91*, 238–243. https://doi.org/10.1016/j.addbeh.2018.08.001

Yong, H.-H., Chow, R., East, K., Thrasher, J. F., Hitchman, S. C., Borland, R., Cummings, K. M., & Fong, G. T. (2023). Do social norms for cigarette smoking and nicotine vaping product use predict trying nicotine vaping products and attempts to quit cigarette smoking amongst adult smokers? Findings from the 2016–2020 International Tobacco Control Four Country Smoking and Vaping Surveys. *Nicotine & Tobacco Research, 25*(3), 505–513. https://doi.org/10.1093/ntr/ntac212