



Research Paper

‘Vaping and fidget-spinners’: A qualitative, longitudinal study of e-cigarettes in adolescence

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ABSTRACT

Background: We see the contours of a cigarette-free adolescent cohort in Norway. Simultaneously, increasing use of vaping devices among adolescents internationally, and in the US in particular, has evoked fear of a new nicotine-addicted generation. This longitudinal study explores the vaping phenomenon in a context where nicotine e-liquid is still prohibited.

Methods: Data are from longitudinal, qualitative interviews with a sizable sample of 12-17 year olds (118 8th graders from 6 schools/classes at baseline). Four follow-ups were conducted from 2015 to 2019 (a total of 50 semi-structured group and 175 individual interviews). The interviews were coded using HyperResearch software and thematically analysed in the light of actor network and interaction ritual theory.

Results: Gradual and collective shifts in vaping practices and in the symbolic meaning of vaping were observed in three phases. First, in 8th grade, few had tried to vape, even if several were curious about this novel invention, practice and the available flavours. Second, after 9th grade, one in three reported personal use. They emphasised harmlessness, coolness, performance and accessibility online. However, by the end of middle school, a third phase became visible; vaping had lost status and was described as ‘childish’ and unpopular. Interviewees repeated the lack of relevance in high school, comparing e-cigarettes with the fidget-spinner and reserving vaping for kids and addicted adult smokers. The analysis displays a systematic pattern in which adolescents account for vaping as a time-limited trend.

Conclusion: E-cigarettes were devalued from novelty and transgression to childish and uninteresting within the same sample over a four-year period. In conclusion, e-cigarettes in the sample represented fashionable experimentation rather than steady user patterns.

Introduction

We see the contours of a cigarette-free generation of adolescents in Norway (Vedoy, 2015). Simultaneously, increasing use of e-cigarettes or vaping devices, especially among young people in the US, has evoked fear of new nicotine-addicted generations (Gilreath et al., 2016). Although vaping is found to occur among Norwegian adolescents (Lundberg, Kvaavik et al., 2019), we lack representative data and qualitative studies on e-cigarette use in this age group. The study offers a contribution to our understanding of young people's vaping, by exploring how the social meaning and usage of e-cigarettes evolves in a sizeable sample of Norwegian adolescents. Such knowledge of young people's perceived and evolving meaning of the technology and practices is important for identifying general attitudes, as well as mechanisms in and out of use.

In what follows, I provide context on e-cigarettes and young people's vaping. I then conceptualize the interwoven role of technology and

sociability in their vaping, drawing on Actor Network Theory (ANT) (Latour, 1987; 1994; 2005) and Interaction Rituals (IR) (Collins, 2004). I outline the restrictive Norwegian context, before presenting the methods. The study is based on extensive longitudinal, qualitative data (Brunborg et al., 2019). Through repeated interviews with adolescents from 2015 to 2019, the study identifies changes in perceptions and use connected with both the technical sides of e-cigarettes and the social sides of vaping.

E-cigarettes, vaping and young people

Studying the features of the e-cigarette is beneficial for understanding the meaning and appeal of vaping in adolescence. Originally e-cigarettes or ENDS (Electronic Nicotine Delivery Systems) were designed to replace combustible cigarettes (Hajek, Etter, Benowitz, Eissenberg, & McRobbie, 2014), as handheld electronic devices that allow users to inhale an evaporated flavoured liquid, often containing

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nicotine (WHO, 2014). Studying understandings of these devices is however complicated by the rapidly moving commercial technology (Farrimond, 2017). The present e-cigarette market offers products with a wide variety of flavoured e-liquids, levels of nicotine and product versatility (Goniewicz, Hajek, & McRobbie, 2014). The ‘first generation’ of e-cigarettes, which largely mimicked smoking, has been overtaken by ‘second’ and ‘third’ generation devices, such as ‘mods’ or ‘tanks’ favoured by many users (Etter, 2016). The pod versions are among the newer vaporizers on the market, most notably those branded JUUL, which seem to particularly appeal to young people in the US (Huang et al., 2019). Relatedly, young people are found to view the e-cigarette as a product in its own right (Hardcastle et al., 2014; Measham, O’Brien, & Turnbull, 2016) and rather focus on flavours, product design and the opportunity to customize devices and show individuality (Hardcastle et al., 2014).

In parallel with the inventions of novel objects, new social practices have emerged. E-cigarettes are now the most commonly used tobacco product among young people in the US (Cullen et al., 2019). During the 2017–2018 period, the prevalence of current vaping (in the past 30 days) increased from 12 per cent to 21 per cent among US high school students. Similarly, data from the UK show that 23 per cent of 11–18 year olds have used e-cigarettes, but typically in an experimenting pattern. Only 1.6 per cent reported use more than once a week (ASH, 2019), indicating that the recent rise in adolescents’ use of e-cigarettes does not necessarily point to a new nicotine epidemic (Miech, Patrick, O’Malley, & Johnston, 2017). Moreover, in contradiction to the original conception of e-cigarettes as an alternative to combustible cigarettes, young people are found to be novel users of e-cigarettes, with no previous history with tobacco (Chapman & Wu, 2014), and to vape for reasons unrelated to conventional smoking (Evans-Polce et al., 2018). Rather, scholars have suggested that many young people use e-cigarettes for fun, to try something new (Hardcastle et al., 2014), or for the performative aspects of vaping (Measham et al., 2016).

Conceptualizing the agency of technology and sociability in adolescents’ vaping

ANT allows agency to be found in both human and nonhuman objects (actants). Hence, the ANT perspective provides attentiveness to how nonhuman objects such as the e-cigarette are part of – and evolve in – networks (assemblages) and how experiences pass through objects and act on users (Latour, 2005, p. 68). The ANT concepts of inscriptions and translations are of particular relevance in this study of vaping in adolescence. Inscriptions refer to how a technical object creates a user pattern by way of how the object facilitates its own use (Latour, 1987). Consequently, an object with a strong inscription will force use in a given way, whilst a weak inscription allows alternative user patterns than the ones originally intended by the creator. Translations refer to creating an inscription with the purpose of aligning the object or the assemblage in a given direction (Latour, 1994, pp. 32–41). E-cigarettes in the hands of non-smoking adolescents may indicate that e-cigarettes have weak inscriptions, given their original conception as a smoking substitute. This is further evident in studies identifying use for fun (Hardcastle et al., 2014) or performance and ‘cloud chasing’ (Farrimond, 2017; Tokle & Pedersen, 2019; Measham et al., 2016). Meanwhile, a translation of an inscription might be to decrease the availability of flavours in vaping devices. A relatable example from the tobacco field are the translations of the inscription of cigarette packets, through plain packets and the increased size of health warnings, in order to try to decrease package appeal (McNeill et al., 2017).

While ANT’s strength is making objects participants in the course of action (Latour, 2005 p.70), the IR perspective provides a supplementary analytical tool for investigating adolescents’ notion of the sociability of vaping. Collins (2004) partly meets Latour (2005) in acknowledging the importance that material objects can have in an IR. Membership

symbols is the label Collins uses for items upon which a group has focused attention during such rituals (2004, p. 150). Collins’ idea of focus is useful when exploring the meaning of e-cigarettes in adolescence. Following Collins, an IR “*is the process in which participants develop a mutual focus of attentions and become entrained in each other’s bodily micro-rhythms and emotions*” (Collins, 2004, p. 47). IRs create symbols of group membership, and represent boundaries of inclusion and exclusion (Collins, 2004, p. 297). Rituals, hence, can show how much solidarity and commitment to shared symbols will occur in a wide variety of situations, and how external conditions can shift the symbolic meaning and the strength of a social ritual (Collins, 2004). The shifting position of smoking in society, from status to stigma, serves as an example of such. Smoking, through the lens of IR, is a low-intensity ritual, defined as a practice that involves varying levels of formality and process. Depending on the social context, smoking has been interpreted as an elegance ritual as well as an anti-elite and toughness ritual (Collins, 2004). Correspondingly, vaping among young people has been identified as a low-intensity ritual, and been linked to both resistance and mechanisms for misbehaviour (Yule & Tinson, 2017).

Notably, when exploring adolescents’ vaping longitudinally, adolescence is in itself an important transformative, social context characterized by physical, mental, and psychosocial development and changes (Forehand & Wierson, 1993). Adolescents become increasingly concerned with peer-relationships during this developmental period (Vartanian, 2000), both in terms of conformity with peers and social acceptance (Forehand & Wierson, 1993).

The Norwegian context

Norway, which is the focus in this study, serves as a restricted regulatory context for vaping, in line with Australia and in contrast to the UK (Erku, Kisely, Morphett, Steadman, & Gartner, 2020). Nicotine-containing e-liquids are not available from domestic retailers, although adult consumers are allowed to import them for personal use. Vaping devices are legally available at selected shops for those over the age of 18. However, to evade the current regulation, the majority of adult users of e-cigarettes are found to purchase the nicotine, liquid and equipment from foreign retailers online (Vedoy & Lund, 2017). The ban on nicotine e-liquid is expected to be lifted in 2020, with the implementation of the Tobacco Product Directive (TPD). How these regulatory changes will affect use in adolescence is frequently debated in the media against the backdrop of increasing use among young people internationally, and the EVALI outbreak in the US in 2019.

The aim of this unique longitudinal study is to identify the evolving social meaning of vaping devices and usage in a sample of 12–17 year olds in the above-outlined context.

Methods

The data consists of interviews from the qualitative arm of the MyLife study, a prospective, longitudinal quantitative and qualitative study of young people’s development and substance use in Norway (Brunborg et al., 2019). To explore the perceived meaning of e-cigarettes and vaping, a sizeable sample from six schools from geographically and economically dispersed areas were recruited to participate with one 8th grade class each. Two schools were located in the north (N), two in the south-east (E) and two in the south-west (W) of Norway. The abbreviations of region (N/E/W), together with school number (1/ 2), are used in the findings to clarify the geographical location of each participant. In addition, two schools were rural, while four were located in urban areas. The analysis is based upon four rounds of group (T1, T2) and individual interviews (T3, T4) with the participants from 2015 to 2019. Experienced qualitative researchers (the author being one of them) conducted all interviews.

Data collection and sample

A pilot study was completed 1 year ahead of the main study schedule and informed decisions concerning the timing and balance of individual and group interviews, group sizes and composition. The pilot class ($n = 13$) is included in the overall sample, except at T2 due to incomparability with the main study, as the first pilot follow-up was carried out with the participants at a younger age and conducted as personal interviews. Group interviews were selected at the two first time points in the main study based on the participants' young age at study onset.

At baseline (T1), spring semester 2015 (main study), 26 semi-structured group interviews were carried out with 118 (58) boys and (60) girls, in 8th grade, age 12-13. First follow-up (T2), fall semester 2017, 24 group interviews ($n = 85$), was conducted when the participants were aged 14-15 years. Time 3 (T3), spring semester 2018 (main study), was conducted as individual interviews ($n = 95$), when the participants were in 10th grade, age 15-16. Finally, Time 4 (T4), spring 2019 (main study), was completed as individual interviews ($n = 80$) when the participants were 16-17 years old and in their first year of high school (for more details, see Brunborg et al., 2019).

T1-T3 interviews were carried out at the schools during school hours. At T4, the interviewees were contacted individually. Interview locations were decided based on participants' preferences, ranging from school areas, cafes and the interviewees' homes. Interviews lasted on average between 45 and 60 minutes. All interviews followed a semi-structured guide, in which participants were questioned about e-cigarettes, first in the form of general questions on their knowledge of e-cigarettes and use among peers, then personal experience. Those with lived experience were asked to elaborate on initiation, practices and exposure, such as: when, why, where, with whom, type of device, nicotine exposure and user patterns. In addition, both pupils who had vaped and those who had not were encouraged to elaborate upon how they perceived e-cigarettes and vaping. Field notes were written up after each interview, providing additional contextual data on aspects such as environment and appearance.

Attrition is a challenge in longitudinal studies (Farrall, Hunter, Sharpe & Calverley, 2015). 118 students were interviewed at T1 to ensure an adequate sample size throughout the study. Because of administrative recruitment issues, 20 participants were lost from T1 to T2 (pilot class included). Learning from these experiences, the attrition was minimized to 3 participants at T3. T4 recruitment was organized outside the school context, which increased the effort to partake in the study. Although all participants were contacted personally, 15 were lost from T3 to T4. All had changed schools, some had moved away, one had died. However, the selective attrition was kept to a minimum in that the heterogeneity in the sample was maintained, in terms of gender, location and inclusion of vulnerable participants.

Thematic analysis

All interviews were audiotaped, transcribed verbatim and systematically sorted using the HyperRESARCH software. Two researchers coded one third of the interviews to ensure that ambiguity in meaning was kept to a minimum. Coding involved developing a codebook consisting of 15 e-cigarette-related codes based on predefined themes from the interview guide, such as 'perceptions of e-cigarettes', 'own experience' and 'perceptions of vapers'. Thematic sub-codes such as 'relative risk' 'flavours' and 'symbolic meaning of vaping' were developed and added during the process of closely reading the transcripts. Data was initially thematically analysed based on the above-mentioned codes. After rounds of sorting and comparing codes, both for each code and time point, a pattern became evident in the large material in respect of how e-cigarettes and vaping changed their meaning for the participants over the study years. The ANT perspective guided the analysis process by increasing attentiveness to how they reported on the vaping devices,

and how these products acted on and integrated into the participants' practices (Latour, 2005; 2004), whilst IR (Collins, 2004) offered an analytical tool to investigate how the symbolic meaning of e-cigarettes and vaping played out in the sample. In addition to the coded interview transcripts, field notes contributed to the analyses in providing context to each interview, as well as to changes over time.

The study was approved by the Norwegian Data Protection Authority (reference no.:15/01495). Both parents and the participants gave their active informed consent. Identifying information, such as names and locations, was replaced with pseudonyms.

Findings and analysis

Vaping's symbolic journey from "transgressive" to "childish"

Outlined in three phases, the analysis shows the gradual and collective shifts in the agency of e-cigarettes and the social meaning of vaping in a group of Norwegian adolescents over four years. First, I present how the adolescents' accounts were marked by a distance to the vaping phenomenon. Second, I show how this distance was replaced by perceptions of vaping as a cool and established practice. Third, at T3, I show how vaping was suddenly perceived as a marginal activity, and how, at T4, the collective negotiated meaning of vaping as an uncool, out-group practice was further established. Findings are presented with awareness of the transitional context, and with attention paid to both the mediating role of the technological objects (e-cigarettes) inspired by the logic of ANT and the collective dimension of vaping through the lens of IR.

Technology, novelty and transgression

At baseline, the 12-13 year old participants had recently made their transition from elementary school to middle school, and described ambivalence about their new role as "more mature" and "no longer playing" in the school playground, as well as being the youngest in the school peer culture.

When asked about e-cigarettes, most had heard about them, but few had personal experiences of vaping. The inscription and the novelty, in terms of the product not yet being "black-boxed" as in normalized and a matter of indifference (Callon & Latour, 1981, p. 279), were present in the way they talked about e-cigarettes by actually describing what they were, as when Bjoern (T1.W1) stated: "*it's vapour, it's a vapour device*". In these accounts, a level of unfamiliarity was typically visible:

E-cigarettes? That's like those fake smokes, isn't it?" (Jorunn T1.N2),
 "E-cigarettes? That's vapour, right? Electronic ones? (Frank T1.W1).

From an ANT perspective, the way many replied in the form of a question highlighted the weak connections between the human and nonhuman actants (Latour, 2005). From a IR perspective (Collins, 2004), e-cigarettes seemed to have little membership significance. This distance was also evident in their accounts of being exposed to vaping by adults who used e-cigarettes for smoking cessation typically in the form of: "*My mum's boyfriend had one because he used to smoke*" (Kjersti T1.N2); or "*Mum bought one last year to quit smoking*" (Cecilie T1.N1).

In line with the quotes by Kjersti and Cecilie, vaping was primarily described as a means of quitting smoking, in accordance with the original inscription (Latour, 1987), and hence as a practice detached from their peer culture. However, a level of appeal was evident in the way some mentioned flavoured e-liquids. One of them, Halvor, eagerly talked about his first encounter with e-liquids after a visit to a store in Spain:

(...) *they had tobacco flavour, weird ones mixed with various flavours, and there was Coke and Red Bull flavour – and you can probably find them with cannabis-flavour and many more (Halvor T1.W2).*

The range of flavours seemed to increase curiosity by creating a

“wow” effect, highlighting another side of e-cigarettes’ inscription (Latour, 1987) as well as their novelty in the period. Flavours were also mentioned relative to conventional cigarettes, by way of increasing the attractiveness of e-cigarettes, as expressed by Roald:

I think e-cigarettes are cooler. It sounds cool to use, to breathe out watermelon-smoke, just without the harmful substances in it, but it's not like I want to order it (Roald T1.N1).

Roald stood out in the group interview due to his oppositional, too-cool-for-school attitude, where he refused to take his headset off during the interview. In line with Roald, several interviewees reported adolescents’ rationales for using e-cigarettes as being related to perceived harmlessness, with emphasis on the lack of nicotine, and perceptions of vaping as cool. Halvor said:

I want to start with e-cigarettes, with strawberry flavour, but without nicotine. I have seen it on YouTube. Those making rings out of the mouth. You can practise and stuff (Halvor T1.W2).

Halvor linked his curiosity to exposure on social networking sites (SNS), and asserted what the vaping devices allowed him to do. SNS emerged as an important translator in the network between curious adolescents and the vaping product, as several described learning about e-cigarettes from sources online. Moreover, Katrine said: “*I think young people use them to appear cool*” (Katrine T1.N2). Using e-cigarettes to enhance one’s image as ‘cool’ has previously been identified as a feature of young people’s use in a UK study (Hardcastle et al., 2014).

Whether located in the north, south-east or south-west of the country, the minority with positive attitudes, such as Roald and Halvor, shared some similarities. They were most often boys; they exhibited a level of opposition towards authority and seemed to value a ‘tough image’ in their way of dressing and talking of not caring for school, together with a level of curiosity towards substance use. Such oppositional denotations of vaping were echoed in the general sample:

I have seen this girl, a 9th grader, she has started vaping. She often hangs out in the city late. I even heard her talk about alcohol (Erling T1.E2).

Erling paired vaping with boundary-testing activities. The transgressive status of vaping became visible in the way several participants connected its use to those seemingly perceived as tougher peers. Trond expressed it like this:

The 9th and 10th graders use them at school, they don't even care, especially not the ones sitting in the chief coach [referring to the spot reserved for pupils at the top of the school popularity hierarchy], they just sit there and barely bother to attend classes (Trond T1.N1).

In Erling’s and Trond’s accounts, vaping was associated with a selected group of oppositional peers. Hence e-cigarettes’ cool connotation in the hands of adolescents emerged as interlinked with a symbolic meaning signalling both counterculture and opposition. Moreover, this symbolic meaning seemed to connote transgression in line with what has previously been identified with the smoking ritual (Turbin, Jessor, & Costa, 2017), but with a renewed focus on the performance. Hence, drawing on Collins (2004, p. 49), the majority of the participants reserved the focus on e-cigarettes to selected groups of ‘others’, namely the adult smokers or oppositional peers. In addition, following Latour (1987; 2005), these descriptions implied an altered inscription of the technical object for some, as the smoking substitute for adults translated to an object that also could act on young people within the network of SNS and oppositional peers.

In summary, it was the novice perspective on both the school context and e-cigarettes that marked the first phase. The 8th graders expressed a general distance to the vaping phenomenon, and presented the object primarily as a smoking-cessation tool for adults. Few had tried vaping, and few reported detailed knowledge. The ones with insight expressed some curiosity, and associated the social meaning of e-cigarettes in the hands of adolescents with novelty, appealing flavours,

transgression and opposition.

Vaping in focus: Performance, experimentation and social status

A second phase emerged at T2, as the now 14-15 year old interviewees had entered 10th grade and become the oldest pupils in middle school. The two years that had passed had not only caused a visible physical transformation, the interviewees had also matured in their way of speaking. Somewhere along the move towards increased status in the school hierarchy, a transition from perceptions of, to experience with, e-cigarettes had occurred for many. One-third now reported having used vaping devices themselves.

Arvid expressed it in a typical manner: “*I think most have tried them, especially my friends*” (Arvid T2.W1). Vaping seemed especially to appeal to boys, but not just boys, as Jorunn specifically pointed out: “*Most have tried them, even many of the girls*” (Jorunn T2.N1). Hence, the connections between the human and nonhuman objects had now strengthened (Latour, 2005).

The increased focus was also evident in terms of where they were used, such as Kjersti and Stian stating: “*Many have used them on the school bus*” (Kjersti T2.N2), and: “*We used them on this school trip, in our rooms*” (Stian T2.E2). Such observations were associated with an evolving IR (Collins, 2004), but also pointed to the agency of vaping devices, in that, compared to conventional cigarettes, they seemed to open up alternative spaces for use. Moreover, Marit talked about how e-cigarettes were passed around in social settings and, addressing her own experience, she said, “*I just tried it from my friend, I don't have my own*” (Marit T2.W2). By pointing to how these products were easy to share, Marit highlighted another aspect of the e-cigarettes’ inscriptions (Latour, 2005) in that they were not perceived as exclusively personal, rather they emerged as membership symbols in a social practice (Collins, 2004).

Importantly, the vaping practice was typically presented in the form of: “*I have tried them, but just like one puff of an e-cig without nicotine*” (Egil T2.W1). The participants generally described experimentation, motivated by an urge to ‘give it a try’, echoing previous findings of use among young people (Hardcastle et al., 2014). Similarly to Egil, Steffen said: “*It's without nicotine, for me that's the whole point of e-cigarettes*” (Steffen T2.N1). Overall, few described a steady user pattern and few vaped with nicotine. On the contrary, non-nicotine-containing e-liquids and vaporizers were presented as part of the attraction.

Interlinked with their preference for non-nicotine vaping, conventional cigarettes held low status among the interviewees. Several applied symbolic boundaries, by describing their use of vaping devices as “something else” than smoking:

No one uses e-cigarettes to quit smoking, it's just to do tricks and have fun (Dennis T2.W1).

Dennis’ quote is representative, as no-one in the sample reported addiction or substitution as a motive for using e-cigarettes. Moreover, Aksel expressed it like this:

E-cigarettes are much more common than normal cigarettes for people our age (Aksel T2.W1).

Many justified their experimentation by pointing to the perceived lack of health hazards. As Steinar stated: “*It's exciting and at the same time it doesn't seem dangerous*” (Steinar T2.E2). The way the interviewees described their vaping as ‘not containing nicotine’, not in the form of established and regular user patterns, and not in order to substitute smoking, distinguished the vaping practice of the young interviewees from how they presented vaping among adults in the first phase. These accounts of using e-cigarettes as a product in its own right, rather than for nicotine, also point to e-cigarettes’ weak inscriptions (Latour, 1987) and a translation of the technical invention (Latour, 2004, p. 33), as their perceptions break with those of the original conception of e-cigarettes as a smoking substitute.

Awareness of the technology part of the device and appeal in terms

of flavours were also more present:

I have one which looks like a big pen with a tank where you can refill the liquid, most often vanilla, and then you just push the button and vape. (Roald T2.N1)

Roald was attentive to the technological and visible features of his vape pen. Echoing previous findings (Measham et al., 2016), the interviewees with lived experience, similarly to Roald, also expressed clear preferences for sweet or fruity flavours, such as peach, tutti-frutti, apple, grape, strawberry, vanilla and Red Bull.

The increased focus on vaping was also demonstrated when the participants talked about user motives, in these terms: “*It’s fun and it’s the flavours*” (Anikken T2.W2), “*I use it to make rings*” (Bjarte T2.N2) and “*It’s like a hobby*” (Sturla T2.W1).

In line with Anikken, Bjarte and Sturla, the interviewees typically related the experimentation to curiosity and performance, by highlighting how the devices enabled them to act and engage in a practice. However, the greatest focus of attention seemed to be on the ritual preparation (Collins, 2004, p. 319) of vaping more than on the vaping itself (Yule & Tinson, 2017). Johannes explained:

I do tricks. You have all that vapour that allows you to do tricks, for example with your tongue. There is this trick called the tornado. You blow all the smoke down, and then you do like this [illustrates with his hands and his mouth] and two lines come up, and you make rings, that’s why I do it, not in order to vape, but because it’s cool to do tricks (Johannes T2.W2).

In the above excerpt, the agency of the e-cigarette (Latour, 2005) is visible as Johannes states that ‘the vapour allows him to do tricks’. There is, however, also an IR aspect in Johannes’ perceptions of the ‘cool’ play and performance features of vaping, evident in the way he expressed subcultural argot and displayed vape competence by describing the ‘tornado’ trick.

The IR aspect of vaping was also evident in the way adolescents translated a symbolic and social dimension of coolness to the practice of vaping in the second phase. Mats addressed this explicitly: “*Most of the young people who vape, do it in order to appear cool*” (Mats T2.W2). The cool connotation was often interlinked with performance: “*I think it looks cool, with the possibility to do tricks, those rings for example*” (Snorre T2.E2).

Descriptions of vaping as ‘cool’ highlighted the increased status and ritual aspects of the practise, as “*rituals do honour to what is socially valued*” (Collins, 2004, p. 25). In addition to the performance part of vaping, the status was related to novelty, typically in the form: “*It’s new; it provides status to try new things*” (Aase T2.E2).

The 14-15 year olds also associated the increased status of vaping with vape influencers on YouTube and Instagram.

You see those people online, crazy people, who make all these vape tricks, it’s cool to watch (Sturla T2.W1).

Sturla talked about how he enjoyed watching vape performances on YouTube. Regardless of their own experience, the majority reported having watched e-cigarette tutorials or videos of vapers performing tricks on SNS. Hence, SNS also involved exposure to vaping for the majority who had not used e-cigarettes themselves. Vaping on SNS was however not solely reserved for pro-vapers:

Many people share videos of themselves performing vape tricks, blowing rings and stuff. I see it on Instagram and My Stories all the time. It’s very like; “I vape, that’s cool” sort of (Ida T2.W2).

In line with Ida’s observations of vape content from peers on SNS, several described sharing their own vape videos and pictures. The practice of adolescents distributing content of themselves vaping on SNS emerged as a self-presentation strategy that most perceived as socially rewarding. Moreover, it demonstrated how drawing on ANT

and IR helped identify drivers for use, as the e-cigarettes weaved in and interacted in peer networks and SNS (Latour, 2005, p. 68), while the IR dimension was present in the increased focus (Collins, 2004) and the performance vaping in this phase.

In summary, vaping among the 14-15 year olds emerged as an activity one third of the sample played with for its performance, status and flavour aspects. In addition to talking about the amusing possibilities of learning new tricks, e-cigarettes in the overall sample seemingly held a position as something new – but not too harmful; transgressive – but not too boundary breaking.

“Unpopular and childish”: Processes of devaluation

A third phase became evident at T3. The now 15-16 year old participants were about to graduate from middle school. Many reported being tired of their present school setting, reading for exams, paralleled with strong expectations of the coming transition to high school. Interestingly, in the nine months that had passed since T2, they also seemed to have grown tired of e-cigarettes.

E-cigarettes? They were popular a year ago but I rarely see them anymore (Jetty T3.N2).

As expressed by Jetty, processes of devaluation of e-cigarettes marked the interviews. Jorunn stated similarly:

Before Christmas there were many who vaped. I guess they used them to get status, to appear cool and like they did not care. Now it seems like no one uses e-cigarettes (Jorunn T3.N2).

From the interviewees’ accounts of vaping as cool and transgressive, e-cigarettes had undergone a symbolic turnaround, and were now predominantly described as ‘pointless’ or ‘childish’. Ulf talked about the change in perceptions in a representative way:

I had one of those cheap shitty ones without nicotine, but I don’t see the point, really, it was supposed to be cool because of all the vapour, but seriously, no one uses e-cigarettes anymore, except perhaps for some younger ones (Ulf T3.N2).

Ulf described his e-cigarette as a low quality product, which in ANT terms, no longer acted on him (Latour, 2005), although he did not rule out that younger adolescents still used these devices. Ulf lived in North Norway. His perception of the devalued status of e-cigarettes was, however, part of a collective shift in focus (Collins, 2004) echoed in the wider sample, regardless of gender, personal experiences and geographical location. Lea talked about the shift in focus using the word ‘hype’:

At one point everyone was supposed to do it, but then it just disappeared, like a hype that passed (Lea T3.N2).

Dina echoed it by describing the use of e-cigarettes as a passing trend:

Now I look at vaping as if it’s untrendy. It was a trend, you know, everybody did it, but not anymore (Dina T3.W2).

The shared and radical change in status seemed connected to the same entangled dimensions of technology and collective mechanisms that first made e-cigarettes appealing, namely the novelty. Earlier the interviewees had connected a certain status to e-cigarettes as the new gadget, and of users being “in the know” (Thornton, 1997) through possessing or using e-cigarettes. However, when status is linked to the novelty of the product, as well as to older peers, the product’s appeal can fade as the product becomes established and they come of age. This mechanism seemed to affect the perceptions and meaning-making of e-cigarettes in the sample. By way of illustration, Arvid talked about e-cigarettes in a manner that connoted an old toy:

It was a thing you used to play with, but then it just became boring (Arvid T3.W1).

In general, e-cigarettes were now denoted as something they had grown tired of – similar to the fast fading glory of new toys. It was evident that the intriguing aspect of e-cigarettes had been related to the translations made possible by these products' weak inscriptions (Latour, 1987); the options of customization, flavours and playfulness. However, the devaluation seemed connected to social dimensions. When Nova discussed the diminished status of vaping, she included SNS:

It was a trend a year ago, when everybody was supposed to have an e-cigarette and take pictures with it to appear cool, but now it has just flattened out (Nova T3.N2).

Vaping's presence on SNS hence emerged as important for their shared understanding. Several described the fall in popularity as being linked with vaping's reduced presence in their social media feeds:

Vaping has become unpopular this year [2018] – it was popular in 2017. Then it was this huge thing, now there is no fuss about it and it's not all over social media anymore (Ida T3.W2).

When asked to elaborate, Ida explained the devaluation process like this:

People got tired. It is always fun in the beginning to try new stuff, and in this case, new ways of blowing smoke, trying new flavours and such. It's like when you get a new phone, it's cool in the beginning, but then it's soon just an ordinary phone. I think it's the same with e-cigarettes, you put them away and forget them.

Vaping was denoted a temporal practice now belonging to the past. Ida pointed to how vaping had gone through various stages in a hype cycle, initially triggered by novelty and social status. Such plasticity of vaping among young people has been identified in other studies (McKeganey, Barnard, & Russell, 2018). Moreover, vaping was commonly reserved for younger adolescents or peers described as 'outsiders':

I feel that they are unsocial, it just like a small gang sitting in their room and vaping for themselves. They are excluded from other people (Anja T3.W2).

Anja described the ones who still vaped in an unflattering manner, highlighting how perceptions of the ritual boundaries of vaping had shifted from that of a valued IR to being perceived as an exclusionary practice reserved for the out-group. Mats echoed this:

Those using e-cigs? It's the douchebags, those who think they are cool, but who everyone knows are the lame ones (Mats T3.W2).

Mats' quote points to how continued use of vaping at this time inflicted damage on users' social self (Collins, 2004, p. 32) and illustrates the importance of peer-impact on adolescents' vaping.

Vaping and "fidget-spinners"

The story of e-cigarettes as out-of-date was collectively confirmed when our participants were interviewed again at T4. They were now 16-17 years old and in high school; many reported increased autonomy in that they were treated as more mature in the school setting, and had less strict rules at home. In addition, many had started experimenting with alcohol and sometimes the occasional party cigarette. Echoing the T3 findings, vaping, however, was primarily talked about in retrospect.

I don't think it's cool. I don't know anyone my age who vapes anymore, even though it used to be popular. It was a middle-school thing. A trend, like the fidget spinner. Those are not trendy anymore either, it just dies out (Gaute T4.W1).

Gaute talked illustratively about the temporality of vaping, by pointing to how the symbolic meaning of vaping had turned from trendy to uncool. Gaute included both age and period (Suzuki, 2012) as important translators in this devaluation context. The way Gaute

compared vaporizers with out-of-fashion fidget spinners illustrated the continued weak connections (Latour, 2005) between e-cigarettes and the participants. Brita contributed additional information through retrospective reflections:

Back when we were in middle school, many brought their e-cigarettes into the classroom. I think it was mostly for fun – they used them for the vapour and flavours, but without nicotine. I feel that is something you do when you are younger, because it's the first thing you test because it is not perceived to be as dangerous as other things. But then you stop, at least if you were born in 04 like me (Brita T4.W1).

Brita similarly addressed temporality in describing how e-cigarettes had been a way to test and push boundaries in a controlled manner, for herself and her peers in middle school. She also implied that younger pupils still could find value in vaping, based on the same transgressive mechanisms. Erlend equally emphasised age as an important contextual dimension, as he differentiated between older and younger adolescents when asked about use of e-cigarettes:

The thing with vaping is that it's such an 8th grade thing to do. Lots of 8th graders buy them, believing it to be cool, however if you vape in high school people will tell you that it's so childish (Erlend T4.W1).

Like Brita, Erlend still connected a symbolic meaning of transgression to the vaping ritual for young adolescents, while labelling it as unappealing for young people of his age. Peers emerge as drivers in the devaluation process, in line with Collins' assertion that rituals generate situational ranking, between the popular and the unpopular, between the cool and the uncool (2004, pp. 337-8). In their rejection of vaping, the interviewees seemed to position themselves apart from the unpopular or 'less mature' adolescents:

That's the thing with e-cigarettes, you know, it passes. It's a thing for middle school pupils and older folks who quit smoking, not for us in high school (Kjetil T4.W2).

Kjetil's quote indirectly points to how the focus on vaping had changed in the transitional phase of adolescence (Forehand & Wierson, 1993). Moreover, the stories of how the vaping practice had faded away in this third phase denoted a 'failed ritual', deemed by Collins (2004 p. 50) as practices with a "low level of collective effervescence".

In summary, the 15-17 year old interviewees established vaping as an activity of the past. Vaping had gone from a symbol of social inclusion to one of social exclusion, whereby the interviewees, including the vast majority of those with personal experience thereof, distanced themselves from both e-cigarettes and the practice of vaping, labelling them as childish and unpopular. Their comparisons of e-cigarettes with trendy toy-gadgets like fidget-spinners highlighted both the translation and the agency of e-cigarettes in adolescent networks, but in the sense of how these devices had stopped acting on them.

Discussion

This study is the first extensive qualitative, longitudinal study of adolescents' user transitions and perceptions of e-cigarettes and vaping in a restricted regulatory context. The study contributes to the understanding of the evolving meaning of vaping devices and usage among adolescents. The longitudinal design illuminates changes in the inscription of 'e-cigarettes', first as novel objects, which act within a network with their own independent meaning regardless of the original conception, then as discarded 'old toys'. The study also identifies the social processes that shape perceptions and experiences of vaping in adolescence, such as transitions in age, positioning among peers and SNS. And importantly, how these changes interlink with variations in adolescents' vaping perceptions and practices over time. The

development can be distinguished in three phases; first, e-cigarettes were perceived as novel and transgressive. Second, e-cigarettes and vaping held status as appealing, harmless and cool, intertwined with increased use and performance vaping. In the final phase, the vaping devices no longer acted on them, and vaping was devalued and coined as childish. In summary, e-cigarettes and vaping are identified as a time-limited trend rather than steady user patterns and a successful IR in the sample.

Fluidity and experimentation

A backdrop for the study was the restrictive Norwegian context and the growing public health concern over young people's vaping internationally (Gilreath et al., 2016). In the current study, rather than signs of nicotine-addicted use, as observed in the US (Cullen et al., 2019), a low-intensity and temporal vaping pattern marked by fluidity and experimentation is witnessed. The evolving meaning of vaping devices and usage in the sample constitute use which, on the one hand, is motivated by non-nicotine devices, lack of addiction, and perceived harmlessness, and, on the other, by status, play and performance. Such fluid and gradually changing vaping patterns are also found in studies using a longitudinal design in other regulatory contexts, such as the US study by Hair and colleagues (2019) and in the small UK case-study by McKeganey and Barnard (2018).

The first phase includes a general distance to the vaping phenomenon. The 12-13 year olds primarily deem e-cigarettes as smoking cessation-tools reserved for adults, whilst a minority express curiosity related to the products' novelty and flavours. They also attach a social meaning of maturity, transgression and opposition to young people's vaping, corresponding with the insights of Yule and Tinson (2017), while also echoing meanings previously identified with young people's smoking (Turbin, Jessor, & Costa, 2017). Moreover, the minority of curious adolescents emphasise the appeal of flavours, echoing previous findings of young people's vaping motivated by varieties of flavours (Measham et al., 2016; Park, Kwon, Gaughan, Livingston, & Chang, 2019).

The second phase involves an increase in lived experience among the now 14-15 year olds, as well as general accounts of vaping as popular and vaping devices as appealing, in line with the findings of Hardcastle and colleagues (2014). The novelty and flavours are still present, but in addition performance and status are key aspects, matching the findings of Measham and colleagues (2016). Non-nicotine-containing e-liquids and vaporizers are part of the attraction, perhaps as a way of indicating that these vaping products were not dangerously acting objects (Latour, 2005) leading to addiction, as they rather seem to delegate more innocent and beneficial actions to them. Vaping's appeal is rather connected to the amusing possibilities of learning new tricks, and seemingly partaking in a ritual allowing them to transgress with limited risk.

The third phase represents a symbolic turnaround, as the 15-17 year olds deem vaping to be an irrelevant practice, and hence a 'failed ritual' (Collins, 2004). The former attractions attached to the vaping devices (novelty, status, transgression) are no longer evident, rather distance is apparent in the way they label devices and usage as childish and unpopular. From an ANT perspective, these devices no longer act on them, as the practices they enabled are dismissed (Latour, 2004, p. 45). Rather they are resorting to an external force (unpopular toys) that has little in common with the original translation or 'purpose' of the object (Latour, 2004, p. 38).

Similar fluid and gradually changing vaping patterns are identified in a US study (Hair et al., 2019) and a small UK case-study (McKeganey & Barnard, 2018), despite different regulatory contexts. Moreover, McKeganey and Barnard (2018) suggested that the development in perceptions among peer group members was one possible explanation of why adolescents' perceptions of vaping can rapidly shift. The fluidity may hence indicate that diffusion processes, both in and out of vaping,

can be affected by the regulatory context to a certain degree, but also unfold outside the control of policymakers. Advertising bans seem, for example, to be challenged by online content. Across the sample, the adolescents in our study reported SNS to be an important information source, both for their initial curiosity, in line with Park and colleagues' findings (2019), and for the continuous collective process of negotiating the meaning of vaping. The performance aspect of vaping mimicked by some interviewees in middle school was, for instance, associated with SNS influencers. Especially at T2, experience, displayed by 'cloud chasing' and performing tricks (Measham et al., 2016; Tokle & Pedersen, 2019) interlinked with status, inclusion and competence, highlighting SNS as an important socio-spatial context of vaping.

The social mechanism at play can also be related to adolescence as a transformative, social context (Forehand & Wierson, 1993), and age as an important driver for change (Suzuki, 2012), evident in the way the participants first connoted vaping with older, tougher peers or adults, then as they devalued vaping as 'childish'. Moreover, the increased knowledge and prevalence of vaping at T2 may be age-related, since curiosity, reward-seeking behaviour and wanting to be "in the know" (Thornton, 1997) have a special place in middle school (Steinberg, 2010).

Actor-Network and Interaction Ritual

In line with the logic of ANT, the study also identifies the importance of nonhuman actants for human practices (Latour, 2005). The adolescents in our sample adapted a technology designed to aid smoking cessation, and altered its meaning in their social context. Latour (2004, p. 234) noted how the effect of an actant depends on its use, as "not all rocks are the same". Latour outlined how objects which, on a broad scale, can be labelled the same, still act differently on us – a stone on a ring versus a stone in the shoe. This can be transferred to the interviewees' descriptions of vaping devices. The participants with personal experience primarily described vaping non-nicotine liquid from low quality e-cigarettes. None reported use of nicotine-containing pod-versions like JUULs as found popular in the US (Hajek et al., 2020). Hence, the decreased interest could be related to their choice – or availability of 'rocks'. Moreover, they assigned a new meaning to these products, presenting them as toys, in contrast to the original inscription of the e-cigarette as a smoking cessation tool (Hajek et al., 2014). In this translation (Latour, 1987; 1994), the adolescents created their own vaping rituals (Measham et al., 2016). Hence, the participants highlight the independent symbolic meaning of e-cigarettes for young people relative to their original purpose (Pokhrel, Herzog, Muranaka, & Fagan, 2015), as a marker of transgression, status and finally stigma. Moreover, Latour (2005, p. 39) wrote: "No matter how apparently simple a mediator might look, it may become complex; it may lead in multiple directions which will modify all the contradictory accounts attributed to its role". Such shifting directions is evident in the way e-cigarettes were given agency in the second phase, 'allowing' the actors to perform tricks and present themselves. Then, as they were disconnected from the human actors in the third phase, and discarded as old phones and unfashionable fidget-spinners. Hence, the e-cigarettes interact with the adolescents not only in their vaping practices, but also integrate into a larger network of consumer practices.

Collins (2004) meets Latour (1994; 2005) in his conceptions of the importance of material resources in social practices. The interviewees did not perceive e-cigarettes as particularly personal objects, rather they described the social aspects of how they were passed around, implying a low-intensity IR taking place (Yule & Tinson, 2017). Collins (2004) describes the relationship between the material market and IR as feedback loops; each is a necessary input into the other. In correspondence with Yule & Tinson's (2017) findings, the social sides of vaping are also driven by the processes of IR. For instance, having an e-cigarette in the initial phases was associated with positive attention, as vaping represented novelty and transgression. Hence, the vaping ritual

could socially include the ones who 'dared' to try. However, the successful IR (Collins, 2004) side to vaping simultaneously disappeared as the focus and meaning of vaping in the sample shifted.

The study adds to the literature on vapers as a heterogenous group vaping for various reasons (see e.g. Farrimond, 2017; Tokle & Pedersen, 2019), suggesting a need for targeted public health messages. Preventing vaping among young people implies a policy of altering the translations, to use Latour's (1994) terminology. This could involve implementing regulations that prevent access to low-cost vaporizers and appealing flavours online and maintaining restrictions on products with high likability such as JUULs in this age group. Importantly, the fluidity of adolescent's perceptions and vaping practices emerged as largely influenced by their shifting focus in peer networks and SNS. Hence, the important connection between symbolic meaning and use seems largely to be governed within the adolescent population itself.

Conclusion

In this study I have found evidence that e-cigarettes or vaping devices can represent fashionable experimentation rather than steady user patterns. Overall, these findings add to the existing literature on vaping in adolescence by acknowledging both the importance of the innovative features of vaping devices, and the evolving symbolic meaning of vaping in peer groups for usage in adolescence.

Declaration of Competing Interest

The author declares no conflicts of interest.

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