

Change and Continuity in Vaping and Smoking by Young People: A qualitative case study of a Friendship Group

Neil McKeganey Ph.D. FRSA Marina Barnard Ph.D.

Centre for Substance Use Research

Block 3/2 West of Scotland Science Park

Kelvin Campus

Maryhill Road

Glasgow

Scotland G20 0SP

Abstract

This paper explores as a case study the development of e-cigarette use and smoking within a small friendship group (n=8) in Glasgow, Scotland. Interviewed twice at six months apart these 16/17 year olds reported substantial change in their use of and attitudes towards e-cigarettes and tobacco. At time 1 vaping generated much excitement and interest, with 6/8 having their own vape device. At time 2 only two young people still vaped, with the others no longer professing any interest in continued vaping. The two regular smokers, who had been smoking before they first vaped, now only vaped privately and to reduce their tobacco intake. This small case study illustrates plasticity in the use of electronic cigarettes; just as young people can initiate using these devices so too can they move away from their use- with such changes in actual use occurring within a relatively short period of time. These findings demonstrate more than anything else the volatility in young peoples' substance use behaviour. If we are to better understand these behaviours we require both quantitative and qualitative research studies that are capable of both monitoring changes in individual and group behaviour over time but which are also able to elucidate the nuance of individual behaviour differentiating between long term, frequent, consistent use and more episodic, experimental and infrequent use by young people.

Introduction

The introduction, proliferation and diversification of e-cigarettes into the tobacco, nicotine and smoking marketplace has generated two prominent public health concerns. Firstly, that the multiplicity of new electronic nicotine delivery devices (ENDS) for inhaling nicotine and flavoured liquids in aerosolized form (vaping), may serve to re-normalise smoking (1,2) and, secondly, that they may be a gateway means to introduce young people to tobacco smoking (3,4). Those concerns have been fuelled by research indicating a marked increase in the prevalence of ENDS used by young people, and by the findings from a range of surveys reporting that young people who have used e-cigarettes/vapes are more likely than non-using peers to have started smoking when followed-up over a twelve month period (5, 6, 7). In the UK, Eastwood and colleagues (8) reported 'ever' use of ENDS rose from 4.6% in 2013 to 8.2% in 2014. The US National Youth Tobacco Survey (5) reported an exponential 900% increase in e-cigarette/vape use among high school students between 2011-15 with 27.1% reporting use of ENDS at some point in the past, and 2,390,000 having done so at least once, in the past 30 days.

Whilst clearly large numbers of youth have encountered and tried e-cigarettes/vapes, it is also the case that many fewer are apparently using them on a regular or even frequent basis and many of those who have initiated vaping do not appear to be vaping nicotine containing e-liquids (9,10). Most young people surveyed in the UK study reported by Eastwood and colleagues (8) (2015) had used e-cigarettes/vapes just once or twice. Monthly or more frequent use was uncommon and furthermore, it was cigarette smokers who were most likely to use or who intended to use e-cigarettes/vapes monthly or more. Data from the US National Youth Tobacco Survey showed that whilst 37.7% of high school students had used e-cigarettes/vapes in the past, and 16% had done so within the past 30 days, only 2.5% of students reported having done so on at least 20 of the last 30 days (9). Villanti and colleagues (11) have stressed the importance of precise measurement in assessing the public health impact of e-cigarettes, whilst Warner (12) has emphasised the difficulty in distinguishing between experimental, infrequent use of e-cigarettes by young people and that which is more long term and the challenge of trying to predict how these devices are going to be used in the future. This is a challenge made that much greater by

the relative novelty of these devices combined with the speed with which the e-cigarette market is developing and diversifying.

The available data on the prevalence of vaping provide only a partial picture on the place of e-cigarettes/vapes amongst youth populations. Even if large numbers of young people have tried them, use by the great majority is neither frequent nor regular. Assertions that e-cigarettes/vapes are becoming normalised amongst youth populations, and may be acting as a bridgehead to the re-normalisation of smoking, deserve greater investigation than the iteration of prevalence measures alone (4). Normalisation, as conceptualised originally by drugs researchers Parker, Aldridge and Measham (13), related to what was seen as the increasing acceptance of some forms of drug use to the point that such use had effectively become a normalised part of individuals' social worlds. The concept of normalisation was seen to involve a great deal more however than increasing prevalence in actual drug use and comprised such additional elements as drug availability and accessibility, increased drug trying, increased drug offers, increased public knowledge, increasing future intentions to use drugs, and a level of cultural acceptance of the fact of some forms of drug use. Most recently the notion of normalisation has been extended to examine the use of e-cigarettes by young people. In their application of the concept of normalisation to the phenomenon of increasing e-cigarette use by young people Measham and colleagues (14) have drawn attention to two further components of normalisation namely legal status and risk perception. To understand whether or to what extent e-cigarette use is itself becoming increasingly normalised amongst young people it is important to move beyond data reporting solely on overall level of e-cigarette use and to enquire in a much more detailed way about individuals perceptions and attitudes towards e-cigarettes, their reactions others use of these devices, their knowledge about e-cigarettes and their intentions to use these devices.

In-depth qualitative research can usefully complement prevalence data by providing a detailed picture of contextual factors influencing the increased use of these devices by young people, their place within youth cultures and their significance with respect to tobacco smoking. Although a small sample, this qualitative case study of eight 16-17 year olds in Scotland interviewed twice, six months apart, illustrates contextual influences on e-cigarettes/vape use. This paper describes a developing culture of use and social

acceptance of e-cigarettes/vapes seen through the lens of the normalisation thesis to focus analytic attention on the processes by which a substance becomes embedded within youth cultures.

The attractions of e-cigarettes/vapes have often been framed as a means of nicotine delivery and/or cigarette substitution (15). Qualitative research on e-cigarette use by young people, however, suggests that different factors are at play in their choices to use them. Their reasons for use have often centred on pleasurable consumption and involve a degree of social playfulness. Qualitative research by Pokhrel and colleagues (16) reported that the e-cigarette preferences of the 62 young adult current vapers (aged 18-35) interviewed were not easily defined in terms of nicotine consumption or tobacco substitution. Rather, interviewees reported that they liked vaping because it was novel and fashionable and a 'cool' and 'intriguing' part of their socialising with friends. Some enjoyed making and seeing big clouds and vapour shapes and saw it as an interesting and customisable hobby. The vape device was represented by some as a means of self-expression and personalised consumption. Measham and colleagues (14) similarly found that whilst not ignorant of scientific and media representations of e-cigarettes and harm, young people's motivations for using e-cigarettes/vapes were more likely to be focussed on 'complex personal social and cultural factors' (233:2016). The authors describe vaping as a 'new pleasure' particularly in relation to the wide variety of available flavours, which, along with the tricks, vape systems and novelty factor of e-cigarettes/vapes were more salient to their sample than the effects of the nicotine or their smoking cessation function. These qualitative findings suggest that e-cigarettes/vapes have found a place in the social worlds of some young people. Whether these devices have found a permanent place within those social worlds or whether they represent more of a transitory pleasure remains a question for research to answer (12).

Methods

The case study of 8 young people we describe here derived from a larger qualitative study of 150 people aged 16-30 years (17,18). In this larger study, the 100 non-smokers and 50 regular vapers interviewed predominantly reported a perception of e-cigarettes/vaping as a means to reduce the harm of tobacco smoking. Consumption of e-cigarettes/vapes was not characterised by this sample in terms of pleasure and leisure. Non-smokers in

this study whilst reporting high perceived visibility of vaping, even amongst their peer groups, expressed little personal interest in the initiation of regular vaping. The 8 young people described in this paper were notable for being quite atypical to the main sample in their positive attitudes and styles of use of vaping which is why they merited closer research attention as a case study.

Research participants for the full study were recruited from a range of educational/work/social settings, were aged between 16 and 30 and lived in Glasgow, Scotland and in the North of England (Leeds and Newcastle). The average age of the 150 respondents in the study was 21 years, (71 females, 79 males). Semi-structured interviews were carried out by 6 peer interviewers (3 males, 3 females, aged 17-30) who were trained and supervised by one of the authors (MB). Peer interviewers were recruited by means of social media advertisement and contacts local to the study leads. Participants were predominantly recruited by means of snowballing although one student peer interviewer used his University social media network to generate recruits. The study intention was to consider young people's perceptions, experiences and understandings of e-cigarettes and to this end we recruited across the spectrum of non-smoking and/or non-vaping, smoking and/or vaping. Non-use of e-cigarettes was defined as no use of an e-cigarette or experimental one-off use. Mixed recruitment was either face to face and proceeded through snowballing or in response to Facebook and institutional media sharing (student networks for example).

The interview topic guide was based upon a literature review on e-cigarette/vape use and the possibility that that these devices might re-normalise smoking. Respondents were asked their experience and history of current and past smoking and/or vaping. Ex, 'tryer', or current vapers were asked to describe how they were introduced to vaping and what their rationale for trying it was. They were asked to describe the frequency with which they vaped, the nicotine content of the liquids they vaped, their preferences for flavours and the devices they used to vape with. Respondents were asked to comment on the similarity of vaping to smoking and if they thought e-cigarettes/vapes were harmful. We asked what they considered were public perceptions of vaping, and if vaping should be restricted or banned in public places, if they agreed with advertising of vaping and e-cigarettes. We asked if they considered their personal experience of vaping had led, or,

might lead, to smoking and if they knew of non-smoking friends or associates moving from vaping to smoking tobacco. They were asked to consider whether they considered e-cigarettes and vaping were acceptable behaviours and whether vaping made smoking more attractive or socially acceptable.

The unusual character of the data derived from interviews with the peer group of schoolchildren led to the decision to re-interview them after 6 months had elapsed to see if their reported patterns of use and attitudes had continued or altered at all. At T2 we were able to re-interview seven of this same group. They preferred being interviewed in groups of two or three, although at T1 we did interview one young man alone. In light of their relatively young age these interviews were carried out by the authors both of whom are professionally trained interviewers with extensive qualitative research experience.

Recorded interview data were all transcribed and analysed within the Centre for Substance Use. Analysis of the interview transcripts followed content analysis by ordering data into key themes covered in the topic guide and assessing dominant patterns or themes. Using a deviant case analysis approach the authors considered the data for its consistency in explaining the data but, importantly, closely examined those data that did not fit the data's overall emergent patterning. Contradictory data were analysed specifically in terms of their capacity to either refine or overturn the emergent explanation until it could account for the majority of cases (19). The small sample of eight at T1 and seven at T2 meant that these data were most logically assessed by comparing individual interviews within and across the two-time points. Our analytic approach to the case study was inductive (20) and used to generate substantive theory as a description and abstraction of this particular social setting (21), we were not testing a theory (22). The analysis indicated a 'fit' with conceptualisations of normalisation by Measham and colleagues (13,14) that were further explored. Given that the behaviours of this friendship group were atypical within the main study this case study analysis is best described as 'intrinsic'; the focus of interest was on understanding the case itself in its own right (23).

This research received positive assessment from the ethics committee of the University of Strathclyde. It was funded by Fontem Ventures, a company manufacturing e-cigarettes.

The funder had no role whatsoever to play in the research design, in the collection and analysis of any of the data, or in the preparation and submission of this manuscript.

Describing the Case Study Sample

The peer group who form the focus of this paper were all friends attending the same school who socialised with each other both in and out of school hours. The age of all 8 participants at Time 1 (T1) was 16, by Time 2 (T2), three had turned 17 years of age. Most of the original peer group were male (6/8), at T2 one male, who was a smoker, did not want to be re-interviewed reducing the sample to seven. At T1, two males reported that they were current smokers additionally one male and one female reported that they smoked tobacco at parties. By T2, one other male had become a smoker and another four said that they smoked at parties. Vaping at least once a week was reported by 6/8 at T1, by T2 this had reduced to two people, both of whom reported that they were current smokers and that they vaped daily.

Table One Here

All the Fun of the Vape

At the time of the first set of interviews, the subject of e-cigarettes/vapes appeared to elicit a good deal of interest and excitement, even by the two participants who reported that they had not vaped beyond trying it out once. As has been reported elsewhere, e-cigarettes can generate a lively interest among young people (16,24). Amongst the friends interviewed here, vaping was commonplace, all of them had tried it and six of them had bought at least one vape device (not e-cigarettes) in the recent past. The sight of young people vaping was regarded as something of an “event”, a “performance” or “show” that rapidly drew the attention of others in their wider social group and afforded them a certain social status:

Some people thought they could become like in our little group of vapers by buying one and trying to be like cool with us.

(Gavin: smoker T1)

...and we bring it to parties and stuff and people are like ‘oh that’s so cool’...you can do tricks and stuff and maybe because it’s a new thing as well it surprises them with the massive like clouds.

(Daniel: smoker, T1)

During the first set of interviews there was a palpable sense of “play” and sociality associated with vaping, which appeared to have influenced the decision to purchase a device for some:

It was my birthday and I just decided to buy one. I had leftover cash and everyone was doing it. Maybe that’s not the way I should be doing things because everyone else is but I thought that kind of looks like an enjoyable pastime so I thought I’ll go for it and bought a cheap one.

(Josh: non-smoker, T1)

Regularity of Use

It was difficult to definitively characterize the quantity of smoking and vaping these young people engaged in because it appeared to be highly context dependent. Although 2/8 described themselves as regular, daily smokers who also regularly vaped, there were varying degrees to which the others vaped or smoked. In total four young people said they vaped at least once a week and used a nicotine infusion of .3mg, Two young people who owned vape devices said they vaped ‘sometimes’, mostly when in company with their friends and if they were ‘bored’. The remaining 2 said they had only ever tried it out of curiosity and were not intending on doing it more than this. Of the six who had purchased at least one vape device two said that they used 0mg nicotine and vaped only intermittently:

I have one but I don’t use it that much, it just sits in the cupboard in my room, I don’t use it a lot.

(Josh T1)

The two young people who did not own vape devices said that whilst they often enjoyed watching their friends’ vaping and the tricks they could perform, they were not personally interested in vaping:

I’ve never done it properly. I just don’t have an interest in it. I didn’t really like it that much. It was kind of just really weird. I didn’t really like it. I like seeing the way it moves but I don’t really do it.

(Gayle T1)

Regular use of the vape was described by four young men, with three saying they used it multiple times every day:

Daniel: Probably all the time, quite a lot

Thomas: Like every 20 minutes

(Daniel and Thomas, T1)

The fourth young man said he used it about every two nights because he was 'bored and it's there'. The situational character of much of this vaping can be heard in the following interview excerpt:

If it's people I don't really know who are doing it and they're like 'do you want a draw?' then no. But if it's like my best friend then I can just pick it up and do it when I'm bored. I've never had a desire to do it, it's just if it's there and I can do cool things with it. Just something to play with. It's not like I need to try it, like I feel I need to vape...I just like blowing circles with the smoke and trying like tricks and stuff just like that, it's kind of interesting seeing how smoke works.

(Lyra: non-smoker, T1)

Even in this small group there were very different styles of use and it was clear that shifting social circumstances influenced the likelihood of use:

I have phases where I'll go through a lot of the e-juice at the one time and then I'll just go off it for a wee bit and then just have the occasional one at night ... When I was studying over the prelims I went through so many bottles because I hate studying and it was just something to do.

(Daniel T1)

Social gatherings, particularly parties, were occasions where vaping was likely to be seen, experimented with and sometimes resulted in initiation of use (Hilton et al., 2017):

I saw one at a party and thought it was cool so I decided to get one to take to a party.

Martyn (T1)

These narratives gave the clear impression of a group of young people for whom vaping was a pleasurable, social activity, whether in their use of the device, the flavours and the plumes of smoke they could generate or in the kudos of their skilled display of tricks to their peers. Their motivations for using e-cigarettes or vapes were not however framed in terms of the infusion of nicotine in the liquids and they did not appear to see these devices as cigarette substitutes.

Smoking and Vaping Hierarchies

There was a definite agreement amongst these young people at this time that vaping was cool and that this was the prime motivation for doing it in a social setting:

Just to look cool, that's pretty much how everything is done, like you'll drink at a party, because everyone else is drinking at a party and you'll smoke because everyone else is smoking.

(Gavin T1)

However, as Gavin points out, the motivation to share in similar behaviours was not confined to vaping. It was also true of smoking, especially at parties and social gatherings. Their patterns of tobacco smoking were similarly resistant to categorisation in terms of frequency and quantity because they too were often confined to particular social circumstances, most especially to parties.

These young people described a clear hierarchy of smoking relative to vaping; even if at this time vaping was perceived as cool, it was not as cool as smoking:

People still say smoking is cooler than vaping because see, like at a party you'll see people smoking still, they'll go outside to have a smoke, a social smoke, nobody would go outside to have a social vape.

(Gavin T1)

When asked how likely it was that they would continue to vape a year into the future there was a decided view that this behaviour was likely to be a phase rather than a fixed pattern of behaviour. The three who appeared to be the most committed to vaping had seen a drop off in interest among their peer group:

We're the only people that have kind of kept it on, a lot of our friends will maybe take it once every two, three weeks.... We've got about 10, 15 friends who do it but they don't do it on a regular basis like us, they'll keep it in a drawer.

(Thomas T1)

They themselves could envisage a time when their interest in vaping would taper off. The widely-held perception of cigarettes as the 'real thing' relative to e-cigarettes might possibly have influenced their view of vaping as a phase to be grown out of:

Sometimes smokers look down on vapers, they're like 'are you not cool enough for that'? Clive's brother he made fun of me because he was like 'Och are you not hard enough to do the real thing', he went on 'you're too scared to do the real thing.' ...Sometimes at parties' people will say 'that's so gay, what are you doing with that why don't you have a real cigarette'? (Martyn T1)

These more negative reactions sound like a virtual egging-on of the young person to initiate tobacco smoking.

The two young people who regularly smoked felt that their vaping was healthier than smoking tobacco and helped reduce their dependence on cigarettes:

A lot of people say they don't know if it's healthier or not (vaping), but when I smoke because I play rugby a lot I can feel it in my lungs, whereas when I go for a vape my lungs feel fine. Vaping has changed the way I see smoking. I feel bad when I have a cigarette now...I feel unhealthy. I feel I'm putting chemicals and cancer and stuff in my body, whereas like before I didn't really care.

(Thomas T1)

There was some uncertainty over whether vaping was as harmful as cigarette smoking. For one young woman, the similarity of smoking and vaping was sufficient to put her off vaping as an activity:

It could harm me and it looks like it has something to do with smoking so it's going to be like it's bad for you so I don't do it.

(Gayle T1)

The six vapers personally experienced vaping as better for them than smoking ('my chest is not tight') and thought that as vaping had been invented to help people stop smoking it must be less harmful, particularly when they were vaping zero nicotine. None of the young people however, thought vaping was without harm:

I know they were created to stop people from smoking...I would say there is still some harm in them because it is still chemicals going into your body and people do smoke the nicotine ones ...but it's not as bad as smoking.

(Lyra T1)

Only one young man described his vaping as addictive. Whilst viewing it as a safer alternative to smoking, the issue of nicotine dependence had surfaced such that if he could not vape he said he would almost certainly smoke more. The other 3 regular vapers did not consider this to be their situation. They discounted addiction for two main reasons, firstly, they did not consider they 'needed' to vape and instanced having spent weeks away from vaping without adverse consequence or even particularly noticing. Secondly, they used either very low concentrations of nicotine or none at all. This same pattern of low or, in most cases, zero nicotine was replicated across all six of the young people who had been sufficiently interested in vaping to invest in a device at T1.

Vaping Normalisation at Time One

Framed in terms of the key indicators of normalisation (offers, experimentation, regular use, future use, familiarity cultural accommodation, legal status and risk perception) vaping appeared in these data at T1 to be an integrated and accepted part of these young people's socialising, even by those who did not vape themselves. Everyone had tried e-cigarettes/vaping and most had been sufficiently interested in the activity to purchase a device for themselves. The two who had tried it once or twice were accepting of their friends continued use and indeed appeared to enjoy the spectacle of clouds and tricks. The recent legal imposition of age restrictions on the purchase of these devices was not apparently a concern to these young people as none mentioned any difficulty purchasing them. There was some uncertainty as to the potential health risks these devices might represent but all the young people were clear that if there was some attached risk it was definitely less than smoking tobacco.

Interestingly the majority view was that continued future vaping was unlikely, most of the group considered that they were likely to grow out of it. Even whilst vaping held their attention they were aware that it had a somewhat stigmatised status as 'kid on smoking' particularly articulated by smokers outside the group.

Change and Continuity: 6 months later

At T2, six months later, we successfully re-interviewed seven of the eight young people. Even in this relatively short time period there had been some quite notable shifts in attitude and use of e-cigarettes.

Attitudes towards vaping were now much less positive, the excitement and novelty of e-cigarettes was no longer mentioned, and they were now no longer apparently a part of their socialising. At T1 most (6/8) owned a vape device and said they vaped more than once a week. Six months later only two (2/7) had functioning devices that they used at least once a week. The two young people who continued to vape were also regular smokers, one of who had moved from intermittent to regular smoking in the time between the interviews.

The young people who said they no longer vaped were also those who did not consider themselves to be smokers. Problems with devices breaking and the expense of buying liquids and maintaining vaping equipment had often precipitated the decision to stop a behaviour that they no longer felt invested in:

It kept breaking and I couldn't be arsed with it. I didn't need to get off smoking or anything so it was just like pointless, there wasn't any need to do it and I didn't like it much, it makes me feel lightheaded, made me feel sick.

(Lyra T2)

The rationale for Lyra's vaping between these 2 time points altered from describing vaping as something she did when she was 'bored' or 'to do cool things with it' at T1, to being 'pointless' since she was 'neither a smoker nor nicotine dependent' at T2. Similarly, the enthusiasm for vaping that had earlier led one young man to use his birthday money to buy a vape had steeply declined six months on:

I did have a vape but I didn't use that much. It was just a thing that was there, that I would just sort of pick up whenever I felt like it and now I'm much the same but I don't use the vape at all and I'm actually trying to sell it...the vape has just become a drag. It's like one of those things you need to do and it's a lot of money and I don't really care about it all that much to keep it up like a hobby so I'm just going to sell it. I quite enjoyed it in the first few weeks I had it but I kind of got bored.
(Josh T2)

The price of e-liquids, the effort and cost of vape device maintenance were factors that were cited as inhibiting regular or continued vaping:

I vaped quite a lot in July and I still vape but I can't really afford the liquid so I don't buy it that often because they're constantly putting the prices up so I don't buy it.... I stopped when I couldn't afford it anymore, midway through my exams I just wasn't getting any more so there was no point, I was just wasting it all on that.
(Gavin T2)

The 2 dual vaper/smokers noted that the relatively high, upfront, costs of vaping sometimes resulted in their buying cigarettes as a cheaper alternative:

Daniel: Because I always end up like breaking it or something. I'd say with a vape you've got to buy juice, it's like you buy it in bulk so you need lots of money to buy it...so say if I don't have a tenner on me...
Thomas: It's cheaper to go buy tobacco
(Daniel and Thomas T2)

Further, these 2 young people considered that cigarettes were 'more reliable' than vape devices because nothing went wrong with them. They were more convenient to use and also less likely to be stolen, especially at parties. Such rationales led to a preference to smoke tobacco over vaping in those situations.

Vaping as a Discredited Activity

A perceived public disapproval of vaping and perhaps more importantly a negative orientation towards vaping amongst their peers generally, exerted an important influence (24). In just six months vaping had gone from being a fun, cool thing to do at parties to being somewhat passé:

Josh: Nobody ever does that now, it doesn't really happen anymore. I don't see it happening at a party.

Philip: It used to happen quite a lot actually

Gavin: Yeah it used to be quite a thing

Philip: I think everybody has grown out of it

Josh: The hype of it runs out

Gavin: And it's now overpriced as well

(Josh, Philip and Gavin T2)

To avoid drawing negative comments from other people around them the two regular vapers reported vaping in private and cigarette smoking in public, particularly at parties. An awareness of a public aversion to vaping had surfaced in the interviews six months earlier but was more prominent at T2:

I think a lot of people have been scared off because see when you're walking down the street like blowing a cloud of whatever people of every age, they're just like...the looks you'll get from people. So, I think that's why you don't see many on the street nowadays.

(Thomas T2)

Perhaps more pertinently, the negative comment attached to vaping at parties was allied with an explicit ranking of smoking cigarettes over vaping:

...people just kind of mess with you a bit when you've got it, people can undermine you a bit and say, "Ha, what a gimp he's vaping, you know".

(Daniel T2)

Smoking at parties was reported by 5/7 young people at T2. Social smoking appeared to mean sharing puffs of others' cigarettes, or, having 1 or 2 cigarettes with friends. It was seen by these young people as a limited, situational activity.

Dual Patterns of Smoking and Vaping

When first interviewed, Daniel reported that he occasionally smoked and regularly vaped using 0mg nicotine liquids. Six months later he was a regular smoker and also vaped a higher nicotine content between :

I started getting nicotine in the juice because my friends were and I thought you know it's quite cool getting some nicotine in, see what it's like. At first, it's quite harsh on your throat, but then you get used to it, and then, you kind of stop thinking about it. Like it's kind of subconscious- 3mg a weak bit of nicotine in it and also you vape it more when you've got nicotine.

(Daniel T2)

The higher nicotine content was allied to the particular vape device he now used but for the other teenager it was clearly associated with wanting the nicotine:

...over the summer, I smoked a lot so I found I couldn't go back to the 3 mgs, but then I can have 3 but sometimes say like 5 is good because you don't have as much time, 3 is ok if you're constantly doing it whereas at school you don't have time to do that, v so doing it at lunchtime or break time 6 is better, a couple of tokes.

(Thomas T2)

Daniel described how over the last few months a pattern of dual use of both smoking and vaping had occurred:

I go through a phase like I'll vape for a month and then like smoke for a week and then by the end of the week I'm done with smoking so I'll go vape for another while...

(Thomas T2)

Daniel described his own combined vaping and smoking although he stated that he preferred vaping over smoking because he enjoyed the flavours, the actual experience of vaping and wanted to limit his exposure to the dangers of smoking:

My friend is always giving me cigarettes he's like 'c'mon I'll give you one' because he wants to smoke with someone, and then I'll do it and I'll be like 'no' and I'll throw it away. Then I'll pick my vape up again but if I've not been vaping for a while, like a whole day, I'll have a cigarette at the end of the day. It'll be quite nice because I've not had any nicotine in my system for the whole day.

(Daniel T2)

These comments indicate the contingent nature of smoking and vaping, at least for these young people. Involvement in both of these activities was dependent upon who they were with, the situations they were in, the reaction of others, and their general feelings towards

vaping and smoking. These two young people saw vaping as a brake on smoking and also as a relaxing, but now private pleasure in its own right. In the six months between interviews their attitudes towards vaping and indeed smoking had changed quite significantly. Their reported engagement in vaping and smoking suggested patterns of behaviour that were fluid and variable rather than entrenched and fixed.

Discussion and Conclusions

The young people we interviewed presented vaping as a context driven social activity. At T1 it was associated with spectacle, a means of consumption and a hobby. By T2 most no longer vaped at all and described the activity in rather pejorative terms. For the two regular smokers vaping had become an activity no longer associated with parties and display, but with private relaxation and more functionally as a means to ameliorate the harms of tobacco. The interviews at T1 suggested that vaping could be seen as a normalised activity in that it was an accepted and integrated part of their socialising with each other. By T2 however, the case study group had substantially changed their use of and attitudes towards vaping. What appeared to be a normalised activity at T1 no longer looked to be the case by T2. Pennay and Measham (25) describe the advantages of the normalisation thesis in terms of its 'fluidity, flexibility and conceptual mutability'. The longitudinal component of this research has underscored the mutability of behaviour over time (a relatively short time at that) and is a cautionary note where the case for normalisation in young peoples' substance use is based upon measurements occurring at a single point in time.

Social smoking was reported at T1 and 2 (4/8 and 5/7). This was reported as a limited and occasional activity mostly at parties and might mean a puff of a cigarette or smoking one or two cigarettes socially with friends. Obviously, no real inference can be drawn from such small numbers but for these young people, at least, vaping and smoking were co-occurring behaviours and there was little to suggest that vaping was causing the smoking. Most of the non-regular smoker vapers at T1, vaped either 0mg or .3mg nicotine concentrations and did not consider themselves to 'need' nicotine. Amongst these young people, as reportedly for those in other research cited above, vaping was for fun, for the tricks, the flavours and for the consumption of devices, it was not for the nicotine or, for cigarette substitution because it had no kudos in this regard. Even at T1 vaping was

widely characterised as ‘not the real thing’, seen as a bit of a joke or, the ‘baby way of smoking’. One effect of this jibing was that by T2 there was reluctance to vape in public and also at parties where they would smoke tobacco instead. These references to tobacco smoking as preferential perhaps suggest that in young people’s worlds at least, smoking is unfortunately a more normalised behaviour than vaping. In light of Public Health England’s assessment (26) that e-cigarettes are 95% less harmful than cigarettes this is a regrettable development. However, that finding shows very clearly that the response to visible vaping may well impact upon young people’s own vaping and smoking in positive or negative ways.

In this paper, we have reported the results of research looking at vaping within a single teenage friendship group in Glasgow, Scotland, over a six-month period. Clearly with such a small sample it is not possible to know how representative our interviewees were of other young people. Similarly, we cannot comment on the likely proportion of young people adopting and shifting between these different styles of e-cigarette/vape use. What our case study research does show, however, is fluidity in the ways in which the young people within this friendship group at least, engaged with e-cigarettes/vapes over a relatively short period of time. That finding is important because of the tendency to assume that reports of past or recent e-cigarette/vape use in quantitative surveys are documenting a form of nicotine consumption that has become an embedded and persistent part of the world of an increasing number of young people. Just as young people can move into using e-cigarettes and other devices, so too can they move out of their use. Moreover, the pattern of initiating and ceasing the use of these devices may have relatively little to do with nicotine. Issues of fashion, theatricality, risk (of having equipment stolen), poor functionality (of equipment breaking down), reduced adverse health impact (breathing more easily under exertion), the reaction of other people, price, and availability may all impact upon whether e-cigarette use becomes an embedded or a temporary aspect of these young peoples’ social worlds. Whilst some young people’s use of these devices will be part of a long-term change in their behaviour, for others their e-cigarette/vape use will be fleeting and transitory - part of the inherent plasticity of young people’s lives as they journey through their teenage years.

Quantitative surveys cannot, for the most part, explore these more nuanced aspects of e-cigarette/vape use and yet these are precisely the domains that we need to better understand in order to develop evidence-based interventions aimed at reducing the use of these devices by non-smokers. Large scale social surveys of young people that report substantial increases in e-cigarette/vape use are often based on 'ever' or 'last 30 day' measures (27). However, survey work with young people have also shown that only a tiny proportion of ever users report frequent or current use of these devices (7,27,28,29,30,31). Quantitative surveys need measures that better capture the quantity and frequency of use of e-cigarette and vape devices and other important variables like nicotine content (11). These surveys also need to be undertaken not at a single point in time but repeatedly if they are going to capture a sense of the fluidity in the behaviour of individuals and social groups. Qualitative studies that detail the nature of young people's e-cigarette/vape use, and the individual and contextual factors impacting upon that use, have the capacity to complement and enhance the evolving quantitative evidence base (32). However those qualitative studies also need to have a temporal component if they are to fully grasp the changeable nature of the social worlds of young people and to avoid ascribing an inaccurate fixity to behaviours that are inherently fluid.

Declaration of Interest

The research reported in this paper was funded by Fontem Ventures, a manufacturer of e-cigarettes. Fontem Ventures played no role whatsoever in the design of this study, the collection of data, analysis and write up of the data nor in the decision to seek publication of these research findings. In all of these areas the research was entirely independent of Fontem Ventures.

References

- 1) U.S. Department of Health and Human Services (2016) E-Cigarette Use Among Youth and Young Adults: A Report of the Surgeon General.
- 2) National Academy of Sciences and Engineering and Medicine (2018) Public Health Consequences of E-Cigarettes Committee on the Review of the Health Effects of Electronic Nicotine Delivery Systems National Academies Press Washington DC
- 3) Doran, N Brikmanis, K., Petersen, A., Delucchi, K., Al-Delaimy, W., Luczak, S., Myers, M., Strong, D. (2017) Does e-cigarette use predict cigarette escalation? A longitudinal study of young adult non-daily smokers *Preventive Medicine* 100:279-284
- 4) Bell, K., Keane, H (2014) All gates lead to smoking: the 'gateway theory', e-cigarettes and the remaking of nicotine *Social Science and Medicine* 119: 45-52
- 5) Barrington-Trimis JL, Urman R, Berhane K, Unger JB, Cruz TB, Pentz MA, Samet JM, Leventhal AM, McConnell R. E-cigarettes and future cigarette use. *Pediatrics* 2016;138(1): e20160379
- 6) Leventhal, A., Strong, D., Kirkpatrick, M., et al (2015) Association of Electronic Cigarette Use with Initiation of Combustible Tobacco Products Smoking in Early Adolescence *Journal of America Medical Association* 314 (7) 700-707

- 7) Wills TA, Knight R, Sargent JD, Gibbons FX, Pagano I, Williams RJ. (2017) Longitudinal study of E-cigarette use and onset of cigarette smoking among high school students in Hawaii. *Tobacco Control* 26: 34-39 DOI 10.1136/tobacco control-2015-052705
- 8) Eastwood, B., Dockrell, M.J., Arnott, D., Britton, J., Cheeseman, H. Jarvis, M.J., McNeill, A. 2015 Electronic cigarette use in young people in Great Britain 2013-2014 *Public Health* 129; 1150-1156
- 9) Miech, R., Patrick, M., O'Malley, P., Johnston, L. (2017) E-cigarette use as a predictor of cigarette smoking: Results form a 1-year follow up of a national sample of 12th grade students. *Tobacco Control* 1-6 – 053291
- 10) Miech, R., Patrick, M., O'Malley, P., Johnston, L. (2017) What are kids vaping? Results from a national survey of US adolescents *Tobacco Control* 26: 386-391
- 11) Villanti, A. C.; Pearson, J. L.; Glasser, A. M.; Johnson, A. L.; Collins, L. K.; Niaura, R. S.; Abrams, D. B. (2016) Frequency of youth e-cigarette and tobacco use patterns in the U.S.: Measurement precision is critical to inform public health. *Nicotine Tob. Res* ntw388.
- 12) Warner, K (2016) Frequency of E-cigarette use and cigarette smoking by American students *American Journal of Preventive Medicine* 51 (2) 179-184
- 13) Parker, H., Aldridge, J., Measham, F. (1998) *Drugs futures: Changing patterns of drug use among English youth* London Institute for the Study of Drug Dependence
- 14) Measham, F., O'Brien, K., Turnbull, G. 2016 'Skittles and Red Bull is my favourite flavour': E cigarettes, smoking, vaping and the changing landscape of nicotine consumption amongst British teenagers – implications for the normalisation debate

Drugs: Education, Prevention and Policy, 23:3, 224-237
DOI:10.1080/09687637.2016.1178708

15) Bunnell, R.E., Agaku, I., Arrazola, R., Carabello, R., Corey, C., Coleman, B., Dube, S., King, B. (2015) Intentions to smoke cigarettes among never smoking US middle and high school electronic cigarette users. *National Youth Survey 2011-13 Nicotine Tobacco Research* 17: 228-35

16) Pokhrel, P., Herzog, T.A., Muranka, N., Fagan, P. (2015) Young adult e-cigarette users' reasons for liking and not liking e-cigarettes: A qualitative study *Psychology & Health* 30:12, 1450-1469 DOI: 10.1080/08870446.2015.1061129

17) McKeganey, N., Barnard, M., Russell, C. (2017) Vapers and Vaping: E-cigarettes users view of vaping and smoking *Drugs Education Prevention and Policy* DOI:10.1080/09687637.2017.1296933

18) McKeganey, N., Barnard, M., Russell, C. (2016) Visible Vaping: E-cigarettes and the Further De-normalization of Smoking. *International Archives of Addiction Research and Medicine* vol 2 no 3 pp1-6

19) Deviant Case Analysis In: *The SAGE Encyclopedia of Social Science Research Methods* Michael S. Lewis-Beck, Alan Bryman & Tim Futing Liao (eds) Published: 2004

20) Rule, P., John, V.J., (2015) A necessary dialogue: theory in case study research *International Journal of Qualitative Methods* 1-11 DOI 10.1177/1609406915611575

21) Fouche, C.B., (2002) Research Strategies In A.S. De Vos (Ed.) *Research in grass roots: For the social sciences and human service professions*. (2nd ed., pp270-290) Pretoria, South Africa: Van Schaik

- 22) Yin, R.K. (2018) Case Study Research and Applications: design and methods Sage Publications Thousand Oaks CA
- 23) Stake, R.E. (2006) Multiple case study analysis New York NY: Guilford Press
- 24) Hilton, S., Weishaar, H., Sweeting, H., Trevisan, F., Vittal Katikireddi, S. 2017 E-cigarettes, a safer alternative for teenagers? A UK focus group study of teenagers' views BMJ Open 6:e013271. DOI:1136/bmjopen-2016-013271
- 25) Pennay, A.E., Measham, F.C. (2016) The normalisation thesis – 20 years later Drugs Education, Prevention and Policy 23:3, 187-189 DOI: 10.3109/09687637.1173649
- 26) Public Health England (2015) E-cigarettes: an evidence update. Public Health England London
- 27) Polosa, R., Russell, C., Farsalinos, K., Nitzkin, J. (2017) A critique of the U.S. Surgeon General's conclusions regarding E-cigarette use among youth and young adults in the United States. International Journal of Environmental and Public Health.
- 28) Kaufmann, N., Currie, D. (2017) The Scottish adolescent e-cigarette user: profiling from the Scottish Adolescent Lifestyle and Substance Use Survey (SALSUS) Public Health 147:69-71
- 29) Goniewicz, M., Leigh, N., Gawron, M., Nadolska, J., Balwicki, L., McGuire, C., Sobczak, A. (2016) Dual use of electronic and tobacco cigarettes among adolescents: a cross-sectional study in Poland International Journal of Public Health 61, 189-197

- 30) Arrazola, R., Singh, T., Corey, C., Husten, C., Neff, L., Apelberg, B., Bunnell, R., Choinier, C., King, B., Cox, S., McAfee, T., Carballo, R. (2015) Tobacco Use among Middle and High School; Students MMWR 64 381-385
- 31) Singh, T., Arrazola, R., Corey, C., Husten, Cl, Neff, L., Homa, D. King, B., (2016) Tobacco use among middle and high school students United States 2011-2015 MMWR 65: 361-367
- 32) Hoek, J., Thrul, J., Ling, P. (2017) Qualitative analysis of young adult ENDS users' expectations and experiences BMJ Open;7:e014990. DOI: 10.1136/bmjopen-2016-014990

Figure 1: Reported Change in Vaping and Smoking at Six Months (Time= T1/T2)

Name	Age		Currently smoking		Smokes at parties		Vapes weekly+	
	T1	T2	T1	T2	T1	T2	T1	T2
Daniel	16	16	x	✓	✓	✓	✓	✓
Thomas	16	17	✓	✓	✓	✓	✓	✓
Gayle	16	16	x	x	x	x	x	x
Lyra	16	17	x	x	✓	✓	✓	x
Martyn	16	-	✓	-	✓	-	✓	-
Gavin	16	16	x	x	x	✓	✓	x
Philip	16	17	x	x	x	✓	x	x
Josh	16	16	x	x	x	x	✓	x